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FINAL SECOND SUPPLEMENTAL CORRECTIVE MEASURE IMPLEMENTATION WORK PLAN

Amphenol Corporation
Former Bendix Facility
Administrative Order on Consent, Docket #RCRA05-2024-0006
EPA ID # IND 044 587 848
980 Hurricane Road
Franklin, Indiana 46131

Prepared For:

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Date: May 3, 2024

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May 3, 2024
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ACRONYM DEFINITIONS

Amphenol – Amphenol Corporation (Performing Respondent)
AOC – Administrative Order of Consent
AST – Aboveground Storage Tank
Bendix – Bendix Corporation (Responsible Party)
BLS – Below Land Surface
CAOs – Corrective Action Objectives
cm/sec – centimeters per second
CMS – Corrective Measures Study
COC – Chemical of Concern
CSM – Conceptual Site Model
cVOC – Chlorinated Volatile Organic Compound
1,1-DCA – 1,1-Dichloroethane
1,2-DCA – 1,2-Dichloroethane
cis-1,2-DCE – cis-1,2-Dichloroethene
trans-1,2-DCE – trans-1,2-Dichloroethene
DO – Dissolved Oxygen
DPT – Direct Push Technology
ERC – Environmental Restrictive Covenant
EVO – Emulsified Vegetable Oil
EXDCSL – Excavation Worker Soil Direct Contact Screening Level
FD – RCRA Final Decision and Response to Comments, USEPA, dated March 13, 2023
FPP – Franklin Power Products, Inc.
gpd/ft - gallons per day per foot
gpm – gallons per minute
GVESL – Groundwater Vapor Exposure Screening Level
HASP – Health and Safety Plan
IA – Indoor Air
IC – Institutional Control
ICM – Interim Corrective Measure
IDEM – Indiana Department of Environmental Management
IDW – Investigation Derived Waste
Investigation Work Plans - *Design-Level Data Soil Investigation Work Plan* (IWM Consulting, February 2019), *On-Site Soil Investigation Work Plan* (IWM Consulting, February 2020) and subsequent addendum submitted and approved via email, *Off-Site Groundwater Investigation Work Plan* (IWM Consulting, October 2018), *Additional Off-Site Groundwater Investigation Work Plan* (IWM Consulting, February 2019), *Vapor Intrusion Investigation – Exterior Soil Gas Sampling Work Plan* (IWM Consulting, September 2018), *Sewer Gas Vapor Intrusion Investigation Work Plan* (IWM Consulting, September 2018), *On-Site Sewer Vapor Intrusion Investigation Work Plan* (IWM Consulting, January 2020), Residential Vapor Intrusion Investigation Work Plan for Priority Residences (IWM Consulting, September 2018), and *Ambient Air Investigation Work Plan* (IWM Consulting, July 2018)
IET – Innovative Environmental Technologies Inc.

ACRONYM DEFINITIONS (continued)

ISCO – In-Situ Chemical Oxidation
ISCR – In-Situ Chemical Reduction
IUPPS – Indiana Underground Plant Protection Services
IWM Consulting – Industrial Waste Management Consulting Group, LLC
K – Hydraulic Conductivity
MC – Methylene Chloride
MCLs – Maximum Contaminant Levels
MFC – Modified Fenton's Chemistry
mg/L – Milligrams per Liter
mg/kg – Milligrams per Kilogram
MIP – Membrane Interface Probe
MNA – Monitored Natural Attenuation
MS/MSD - Matrix Spike/Matrix Spike Duplicate
MTGSL – Migration to Groundwater Screening Level
mV – Milli-Volts
NAPL – Non-Aqueous Phase Liquid
OIM – Off-Site Interim Measure
OIM Work Plan – Off-Site Interim Measure Work Plan and Response to Comments dated June 18, 2019
OM&M Plan – Long-Term Operation Maintenance and Monitoring Plan associated with residential vapor mitigation system operations
ORP – Oxygen Reduction Potential
PCE – Tetrachloroethene
PID – Photoionization Detector
Pilot Study Work Plan – Off-Site Groundwater Treatment Pilot Study dated October 9, 2019
ppb – Parts per Billion
ppm – Parts per Million
PPE – Personal Protective Equipment
PR – Priority Residence
PRB – Permeable Reactive Barrier
psi – Pounds per square inch
PVC – Polyvinyl Chloride
QAPP – Quality Assurance Project Plan
QA/QC – Quality Assurance/Quality Control
RCG – Remediation Closure Guide dated March 22, 2012, with corrections through July 9, 2012, and most recently updated March 1, 2022
RCRA – Resource Conservation and Recovery Act
RDCSL – Residential Direct Contact Screening Level
Res – Residential
RIA – Residential Indoor Air
RFI – RCRA Facility Investigation
ROI – Radius of Influence
ROW – Right-of-Way
RRS – Regenesis Remediation Services

ACRONYM DEFINITIONS (continued)

SB – Statement of Basis, USEPA, dated May 18, 2022
SDS – Safety Data Sheet
SGss – Sub-Slab Soil Gas
Site – Former Bendix Facility
SL – Screening Level
SOD – Soil Oxidant Demand
SOP – Standard Operating Procedure
SPM – Sodium Permanganate
SPS – Sodium Persulfate
SS CMS – Second Supplemental Corrective Measures Study dated March 12, 2021
SSCMIWP – Second Supplemental Corrective Measures Implementation Work Plan
SSDS – Sub-Slab Depressurization System
SMDS – Sub-Membrane Depressurization System
1,1,1-TCA – 1,1,1-Trichloroethane
TCE – Trichloroethene
USCS – Unified Soil Classification System
USEPA – United States Environmental Protection Agency
UST – Underground Storage Tank
ug/L – Micro-Grams per Liter
VC – Vinyl Chloride
VCP – Vitrified Clay Pipe
VI – Vapor Intrusion
VISL – Vapor Intrusion Screening Level
VOC – Volatile Organic Compound
ZVI – Zero-Valent Iron

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1.0 INTRODUCTION

1.1 Purpose

USEPA issued the Statement of Basis ([*SB*], USEPA 2022) and the Final Decision ([*FD*], USEPA 2023) which specify corrective measures to be implemented for the Site located at 980 Hurricane Road in Franklin, Johnson County, Indiana. This *Final SSCMIWP* presents the scope, development, and implementation details for the USEPA-selected corrective measures. This implementation work plan, prepared in accordance with the USEPA's *SB* and *FD*, is being submitted to the USEPA in partial fulfillment of the Administrative Order on Consent executed on March 21, 2024. The First Draft version of this *SSCMIWP* was submitted to the USEPA on June 2, 2023, and based on comments received from the USEPA on July 21, 2023, and November 3, 2023, the text of this *SSCMIWP* has been updated to include the requested information. A Second Draft version of this *SSCMIWP* was submitted to the USEPA on January 2, 2024, and the USEPA approved the *SSCMIWP* in a letter dated April 17, 2024 with three conditions which are addressed in this document. Additional responses to the USEPA comments are provided in **Table 2**.

Documentation, including the *Investigation Work Plans*, *Pilot Study Work Plan*, *SS CMS* report, *SB*, and *FD*, is part of the Administrative Record File for the Site and is available to the public.

1.2 Report Organization

This *SSCMIWP* is organized as follows:

- Section 1: Introduction – Provides the purpose and organization of this work plan, as well as a summary of the Site background and chronology of remedial investigations and activities.
- Section 2: Conceptual Site Model – Presents the current Site conditions, including defining the nature and extent of impacts that need to be mitigated, and potential receptor exposure pathways to be addressed through the selected corrective measures.
- Section 3: Corrective Action Objectives and Selected Remedies – This section documents the CAOs, or remedial goals, identified by USEPA and the associated remedial technologies selected by USEPA in the *SB* and *FD*.

- Section 4: Description of Corrective Measures – Presents the remedial design considerations, and design assessments, and identifies major components needed to implement the selected corrective measures.
- Section 5: Corrective Measure Implementation – Presents corrective measure implementation details, corrective action sequencing, and associated performance monitoring necessary to meet the stipulated CAOs.
- Section 6: Project Management – Discusses the administrative, organizational, and logistical requirements needed to facilitate and document the planned corrective actions.
- Section 7: References

Figures and Tables follow the text of the work plan. The following technical appendices (A through F) are also included as referenced in the above sections:

- Appendix A – Safety Data Sheets
- Appendix B – Long-Term Operations, Maintenance & Monitoring Plan (for residential vapor mitigation systems)
- Appendix C – Pre-Design Assessment Documents
- Appendix D – Health & Safety Plan
- Appendix E – Cost Estimate
- Appendix F – Schedule

1.3 Background

Historical manufacturing activities at the subject Site consisted of the following: manufacturing of electrical connectors, electroplating, machining, assembling, and storing of manufactured components and raw materials required for production. The main structure on the Site is a 46,000-square foot building formerly used for the manufacture and distribution of electrical components and was constructed in 1961 by Dage Electric, Inc. In 1963, the operation was acquired by Bendix for the manufacture of electrical connectors. The subject Site operated as an electric connector manufacturing facility from approximately 1961 through 1983. In 1983, Bendix was acquired by Allied Corporation (Allied) and Bendix was merged with Allied's Amphenol Products Division. As a result of consolidation efforts, manufacturing at the Franklin facility ceased in September 1983 and the plant was closed. In 1986, the Amphenol Products Division became Amphenol.

From 1961 to 1981, waste acid, cyanide/alkalide, and chromium wastewater from plating operations were routed into a sanitary sewer manhole, which discharged into the local sanitary sewer system south of the subject Site. Wastewater was discharged to the sanitary sewer system under a discharge permit issued by the City of Franklin. In 1981, a wastewater pretreatment system was installed in a separate building on the southwestern portion of the rear parking lot for treatment of cyanide and chromium-bearing wastewater from the plating room. Treated wastewater was then discharged to the sanitary manhole south of the facility. Closure of RCRA units began in February 1984. A Historical Site Layout Map has been included as **Figure 1-1** which depicts the location of historically pertinent site features (i.e., ASTs, USTs, drum storage areas).

On June 15, 1989, FPP acquired the Site from Amphenol. FPP manufactured fuel injectors for diesel engines and assembled marine diesel engines at the Site. In January 2007, FPP sold the Site to Lancer Leasing LLC. Since January 2007, the facility building has been leased for use as a recycling sorting facility (Community Recycling Solutions) and is currently utilized for the assembly of original equipment and aftermarket cooling and heating products for vehicles (Grayson Thermal Systems) and the mixing, repackaging, and distribution of industrial chemicals (Miller Chemical). Vacant portions of the Site to the north and west of the Site facility buildings and parking areas were divested to Bastin Logan Water Services, Inc. (a potable water well drilling company) and a self-storage unit facility (Specialty Storage Solutions).

1.4 Chronology of Investigations & Interim Measures

Environmental investigation and remediation efforts at the Site were implemented by Amphenol, under the direction of the Remediation Branch – Land, Chemicals, and Redevelopment Division – Region 5 – USEPA.

Amphenol has cooperated and complied with the USEPA requests and, over the years, has completed numerous investigations of soil, groundwater, ambient air, soil vapor, and sewer vapor conditions On-Site and Off-Site. These subsurface investigations have been completed from 1985 through 2022 to characterize, delineate, and monitor environmental conditions. During the investigation activities, cVOCs were detected in the soil, groundwater, soil vapor, and sewer vapor beneath the Site and downgradient in the Off-Site area, which is referred to as the Study Area. A Site Vicinity Map, depicting the sanitary sewer system layout, monitoring wells, and relevant Off-Site features within the Study Area extent, has been included as **Figure 1-2**.

The On-Site and Off-Site investigations were conducted to define the vertical and horizontal extent of adsorbed, dissolved, and vapor-phase COCs and to develop the conceptual site model presented in Section 2.0.

Amphenol submitted the original RFI in June 1994, the original CMS report in September 1995, an Additional CMS report in November 1996, and the *SS CMS* in March 2022. These previous investigation activities and corresponding submittals were used by the USEPA to issue the *SB* and *FD*. Relevant site documents are included in the references list in Section 7, and this documentation is part of the Administrative Record File for the Site and is available to the public.

In addition to the investigation activities conducted in the Study Area, numerous ICMs have been previously implemented to mitigate some identified impacts. These ICMs include:

1) Excavating and disposing of 856 cubic yards of impacted soil from beneath the former plating room floor (1985);
2) Disconnecting and plugging the Site's former sanitary sewer lateral and installing a new sanitary sewer lateral (1985), and subsequent excavation and removal during 2019 OIM activities;
3) Completing an enhanced bioremediation pilot study (2006 and 2010/2011);
4) Remediating a source area beneath the former plating room (2011/2012) using ISCO;

5) Installing a sub-slab vapor barrier beneath the new concrete floor of the former plating room (2012);
6) Installing, operating, and deactivating a sub-slab vapor mitigation system at the Site facility structure (2010-2012);
7) Installing and operating a groundwater pump and treat remedial system (1995-current) which has treated over 324,000,000 gallons of groundwater and maintained hydraulic control of the dissolved plume. The groundwater pump and treat remedial system was upgraded in 1999 and 2010 to incorporate additional recovery wells (RW-4 and RW-5, respectively);
8) Repairing interior sanitary sewer plumbing at nine identified priority residences (2018-2020);
9) Inspecting the On-Site storm sewer (2020) followed by lining the storm sewer in 2021;
10) Installing seven vapor mitigation systems at priority residences (2018-2019); and,
11) Implementing the *OIM Work Plan* which consisted of replacing the sanitary sewer mains and connecting laterals on portions of Forsythe Street and Hamilton Avenue, removing surrounding soil and excavating, dewatering, and installing cured-in-place pipe within portions of the sanitary sewer mains in Hamilton Avenue, Forsythe Street, Ross Court, and Glendale Drive (2019).

These implemented ICMs (removal of contaminated groundwater via pumping and removal of contaminated media along the sewer lines via excavation) were consistent with CAOs for the Site, were undertaken to protect human health and the environment, and were utilized as interim measures to limit the migration of contamination before implementation of the final remedy described in this *Final SSCMIWP*.

2.0 CONCEPTUAL SITE MODEL

This section summarizes current Site conditions that define the nature and extent of environmental impacts and identifies the potential receptors and associated exposure pathways to be addressed by the final corrective action. These Site conditions supported the development of CAOs and the selection of the final remediation technologies by USEPA, as discussed in Section 3.

2.1 Site Location and Description

The Site resides within the City of Franklin, Johnson County, Indiana, approximately one mile northeast of the Johnson County Courthouse located in downtown Franklin. The former Bendix facility historically covered an area of approximately 15.16 acres. The Site has been subdivided into five parcels and is currently occupied by Grayson Thermal Systems, Miller Chemical, Bastin Logan Water Services, Inc., and the ICM groundwater pump and treat remediation system. A self-storage unit facility (Specialty Storage Solutions) is currently being constructed on the northern-most portion of the Site. The Site is located in the Northwest Quarter of the Northwest Quarter of Section 13, Township 12 North, Range 4 East on the northeastern side of Franklin, Indiana. A Site Location Map has been included as **Figure 2-1**.

The Site is bound on the east by Hurricane Road, on the South by Hamilton Street, on the north by an abandoned rail line, and on the west and northwest by Nutrien Ag Solutions facility and the former Arvin Industries facility (now occupied by the Hurricane Industrial Complex), respectively. The Site is relatively flat in topography with approximate elevations ranging from 730 and 735 feet above Mean Sea Level. Within the Study Area, the topography slopes to the southeast, toward Hurricane Creek. The Study Area includes portions of streets and adjacent structures that are near and down-gradient of the Site, including Hurricane Road, Hamilton Avenue, Forsythe Street, Glendale Drive, and Ross Court. A map depicting the Study Area has been included as **Figure 2-2** and a Site Plan has been included as **Figure 2-3**.

2.2 Study Area Geology

The geology within the Study Area has been characterized as four distinct geologic units; Units A through D. Unit A is the uppermost weathered glacial till geologic unit in the Study Area and extends from three to eight feet BLS. Unit B, the second encountered geologic unit in the Study Area, consists of sand to silty sand which is saturated in the lower part and extends from approximately eight to 26 feet BLS, shallowing and thinning out in the southern portion of the Study Area. The majority of chemical impacts (cVOCs) have been observed in the bottom of the saturated portion of Unit B. Unit C, the third encountered geologic unit in the Study Area, consists of a slightly moist to dry, hard, dense till which is 30 to 35 feet in thickness. High cVOC soil impacts have been observed in the upper one to two feet of this geologic unit near the Site. Unit D, the fourth and final investigated geologic unit in the Study Area, consists of sand that is approximately 12 feet in thickness. Impacts related to cVOCs from the Site have not been observed within Unit D. Further discussion of chemicals of concern detected in Units B and C is included below.

2.3 Study Area Hydrogeology

Based on groundwater monitoring results, groundwater in Unit B (the water table aquifer) in the Study Area flows to the south-southeast. During the operation of the ICM groundwater pump and treatment remediation system, groundwater flow at the Site has been managed to mitigate Off-Site migration of the dissolved cVOC plume and to lower the groundwater elevation below the existing storm sewer invert elevation. A figure comparing groundwater elevations in Unit B with and without system operation has been included as **Figure 2-4**.

The hydraulic conductivity of Unit B, reported by IT Corporation based on the completion of six "slug" tests conducted on select On-Site monitoring wells (IT Corporation, 1985), is within a range of 3.08×10^{-6} to 9.51×10^{-4} cm/sec. However, it was reported that the slug test results may be biased low due to poor well construction and/or development. Unit B hydrogeology was also evaluated using pump test data. Transmissivity within Unit B was reported within a range from 625 to 4,927 gpd/ft and hydraulic conductivities within a range from 7.98×10^{-3} to 3.06×10^{-2} cm/sec. The hydraulic conductivity of Unit C was evaluated using geotechnical soil testing from the top of Unit C since it does not yield groundwater and the reported permeability ranged from 4.0×10^{-8} to 5.2×10^{-8} cm/sec (Earth Tech, 1996). Additional hydraulic conductivity testing was completed during the On-Site MIP investigation completed in 2020/2021. **Table 1** presents a summary of the hydraulic characteristics of the On-Site Unit B. This information has been considered, in addition to a recent groundwater flux assessment discussed in Section 4, in the design of the corrective action implementation.

2.4 Chemicals of Concern

Numerous soil and groundwater sampling events have occurred at the Site during the RCRA Closure and associated RFI and ICM activities since 1984 and included a wide range of laboratory analytical parameters. Based on the sampling results, the USEPA agreed that the following COCs (or shortlist VOCs) are associated with the Site and need to be addressed by this *SSCMIWP*. The CAOs for the cVOCs listed below are discussed in Section 3.

- PCE
- TCE
- Cis-1,2-DCE
- Trans-1,2-DCE
- VC
- 1,2-DCA
- 1,1,1-TCA
- 1,1-DCA
- MC

2.5 COC Distribution

The following subsections summarize the distribution of Site-related COCs in soil and groundwater.

2.5.1 Soil Conditions

More recently (2018 through 2022), soil conditions have been characterized at the Site and in the Study Area using collected soil samples to quantify and delineate cVOC impacts in soil and evaluate the potential presence of NAPL, or free-product. Potential NAPL residual saturation appears to be substantially mitigated due to dissolution into permeable portions of Unit B and due to remedial efforts (pump and treat) implemented as an interim corrective action. Soil samples were analyzed for shortlisted VOCs, which include the above-listed Site COCs.

The soil characterization results were previously presented in the *SS CMS*. Approximately 98.6% of the On-Site soil samples analyzed did not indicate the presence of potential residual PCE NAPL, while PCE soil-saturation exceedances were only observed between 23 and 24 feet BLS, at the base of Unit B or top of Unit C. All Off-Site soil samples had COC concentrations below applicable direct-contact soil screening criteria (RCG RDCSLs and EXDCSLs]). The approximated area with On-Site PCE concentrations within the saturated portion of Unit B and Unit C greater than the Site-specific MTGSL and EXDCSL are shown in **Figure 2-5** and **Figure 2-7**, respectively. The approximated area with TCE concentrations within the saturated portion of Unit B and Unit C greater than the Site-specific MTGSL is shown in **Figure 2-6** and **Figure 2-8**, respectively. As discussed further in Section 3, two of these screening criteria (EXDCSL and MTGSL) have been identified by USEPA as numerical soil CAOs, such that impacts delineated by these screening criteria represent areas to be remediated through the final corrective action implementation. Cross-sectional drawings illustrating the vertical distribution of soil impacts, in conjunction with groundwater conditions, are discussed in the following section.

During the OIM implementation in 2019, encountered impacted soils were removed to the extent practical as sections of the sanitary sewer main were replaced. As such, no Off-Site unsaturated soil samples remain or have been detected with a COC concentration above the site-specific MTGSL. Off-Site saturated zone soil conditions are more appropriately evaluated using groundwater monitoring data as discussed below.

2.5.2 Groundwater Conditions

Groundwater conditions at the Site and in the Study Area have been characterized using groundwater samples collected from temporary and permanent monitoring wells to quantify and delineate cVOC impacts in the shallow groundwater and at the base Unit B. Groundwater samples were analyzed for the previously listed Site COCs which are PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, VC, 1,1,1-TCA, 1,1-DCA, 1,2-DCA, and MC.

Groundwater characterization results were discussed in more detail in the *SS CMS*. On-Site source area characterization and semi-annual groundwater monitoring results have demonstrated that cVOC impacts above GVESLs are limited On-Site to the areas beneath, west, and south of the former plating room at the facility. Groundwater impacts are not present beneath the facility building, outside the footprint of the former plating room.

Additionally, On-Site and Off-Site groundwater impacts down-gradient (south) of the former plating room are concentrated along the former sanitary sewer lateral from the facility and sanitary sewer main along portions of Hamilton Avenue and North Forsythe Street.

These groundwater impacts have been delineated both horizontally and vertically and they are confined within the Study Area within Unit B. Recent groundwater PCE and TCE isoconcentration maps, as the primary cVOCs, incorporating temporary well data in Unit B have been developed and are included as **Figure 2-9** (Groundwater PCE Isoconcentration Map - Shallow and Deep Unit B) and **Figure 2-10** (Groundwater TCE Isoconcentration Map - Shallow and Deep Unit B).

As illustrated in the figures, dissolved phase PCE concentrations above residential GVESLs are predominantly detected in Unit B groundwater and are generally contained On-Site, north of Hamilton Avenue. In comparison, dissolved phase TCE concentrations exhibit a similar On-Site extent of impacts above residential GVESLs, but the plume extends Off-Site generally following the sanitary sewer main along Forsythe Street. Another difference in the distribution of the dissolved phase TCE impacts is that the TCE figure exhibits a secondary, third-party plume located west of the Site, west of Forsythe Street, and north of Hamilton Avenue, emanating from the northwest of the Site. This third-party plume extends south-southeast across Hamilton Avenue, where it appears to co-mingle with the Site-related groundwater impacts along Forsythe Street. This third-party plume is not the focus of this *SSCMIWP*.

Figure 2-11 displays the locations of cross-sections which have been generated for the On-Site and Off-Site areas. **Figures 2-12a**, **2-12b**, and **2-12c** present cross-sectional views of the On-Site distribution of soil impacts, illustrating the monitoring well locations, screen intervals, and the estimated potentiometric surface, as well as the extents of the projected On-Site Source and Treatment Areas. **Figures 2-12d**, **2-12e**, **2-12f**, and **2-12g** present cross-sectional views of the Off-Site groundwater plume, parallel to Forsythe Street and the sewer main, Hamilton Avenue, Glendale Drive, and Ross Court, respectively, illustrating the monitoring well screen locations in relation to the sewer invert elevation and/or groundwater table elevation, as well as locations of the proposed Off-Site PRBs.

As discussed previously, during the operation of the groundwater pump and treat ICM remediation system, groundwater elevations On-Site were lowered to maintain a potentiometric surface below the existing storm sewer invert elevation.

During the OIM implementation in 2019, the original On-Site sanitary sewer lateral that was disconnected and plugged in 1985 was excavated and removed, while the Off-Site sanitary sewer main and service laterals were rehabilitated with removal, replacement, repair, and lining of the sewers. Additionally, the On-Site storm sewer was inspected in 2020, and then subsequently lined in 2021 to prevent infiltration into the sewer or leaks from the sewer. These rehabilitation measures will (i) prevent vapors from entering the storm and sanitary sewers and (ii) prevent infiltration of impacted groundwater from entering the sewer should groundwater elevation rise in the future above the sewer invert elevation. As such, the sewers have been eliminated as a potential exposure pathway for groundwater and/or soil vapor receptors, and the current operation of the groundwater pump and treat ICM is continued only for hydraulic control to prevent dissolved plume migration pending implementation of the final corrective actions.

2.6 Exposure Pathways and Receptor Evaluations

The CSM for the Site was developed to provide an understanding of how impacts related to the Site may affect potential receptors.

Source and Nature of Release

On-Site soil and groundwater impacts have been identified in the areas beneath the plating room floor and the areas extending south along the current and former sanitary sewer system, then off-site along Forsythe Street until about Ross Court. These impacts generally followed the preferential pathway of former sewer bedding and migrated vertically downward through the sewer bedding and/or vadose zone until they reached groundwater, at which time, dissolved impacts migrated to the south-southeast via groundwater flow.

Due to chlorinated compounds being heavier than water, cVOC vertical migration, following a release to the environment, often results in saturated zone soil impacts. cVOC impacts in On-Site soils are concentrated near the Unit B-Unit C interface and potential NAPL is limited spatially and is more accurately described as high adsorbed cVOC concentrations. Direct contact with impacted soil is not a potential exposure pathway for occupants of the Site or structures to the south-southeast of the facility. However, construction workers could be exposed to impacted soil or groundwater if the On-Site storm sewer main, which is routed through the Site, is exposed for repair or replacement. However, given that the storm sewer has been lined, the potential risk of soil vapors or impacted groundwater entering the sewer has been mitigated and the only sampling locations that exceed the EXDCSL were obtained from depths greater than 20 feet BLS, which is greater than the storm sewer invert.

On-Site and Off-Site residual saturated soil impacts are a continued source of dissolved cVOCs in groundwater, which in turn may generate cVOC soil vapors. The soil vapors may then enter into residential structures with basements via vapor intrusion or influence sewer vapor concentrations utilizing entry points along portions of the private sanitary sewer laterals which could not be replaced during OIM implementation.

Shallow groundwater in the Study Area, however, does not represent an ingestion risk as it is not used for consumption purposes. Potable water is supplied to structures in the Study Area by Indiana-American Water Company, whose supply wells are not located in the Study Area. Further, groundwater quality conditions are delineated to the USEPA MCLs before the nearest surface water body in Hurricane Creek.

Potential Exposure Pathways

Based on the CSM and nature of the historical release at the Site, potentially complete exposure pathways to Site-related COCs can be summarized by environmental media as follows:

> ***Soil Exposure Pathways*** – COC concentrations in soil may represent potentially complete exposure pathways for two scenarios:
>
> - Soil direct-contact (including dermal, ingestion, or inhalation of particulates) by construction workers excavating in proximity to the On-Site storm sewers;
> - Dissolution and migration of COCs from soil to groundwater at a concentration that poses a subsequent potential for vapor intrusion to downgradient structures (addressed as a groundwater pathway).
>
> ***Groundwater Exposure Pathway*** – Given the lack of potable use wells or surface water bodies within the delineated area of groundwater impacts, COC concentrations in groundwater may represent potential exposure through the following scenario:
>
> - cVOC volatilization from groundwater to soil vapor and subsequent intrusion into Off-Site residences within the Study Area (either through the building foundation or indirectly, into a domestic sewer lateral not addressed during the OIM)
>
> ***Vapor Intrusion Exposure Pathway*** – As discussed above, soil vapor impacts generated from cVOC volatilized from groundwater in the downgradient Off-Site portion of the Study Area may represent a source of vapor intrusion.

These potential exposure pathways, in conjunction with the fact that the potential VI exposure pathway has already been thoroughly assessed and is currently being mitigated through the use of SSDSs at affected residences, were considered by USEPA in developing the CAOs for the Site as presented in Section 3.

2.7 Data Sufficiency

The data collected through historical environmental investigations and interim remedial measures provided the information to characterize the nature and extent of contamination, assess baseline human health and environmental risks, and develop the CSM summarized above. This information supported the preparation of the final *SS CMS*, to characterize Site conditions and evaluate potential corrective action alternatives to address identified impacts and identify applicable CAOs.

USEPA determined in its *SB* dated May 18, 2022, and *FD* dated March 14, 2023, that sufficient Site characterization data has been collected to select the remedial action technologies to be implemented at the Site, as well as the associated CAOs to be attained through the corrective action implementation. Accordingly, sufficient data is available to design and implement the selected corrective measure as described in Sections 4 and 5.

3.0 CORRECTIVE ACTION OBJECTIVES AND SELECTED REMEDIES

USEPA, in the *SB* dated May 18, 2022, presented CAOs to be attained by corrective actions implemented at the Site, as well as the remedial technologies selected for implementation. Following the completion of the public comment period, the USEPA then published the *FD* dated March 13, 2023, to document the CAOs, select remedies, and define a timeline for attaining the remedial objectives. This section summarizes the CAOs and remedial approaches selected by USEPA. For clarification purposes, the USEPA utilized the general term VISL (which can be associated with several different types of sampling media) when identifying the short-term CAO for groundwater but this document clarifies that the short-term CAO for groundwater is IDEM's RCG Groundwater Vapor Exposure Screening Level (GVESL). Sections 4 through 5 then present the remedial design and associated plans for implementing the remedy and monitoring the effectiveness of remedial progression at attaining CAOs.

3.1 Short-Term and Long-Term CAOs

In addition to numerical value CAOs for impacted environmental media as presented in Section 3.2 below, USEPA developed a series of narrative CAOs to define Short-Term and Long-Term goals to be attained both On-Site and/or Off-Site within defined timeframes. Short-term objectives are anticipated to be attained within five years of implementing the final corrective action measures, while long-term objectives are defined to be attained within approximately 10 years of corrective action implementation.

Final Remedy Short-Term CAOs

1) Prevent cVOC leaching from soil source areas into groundwater, resulting in VOC concentrations above GVESLs;
2) Prevent Off-Site migration of cVOCs above GVESLs from the On-Site secondary source area to properties located beyond the facility boundary;
3) Reduce groundwater cVOC concentrations beyond the facility boundaries to below GVESLs; and
4) Implement active remedial measures for Off-Site groundwater contamination (i.e., SSDS/SMDSs) until GVESLs are attained, and confirmed by sub-slab vapor sampling results (see long-term objectives below).

Final Remedy Long-Term CAOs

1) Reduce cVOC mass from primary and secondary soil source areas to the extent that:
    a. they no longer pose an unacceptable risk from direct contact by workers; and
    b. cVOCs do not leach to groundwater resulting in concentrations above the MCLs.
2) Continue implementing the final corrective measures and demonstrate efficient plume contraction and stabilization; and
3) Continue implementing the final corrective measures such that the CAOs are achieved On-Site and MCLs are met and maintained at the property line point of compliance, both with and without active remedial measures (with the goal of decommissioning SSDS/SMDS on residences due to sources below levels of concern*).

**The residential vapor mitigation system deactivation will be based on IDEM's RCG Calculated Sub-Slab Soil Vapor SLs. Short-term groundwater vapor exposure SLs will be utilized to evaluate the effectiveness of the proposed remedial technology.*

3.2 Numerical Corrective Action Objectives and Reference Values

Numerical CAOs and Reference Values are numerical values designed to be protective of human health and the environment, and are based upon residential, commercial/industrial, and environmental exposure criteria; and applicable state and federal regulations. To be protective of human health and the environment, CAOs and Reference Values evaluate source areas, potential exposure pathways, and potential receptors as discussed in Section 2. The numerical CAOs were developed to ensure that the source area (an area surrounding the On-Site former sanitary sewer lateral location), the migration pathways (groundwater and/or Off-Site sanitary sewer system), or both, do not impact potential On-Site and/or Off-Site receptors.

USEPA's *FD* includes numerical CAOs for soil, groundwater, and residential indoor air or sub-slab soil vapor, as well as Reference Values for sewer vapor. These numerical CAOs are discussed in the following subsections. These remedial goals and objectives have been considered in the design of the corrective action measures implementation described in Section 4. Additionally, during the implementation of the selected corrective measures, remedial progress monitoring will be conducted to verify that the numerical CAOs listed below are achieved and maintained.

3.2.1 Soil CAOs

CAOs for soil are differentiated to those applicable to unsaturated and smear zone soils, versus those applicable to saturated soils (located below the water table). The unsaturated and smear zone soil CAOs are site-specific MTGSL values protective of groundwater conditions. The saturated zone soil CAOs are the RCG EXDCSL values protective for potential excavation workers.

Site-specific MTGSLs and RCG EXDCSLs, listed in the *FD*, are summarized in the following table.

Table: CAOs for COCs in Soil

Chemical of Concern	CAOs for Unsaturated or Smear Zone Soils Site-Specific RCG MTGSL (mg/kg)	CAOs for Saturated Soils RCG Excavation Worker Soil Exposure Direct Contact Screening Level (mg/kg)
PCE	2.667	170
TCE	0.153	95
cis-1,2-DCE	0.855	2,400
trans-1,2-DCE	1.258	1,900
VC	0.022	1,300
1,1,1-TCA	181.959	640
1,2-DCA	0.600	730
1,1-DCA	1.399	1,700
MC	65.008	3,300

During corrective action implementation, improvement of soil conditions in response to remedial progress will be assessed through groundwater monitoring and sampling since there are no unsaturated soil sampling locations with concentrations over the MTGSL. Groundwater monitoring results will indicate if soil conditions continue to contribute to groundwater conditions, which would indicate adsorbed-phase concentrations above the Site-specific MTGSL or EXDCSL. Once groundwater is demonstrated to achieve groundwater CAOs, soils will have attained soil CAOs and no additional confirmation soil sampling is planned following implementation of the Final Remedy.

3.2.2 Groundwater CAOs

The *FD* lists numeric short-term and long-term groundwater CAOs. In the short-term, the CAO is for groundwater COC concentrations in Unit B to meet IDEM RCG Residential GVESLs to mitigate potential soil vapor intrusion exposure. Long-term groundwater CAOs are based on meeting USEPA MCLs to restore the groundwater to drinking water standards (although there is no current groundwater ingestion exposure due to the lack of current potable uses). The short-term CAO time period is defined as five years from the implementation of the final corrective measure, while the long-term CAO time period will be defined as beyond 10 years from the implementation of the final corrective measure.

The short-term CAOs for groundwater are GVESLs to address the potential vapor intrusion exposure pathway while long-term CAOs are MCLs for drinking water consumption. The dissolved cVOC short- and long-term CAOs, stated in the *FD*, are shown in the following table.

Table: CAOs for COCs in Groundwater

Chemical of Concern	Short-Term CAO Groundwater Vapor Exposure Screening Level (ug/L)	Long-Term CAO Maximum Contaminant Level (ug/L)
1,1-DCA	130	28
1,2-DCA	50	5
cis-1,2-DCE	NE	70
trans-1,2-DCE	NE	100
MC	NE	5
PCE	110	5
1,1,1-TCA	13,000	200
TCE	9.1	5
VC	2.1	2

NE: Not Established

During corrective action implementation, improvement of groundwater conditions in response to remedial progress will be assessed through groundwater monitoring and sampling. Attainment of the Short-Term and Long-Term CAOs for groundwater considers both the location (i.e., On-Site vs. Off-Site) and potential use of engineering controls (i.e., protective PRBs remedy) to prevent Off-Site migration of groundwater above the numerical CAOs or to limit potential exposure through the use of a Site-specific institutional control (ERC).

3.2.3 Residential Indoor Air and Sub-Slab Soil Vapor CAOs

Residential Indoor Air and Sub-Slab Soil Vapor CAOs, as stated in the *FD*, have been developed to address the vapor inhalation exposure pathway. No complete vapor inhalation exposure pathway exists at this time within the Study Area. Vapor mitigation systems were installed on residential structures which exhibited the potential for vapor intrusion throughout the Study Area. Additionally, plumbing repairs were completed on structures that exhibited the potential for sewer vapor intrusion due to faulty plumbing. Residential Indoor Air and Sub-Slab Soil Vapor CAOs, identified in the *FD*, are presented in the following table.

Table: CAOs for COCs in Residential Indoor Air and Sub-Slab Soil Vapor

Chemical of Concern	Residential Indoor Air Screening Level (µg/m^3)	Residential Sub-Slab Vapor Screening Level* (µg/m^3)
PCE	42	1,400
TCE	2.1	70
cis-1,2-DCE	NE	NE
trans-1,2-DCE	NE	NE
VC	1.7	56.7
1,1,1-TCA	5,200	173,333
1,2-DCA	1.1	36.7
1,1-DCA	18	600
MC	630	21,000

Residential Indoor Air Screening Levels are IDEM RCG Screening Levels listed in Appendix A, Table A-6 of the RCG, updated March 1, 2022.
Sub-Slab Soil Vapor screening levels were calculated using an attenuation factor of 0.03 per IDEM Technical Guidance Document *Attenuation Factors* dated September 29, 2016.
NE: Not Established

Residential structures will be evaluated for the cessation of vapor mitigation system operation as the subsurface media (i.e., groundwater) in the vicinity of each residential structure meets remediation goals identified in the *FD* and follows procedures outlined within the OM&M Plan. Once groundwater COC concentrations are documented to meet the GVESLs in monitoring well(s) located closest to a residence with a vapor mitigation system, then sub-slab vapor and indoor air (i.e., basement) sampling will be performed to verify that the vapor mitigation system is no longer required and can be petitioned for cessation and removal. A copy of the Long-Term OM&M Plan for the installed vapor mitigation systems has been included as **Appendix B**.

3.2.4 Sewer Vapor Reference Values

The sewer vapor reference values, stated in the *FD*, are shown in the following table.

Table: Reference Values for COCs in Sewer Vapor

Chemical of Concern	Sewer Vapor Reference Values (ug/m^3)
1,1-DCA	2,654.9
1,2-DCA	162.2
cis-1,2-DCE	NE
trans-1,2-DCE	NE
MC	92,920
PCE	6,194.7
1,1,1-TCA	766,961.7
TCE	309.7
VC	250.7

NE: Not Established

It should be noted that sources of COCs in sewer vapors unrelated to the Site may be present as what is discharged to the sanitary sewer cannot be controlled nor is Amphenol responsible for the characterization and remediation of secondary sources/releases of COCs by other responsible parties. As such, it is possible that other sources could cause future sewer vapor concentrations to exceed sewer gas reference values even after historical Bendix release(s) have been mitigated (as evidenced by groundwater COC concentrations below IDEM RCG Residential GVESLs and/or MCLs). Since Amphenol has addressed storm and sanitary sewers as potential preferential migration pathways by replacing and/or lining the accessible storm and sanitary sewer lines overlying the dissolved cVOC plume located within the Study Area and will be actively remediating the groundwater to CAOs, no additional sewer vapor sampling will be conducted.

3.3 Selected Corrective Measures

The selected Final Remedy or "Final Remedy" is an action that will address contaminated groundwater and soils at the Site. The Final Remedy will also address sources of contamination that may go into the vapor phase. The interim measures completed have addressed current vapor intrusion concerns and will continue to keep residents within the Study Area safe from vapor intrusion related to Site conditions.

USEPA's selected Final Remedy for the Amphenol Site consists of the following remedial components:

On-Site Selected Remedies:

- Installing a permeable reactive groundwater treatment barrier (PRB);
- Injecting treatment materials into soil to breakdown cVOCs ("soil source treatment remedy") and remediate groundwater;
- MNA to document ongoing post-treatment decreasing groundwater concentration trends; and
- Shutting off the ICM groundwater pump-and-treat system permanently, once CAOs are reached.

USEPA selected a sequential injection of ISCO and ISCR, as well as implementing bioremediation to remediate cVOCs and achieve CAOs. Sequential injections with the oxidizing and reducing agents for source zone remediation are expected to reduce both adsorbed and dissolved phase cVOCs to nontoxic end products with no long-term accumulation of daughter products, such as vinyl chloride, and to create a clean waterfront to migrate downgradient, reducing plume concentrations to meet short-term CAOs.

USEPA selected the remedial approach for the On-Site Source and Treatment Areas to reduce the cVOC groundwater impacts within the Unit B water-bearing unit and prevent the Off-Site migration of cVOCs at concentrations exceeding the GVESLs using a PRB near the property boundary to assist in meeting the short-term CAOs.

MNA, following Source and Treatment Area remediation, was selected to monitor the progress of subsequent enhanced biodegradation to achieve long-term CAOs. USEPA also selected institutional controls (deed restrictions) to restrict land use and groundwater use while contamination remains above numerical CAOs.

Off-Site Selected Remedies:

- Installing PRBs to treat secondary source soil impacts and remediate groundwater conditions;
- MNA to document ongoing post-treatment decreasing groundwater concentration trends; and
- Continuing operation and monitoring of Off-Site engineering controls (i.e., SSDS and/or SMDS) for vapor intrusion mitigation until the controls are demonstrated as unnecessary to prevent exposure above CAOs.

USEPA's selected remedy to address Off-Site groundwater includes the installation of PRBs with ISCR injectants that will be constructed to reduce cVOC impacts in groundwater resulting from secondary Off-Site sources (related to the former sewer line). Particularly, USEPA selected a PRB with ISCR injection at the southern boundary of the Site property (as discussed above) to prevent plume migration to the south of the source area treatment system, as well as the Off-Site PRBs to achieve the short-term CAOs.

USEPA selected MNA following source area treatment to achieve long-term CAOs. Until COC volatilization from groundwater is mitigated to applicable numerical CAO, USEPA selected operation and maintenance of the existing vapor intrusion mitigation systems to ensure continued protection of potential receptors.

Section 4 and Section 5 present the basis, design, and implementation details for the On-Site and Off-Site remedy components, including operation and progress monitoring to ensure that CAOs (short-term and long-term) are attained.

4.0 DESCRIPTION OF CORRECTIVE MEASURES

This section discusses remedial design considerations, and design assessments, and identifies major components to implement the selected corrective measures.

4.1 Design Basis

The basis of the design of the corrective measures is to achieve site-specific cleanup goals presented in the USEPA's *FD* which are also restated in Section 3 above. The extent of the planned corrective measures, as defined by USEPA in the *SB* and *FD*, is based on analytical results obtained during investigation activities completed from 2018 through 2022, which were reported in the *SS CMS*.

A primary component of the design is to mitigate adsorbed phase soil impacts affecting groundwater conditions, as well as to reduce dissolved mass flux in groundwater from the On-Site and Off-Site treatment areas, to reduce downgradient groundwater concentrations to below GVESL concentrations. As downgradient groundwater concentrations are reduced, downgradient soil vapor concentrations will also be reduced such that they will no longer pose an unacceptable health risk to Off-Site receptors.

To address the current VI risk, Amphenol has pre-emptively installed SSDS/SMDSs at residential properties that have previously exhibited the potential for VI, as described in Section 1.4. These SSDS/SMDSs will remain active until the potential exposure pathway for vapor intrusion has been eliminated which will be demonstrated by groundwater monitoring followed by confirmatory sub-slab vapor and indoor air sampling (i.e., basement). Amphenol will complete confirmation sub-slab vapor and indoor air sampling at private residences with installed vapor mitigation systems in accordance with the OM&M plan (see **Appendix B**). Required sampling events will be completed before permanently deactivating the mitigation systems on the private residences.

The results of the bench scale treatability testing of the soil and groundwater from the Site, as discussed in Section 4.3.2, confirmed that the ISCO and ISCR remedial approaches selected for the Site can reduce the mass and dissolved phase flux of the COCs such that the short-term CAOs are achieved. These corrective action measures are also designed to produce groundwater geochemical conditions conducive to subsequent bioremediation of COCs through continued biological reductive dechlorination to achieve long-term CAOs.

During and upon completion of the planned corrective measures, performance groundwater monitoring will be completed and groundwater samples will be analyzed to verify that CAOs are being achieved. The groundwater performance monitoring plan is detailed in Section 5.4.

4.2 Remediation Areas

The figures included in this section display the On-Site Treatment Area and Off-Site PRB locations where in-situ injections are planned to be completed. It should be noted that any Off-Site PRB location on private property is dependent on obtaining off-site access approval and having sufficient lateral distance away from any existing structure with a basement or subsurface utility. A Site Plan has been included as **Figure 2-3** and the planned On-Site Treatment Area and Off-Site PRB locations are displayed in **Figure 4-1** and **Figure 4-2**, respectively.

4.2.1 On-Site Source and Treatment Areas

The On-Site Treatment Area covers approximately 74,000 square feet, and it encompasses the On-Site Source Area of approximately 30,500 square feet.

The On-Site Treatment Area includes impacted saturated soils with cVOC concentrations over Site-specific MTGSLs, whereas the On-Site Source Area includes impacted saturated soils with cVOC concentrations over 40 mg/kg.

The On-Site Source Area will initially be treated utilizing ISCO. The On-Site Source Area and remainder of the On-Site Treatment Area will subsequently be treated via ISCR injections and enhanced bioremediation.

Additionally, two or more On-Site PRBs are planned to be installed to mitigate dissolved mass flux in groundwater – one or more PRBs across the central portion of the treatment area and one along the downgradient property boundary (just north of Hamilton Avenue).

4.2.2 Off-Site Remediation Area

The Off-Site remediation area primarily covers residential areas to the south of Hamilton Avenue and to the east of Forsythe Street, north of Hurricane Creek, where dissolved phase groundwater conditions exceed RCG Residential GVESL concentrations. Note that a PRB will be installed parallel to the northside of Hurricane Creek, east of Forsythe Street, as an extra precautionary measure along the southern end of the Study Area even though dissolved cVOC sampling has documented that groundwater in this area already meets both short-term and long-term CAOs.

The Off-Site remediation areas will be treated using a series of PRBs installed parallel and perpendicular to former secondary sources associated with former sewers and will utilize a combination of a carbon-based substrate, ZVI, and bacterial inoculation; successful implementation of the carbon-based substrate and ZVI has been demonstrated in prior pilot testing and bench-scale treatability testing (discussed below).

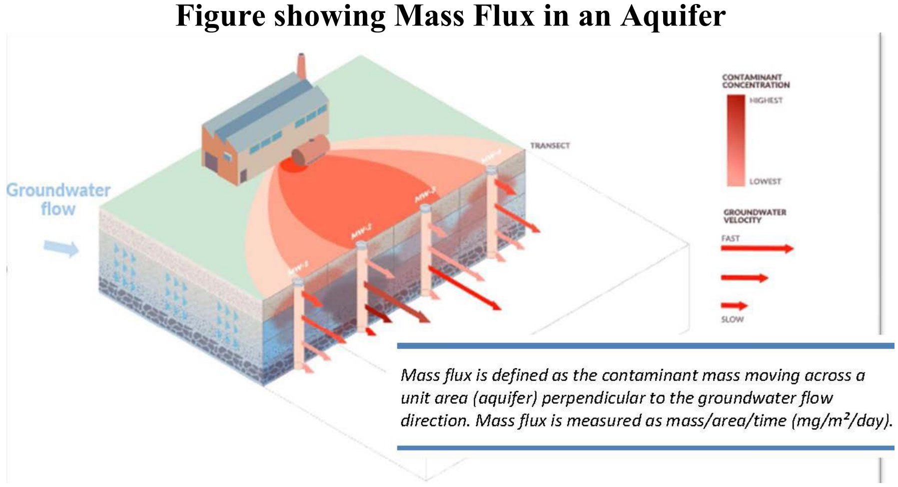
4.3 Pre-Design Assessments

Pre-design assessments were completed to gain a better understanding of the groundwater flow velocity in conjunction with the mass flux of contaminants and to determine which amendments may be best suited to employ during the implementation of the selected corrective measures. IWM Consulting also considered the results of previous On-Site remediation activities and Off-Site pilot studies which had utilized similar remedial technologies.

4.3.1 Groundwater Flux Assessment

FluxTracer® testing was completed to assess groundwater velocity and contaminant mass flux within several existing monitoring wells located On and Off-Site. Conventional methods (pump and slug tests) give a single value for groundwater velocity whereas passive tools like FluxTracer® are designed to distinguish individual zones within a water bearing unit. The quantitative FluxTracer® test measures the amount of alcohol tracers that desorb from the activated carbon due to groundwater passively flowing through the cylinder canisters. Concurrently, contaminants present in the plume adsorb to the activated carbon during the deployed period after which they are extracted from the activated carbon to quantify mass flux and flux-derived contaminant concentrations. FluxTracers® were installed within monitoring wells MW-3, MW-22, MW-37, and MW-38 to determine Darcy flux, mass flux, and flux-derived contaminant concentrations. The FluxTracers® provide contaminant flux and Darcy velocity measurements at 1-foot intervals within each well evaluated.

Figure showing Mass Flux in an Aquifer



(Regenesis. March 2023)

The FluxTracers® consisted of three to five separate 2-foot-long stainless-steel canisters secured inside each well in succession on a premeasured central wire line attached to a modified J-plug well cap. The number of canisters utilized in each well corresponded with the monitoring well screen lengths. The FluxTracers® were pre-assembled and arrived ready to deploy with no on-site construction required.

FluxTracers® were deployed in On-Site monitoring wells MW-3 and MW-22 for one week and within Off-Site monitoring wells MW-37 and MW-38 for two weeks. Due to the historically lower observed dissolved cVOC concentrations in samples obtained from monitoring wells MW-37 and MW-38, they required a longer period of deployment to accurately measure the mass flux.

FluxTracer® results are summarized within the FluxTracer® Summary Report, which has been included in **Appendix C**. As expected, the dissolved PCE and TCE mass flux varies with depth through the saturated portions of Unit B and, in general, in the On-Site monitoring wells with 10-foot screens (MW-3 and MW-22), the majority of the contaminant mass flux appears to be concentrated in the saturated lower portion of Unit B at intervals 24.1 feet BLS (150 mg/m^2/day PCE) and 14.8 feet BLS (240 mg/m^2/day PCE), respectively. In the Off-Site monitoring wells with 5-foot screens

(MW-37 and MW-38), which are screened across the groundwater table, maximum mass fluxes were measured near the bottoms of the wells at 13 feet BLS (10 mg/m^2/day PCE) and 11.7 feet BLS (9 mg/m^2/day TCE), respectively.

In general, the contaminant mass flux appears to increase with depth toward the center and base of the saturated Unit B zone, and contaminant mass flux decreases by an order of magnitude in Off-Site areas. The calculated groundwater flow velocities observed during this assessment were generally consistent with previous estimates of groundwater flow rates. This information has been considered in designing the remedial injections and PRBs, and in considering remedial monitoring frequencies.

4.3.2 Bench Testing

Bench-scale treatability testing was conducted on bulk soil and groundwater samples collected from the Site to support the design of the selected corrective actions. Soil samples were obtained from source area locations (GP-10 and GP-11 at depths ranging from 21 to 25 feet BLS) that exhibited the highest adsorbed cVOC concentrations during the On-Site source investigations completed in 2020/2021. The groundwater sample was obtained from the On-Site monitoring well (MW-12R) screened across Unit B, which has consistently exhibited the highest dissolved-phase cVOC concentrations over the last five years. The soil and groundwater samples were obtained in February 2023 utilizing a direct push soil sampling probe and low-flow groundwater sampling equipment, respectively. The objective of these bench-scale studies was to evaluate the relative effectiveness of the various ISCO and ISCR remedial technologies considered, both independently and sequentially. The components of the bench testing included:

1. **SOD testing** to document the relative impact of natural soil chemistry at consuming the three considered chemical oxidants (i.e., hydrogen peroxide, sodium persulfate, and sodium permanganate) and to support ISCO dosing considerations for field implementation. Testing was focused on Unit B soils with Site groundwater.
2. **ISCO batch reactor testing** to evaluate the relative performance of the chemical oxidants not previously utilized at the Site (i.e., SPS and SPM) for comparison to previous Site results using MFC, and to further document the relative performance of varying activation chemistries for SPS implementation. Testing was conducted independently for samples of Unit B soil and Unit C soil with Site groundwater originating from Unit B.
3. **ISCR batch reactor testing** for varying doses and ratios of ZVI and EVO to document the relative performance of the chemistries on reducing COC mass and generating favorable groundwater geochemistry conditions to support subsequent enhanced bioremediation through reductive dechlorination. This batch testing also compared COC reductions through chemical adsorption using activated carbon for comparison. The goal of these batch tests using Unit B soil and Site groundwater was to support the design of ISCR injections and PRBs for field implementation.
4. **Column reactor treatability testing** which included the flow of Site groundwater through a series of independent or sequential reactor columns filled with Unit B soils amended with remedial reagents to simulate in-situ application and support the design of field implementation injection details and PRB designs.

The bench-scale batch tests utilized varying doses and ratios (i.e., high and low doses/ratios) of the remedial amendments to support the final selection and design of the chemical applications. The column studies utilized varying configurations of unamended Site soil versus Site soil amended with ISCO, ISCR, or activated carbon media, based on the previous batch testing results, to inform the final injection implementation and PRB designs.

A copy of the *Bench-Scale Testing to Support Remedial Implementation* report has been included in **Appendix C**. The key findings based on the treatability testing results are summarized below.

SOD Test Findings

- Results matched general expectations on the relative persistence of the ISCO reagents based on oxidant demand and dose. Longer persistence in the subsurface results in greater distribution from the point of injection and longer reaction time.
- Hydrogen peroxide (or MFC), while it had demonstrated success at source reduction in previous site applications, had the shortest persistence (less than one day) which if used alone could require more applications to meet remedial goals.
- SPS exhibited more persistence (approximately five days) than MFC, allowing for greater distribution and reaction time.
- SPM exhibited the longest persistence (17 to 20 days), but is also the most expensive oxidant tested and its persistence could lead to oxidant migration to an adjacent area of ISCR or PRB application which could reduce effectiveness and efficiency.

ISCO Batch Test Findings

- SPS was observed to most effectively activate and provided the fastest COC reductions when combined with hydrogen peroxide (i.e., MFC) for activation.
- While self-activated SPS provided similar COC reductions (at high doses), it is less efficient than MFC activation. However, it has been demonstrated that any persulfate not activated by MFC would self-activate in-situ, thus ensuring the efficiency of the application.
- Based on the observed Site soil buffering capacity and COC removal, sodium hydroxide alkaline activation of SPS is not recommended at this site.
- While SPM also provided good COC reductions, it is the most expensive oxidant tested, and its longevity could present the potential to migrate to a downgradient ISCR PRB (not desired).
- A single application of MFC-activated SPS in the bench testing provided COC reductions in both Unit B and Unit C soils of up to 87.7%, which could lead to fewer in-situ applications (and less time) required to be implemented due to higher treatment efficiency.

ISCR Batch Test Findings

- ZVI is effective at both reducing COC mass through abiotic reductive dechlorination and reducing groundwater oxidation-reduction potential (ORP or redox) to levels conducive to subsequent anaerobic bioremediation through reductive dechlorination.
- ZVI-induced ISCR treatment of COC provided reductions of up to 84%, which demonstrates that these ISCR applications can provide a level of treatment similar to ISCO. The persistence

of ZVI and the associated groundwater ORP reduction would provide significant source reduction/ treatment in addition to subsequent enhancement of bioremediation.

- EVO did not exhibit a significant effect on the performance of ZVI but aided in reducing and sustaining low ORP levels. Previous work on subsurface materials from the Site shows a robust population of halorespiring microorganisms and EVO injection, a soluble and mobile electron donor source, is expected to stimulate in-situ anaerobic biodegradation at and downgradient of the injection points.
- ZVI and EVO represent a good combination of amendments for area-wide treatment zone injection or to create a PRB.
- Activated carbon-amended soil provides significant adsorption capacity to treat/retard COCs in groundwater and may augment ZVI/EVO in a PRB or downgradient of ISCR application.

Column Reactor Test Findings

- The multi-column treatment train of ISCO followed by ISCR followed by activated carbon showed rapid and sustained reduction of PCE (and other COC) concentrations. ISCO followed by ISCR provides effective treatment, and activated carbon provides an adsorptive polish to prevent the re-impact of groundwater by soil conditions and potential migration.
- The ISCO→ISCR→carbon column train also showed a rapid and sustained reduction of ORP. The initial ISCO oxidation column did not prevent subsequent redox reduction by the ISCR column, and the final effluent ORP measured (-150 to -160 mV) is amenable to subsequent biological reductive dechlorination.
- The two-column treatment train of ISCR PRB followed by unamended soil (ISCR→Soil) showed a similarly rapid reduction in PCE concentration as the above columns, but without ISCO pre-treatment, and provided downgradient PCE reductions through the subsequent natural soil column. Some rebound in PCE concentrations after 17 days was observed, as water continued to flow through the subsequent unamended soil column with source concentrations. It should be noted that the influent groundwater to the ISCR→Soil treatment train had high COC concentrations found at the source, whereas in the field influent groundwater to ISCR PRB would have been ISCO-treated and would have considerably lower concentrations. These results demonstrate the ability of ISCR injections to mitigate downgradient groundwater conditions.
- The ISCR PRB column followed by unamended soil (ISCR→Soil) showed an even more rapid (and sustained) reduction of ORP than the multi-column study, with an even lower final effluent ORP (-189 to -200 mV). ORP values remained very reduced after Day 17 when PCE concentrations began to be detected again, indicating that groundwater conditions would be amenable for subsequent bioremediation (note that the duration of bench testing is generally too short to observe the onset of bioremediation effects).
- The treatment train column studies demonstrated that the natural soil and groundwater pH buffering capacity prevents dramatic shifts in pH, which can support post-remedial biodegradation. No evidence of a significant groundwater pH decrease from ISCO reactions was observed, and no evidence of a significant groundwater pH increase from ISCR reactions was observed.

These bench-test treatability findings were considered in the development and design of the remedial implementation approach presented in this work plan.

4.3.3 ISCO On-Site Source Area Remediation (2011-2012)

The On-Site Source Area remediation completed beneath and adjacent to the former plating room in 2011/2012 was completed via ISCO utilizing hydrogen peroxide as an oxidant (aka MFC). Two full-scale injection events and six subsequent, smaller, targeted injection events focused on residual hot spot areas, were completed as dictated by progress sampling events. All of the injection events were completed between July 2011 and May 2012 and six temporary sampling locations were utilized to evaluate the effectiveness of the implemented remedial program and to identify residual hot spots that warranted supplemental, targeted injection activities. The temporary sampling locations were installed via a direct push drilling unit and the progress soil/groundwater samples were obtained after select phases of the injection activities were completed. Once the sampling activities were completed, the temporary sampling points were abandoned and a new temporary sampling point was installed in the same general area if additional progress sampling was required after subsequent injection activities.

A comprehensive summary of the 2011/2012 ISCO injection activities and progress sampling results is included in the Treatment Program Report prepared by Isotec and dated July 16, 2012, which is provided in **Appendix C**. However, highlights of the work activities are given below to provide pertinent background information relating to the 2011/2012 ISCO activities and how they relate to the proposed ISCO activities.

The ISCO injection program focused on an approximately 4,000-square foot area, with three different targeted treatment intervals: shallow vadose zone soils (2 to 10 feet BLS); deep vadose zone soils (10 to 15 feet BLS); and saturated zone soils (15 to 25 feet BLS). The injection activities typically occurred under a low-pressure condition (0 to 20 psi). For shallow vadose zone soils, all of the sampling locations exhibited decreasing concentrations post ISCO injection activities, and the total adsorbed VOC reductions observed ranged from 4% to 96%. The average total VOC reduction in the shallow vadose zone soil was 92% (from 0.15 mg/kg to 0.01 mg/kg) after 2 injection events.

When compared against the baseline sampling event results, only one deep vadose zone sampling location exhibited an anomalous increased total adsorbed VOC concentration (total final VOC concentration of 0.1803 mg/kg) by the end of the last (fifth) deep vadose zone injection event; however, the other five sampling locations exhibited decreased concentrations ranging between 15% and 99%, with an average decrease of 96% (from 1.74 mg/kg to 0.07 mg/kg) across the treatment area by the conclusion of the injection program.

For saturated zone soils (15 to 25 ft BLS), total adsorbed VOC reduction ranged from 26% to 100% in five of the six sample locations. Sampling location SB-8, the only sampling location that exhibited an overall increase in total adsorbed VOC concentrations after the ISCO injection program, initially exhibited nearly a 100-fold VOC increase from a baseline value of 0.07 mg/kg to 6.4 mg/kg after two events (likely due to redistribution of residual VOC impacts), but subsequently decreased to 0.142 mg/kg after eight events.

A limited number of progress groundwater sampling events occurred at five different temporary groundwater sampling locations during the ISCO injection program. One sampling point exhibited a nine-fold increase in total dissolved VOC concentrations (36 μg/L vs. 324 μg/L) after the injection program, which was attributed to chemical and physical desorption of solid-phase impacts. Short-term, transient, increases in dissolved VOC concentrations were observed in two other sampling locations, which were followed by subsequent decreases in concentrations when compared to the baseline concentration. The two remaining sampling locations only exhibited decreasing dissolved VOC concentrations. The total dissolved VOC concentration decreases for the sampling points exhibiting overall decreasing contaminant concentrations ranged between 18% and 61%.

Overall, the implemented ISCO injection program (MFC) successfully remediated the source area and expeditiously desorbed and treated contaminants (potentially including DNAPL) that were locked up in the interstitial pores of the deep, saturated soil (near the Unit B/Unit C interface). However, multiple rounds of MFC injections were required when utilizing the hydrogen peroxide as the sole oxidant (although the subsequent injection events were more focused and decreased in size). Based on the results of the pre-design bench testing completed in 2023, a single application of MFC-activated SPS provided COC reductions in both Unit B and Unit C soils of up to 87.7%, which provides more expeditious and efficient remedial results when compared to hydrogen peroxide activation. Additionally, based on the final groundwater analytical results, a more long-term in-situ soil and groundwater treatment process (ISCR) which creates an anaerobic environment conducive for reductive dechlorination over a longer time period should be implemented as a polish after implementation of the ISCO program in the known source area.

4.3.4 Off-Site Groundwater Treatment Pilot Study (2019)

The OIM activities completed in 2019 included the removal and replacement of the old VCP sanitary sewer main in the center of Hamilton Avenue and Forsythe Street. During restoration activities, IWM Consulting completed a pilot study that incorporated the injection of a mixture of PlumeStop and S-MZVI supplied by Regenesis® in two areas. The first area (Area 1) surrounds monitoring well MW-35, near the entrance to Glendale Drive. This area provides a relatively undisturbed Off-Site sub-surface lithology which is more representative of natural sub-surface conditions within the Study Area. Any observed groundwater improvements would be more representative of the expected results if this technology were to be employed throughout portions of the Study Area that were not disturbed or affected during the implementation of the OIM. The second area (Area 2) was within the sewer bedding material located adjacent to the southern portion of the newly installed sewer main on Forsythe Street.

Area 1 Pilot Study Evaluation

On October 22, 2019, approximately 3,200 lbs of PlumeStop and 100 lbs of S-MZVI (which equaled a combined 1,923 gallons of the remedial solution once the material was thoroughly mixed with water) were injected evenly into five temporary injection points (INJ-1 through INJ-5) placed in a star pattern around monitoring well MW-35, treating an area approximately 400-square feet in size. The temporary injection points were installed with a direct push drilling unit equipped with 1.5-inch diameter drill rods and retractable screens (up to three feet in length). The mixture was pressure injected into the formation using a bottom-up injection technique via the above ground pumps placed inside the injection trailer. The vertical treatment area was from 11 to 16 feet BLS, which included treatment from the base of Unit B upward five feet, which fully treats the saturated thickness of Unit B (including any potentially unusually high-water table periods). The ability to control the depth and length of the injection interval allowed for the precise injection of the remedial solution. Before injection activities, depth to water was measured in monitoring well MW-35 at 11.24 feet below the top of casing. Remedial solution was injected at a rate of 2.9 to 3.5 gpm and at a pressure of 15 to 35 psi. It appeared that this was close to the highest pressure that could safely inject the remedial solution into the subsurface without causing the solution to surface (i.e., material breaching the ground surface) during the injection activities. This observation was consistent with RRS' previous experience with injection projects.

The distance to monitoring well MW-35 from the injection points is shown in the table below.

Table: Distance to Injection Points to Monitoring Well MW-35

Injection Point	Nearest Monitoring Point to Injection Location	Distance/Direction to Nearest Monitoring Point from Injection Location
INJ-1	MW-35	7.5 Feet; West-Northwest (up-gradient)
INJ-2	MW-35	5.5 Feet; North (up-gradient)
INJ-3	MW-35	5.75 Feet; Northeast (cross-gradient)
INJ-4	MW-35	5 Feet; Southeast (down-gradient)
INJ-5	MW-35	5.25 Feet; South (down-gradient)

Groundwater samples obtained from monitoring well MW-35 exhibited immediate and sustained reductions in dissolved VOC concentrations after the pilot study. Dissolved VOC groundwater samples were obtained every month for 10 consecutive months (November 2019 through August 2020) starting one month after the low-pressure injection activities were completed in October 2019 and complete elimination of dissolved VOC reductions was observed after the initial 30-day post-injection activities sampling event. Additionally, the sustained reduction of nitrate and increase in dissolved manganese with only temporary reductions in sulfate and the temporary increase in iron indicates that groundwater-reducing conditions in the area were manganese-reducing, which is ideal for maintaining lower dissolved methane concentrations.

As outlined in the Off-Site Pilot Study Evaluation Report dated September 28, 2020, and included in **Appendix C**, the dissolved VOC concentrations were decreased by 100% in monitoring well MW-35 when comparing the baseline sampling results with the August 2020 sampling results. The elimination of dissolved VOC concentrations in monitoring well MW-35 has been maintained since the October 2019 pilot study.

Area 2 Pilot Study Evaluation

Before backfilling the sanitary sewer excavation, a series of temporary injection wells were installed within the backfill of the sanitary sewer trench to facilitate injection of PlumeStop and S-MZVI along the southern portion of the excavation that extended into the underlying water table. On October 23, 2019, approximately 3,600 pounds of PlumeStop and 200 pounds of S-MZVI (which equaled a combined 2,892 gallons of the remedial solution once the material was thoroughly mixed with water) were injected evenly into five 2-inch diameter temporary PVC injection wells (IP-1, IP-2, IP-3, IP-4, and IP-6) and one temporary direct push injection point (DPT-1) placed within the backfill of the newly installed sewer main trench. This covered an area of approximately 383 linear feet along the southern portion of the newly installed sewer main trench. Each well was constructed with five feet of 0.020-inch slotted PVC screen and the wells were placed as close as possible to the bottom of the sewer main trench before the trench was backfilled with No. 8 limestone aggregate. Remedial solution was injected at a rate of 10 to 15 gpm and a pressure under five psi, and under 15 psi at the direct push boring location. Due to the lack of fine-grained soils within the sewer backfill material (No. 8 stone), it appeared the backfill material surrounding the new sewer main could handle higher remedial solution flow rates without restrictions or surfacing ("daylighting") of the remedial solution. Additionally, since the injectant was injected under low pressure into the aggregate sanitary sewer backfill, all of the injectants installed via the IP points had a limited ROI and were likely contained within the backfilled excavation trench itself.

The nearest monitoring wells surrounding the injection points are shown in the following table.

Table: Distance of Injection Points to Nearest Monitoring Well

Injection Point	Nearest Monitoring Point to Injection Location	Distance/Direction to Nearest Monitoring Point from Injection Location
DPT-1	MW-39	160 Feet; East-Southeast (cross-gradient)
IP-1	MW-39	180 Feet; Southeast (down-gradient)
IP-2	MW-38	30 Feet; Northeast (up-gradient)
IP-3	MW-38	60 Feet; South-Southeast (down-gradient)
IP-4	MW-31	25 Feet; Southeast (down-gradient)
IP-6	MW-37	30 Feet; Northwest (up-gradient)

Groundwater samples obtained from monitoring wells (MW-31 and MW-38) located between 25 and 75 feet hydraulically downgradient of the closest injection point, respectively, exhibited immediate and sustained reductions in dissolved VOC concentrations after the pilot study. Dissolved VOC groundwater samples were obtained every month for 10 consecutive months (November 2019 through August 2020) starting one month after the low-pressure injection activities were completed in October 2019 and noticeable dissolved VOC reductions were observed as early as 30 to 60 days after the injection activities. Additionally, total iron, total manganese, and sulfate concentrations exhibited short-term increases after the injection activities, with the largest increases observed in MW-38 between 90 to 120 days post-injection activities.

As outlined in the Off-Site Pilot Study Evaluation Report dated September 28, 2020, and included in **Appendix C**, the dissolved PCE, TCE, and total dissolved VOC concentrations were decreased by 32.3%, 28.5%, and 29.5%, respectively, in monitoring well MW-31 when comparing the baseline sampling results with the August 2020 sampling results. The dissolved PCE, TCE, and total VOC concentrations were reduced by 85.7%, 87.7%, and 88.4%, respectively, in monitoring well MW-38 during the same time period. The dissolved VOC concentrations have continued to decrease since

August 2020, and when a comparison is made with the most recent analytical data collected at the Site (April 2023), the PCE, TCE, and total dissolved VOC concentrations have been reduced by another 30.9%, 4.5%, and 16.8%, respectively, in MW-31 and 69.6%, 33.6%, and 56.7%, respectively, in MW-38. Monitoring wells located hydraulically upgradient or at distances over 160 feet away from the closest injection point did not exhibit similar results.

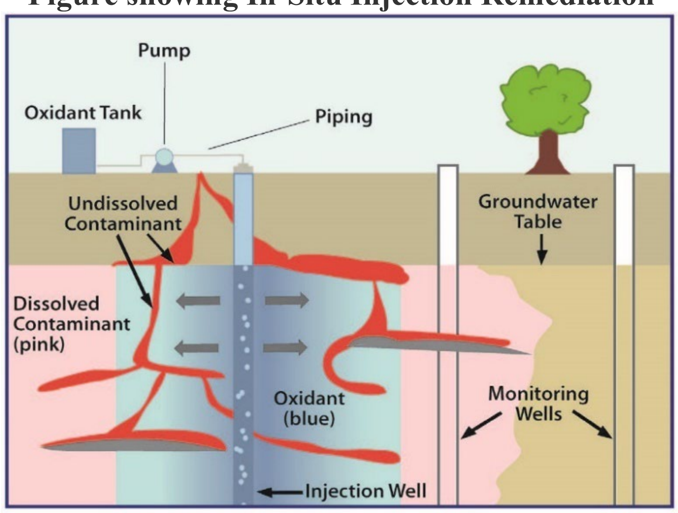
4.4 Identification of Major Corrective Measures Components

No permanent equipment is required for implementation of the selected corrective measures; however, several processes are necessary for implementation and one or more existing recovery wells or injection wells may be utilized in the future to augment the implemented in-situ remediation activities. Additionally, the selected injection contractor(s) will provide the injection trailers, which will include holding tanks, mixers, pumps, totalizers, and hoses. A direct push drilling unit, equipped with drilling rods, will also be utilized to facilitate the injection activities.

4.4.1 Conceptual Process

In-situ injection is a method of cleaning up soil and groundwater by injecting amendments into the subsurface, where they cause a chemical or biological reaction that destroys or degrades COCs. The amendments are typically injected underground, via wells or direct push tooling, at varying depths, targeting intervals that are impacted by COCs. Once injected, the amendments spread throughout the saturated soil and groundwater through advection and/or dispersion where they then mix with the COCs and react, leaving harmless byproducts.

Figure showing In-Situ Injection Remediation



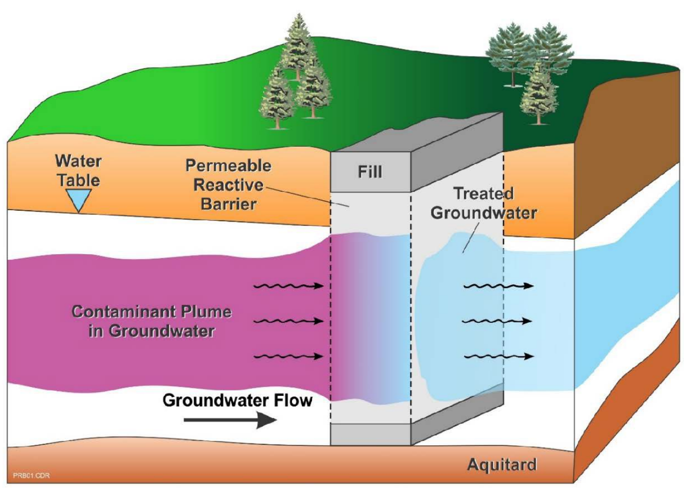
(USEPA, September 2012)

The in-situ injection methods that will be employed at the Site can be divided into two categories: area-wide application and PRBs. The area-wide application requires the applied amendment (i.e., ISCO or ISCR) to come into direct contact with the contaminant for desorption and destruction, and therefore will be applied throughout the On-Site Source Area and On-Site Treatment Area. Several area-wide or targeted applications of ISCO may be necessary for the On-Site Source Area before transitioning to another in-situ injection technology (i.e., ISCR or enhanced bioremediation) for continued remediation of the On-Site Source and On-Site Treatment Areas. The On-Site Source Area and On-Site Treatment Area are displayed in **Figure 4-1**.

ISCR can be applied area-wide or within PRBs, to directly destroy COCs through reductive dechlorination and to promote groundwater geochemical conditions that enhance the subsequent biodegradation of cVOCs. PRBs, specifically, are installed as concentrated treatment areas that extend across the groundwater plume, generally perpendicular to the flow path of contaminated groundwater, such that groundwater flowing through the PRB is treated. PRBs can be constructed through trenching methods or through direct-push injection techniques to achieve the desired width, depth, and thickness of the treatment zone. In this case, PRB installations in both the On-Site and Off-Site areas are planned to utilize direct-push injection techniques based on successful previous implementation during ICM and pilot testing at the Site.

The PRB allows the dissolved-phase contaminants to pass into the treatment zone with groundwater flow where contaminants are then adsorbed and/or destroyed, leaving harmless byproducts. PRBs may be constructed with a carbon-based substrate, ZVI (ISCR), bacterial inoculations, and/or EVO (for enhanced bioremediation) or some combination of all four remedial amendments. The On-Site and Off-Site PRBs are displayed in **Figure 4-1** and **Figure 4-2**.

Figure showing the operation of a PRB



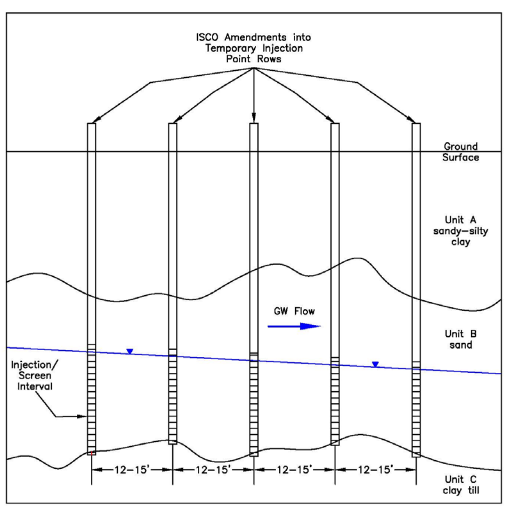
FRTR, 2023

Once groundwater passes through a PRB and has been successfully treated, the down-gradient saturated subsurface conditions should be conducive to bioremediation of any residual dissolved cVOCs (if present) using anaerobic biodegradation and MNA processes, particularly if the PRBs include ZVI, bacterial inoculation, or EVO amendments as planned at the Site.

The effectiveness of these remediation technologies will be verified using performance groundwater monitoring which will transition into plume stability or attenuation monitoring after short-term CAOs are attained. The data obtained from groundwater monitoring events will be used to evaluate the effectiveness of the selected corrective measures in eliminating risk for excavation workers and VI into residential structures. The use of remedial components described above for the On-Site and Off-Site areas is discussed in the following subsections, and the sequencing and implementation details are presented in Section 5.

4.4.2 On-Site Source Area Mass Reduction through ISCO

The On-Site remedy application includes initially injecting ISCO chemicals into the saturated subsurface soils in the On-Site Source Area (defined as areas where PCE or TCE concentrations in soil are greater than 40 mg/kg) to expeditiously reduce COC concentrations in the source area. As documented through the collection and analysis of soil samples during On-Site Source Area investigations, no unsaturated soil samples have concentrations greater than the CAOs, thus no active remediation is required in the vadose zone. ISCO is typically used to treat source areas where high concentrations of soil contamination are present that will continue to slowly desorb over an extended period of time, resulting in persistent and long-term high dissolved contaminant concentrations. The area-wide ISCO applications will target the Site's former plating room, the former location of the On-Site sanitary sewer lateral which historically serviced the facility, and the areas immediately downgradient of these locations. Multiple injection rows will be installed throughout the On-Site Source Area (in an offset "W" grid pattern) to provide adequate coverage and each row and injection point will be evenly distributed (provided no above ground or underground restrictions) throughout the remediation area. The amendment injection activities will generally follow standard industry practices most protective of potential down-gradient receptors, starting from in-situ injections on the exterior limits of the dissolved plume (hydraulically side-gradient or downgradient) and moving toward (inward or upgradient) the source area. It is anticipated that initial ISCO injection locations will be spaced within rows approximately 12 to 15 feet apart, with individual locations in each row spaced approximately 12 to 15 feet apart, and extending in depth into the top of Unit C to get adequate coverage of the On-Site Source Area. A diagram displaying the typical ISCO injection layout is provided below.



The On-Site Source Area has relatively high concentrations of adsorbed COCs which are affecting groundwater concentrations. ISCO works relatively quickly (days to weeks) to significantly reduce source area COC concentrations by desorbing and destroying the contaminants and producing harmless byproducts. The area-wide ISCO application is anticipated to be applied throughout the On-Site Source Area over the course of several injection events, spanning a period of approximately six to nine months. Details regarding the area-wide ISCO injections are included in Section 5.2.3.

Although short-term increases in dissolved cVOCs may be observed during the early stages of the ISCO program as the cVOCs are initially desorbed from the deeper soil, IWM Consulting anticipates that the ISCO injections will result in an average reduction of 50 to 70% in dissolved PCE, TCE, and total shortlist cVOCs concentrations across the source area when compared to the planned pre-injection baseline sampling event. As noted in Section 4.3.2, the bench scale testing completed in 2023 indicates that the selected ISCO program can quickly (days to weeks) reduce the cVOC concentrations by as much as 87.7% in a single application. Therefore, conservative reduction estimates of 50 to 70% for the implemented ISCO program are projected knowing that reduction rates can vary when comparing bench-scale study results to field application results. These reductions will allow the subsequent source area treatments to transition to other cleanup technologies (i.e., ISCR, enhanced bioremediation, or MNA) to meet CAOs. A description of the transition plan from ISCO to ISCR in-situ injections is discussed in Section 5.2.

4.4.3 On-Site Treatment Area Mass Reduction through ISCR

Following the implementation of the On-Site Source Area ISCO application(s), ISCR injections will be implemented in the surrounding On-Site Treatment Area to provide additional contaminant mass reductions and to achieve reduced ORP groundwater conditions that are amenable for subsequent anaerobic bioremediation through reductive dechlorination. Given that bench-scale treatability testing results demonstrated that ISCR processes resulted in a similar level of cVOCs treatment as ISCO, ISCR application may also extend into portions of the On-Site Source Area, as necessary, to further treat remaining impacts depending on the results of the preceding ISCO injection(s).

The ISCR injection point spacing and depth will be consistent with that specified for ISCO applications, for area-wide application, or may alternatively be installed as a series of PRB transects across the On-Site Treatment Area (per Section 4.4.4 below). Timing for the application of ISCR injections in areas previously treated through ISCO will be dependent upon groundwater geochemical monitoring to ensure that oxidants have been fully utilized and that groundwater pH and ORP return to near baseline conditions to ensure efficient use of amendments. The On-Site Treatment Area has lower concentrations of adsorbed COCs than the source area. ISCR's abiotic treatment mechanisms work relatively quickly (days to weeks) to reduce COC concentrations by destroying the contaminants, and then provide a sustained period of low ORP groundwater conditions that are suitable for stimulating enhanced anaerobic bioremediation of remaining cVOCs to produce harmless byproducts. ZVI combined with EVO and hydrogen donor/oxygen scavenging amendment (Provect-IR) is planned as the injectants for the On-Site Treatment Area ISCR application. Additional bacterial inoculations may be added at a later time based on the performance results following the ISCR application.

ZVI is a concentrated aqueous suspension of colloidal zero-valent iron formulated for compatibility with carbon-based substrates. When applied to the subsurface, it imparts an ISCR mechanism that allows for the destruction of chlorinated ethenes (i.e., PCE and TCE) via abiotic degradation pathways. This unique mechanism allows for the traditional reduction pathway to be bypassed, minimizing the formation of daughter species, such as vinyl chloride. Sulfidation blocks the effects of water on the ZVI particles, allowing the reagent to be effectively focused on the chemical reduction of chlorinated ethenes. ZVI has been shown to significantly degrade cVOCs and promote reduced ORP groundwater conditions (minimum of -100 mV) necessary for halorespiring bacteria to subsequently biodegrade cVOCs. Provect-IR is an additional amendment that works in conjunction with ZVI to act as a hydrogen donor and oxygen scavenger to facilitate abiotic reduction.

EVO is commonly added during in-situ injections to provide a slowly fermentable carbon substrate that can stimulate the anaerobic bioremediation of cVOCs. The use of EVO is a flexible technology that can be used in a variety of different configurations to treat contaminated groundwater, including source area treatment and PRBs. Potential benefits of this process include reduced source longevity, reduced contaminant mass flux, enhancement of ongoing natural attenuation, and/or control of dissolved plume migration. To enhance in-situ biodegradation, cVOCs can be brought into contact with a biodegradable EVO, which will serve as a carbon source for microbial cell growth and as an electron donor for energy generation. This will also promote the biodegradation of cVOCs at a significant distance downgradient of the injection area. However, the increased activity of a microbial population can also generate methane, which must be monitored if utilized in the vicinity of potential receptors (i.e., residential basements or utility corridors). Increased activity in microbial populations has the potential to produce methane, therefore, methanogenic inhibitors will be included in the EVO amendment and a proposed methane monitoring plan has also been included in Section 5.4.

A single ISCR injection event is anticipated to be needed to meet the CAOs; however, supplemental addition of ZVI and/or EVO to sustain effective bioremediation conditions may be applied using the existing injection wells installed along the former sanitary sewer lateral On-Site (shown in **Figure 2-3**). Details regarding the On-Site ISCR application are included in Section 5.2.4.

IWM Consulting anticipates that the ISCR injections will also initially result in an average reduction of 50 to 70% in dissolved PCE, TCE, and total shortlist cVOCs concentrations across the On-Site Treatment Area when compared to the planned pre-injection baseline sampling event. As noted in Section 4.3.2, the bench-scale testing completed in 2023 indicates that the selected ISCR program can quickly reduce the cVOC concentrations by as much as 84% in a single application, and create sustained groundwater geochemistry conditions that can reasonably be expected to promote long-term anaerobic biodegradation of cVOCs. Therefore, conservative reduction estimates of 50 to 70% for the implemented ISCR program are projected knowing that reduction rates can vary when comparing bench-scale study results to field application results. Thereafter, continued anaerobic bioremediation of remaining cVOCs will be utilized to meet long-term CAOs through MNA.

4.4.4 On-Site PRB(s) to Reduce Dissolved Mass Flux

In addition to the more area-wide injection approach discussed above for ISCO and ISCR applications, ISCR amendments will also be utilized for the installation of PRBs (both On-Site and Off-Site). The primary differences between ISCR injections for On-Site area-wide treatment versus injection to create a PRB include spacing of the injection points, vertical interval or distribution of injectant application, and amendment formulation. The spacing of rows of injection points is approximately six to 12 feet apart (similar to the spacing of points in each row) to provide a more concentrated zone of application, and arranged in a "W" pattern (see following diagram) to provide overlapping injection radii of influence/distribution to provide consistent contacting with groundwater flux.

For vertical distribution, because PRBs are designed to treat the flux of contaminant mass moving in groundwater, it is anticipated that the intervals exhibiting the higher contaminant mass flux will be more heavily dosed with the amendments than the less impacted intervals, particularly targeting the bottom several feet of geologic Unit B. The amendments to be utilized in the formulations include ZVI with Provect-IR, or ZVI with carbon-based sorptive media (i.e., activated carbon). The use of EVO will only be considered in the upgradient On-Site ISCR Treatment Area due to the potential for methane gas generation and proximity to potential receptors during Off-Site applications (as discussed below).The application of ZVI (with Provect-IR) and potentially carbon-based sorptive media (i.e., activated carbon) is planned to treat residual chlorinated solvent impacts dissolved in groundwater passing through the PRB and to further induce reduced ORP in downgradient groundwater to stimulate subsequent bioremediation. The carbon-based sorptive media is a colloidal form of activated carbon with a surface treatment that reduces its interactions with the soil matrix. This allows it to move through soil pores leaving a coating on the soil matrix as it distributes from the injection point and provides a very large sorption surface which will result in an immediate reduction of groundwater cVOC concentrations while sorbing and retarding migration of contaminants to allow for more efficient and controlled remediation through destructive reductive technologies, like ZVI. As contaminants are degraded to non-toxic and non-sorptive end products, the PRB carbon-based substrate sorption surface will be regenerated. This allows for further sorption and treatment of dissolved contaminants within the PRB over time.

Two or more On-Site PRBs will be installed, one or more in the central portion of the On-Site Treatment Area (generally extending across the plume and/or surrounding the adjacent residence structure that is currently equipped with an SSDS), and a final On-Site PRB along the northern ROW of Hamilton Avenue (i.e., southern/downgradient Site boundary). Additional PRBs will be constructed Off-Site as discussed below. The PRB installed along the north ROW of Hamilton Avenue will employ ZVI with Provect-IR to destroy cVOCs and reduce cVOC flux from the Site, by directly destroying contaminants (abiotically) and promoting downgradient groundwater ORP conditions suitable for bioremediation. This PRB is planned to be installed before conducting the On-Site ISCO/ISCR injections. The use of activated carbon in the On-Site PRB along the northern ROW of Hamilton Avenue will only be considered as a subsequent amendment application, based on observed groundwater conditions following the On-Site ISCO and ISCR injections.

The central On-Site PRB(s) are planned to treat desorbed and residual cVOCs migrating down-gradient from the northern portion of the On-Site Source Area treatment zone and/or spreading southwestward toward the adjacent residence structure. These PRB(s) will employ a mixture of ZVI and EVO to promote reductive dechlorination of cVOCs as they pass through the barrier and begin enhancing bioremediation activities. These barrier(s) will be installed to reduce the mass flux of cVOCs which could impact the adjacent residence or overload the downgradient PRBs on Hamilton Avenue over time. These PRB(s) may be installed following the initial or second ISCO injection event, depending on the performance monitoring results obtained after each ISCO injection event.

Details regarding the timing and installation of the On-Site PRBs are discussed in Sections 5.1 and 5.2.1, respectively.

4.4.5 Off-Site PRBs for Groundwater Treatment

As with the On-Site PRBs, ISCR amendments will also be utilized for the installation of Off-Site PRBs. The spacing of Off-Site PRB injection points will be approximately five to seven feet apart along PRB transects. As the PRBs are being installed along accessible properties and ROWs, a single row of injection points is anticipated, such that dosing of each point will account for sufficient coverage and distribution of amendments. Where accessible, a second row of points may be installed in an offset "W" pattern for additional distribution. For vertical distribution, because PRBs are designed to treat the flux of contaminant mass moving in groundwater resulting in concentrations above GVESLs in shallow groundwater, the injection intervals will be concentrated near the water table interface although the treatment zone will extend vertically to the Unit B/Unit C interface. The Unit B/Unit C interface is obvious when conducting drilling activities at the Site because Unit C is very stiff to hard and the direct push drilling units encounter refusal once they reach the top one to two feet of Unit C. In addition to this field indicator, a series of exploratory borings will be installed before and/or during the injection activities for each Off-Site PRB, as detailed in Section 5.3.2 of the SSCMIWP. The exploratory borings will be spaced every 50 to 100 feet along the length of the PRB and the soil will be visually inspected and logged to document the depth to the top of Unit C.

The amendments to be utilized in the formulations include ZVI with carbon-based sorptive media (i.e., activated carbon) and bacterial inoculations. The use of EVO will not be considered in the Off-Site area PRBs due to the potential for methane gas generation and proximity to potential receptors during Off-Site applications. Previous pilot testing of Off-Site ZVI and carbon-based substrate (in the area of monitoring well MW-35) demonstrated that this formulation is effective (without the addition of EVO) for Off-Site groundwater conditions. The addition of bacterial inoculations should also assist with down-gradient biodegradation of residual dissolved cVOCs.

One PRB is planned to be constructed along the southern ROW of Hamilton Avenue to provide an additional layer of protection for downgradient residences. A series of additional PRB sections will be installed parallel to Forsythe Street along the ROWs and select perpendicular arms to intersect and treat impacted groundwater upgradient of residences. The Off-Site PRBs may be installed concurrently with On-Site remedy implementation measures. Details regarding the timing and installation of the On-Site PRBs are discussed in Sections 5.1 and 5.3.2, respectively.

4.4.6 Contingency Measures

If the anticipated reductions in COC concentrations are not observed, On-Site and Off-Site contingency measures are discussed in more detail in Sections 5.2.6 and 5.3.4.

During in-situ injection activities, short-circuiting of injection material application will be monitored when working near conduits (sanitary or storm sewer mains) by monitoring nearby manholes. If injection materials are noted entering a sanitary or storm sewer, injection will be ceased and the injection points will be relocated to a distance further from the conduits. It is not possible to visually inspect the permeable backfill around the sewers, but precautions will be made regarding maintaining an adequate distance (approximately 10 feet) from any known sewer corridor and injecting the material at low pressure (anticipated to be approximately 15 to 20 psi). Observations will also be made during the installation activities to confirm there are no sudden pressure drops or increased flow rates, which may indicate short-circuiting into a more permeable material. Maintaining a distance of 10 feet from any known sewer line should provide enough lateral distance from the injection point since the anticipated ROI of the solid injectants (ZVI and activated carbon) is not anticipated to be more than 10 feet. Likewise, monitoring of groundwater liquid levels in Site monitoring wells during injections will be conducted to identify the potential for localized groundwater mounding that could intersect more permeable fill around Site sewers. Additionally, injections are anticipated to maintain a minimum distance of at least 10 feet from any residential basement.

4.5 Required Permits

Before mobilization to the Site, permits necessary for implementation will be obtained from the various permitting and regulatory authorities. This will include a right-of-way permit with the City of Franklin – Department of Public Works (City DPW). IWM Consulting has historically had a standing ROW permit with the City DPW to conduct Off-Site investigation and remediation activities and will work with the City DPW to update the permit before implementing any work activities within the public ROW. The City DPW will also be notified of the planned traffic control measures needed to safely implement the Off-Site work activities adjacent to City streets. Underground Injection Control Permits are not required for projects in Indiana and no additional permits should be required before implementing the work activities.

4.6 Required Access Agreements

Before mobilization to the Site, right-of-entry access agreements necessary for the implementation of injection activities and performance monitoring activities on Off-Site private properties will be obtained from various private property owners. The location of the proposed Off-Site PRBs and performance monitoring wells are dependent on obtaining private access and may be offset to account for the proximity of public utilities. Private access is planned to be requested for the following properties:

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5.0 CORRECTIVE MEASURE IMPLEMENTATION

This section details the plan for implementing the remedy and monitoring the effectiveness of remedial progression at attaining CAOs. The selected corrective measures were introduced in Section 4.0. This Section is designed to give more detail regarding the implementation phase of the corrective measures and how they will be applied to meet short-term and long-term goals.

5.1 Corrective Measures Sequencing

The general sequencing of the remedial components to be implemented is summarized below for On-Site and Off-Site measures. It is planned to conduct On-Site and Off-Site remedy implementation concurrently, but subcontractor availability may require the activities to start at different times. Details of the implementations are presented in the subsequent subsections for each remedial component. The schedule is also discussed in Section 6.8 (and a timeline is presented in **Appendix F**).

On-Site Remedy Sequencing:

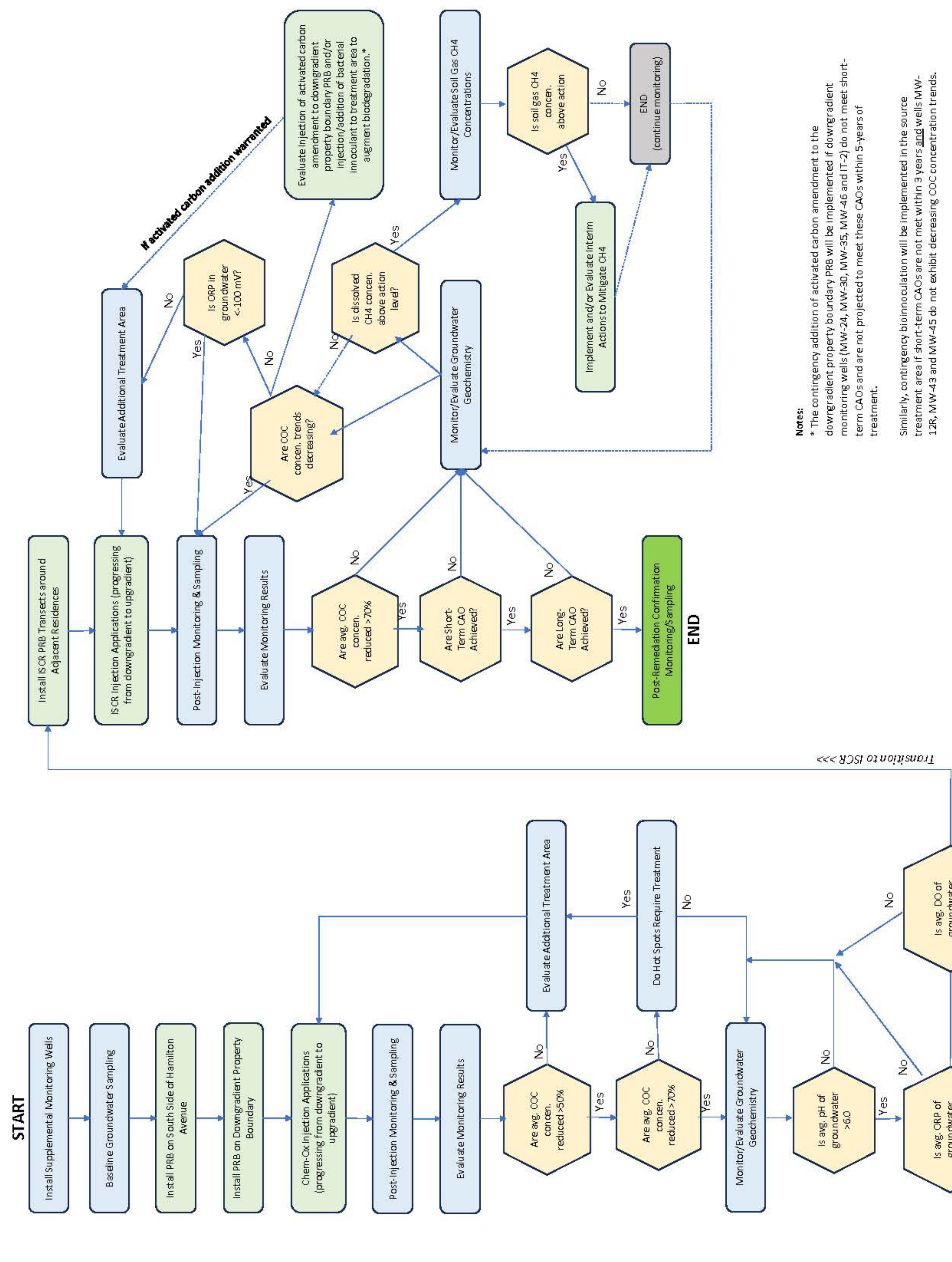
- Southern PRB Installation (northern ROW of Hamilton Avenue);
- ICM Groundwater Extraction System Deactivation (concurrent with the above PRB installation);
- ISCO in-situ injections in On-Site Source Area;
- Central On-Site PRB(s) Installation;
- ISCR in-situ injections in the On-Site Treatment Area; and
- Enhanced Bioremediation with MNA.

Off-Site Remedy Sequencing:

- Southern Hamilton Avenue ROW PRB Installation (before or concurrent with Southern On-Site PRB installation above)
- Off-Site PRBs Installed along Forsythe Street; and
- Enhanced Bioremediation with MNA.

The transition between the On-Site phases of remediation (i.e., ISCO to ISCR) is discussed in the sections below and displayed in the following flow chart.

On-Site Treatment Area Remedial Progression Work Flow
Amphenol Former Bedix Facility - Franklin, IN



Notes:
* The contingency addition of activated carbon amendment to the downgradient property boundary PRB will be implemented if downgradient monitoring wells (MW-24, MW-30, MW-35, MW-46 and IT-2) do not meet short-term CAOs and are not projected to meet these CAOs within 5-years of treatment.

Similarly, contingency bioinnoculation will be implemented in the source treatment area if short-term CAOs are not met within 3 years and wells MW-12R, MW-43 and MW-45 do not exhibit decreasing COC concentration trends.

5.2 On-Site Soil and Groundwater Remediation

5.2.1 On-Site PRBs

Before initiating On-Site Source Area ISCO in-situ injection activities, an On-Site ISCR PRB with ZVI and Provect-IR will be installed along the southern property boundary (i.e., northern Hamilton Avenue ROW) to minimize potential Off-Site migration of dissolved COCs since the existing ICM (Groundwater Pump & Treat Remediation System) will be deactivated to facilitate the subsequent injection activities. The installation of this PRB (in conjunction with the Off-Site PRB installed in the southern ROW of Hamilton Avenue) will be the first in-situ remedial action performed and the PRB will protect downgradient receptors from short-term fluctuations in the On-Site dissolved-phase COC concentrations, which are expected during the On-Site Source Area ISCO in-situ injection events. One or more, centrally located, On-Site PRB(s) will also be installed upgradient of the property boundary PRB, and surrounding the adjacent residential structure, to provide additional groundwater treatment of desorbed cVOC that may migrate downgradient from the northern On-Site Source Area during ISCO injection(s). These upgradient On-Site PRB(s) will be installed following the initial or second ISCO injection event, depending on the performance monitoring results obtained after each ISCO injection (discussed in Section 5.2.3) and before, or concurrent with the subsequent On-Site Treatment Area ISCR injections (discussed in Section 5.2.4). Another PRB will be installed Off-Site, located in/adjacent to the southern ROW of Hamilton Avenue, as part of the Off-Site in-situ injection remediation program, which is discussed in Section 5.3.2 of this report. This duplicative PRB barrier approach provides multiple layers of protection before the Site groundwater reaches downgradient Off-Site residences. The proposed locations of the northern and southern Hamilton Avenue ROW PRBs are displayed in **Figure 4-1** and **Figure 4-2**, respectively.

The On-Site PRBs (north side of Hamilton Avenue and north and east of the adjacent residence) will be installed to protect potential receptors using an outward to inward and downgradient to upgradient approach (the lower towards the higher concentration areas). The injections are anticipated to be completed at low pressures (anticipated to be approximately 15 to 20 psi) to reduce the potential for fracturing, daylighting, and impacting receptors (i.e., sewer conduits, and basements). Following the On-Site PRB installation, it is anticipated that the ISCO/ISCR amendments will be applied to the On-Site Source Area using an outward to inward and downgradient to upgradient injection approach to limit potential plume migration toward potential receptors. Again, slight variations to this sequencing may be made due to logistical or access limitations.

The On-Site PRBs consist of multiple components that have varying expected lifespans and create subsurface conditions that will continue to be effective at promoting reductive dechlorination. The combination of Provect-IR and ZVI will create a longer-lasting reducing environment than Provect-IR alone. This in combination with anaerobic amendments (ZVI, Provect-IR, and EVO) being emplaced upgradient via future ISCR injections will increase the longevity of the PRB as anoxic water enters the barrier. A major component of the PRB is ZVI (approximately 4,700 lbs) and the reductive environment created by the injection program will preserve the reactive surfaces of the iron, resulting in an overall expected lifespan of over 10 years. Remedial performance monitoring will document the remedial progression and groundwater conditions, which will determine if additional contingency applications are necessary.

Hamilton Avenue PRB (Northern ROW)
The On-Site property boundary PRB will be installed along the southern perimeter of the Site, either within the northern ROW of Hamilton Avenue or just inside the Site property boundary, depending upon the location of identified utilities within the ROW. This northern Hamilton Avenue ROW PRB will be established using a combination of injectable ZVI and Provect-IR. Dissolved-phase cVOCs will be directly destroyed by the ZVI through abiotic dechlorination, which does not generate chlorinated daughter byproducts (i.e., vinyl chloride), and the ZVI will generate reduced groundwater geochemical conditions suitable for subsequent biological reductive dichlorination of cVOCs passing through the PRB for continued downgradient bioremediation. These technologies have been shown to achieve rapid reduction in cVOC concentrations in groundwater (days to months) exiting the PRB which will also result in cVOC desorption from downgradient saturated soils which will result in continuous reduction of cVOCs in groundwater downgradient of the PRB. The PRB is designed to operate for an extended lifetime of at least 10 years to allow for remediation and attenuation of On-Site impacted soil and groundwater.

The northern Hamilton Avenue ROW PRB is approximately 350 feet long and the eastern extent of the PRB is hydraulically upgradient of RW-1, which will remediate groundwater in the vicinity of RW-1. Where possible, the PRB injection points will be staggered in a “W” pattern and located approximately six to 12 feet apart horizontally. Where available areas in the ROW do not permit the installation of a “W” pattern due to the property line and subsurface utility locations, PRB injection points will be placed in a straight line and will be spaced approximately five to seven feet apart horizontally, and the volume/dose of injectants may be adjusted to ensure adequate distribution. Vertical treatment intervals are approximately nine feet in thickness, from the shallowest depth where cVOC impacts are noted within Unit B (located approximately 13 feet BLS, at the water table) and slightly into Unit C (located approximately 22 feet BLS). Based on pilot study data, a treatment radius of influence of three to six feet is assumed. The injectable activated carbon and ZVI mixture will be injected into approximately 47 temporary direct push points along the northern Hamilton Avenue ROW PRB.

The temporary injection points will be installed with a direct push drilling unit equipped with 1.5-inch diameter drill rods and retractable screens (two to four feet in length). Direct push injection points offer flexibility with moving injection point locations as well as adjusting target vertical depth intervals. Additionally, direct push injection points do not generate soil cuttings (waste) that would require disposal or abandonment after the project is completed. The in-situ treatment mixture is anticipated to be pressure injected into the formation using a top-down injection technique (although site conditions may also require a bottom-up injection approach to prevent short-circuiting or daylighting of amendments) via the above ground pumps placed inside an injection trailer. The anticipated northern Hamilton Avenue ROW PRB design details are as follows:

Surficial Treatment – 350 linear ft.
Vertical Treatment Interval –from approximately 13 to 22 ft. BLS
Remediation Technologies:

- Provect-IR Substrate – ~37,600 lbs.
- ZVI – ~4,700 lbs.

Injection Points: ~47 DPT
Volume Per Injection Point: ~330 gallons

In conjunction with the installation of the northern Hamilton Avenue ROW PRB, the ICM groundwater pump and treat system will be deactivated in preparation for the subsequent On-Site ISCO in-situ injections. After the initial or second ISCO injection event is completed (as discussed in Section 5.2.4), the upgradient, On-Site PRB(s) will be installed to assist with the destruction of desorbed and dissolved cVOCs. This will help prevent the adjacent residence structure and northern Hamilton Avenue ROW PRB from becoming exposed to a short-term increase in contaminant mass that may be observed after the On-Site ISCO in-situ injection event.

Upgradient On-Site PRBs
An upgradient On-Site PRB will be installed in the Treatment Area in the vicinity of the adjacent residence structure. Additional On-Site ISCR applications in the Treatment Area (see Section 5.2.3) may also utilize PRB transects or a more area-wide approach (or a combination) based on encountered Site logistics. The upgradient On-Site PRB in the vicinity of the adjacent residence is anticipated to be approximately 360 linear feet in total. It is anticipated that the PRB injection points will be staggered in a "W" pattern and located approximately six to 12 feet apart horizontally. Impacts have been observed from the top of the observed water table (approximately 15 feet BLS) to 25 feet BLS. Vertical treatment interval is approximately 10 feet in thickness, from the shallowest depth where cVOC impacts are noted within Unit B (located approximately 15 feet BLS) and slightly into Unit C (located approximately 22 to 24 feet BLS). Based on pilot study data, a treatment radius of influence of three to six feet is assumed. The injectant formulation, comprised of ZVI and Provect-IR, will be injected into approximately 28+ temporary direct push points along the upgradient On-Site PRB transect. The injection points will be advanced consistent with the plan for the Northern Hamilton Avenue ROW PRB discussed above. The anticipated central On-Site PRB design specifications are listed below:

Surficial Treatment – 360 linear ft.
Vertical Treatment Interval –from approximately 15 to 25 ft. BLS
Remediation Technologies:

- ZVI – ~2,800 lbs.
- Provect-IR – ~22,400 lbs.

Injection Points: ~28+ DPT
Volume Per Injection Point: ~280 gallons

The timing of the installation of the upgradient On-Site PRB(s) will depend on groundwater geochemistry monitoring following the ISCO injections, to determine when groundwater has approached baseline geochemistry conditions, to reduce the potential for competing chemistries between ISCO and ISCR technologies.

5.2.2 ICM Groundwater Recovery and Treatment System

The On-Site ICM has served its purpose and recovered and treated over 324,000,000 gallons of impacted groundwater and maintained hydraulic control of On-Site dissolved cVOCs during its operation. The planned final corrective action measures are designed to reduce sorbed source mass that is affecting groundwater conditions and to treat groundwater such that both the contaminant mass flux and risk to downgradient receptors are reduced to a point that the ICM is no longer necessary to provide hydraulic control.

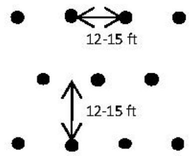
During the northern Hamilton Avenue ROW PRB injection (and subsequent to, or concurrent with, the southern Hamilton Avenue ROW PRB injection), the On-Site ICM groundwater recovery and treatment system will be deactivated to allow injected amendments to have sufficient time to contact and react with impacted soil and groundwater within the On-Site Treatment Area. IWM Consulting plans to deactivate the southernmost recovery wells (RW-1, RW-2, and RW-5) in phases during installation of the northern Hamilton Avenue ROW PRB to ensure that the closest recovery well is not recovering the injectants being installed. Once the recovery well is deactivated, the PRB points will be installed in that area, providing an effective and long-term in-situ treatment barrier, and the recovery well will remain deactivated. Once the entirety of the northern Hamilton Avenue ROW PRB has been installed, all of the remaining recovery wells will be permanently deactivated. It is anticipated that the ICM will not be utilized again following its deactivation and has utilized the majority of the life expectancy of many of the major components of the system.

The sewer vapor recovery system installed within the groundwater pump and treat remediation system building will remain active through the completion of the plume stability/attenuation groundwater sampling activities (~3 additional years) and a determination will be made at that point on whether it is necessary to continue to operate the sewer vapor recovery system.

5.2.3 On-Site ISCO

On-Site ISCO in-situ injections are intended to provide relatively quick reductions in adsorbed and dissolved cVOC concentrations within the On-Site Source Area. The application of in-situ technologies will treat both impacted soil and groundwater. The On-Site Source Area is displayed in **Figure 4-1**. The initial in-situ injection of ISCO chemistries will consist of SPS activated with hydrogen peroxide (or MFC) and ZVI, which will treat the soil impacted with cVOCs that exceed 40 mg/kg (for either PCE or TCE). Impacts range in depth from the top of the observed water table (approximately 15 feet BLS) to 26 feet BLS. However, the majority of impacts are located from 17 to 26 feet BLS, with high concentrations observed within the interface zone between the bottom of Unit B and the top of Unit C. The ISCO technology will promote the desorption of soil impacts, including within silty and clay-rich soils, and then promote the destruction of the COCs within groundwater. Following the initial ISCO injection event, subsequent ISCO injection events will target "hot-spot" areas and will continue to lower COC concentrations in soil and groundwater. A determination of how many additional in-situ injection events is necessary will be based on performance monitoring after each in-situ injection event. At this time, based on the bench-testing results, up to three (3) ISCO injection events may be completed.

The temporary injection points will be installed similarly to the On-Site PRB injection points discussed in Section 5.2.1, but in a grid pattern. Rows of points will be spaced approximately 12 to 15 feet apart, with individual points spaced approximately 12 to 15 feet apart (and staggered from adjacent rows) throughout the On-Site Source Area (see following diagram). Vertical treatment intervals range from 10 to 11 feet in thickness. An ROI of three to six feet is assumed throughout the On-Site Source Area. The amendment injection activities will generally follow standard industry practice most protective of potential downgradient receptors, starting with in-situ injections on the exterior limits of the dissolved plume (hydraulically side-gradient or downgradient) and moving toward (inward or upgradient) the source area.



Source Area Injection
Point Spacing

On-Site Source Area
Surficial Treatment – 30,500 square feet
Vertical Treatment Interval –from approximately 15 to 26 ft. BLS
Remediation Technologies:

- SPS – ~34,801 lbs.
- MFC – ~2,983 gallons
- ZVI Activator – ~11,057 lbs.

Injection Points: ~94+ DPT
Volume Per Injection Point: ~400 gallons

Subsequent ISCO in-situ injections are anticipated to be reduced in size from the initial injection event and they will be based upon groundwater sampling results.

It is anticipated that an average reduction of at least 50% of dissolved-phase cVOCs will be achieved in the On-Site source area, however, a much greater reduction in cVOC concentrations in most locations is expected. Following completion of ISCO in-situ injections in the On-Site Source Area, the remaining On-Site in-situ injection event(s) will consist of ISCR and enhanced bioremediation technologies to complete Site remediation within the entirety of the On-Site Treatment Area establishing an anaerobic environment for anaerobic biodegradation of cVOCs using reductive dechlorination.

Utility Protection

The On-Site ISCO injection activities will target the saturated portion of Unit B, typically starting approximately 12 to 15 feet BLS. The municipal storm sewer is the only utility, deeper than approximately six feet BLS, located in the On-Site Source or Treatment Area where ISCO amendments will be employed. Depth to groundwater measurements will be obtained during the injection activities when working near this utility to ensure groundwater mounding does not submerge this utility.

The municipal storm sewer is a 60-inch diameter galvanized steel corrugated pipe that was originally installed with a rubberized internal coating. In anticipation of upcoming remediation activities and to minimize the possibility of natural groundwater infiltration and short-circuiting of any future remedial injectants, Amphenol rehabilitated an approximately 600-foot section of the storm main which traverses across the Site in May/June 2021. The joints of the storm sewer main were re-sealed with an 18-inch full circumferential band of 5,000 psi shotcrete which was applied approximately two inches in thickness. In addition, the invert of the pipe received a shotcrete structural lining from the 05:00-07:00 position. The shotcrete throughout the structural rehabilitation was enhanced with 2-inch by 2-inch, 12-gauge, welded wire mesh reinforcement and the final thickness of the shotcrete was approximately two inches (1-inch below and 1-inch above the wire mesh). The wire mesh was anchored to the storm sewer pipe using self-taping screws and the wire mesh was tied into the anchors with 16-gauge annealed tie wire.

The bottom of the On-Site municipal storm sewer line is located approximately 15 feet BLS across the Site, which is within one to two feet of the potentiometric surface and does have the potential to come into contact with ISCO amendments if mounding occurs. Special care will be taken while injection takes place near the On-Site municipal storm sewer line to limit groundwater mounding by monitoring the potentiometric surface near the storm sewer line. Additionally, the injection locations will be spaced far enough away (approximately 10 feet) from the On-Site storm sewer line to prevent any direct contact of the injectant to the exterior surface of the storm sewer. If contact is encountered as a result of groundwater mounding, the injectant will be diluted and utilities that have reactive surfaces should already be neutralized (ferric oxide, providing a protective coating) due to historical interactions with oxygen dissolved in groundwater.

Injectant Loss Monitoring

During the injection activities, injectant loss will be monitored in the nearby On-Site municipal storm sewer via the accessible down-flow sewer manholes. The northwest drainage ditch is located several hundred feet hydraulically upgradient from the closest injection area. Given the fact that the estimated injection ROI is not anticipated to be greater than 10 to 15 feet, no monitoring of the northwest ditch will be conducted.

5.2.4 On-Site ISCR and Enhanced Anaerobic Bioremediation

Following the completion of ISCO injection activities and performance monitoring, ISCR in-situ injections utilizing ZVI and Provect-IR with EVO (for enhanced anaerobic bioremediation) will be conducted to complete the remediation of adsorbed and dissolved-phase cVOCs in the On-Site Treatment Area. These ISCR injections will be implemented along with the installation of the above-referenced upgradient On-Site PRB, which uses a similar ISCR injection formulation, but at a tighter spacing to ensure consistent groundwater contact. This additional On-Site ISCR application will generally utilize a more area-wide application, as discussed below, or a combination of area-wide grid application and a series of transect injections approach based on site logistics (i.e., accessibility, infrastructure, and drilling refusals).

The estimated On-Site Treatment Area covers approximately 74,000 square feet and encompasses the On-Site Source Area. The On-Site Treatment Area is displayed in **Figure 4-1**. The initial in-situ injection of ISCR chemistries should expeditiously reduce the cVOC concentrations in the soil and groundwater within the On-Site Treatment Area, as similar performance to ISCO was exhibited in bench-scale testing. As previously discussed, the majority of impacts are located in the saturated interval of Unit B from 19 to 26 feet BLS, and most prominently within the interface zone between Unit B and Unit C. It is anticipated that a single ISCR in-situ injection with EVO will be completed within the On-Site Treatment Area using temporary injection points.

Rows of points will be spaced approximately 12 to 15 feet apart, with individual points spaced approximately 12 to 15 feet apart (and staggered from adjacent rows) throughout the On-Site Treatment Area, similar to the On-Site Source Area reduction treatment strategy. Vertical treatment intervals range from 10 to 11 feet in thickness. The amendment injection activities will generally follow standard industry practice most protective of potential down-gradient receptors, starting in situ injections on the exterior limits of the dissolved plume (hydraulically side-gradient or downgradient) and moving toward (inward or upgradient) the source area.

If injection points are installed as PRB transects, then each transect would include two closer-spaced rows of injection points consistent with the PRB approach, described above, with transects spaced 30 to 40 feet apart based on groundwater flow velocities. The use of grid application versus transects will be determined based on the results of ISCO injections at reducing cVOC mass.

On-Site Treatment Area
Surficial Treatment – ~43,500+ square feet (may also expand to portions of On-Site Source Area, depending on the sampling results obtained after the ISCO injection events)
Vertical Treatment Interval –from approximately 15 to 26 ft. BLS
Remediation Technologies:

- ZVI – ~22,800 lbs.
- Provect-IR – ~104,500 lbs.
- EVO – ~38,000 lbs.

Injection Points: ~190+ DPT
Volume Per Injection Point: ~280 gallons

If subsequent ISCR or EVO in-situ injections are necessary, they are expected to be reduced in size from the initial injection event; however, the size reduction is not currently known and is dependent upon the results of the progress sampling activities. Additionally, existing injection wells (IN-1 through IN-7) or recovery wells (RW-1 through RW-5) could potentially be utilized for future ISCR or amendment injections, if warranted.

It is anticipated that an average reduction of at least 70% of dissolved-phase cVOCs will be achieved in the On-Site Treatment Area when compared to baseline concentrations. Post ISCO and ISCR treatment, the entirety of the On-Site Treatment Area, including both On-Site Source Area, is expected to be remediated using reductive dechlorination and establishing an anaerobic environment for ongoing biodegradation of cVOCs to achieve long-term CAOs. The use of SPS with ZVI activation (in addition to MFC) for ISCO will result in post-oxidation groundwater geochemistry reverting to anaerobic and reducing conditions, and subsequent ISCR application will further promote these conditions.

As previously stated, during the injection activities, injectant loss will be monitored in the nearby On-Site municipal storm sewer via the accessible down-flow sewer manholes.

5.2.5 MNA

Following the completion of ISCR in-situ injections with EVO (for enhanced anaerobic bioremediation) and performance monitoring, the On-Site Treatment Area will be monitored to ensure that sufficient ORP-reducing conditions are maintained for the continued anaerobic biodegradation of cVOCs. Continued verification of MNA will be conducted through the plume stability monitoring program described in Section 5.4.

5.2.6 On-Site Contingency Plans

If the anticipated reductions in COC concentrations are not observed after the first ISCO injection event, then one to two more ISCO injection events may be completed, before transitioning to ISCR and/or enhanced bioremediation. ISCR and enhanced bioremediation (i.e., EVO application) should supply the conditions necessary to promote an environment that is conducive to the long-term degradation of cVOCs.

It is anticipated that the above On-Site remedial measures will attain the short-term CAOs within five years following the injections. The performance of active remediation will be evaluated through groundwater quality monitoring, with the short-term goal of reducing On-Site to Off-Site cVOC groundwater migration to concentrations below GVESLs. Monitoring of groundwater will also document On-Site groundwater geochemistry conditions to confirm that conditions remain amenable to reductive dechlorination through bioremediation until dissolved phase concentrations meet the GVESLs.

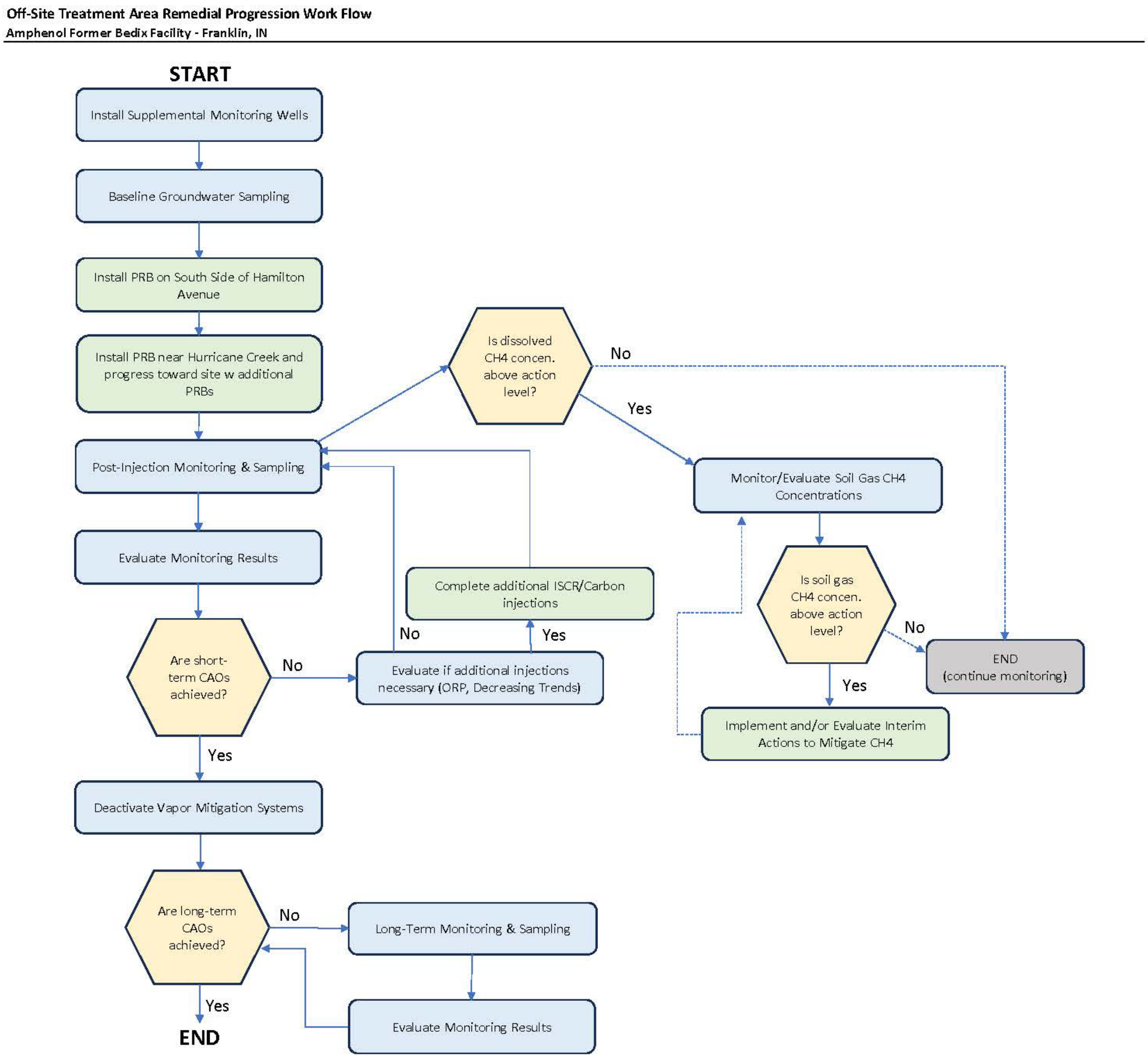
Following the completion of ISCR/enhanced bioremediation in-situ injection activities, if the overall average conditions of the On-Site Treatment Area do not meet the necessary reducing conditions (ORP of at least -100 mV) which promote halorespiring bacteria to multiply and consume cVOCs, then the need for additional remediation will be evaluated, which may include supplemental in-situ injection events. Groundwater sampling data from 2021 demonstrate the presence of cVOC consuming bacteria (Microbial Insights Laboratory Report included in **Appendix C**). Existing On-Site injection wells (IN-1 through IN-7) or recovery wells (RW-1 through RW-5) could potentially be utilized for future ISCR or amendment injections, if warranted. Further, if groundwater concentrations migrating off-site through the downgradient property boundary PRB, as monitored in the performance wells down-gradient of the On-Site Treatment Area, do not meet short-term CAOs and do not exhibit decreasing concentration trends sufficient to meet the short-term CAOs within five years, then contingency measures may also include the addition of activated carbon to the downgradient PRB and/or bioaugmentation with chlorinated hydrocarbon degraders.

Injectant Loss

Although not anticipated, in the unlikely event that an injectant is discovered in the sewer, the injectant may be recovered using an explosion-proof shop or drum vac, absorbent booms, or other absorbent materials to the extent practical. If such an incursion into the sewer occurs, subsequent injection points will be completed using a lower injection pressure and will be placed at distances further away from any identified short-circuiting feature.

5.3 Off-Site Groundwater Remediation

The progression of Off-Site phases of remediation (i.e., Vapor Mitigation, PRBs, MNA) is discussed in the sections below and displayed in the following flow chart.



5.3.1 *Vapor Mitigation Systems*

Vapor mitigation systems within the Study Area were installed at seven residential structures which exhibited the potential for vapor intrusion. The operation of the vapor mitigation systems allows for the mitigation of potential VI until the Final Remedy can achieve short-term groundwater CAOs beneath the residential structures and eliminate the risk of potential VI from releases associated with the Site. Once confirmation sampling results meet the necessary criteria to permanently deactivate the vapor mitigation systems, Amphenol will submit for the USEPA's review and approval for the recommendation to cease vapor mitigation system operation and the vapor mitigation system(s) will be decommissioned, or they may be left in place at the property owner's request.

5.3.2 Off-Site PRBs

The Off-Site PRBs (nine total) include injection of carbon-based substrate, ZVI, and bacterial inoculations along Forsythe Street, Hamilton Avenue, Ross Court, and private properties and totals approximately 3,430 feet in total length. The injections will be used to treat the dissolved cVOCs located adjacent to the refurbished sanitary sewer lines, under private and public properties located within the Study Area, and provide a treatment barrier north of Hurricane Creek. The treatment will also provide long-term barriers to intercept contaminants from hydraulically upgradient areas. This approach will utilize multiple treatment lines, the longest to be installed along Forsythe Street, with shorter perpendicular lines installed along Hamilton Avenue, Ross Court, and on private properties. The Off-Site PRBs should be viable for a minimum of 10 years.

The Off-Site PRB consists of multiple components that have varying expected lifespans and create subsurface conditions that continue to be effective at promoting reductive dechlorination. The combination of granular activated carbon (PlumeStop), ZVI (S-MZVI), and bacterial inoculations (Bio-Dechlor Inoculation®) will create a long-lasting reducing environment amenable to reductive dechlorination and bacterial consumption of residual chlorinated solvents. Based on current Off-Site groundwater COC concentrations and using two different groundwater velocity estimates (183 feet/year and 350 feet/year), Regenesis completed two separate modeling scenarios to demonstrate anticipated performance 10 years post-application. Both modeling scenarios demonstrated that the barrier should still be effective at 10 years post-application. This, in combination with anaerobic amendments (ZVI, Provect-IR, and/or EVO) being emplaced upgradient via the planned On-Site ISCR injections, will further increase the longevity of the PRBs as anoxic water is entering the downgradient barriers. The Regenesis modeling information has been included in **Appendix C**.

The temporary injection points will be installed similarly to the On-Site PRB injection points discussed in Section 5.2.1. The points will be installed at a distance of 10 feet or greater from the OIM sanitary sewer trench located within the City ROW as conditions allow. Injection points will be spaced every five to seven feet along the lines of treatment. Vertical treatment intervals range from six to eight feet in thickness to address the zone of residual impact influencing shallow groundwater conditions and will extend to the Unit B/Unit C interface. The Unit B/Unit C interface is obvious when conducting drilling activities at the Site because Unit C is very stiff to hard and the direct push drilling units encounter refusal once they reach the top one to two feet of Unit C. Exploratory test borings will be installed approximately every 50 to 100 feet of linear PRB installation to verify PRB installation injection depths are encountering the Unit B/Unit C interface.

Initially, an Off-Site PRB will be constructed on the south side of Hamilton Avenue, which will utilize ZVI with carbon-based sorptive media and bacterial inoculations to protect potential receptors immediately down-gradient of the Site. As the PRB is being installed along the ROW, a single row of injection points is anticipated, such that the dosing of each point will account for sufficient coverage and distribution of amendments. Based on Off-Site access, a second row of points may be installed in an off-set "W" pattern for additional amendment distribution. Injections are anticipated to start on the eastern and western ends of the southern Hamilton Avenue PRB and proceed inward, based on the observations that the areas to the east and west are less impacted than the area in the center of the PRB, immediately down-gradient of monitoring well MW-12R and recovery wells RW-2 and RW-5. The injections are anticipated to be completed at low pressures (anticipated to be approximately 15 to 20 psi) to reduce the potential for fracturing, day-lighting, and impacting receptors (i.e., sewer conduits, and basements).

Following the installation of the southern Hamilton Avenue PRB, additional PRB installation on Forsythe Street will proceed, starting at the furthest downgradient proposed PRB, near Hurricane Creek. To the extent practical, the Off-Site PRB installation will continue north (hydraulically upgradient), toward the Site. Slight variations to this sequencing may be made due to logistical or access limitations.

A summary of design parameters for the areas described above is presented as follows and the PRBs are displayed by location (using the numeric IDs listed below) in **Figure 4-2**. A figure depicting a closeup along a portion of Forsythe of the injections, monitoring well locations, and distance from the road has been included in **Figure 4-3**. Volumes/Mass of injectable amendments in each transect and each point will vary slightly based on the actual spacing of injection points, treatment interval thickness at each point, and relative cVOC concentrations in nearby monitoring wells.

(1) Hamilton Avenue (Southern ROW)
Surficial Treatment – 290 linear ft.
Vertical Treatment Interval –from approximately 13 to 21 ft. BLS
Remediation Technologies:
- Carbon-Based Media – ~3,864 lbs.
- ZVI – ~420 lbs.
- Bacterial Inoculation - ~ 21 liters

Injection Points: ~42 DPT
Volume Per Injection Point: ~272 gallons

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(2) Forsythe St – West Transect
Surficial Treatment – 810 linear ft.
Vertical Treatment Interval – from approximately 8 to 14 ft. BLS
Remediation Technologies:
- Carbon-Based Media – ~10,672 lbs.
- ZVI – ~1,160 lbs.
- Bacterial Inoculation - ~ 58 liters

Injection Points: ~116 DPT
Volume Per Injection Point: ~256 gallons

(3) Forsythe St – East Transect
Surficial Treatment – 1,325 linear ft.
Vertical Treatment Interval –from approximately 8 to 14 ft. BLS
Remediation Technologies:

- Carbon-Based Media – ~18,400 lbs.
- ZVI – ~2,000 lbs.
- Bacterial Inoculation - ~ 100 liters

Injection Points: ~200 DPT
Volume Per Injection Point: ~210 gallons

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(4) Ross Court
Surficial Treatment – 225 linear ft.
Vertical Treatment Interval –from approximately 7 to 13 ft. BLS
Remediation Technologies:

- Carbon-Based Media – ~3,036 lbs.
- ZVI – ~330 lbs.
- Bacterial Inoculation - ~ 16.5 liters

Injection Points: ~33 DPT
Volume Per Injection Point: ~253 gallons

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(5) East Forsythe St – Sewer ROW
Surficial Treatment – 200 linear ft.
Vertical Treatment Interval –from approximately 8 to 14 ft. BLS
Remediation Technologies:

- Carbon-Based Media – ~2,760 lbs.
- ZVI – ~300 lbs.
- Bacterial Inoculation - ~ 15 liters

Injection Points: ~30 DPT
Volume Per Injection Point: ~291 gallons

(6-9) Private Property Barriers (4)
Surficial Treatment – 580 linear ft. (combined)
Vertical Treatment Interval –ranges from 2 to 7 ft. (thickness of saturated Unit B), depths and interval thickness vary by location depending on depth to Unit C.
Remediation Technologies:

- Carbon-Based Media – ~7,636 lbs.
- ZVI – ~830 lbs.
- Bacterial Inoculation - ~ 41.5 liters

Injection Points: ~83 DPT
Volume Per Injection Point: ~233 gallons

Following the completion of PRB installation activities, performance groundwater monitoring will be completed, as described in Section 5.4, to evaluate the effectiveness of the completed corrective measure. Based on current groundwater COC concentrations, only one Off-Site injection event is anticipated to be needed to meet short-term CAOs and the long-term goals will be achieved through continued treatment by the PRBs and enhanced anaerobic biodegradation. Continued verification of MNA will be conducted in accordance with the plume attenuation monitoring plan described in Section 5.4. MNA monitoring will be focused on progress towards meeting the GVESL (short-term groundwater CAOs) and MCLs (long-term groundwater CAOs) and ensuring methane levels are not temporarily elevated by methanogenesis.

Injectant Loss Monitoring

During injection activities near Hurricane Creek, visual inspections will be completed for injectant seepage. However, due to the distance of the closest proposed PRB to Hurricane Creek (approximately 70 to 100 feet), it is not anticipated that injected materials will enter the creek. The anticipated ROI of the injected material is not anticipated to exceed approximately 10 feet during injection. Following injection, the injected materials (ZVI with carbon-based sorptive media) are not mobile as they are solid materials. During injection, ORP in groundwater may also be monitored in proposed monitoring well MW-53, although the monitoring location is also located approximately 25 feet from the proposed PRB, outside of the anticipated injection ROI.

5.3.3 MNA

Following the completion of PRB in-situ injections with carbon-substrate/ZVI, the Off-Site remediation area will be monitored to evaluate that sufficient reductive conditions are maintained for anaerobic biodegradation of cVOCs and plume attenuation monitoring will be completed.

5.3.4 Off-Site Contingency Plans

Following the completion of PRB in-situ injection activities, if the overall average conditions of the Off-Site remediation area do not meet the necessary reducing conditions (ORP of at least -100 mV) which promote halorespiring bacteria to multiply and consume cVOCs or if short-term CAOs are not achieved within the required timeframe, then additional remediation will be evaluated, including completing supplemental in-situ injection events.

The vapor mitigation systems will continue to be operated until short-term CAOs are achieved and confirmation sampling determines that the vapor mitigation systems may be decommissioned.

It should be noted that Residential Sub-Slab Vapor Screening Level CAOs may not be met at one residence located west of the Site on Hamilton Avenue as it is located hydraulically down-gradient of the third-party plume west of Forsythe Street which is not part of the focus of this *SSCMIWP*.

The implementation of supplemental in-situ injection will be based on groundwater monitoring results; if groundwater concentrations meet short-term groundwater CAOs Off-Site, additional active remediation will not be required. Monitoring of groundwater will be necessary to verify groundwater conditions continue to meet short-term groundwater CAOs Off-Site. Long-term monitoring will also demonstrate MNA processes are creating groundwater conditions that provide continuous reductions in cVOC concentrations or established plume stability (at concentrations less than short-term groundwater CAOs).

Injectant Loss

Although not anticipated, in the unlikely event that an injectant is discovered in Hurricane Creek, the injectant may be recovered using an explosion-proof shop or drum vac, absorbent booms, or other absorbent materials to the extent practical.

5.4 Remedial Performance and Progress Monitoring

Following the implementation of the Final Remedy, a period of groundwater monitoring will be conducted to confirm the effectiveness of the remedy and evaluate whether additional injections are warranted. Per the On-Site Remedial Progression Work Flow decision matrix, an evaluation regarding implementation of additional injections will be based on observed groundwater concentrations and trends; if groundwater concentrations meet short-term groundwater CAOs Off-Site, additional On-Site injection events or active remediation may be warranted even if short-term CAOs are met for Off-Site monitoring wells, depending upon the contaminant concentrations and trends observed along the hydraulically down-gradient perimeter of the Site to ensure continued protection of potential VI receptors. Groundwater monitoring will also be used to (i) evaluate attainment of short-term groundwater CAOs and (ii) demonstrate groundwater geochemical conditions (i.e., pH, ORP, sulfate, and iron) are favorable for MNA processes to establish continuous reductions in cVOC concentrations or plume stability leading to attainment of long-term CAOs.

5.4.1 Sampling and Analysis Plan

5.4.1.1 Performance Monitoring Well Installation

Since the effectiveness of the implemented active remediation will be based on groundwater concentrations meeting short-term groundwater CAOs that are protective of vapor intrusion, monitoring wells will be installed to intercept the groundwater table to monitor dissolved contaminants in groundwater for the potential to generate soil vapor, which could potentially impact basements, utility conduits, or other preferential pathways.

A series of new performance monitoring wells (MW-43 through MW-54) will be installed to supplement existing monitoring wells at the Site and the proposed performance monitoring well network will be sampled before the implementation of the selected corrective measures to establish the pre-treatment baseline conditions. The results from the baseline performance monitoring well sampling event may also be used to modify the in-situ injection plan, as warranted. This baseline sampling will be conducted approximately one month before the initiation of the selected corrective measures so groundwater sampling results may be available for review before beginning in-situ injection activities. It should be noted that many of the proposed performance monitoring wells are located on private property, and the installation will be contingent on the approval of access.

Before the initiation of On-Site or Off-Site in-situ injection activities, IWM Consulting will coordinate and oversee the installation of 12 new monitoring wells [three On-Site and nine Off-Site]. The new monitoring wells will be installed to document baseline conditions and monitor the effectiveness of the implemented corrective measures. The installation of the nine Off-Site monitoring wells (MW-46 through MW-54) will be dependent on obtaining approved Off-Site access from private property owners and the exact location and number of wells installed may vary from what is currently proposed if access agreements cannot be obtained.

The monitoring well borings will be installed using a hollow stem auger drill rig. Initially, the soil borings for each monitoring well location will be advanced using direct push methods, and soils will be characterized using USCS description methods and screened with a PID. No soil samples will be submitted for laboratory analysis since the purpose of these wells is to facilitate the collection of groundwater samples. The monitoring wells will then be installed with 4.25-inch inside diameter hollow stem augers and advanced to approximately three to four feet below the observed groundwater table where sufficient saturated thickness is present. The wells will be constructed using a 2-inch diameter PVC well casing with five feet of 0.010-inch slotted PVC screen (if feasible). Note that the thickness of Unit B thins out considerably moving south of the Site and is only approximately two feet thick near Hurricane Creek, so the proposed well at that location (MW-53) may only have a 2-foot-long screen. Silica well sand will be poured around the well screen to approximately two feet above the screened interval and bentonite chips will be placed in the remaining annular space to approximately one foot below grade and hydrated. A flush-mounted protective cover (Off-Site) or stickup cover (On-Site) will be placed in a concrete pad and installed to protect the integrity of each monitoring well. Following monitoring well installation activities, each monitoring well will be properly developed to remove fine-grained particles using traditional surge and purge techniques.

The top of casing elevation, ground surface elevation, and horizontal coordinates of each monitoring well will be surveyed into the monitoring well network by a subcontracted licensed surveyor. The IDW will be containerized in drums, transferred back to the Site, and stored within the fenced-in area west of the main Site building.

The effectiveness of the implemented remediation activities will be based on remediating the groundwater to levels that are protective of vapor intrusion. Since vapor intrusion emanating from dissolved phase VOCs is associated with volatilization of contaminated groundwater in the upper two to three feet of the groundwater table, the risk of vapor intrusion originating from deeper water-bearing zones is minimal and not likely to occur based on the available groundwater buffer and associated low aqueous diffusivity. For this to occur, the contaminants would need to migrate upward through the shallower groundwater zone and these contaminants would be detected through collection of groundwater samples obtained from the upper portion of the groundwater table.

However, one or more deeper groundwater samples may periodically be obtained through the use of temporary sampling points On-Site or from existing groundwater monitoring wells that are currently screened at the base of Unit B. In fact, according to the boring logs/well construction diagrams, the following existing wells have a screened interval five feet or less in length and the bottom of the screened interval extends to or just above the base of Unit B.

Well ID	Screen Interval (feet BLS)	Top of Unit C (feet BLS)	Included in Proposed Performance Monitoring Network (On-Site or Off-Site)
MW-12R	17 – 22’	22’	Yes – On-Site
MW-31	7.58 – 12.58	12’	Yes – Off-Site
MW-32	4.09 – 9.09’	8.8’	Yes – Off-Site
MW-33	4.13 – 9.13’	9.2’	Yes – Off-Site
MW-34	10.49 – 15.49’	15’	Yes – Off-Site
MW-39	6 – 11’	9.5’	Yes – Off-Site
MW-40	7.5 – 12.5’	12’	Yes – Off-Site
MW-41	17.98 – 22.98’	23.75’	No – On-Site
MW-42	17.96 – 22.96’	23.5’	Yes – On-Site
RW-1	11 – 16’	16’	No – On-Site
RW-2	14 – 19’	19’	No – On-Site
RW-3	16 – 21’	23’	No – On-Site
MON-1D	16 – 18’	20’	No – On-Site
MON-2D	16 – 18’	20’	No – On-Site
AS-01	18 – 20’	20’	No – On-Site
AS-02	18 – 20’	20’	No – On-Site

Based upon the lithology previously encountered along the southern end of the Off-Site remediation area (saturated Unit B thickness of five feet or less), newly installed performance monitoring wells MW-52 and MW-53 are also anticipated to have a screened interval extending to the base of Unit B. Additional new Off-Site performance wells may also have screen intervals extending to the base of Unit B as well, depending on the lithology encountered during the well installation activities.

Based upon the information above, two On-Site and a minimum of eight Off-Site performance monitoring wells with the screens installed to or near the base of Unit B will be monitored per the proposed performance monitoring schedule to provide adequate information to evaluate the effectiveness of the implemented remedial activities at deeper depths. Eight additional deep wells (MW-42, RW-1, RW-2, RW-3, MON-1D, MON-2D, AS-01, and AS-02) may be sampled periodically to provide supplemental groundwater data to assist in evaluating the implemented work activities.

The locations of the proposed monitoring wells are displayed in **Figure 5-1** (Proposed On-Site) and **Figure 5-2** (Proposed Off-Site).

5.4.1.2 Baseline Groundwater Monitoring

Before implementation of the selected On-Site and Off-Site corrective measures, performance monitoring wells will be sampled using low-flow sampling methodology to establish pre-treatment baseline conditions at all sample locations. During low-flow sampling, pH, DO, ORP, conductivity, turbidity, and temperature will be measured using a field multi-parameter meter (i.e., YSI Pro Plus meter, Horiba U-52 meter, or similar instrument) and flow-through cell. Following the stabilization of groundwater parameters, or a maximum of 30 minutes of purging, groundwater samples will be collected for laboratory analysis of short-list VOCs using SW-846 Method 8260, dissolved gases (methane, ethane, and ethene) using Method RSK 175, sulfate using SW-846 Method 9038; and total and dissolved iron using SW-846 Method 6010. The short-list VOCs analyzed will include PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, VC, 1,1,1-TCA, 1,2-DCA, 1,1-DCA, and MC which is consistent with previous sampling activities.

The 34 monitoring wells selected as performance monitoring wells are listed below and are displayed by location in **Figure 5-2**.

Table: Proposed Performance Monitoring Wells

On-Site Performance	On-Site Control	Off-Site Performance	Off-Site Control
IT-2, MW-3, MW-12R, MW-21, MW-22, MW-28, MW-30, MW-35, MW-36, and MW-42 and proposed new monitoring wells MW-43 through MW-46	MW-24, MW-27, and MW-29 (side-gradient); and MW-26 (up-gradient)	MW-31, MW-32, MW-34, MW-37 through MW-40, and proposed new monitoring wells MW-47 through MW-52	MW-33 (side-gradient); MW-53 (down-gradient); and MW-54 (side-gradient)

The On-Site performance monitoring wells have been selected to monitor groundwater conditions longitudinally along the general centerline of the dissolved phase groundwater plume, from upgradient to downgradient, as well as laterally across the treatment area. Control monitoring wells, located along the perimeter of the treatment area, are also included in the monitoring network to document conditions and trends outside of the treatment area.

The Off-Site performance monitoring wells will monitor groundwater conditions adjacent to and downgradient of the treatment PRBs. Several of the downgradient monitoring wells are located in proximity to residences with existing SSDSs to assess the performance of remediation at mitigating groundwater conditions that pose a VI risk to these potential receptors.

The proposed performance monitoring well network and Off-Site PRB locations are highly dependent on obtaining access agreements with private individuals and must take into account existing utility and structure locations as well as property boundaries. Although the ideal locations for performance monitoring wells would be 30 to 50 feet from a PRB, this is not always feasible for this Site given the limitations just described. Given the historical groundwater flow direction (south/southeast) during static (i.e., non-pumping) conditions, care was taken to select performance monitoring well locations that would provide good coverage south, east, and southeast of the treatment areas, and adjacent to the treatment area and closest potential receptor. For instance, monitoring wells located in the eastern ROW of Forsythe Street are hydraulically downgradient (between 30 to 50 feet) of the PRB being installed on the west side of Forsythe Street. Additional proposed wells (MW-47 through MW-53) will be installed at various distances (approximately 15 to 75 feet) hydraulically downgradient of the Off-Site PRBs and will allow continuous monitoring in the proximity of potential receptors.

Based on the results of the pilot study discussed in Section 4.3.3, given the distance (30 to 60 feet hydraulically downgradient) of the monitoring points (MW-31 and MW-38) from the closest injection points and both the short-term and long-term sustained reductions in VOC concentrations in these wells, IWM Consulting is confident the proposed PRBs will remediate the Off-Site Treatment Area. Additionally, the performance monitoring well network will adequately monitor the Off-Site Treatment Area and is appropriate for demonstrating protection of downgradient receptors. The total volume of injectant and the increased number and lateral distribution of the PRBs throughout the Off-Site treatment area provide even more confidence that the proposed remedial approach will successfully meet the CAOs, even at distances greater than 30 to 50 feet away from the PRBs.

Forsythe Street (from Hamilton Avenue south to Hurricane Creek) and Hamilton Avenue (from the Site west to sanitary sewer manhole #250054) were repaved after the OIM excavation activities and the City of Franklin officials have indicated that they will not approve any additional subsurface work to occur in the newly paved areas of Forsythe Street and Hamilton Avenue. Consequently, no performance monitoring wells can be installed between the two (2) PRBs running in a north-to-south direction along the western and eastern ROW of Forsythe Street, and aggressive remedial activities (installation of new sanitary sewer main, soil excavation, and dewatering) have already been completed beneath this portion of the Project Area.

As noted in Section 2.5.2, the delineation of TCE impacts in Off-Site groundwater indicates the presence of a secondary, third-party plume located west of the Site, west of Forsythe Street, and north of Hamilton Avenue. This separate TCE plume appears to emanate from the northwest of the Site. This third-party plume extends south-southeast across Hamilton Avenue, where it comingles with the Site-related groundwater impacts along Forsythe Street. This third-party plume is not part of the remedial focus of this *SSCMIWP* and the installation of one additional Off-Site monitoring well (MW-54) is planned in this area to evaluate the potential contribution of this third-party plume to groundwater conditions during and after the planned corrective actions. Proposed well MW-54 will be installed to the west of the Site and outside of the treatment area, but upgradient of Hamilton Avenue and Off-Site Area residences. Conditions in the area beneath and adjacent to this third-party plume are out of the scope of Amphenol's responsibility to remediate and the long-term effects on Amphenol's remediation efforts cannot be determined as it relates to COC concentrations in MW-54 or impacts originating from a separate offsite source(s).

5.4.1.3 On-Site Corrective Measure Performance Monitoring Plan

Groundwater sampling to monitor the performance of the implemented corrective measures will be conducted following each ISCO and ISCR application.

ISCO Monitoring
The proposed ISCO chemistries (i.e., MFC-activated SPS) will provide quick chemical reactions to desorb and destroy cVOCs in the On-Site Source Area and performance groundwater sampling will take place approximately two weeks following the completion of ISCO injection activities. The objective of the sampling is to determine the average contaminant reduction across the On-Site Source

Area and to evaluate the need for additional ISCO injection event(s).
Collection of groundwater samples for VOC analysis and field measurements for ORP and dissolved oxygen will be obtained throughout the On-Site source area via monitoring wells MW-3, MW-12R, MW-21, MW-22, and MW-42 and On-Site Treatment area via monitoring wells MW-28 and MW-45.

Measurements will also be obtained from monitoring points to the west (MW-29), east (MW-30, MW-43, and MW-44), and south (IT-2, MW-35, MW-36, and MW-46) outside the On-Site Treatment Area for a site-wide comparison of ORP and dissolved oxygen measurements to be made when evaluating the timing of transitioning to ISCR.

If needed for the evaluation, additional field monitoring for ORP and dissolved oxygen and collection of groundwater samples for VOC analysis can be completed on a temporary basis from one or more additional existing On-Site wells (injection wells IN-1 through IN-7, piezometer P-4, or recovery wells RW-2, RW-3, and RW-5) that are located within the On-Site Source Area. If these supplemental measurements are made, it will only be on a temporary basis during the ISCO performance evaluation period and during the evaluation period when determining the appropriate time to transition from the ISCO to the ISCR remedial program. These additional wells will not be monitored for dissolved VOCs or any additional analytical or field parameters on an ongoing basis.

Additional temporary wells may also be installed in select locations within the On-Site Source Area to assist in evaluating the effectiveness and progress of the ISCO remedial activities, primarily focusing on areas that historically exhibited the highest PCE or TCE concentrations.

Further, the identified On-Site monitoring network has been developed to allow evaluation of both spatial impacts of remediation on dissolved phase conditions as well as dissolved phase mass flux from upgradient to downgradient transects of monitoring wells. The monitoring network is also designed to focus on monitoring remedial progress toward attaining short-term and long-term CAOs for the protection of potential receptors. This monitoring well network provides sufficient coverage within and immediately outside the On-Site Treatment Area to evaluate the effectiveness of the ISCO/ISCR activities and to monitor groundwater conditions between the On-Site Treatment Area and the closest Off-Site receptors.

The dissolved VOC analytical information will be evaluated against the CAOs and the anticipated average VOC reduction (50 to 70%) across the entire On-Site Source Area. A determination will then be made in accordance with the flow chart included in Section 5.1 regarding the next phase and/or location of remediation.

During each ISCO performance monitoring event, groundwater samples will be collected using low-flow methods, and pH, DO, ORP, conductivity, turbidity, and temperature will be measured using a field multi-parameter meter and flow-through cell. Following the stabilization of groundwater parameters, or a maximum of 30 minutes of purging, groundwater samples will be collected for laboratory analysis of shortlist VOCs using SW-846 Method 8260 only.

ISCR Monitoring
Following the completion of up to two additional rounds (dependent upon the results of the performance sampling) of ISCO in-situ injection, the next phase of remediation will consist of ISCR injections, which will provide chemistries that promote reductive dechlorination of any remaining COCs. Groundwater samples will then be collected from the designated On-Site performance monitoring wells 30, 60, and 90 days following the ISCR injection and then quarterly for a total of one year, for a total of six groundwater sampling events to assess the effectiveness of the implemented

remedy. Thereafter, plume stability monitoring will be conducted quarterly for two additional years. An overall stable or decreasing trend of dissolved COC concentrations is expected at each monitoring well within and down-gradient of the ISCO/ISCR injection area.

During each ISCR performance monitoring event, groundwater samples will be collected using low-flow methods, and pH, DO, ORP, conductivity, turbidity, and temperature will be measured using a field multi-parameter meter and flow-through cell. Following the stabilization of groundwater parameters, or a maximum of 30 minutes of purging, groundwater samples will be collected for laboratory analysis of shortlist VOCs using SW-846 Method 8260, dissolved gases (methane, ethane, and ethene) using Method RSK 175, sulfate using SW-846 Method 9038; and total and dissolved iron using SW-846 Method 6010. Dissolved gases will only be monitored annually following the first year of performance monitoring.

After the 2-year plume stability monitoring is complete, the data will be evaluated to determine if the plume is stable or attenuating and the data will be compared to both long-term and short-term groundwater CAOs. If during the 2-year plume stability monitoring period, a monitoring well exhibits COC concentrations below long-term groundwater CAOs for two consecutive quarters, the performance monitoring at that location will be modified to an annual monitoring schedule. Based on the evaluation of the 2-year plume stability monitoring results, a determination will be made regarding the need for additional sampling or remediation; and a reduced groundwater monitoring schedule (annual) is anticipated moving forward, if the short-term goals are achieved or if decreasing groundwater concentration trends are documented and projected to meet long-term CAOs. It is anticipated that only short-list VOCs will be analyzed during annual groundwater monitoring events, although select wells may continue to have dissolved gas analysis completed if the dissolved methane concentrations are high (greater than or equal to 10 mg/L). The need for supplemental ISCR injections will be considered if groundwater quality leaving the downgradient Site property boundary (beyond the Hamilton Avenue ROW PRBs) remains above the short-term CAO after two years of plume stability monitoring and On-Site groundwater concentrations do not exhibit a decreasing trend or geochemistry conditions amenable to continued bioremediation.

After the initial 2-year plume stability monitoring period, annual groundwater monitoring of short-list VOCs will continue after the short-term CAOs are met or decreasing trends are established to determine when long-term groundwater CAOs (i.e., MCLs) will be achieved. Once a groundwater monitoring well achieves long-term groundwater CAOs for two consecutive years, future groundwater sampling from that monitoring well will be discontinued following EPA review and approval.

To allow for a comparison of methane soil gas concentrations before and after in-situ injection activities, IWM Consulting will obtain one round of baseline dissolved methane concentrations for all performance monitoring wells and methane soil gas concentrations at each residence with an operating SSDS/SMDS (if access is granted). The baseline methane soil gas concentrations will be established using a field instrument (GEM 5000 or similar model) before initiating the injection activities. Additional field screen readings will be obtained if the dissolved methane concentrations in the adjacent performance monitoring wells are greater than or equal to 10 mg/L. Additionally, if dissolved methane concentrations in groundwater during performance monitoring exceed the 10 mg/L threshold for vapor concern, then soil gas should be monitored in the monitoring wellhead to verify that soil gas is not detected more than 10% of the lower explosive limit. Should soil gas within the wellhead exceed 10% of the lower explosive limit, then collection of an exterior soil gas sample adjacent to the monitoring well with the exceedance will be completed. If the exterior soil gas concentration is also detected more than 10% of the lower explosive limit, then additional assessment or mitigation at nearby potential receptors will be considered. In-situ injection in the area of concern utilizing a potassium sulfate (Glaser's salt) or magnesium sulfate (Epsom salt) amendment to temporarily increase reducing conditions from methanogenic levels will be considered for methane mitigation, if necessary.

Additional field screening for methane gas before SSDS/SMDS deactivation is not warranted if the closest adjacent groundwater monitoring wells exhibit dissolved methane gas concentrations less than 10 mg/L. However, if the dissolved methane concentration is still greater than or equal to 10 mg/L at the time of system deactivation evaluation, an additional round of field screening for methane soil gas will be completed as part of the system deactivation evaluation process.

Bypass Monitoring
When feasible, the injection activities will commence from the outside to inside (lowest to highest COC concentrations) and downgradient to upgradient, minimizing the possibility of any significant PRB bypass effects. Also, the groundwater flow direction under static conditions (i.e., when the groundwater pump and treat system is deactivated) is to the south-southeast and thus the proposed performance monitoring well network is focused on areas immediately south and east of the proposed On-Site Treatment Area and PRBs. Collection of field data (including ORP) and groundwater samples for VOC analysis from the performance monitoring wells will allow for a determination to be made regarding potential PRB bypass effects, in addition to a review of groundwater potentiometric surface contour maps. If PRB bypass is observed (increasing trend in dissolved COC concentrations with no observed ISCO/ISCR chemistry signature), the possibility of extending or installing a new PRB, or creating a higher permeability treatment gate within the PRB, will be evaluated, as feasible (i.e., Off-Site property access dependent and actual COC concentration).

The On-Site ISCO/ISCR and PRB injection areas will be monitored for potential PRB bypass effects using performance monitoring wells MW-24, MW-30, MW-43, and MW-44 (eastern boundary) and MW-28 and MW-29 (western boundary).
The areas down-gradient of the Site to the west are covered with additional Off-Site PRBs and groundwater monitoring in two nearby Off-Site performance monitoring wells (MW-35 and MW-36) is already planned immediately south of the Site, along the eastern and western boundaries of the injection area, respectively. The successful Off-Site pilot study conducted around Off-Site monitoring well MW-35 in October 2019 indicated an injection flow rate of 2.9 to 3.5 gpm under an applied injection pressure ranging between 15 to 35 pounds psi. Multiple PRBs are proposed to be installed in the Off-Site Area and given the soluble nature of the material being injected and the anticipated low injection pressure (less than 50 psi), there is minimal risk of PRB bypass effects.

5.4.1.4 Off-Site Corrective Measure Performance Monitoring Plan

Groundwater samples will be collected from Off-Site performance monitoring wells 30, 60, and 90 days following the completion of in-situ injection activities and then quarterly for one year, for a total of six quarterly groundwater sampling events to assess the effectiveness of the implemented remedy. Thereafter, plume attenuation monitoring will be conducted quarterly for two additional years. An overall decreasing trend of dissolved COC concentrations is expected at each monitoring well down-gradient of a PRB.

During each performance monitoring event, groundwater samples will be collected using low-flow methods, and pH, DO, ORP, conductivity, turbidity, and temperature will be measured using a field multi-parameter meter and flow-through cell. Following the stabilization of groundwater parameters, or a maximum of 30 minutes of purging, groundwater samples will be collected for laboratory analysis of shortlist VOCs using SW-846 Method 8260, dissolved gases (methane, ethane, and ethene) using Method RSK 175, sulfate using SW-846 Method 9038; and total and dissolved iron using SW-846 Method 6010. Dissolved gases will only be monitored annually following the first year of performance monitoring.

After the 2-year plume attenuation monitoring is complete, the data will be evaluated to determine if the plume is stable or attenuating and the data will be compared to both long-term and short-term groundwater CAOs. If during the 2-year plume attenuation monitoring period, a monitoring well exhibits COC concentrations below long-term groundwater CAOs for two consecutive quarters, the performance monitoring at that location will be modified to an annual monitoring schedule. A reduced groundwater monitoring schedule (annual) is anticipated moving forward, if the short-term goals are achieved or decreasing groundwater concentration trends are documented. The need for supplemental Off-Site injections will be considered if (i) short-term CAOs are not achieved within the 2-year plume attenuation monitoring period, (ii) overall decreasing dissolved COC trends are not established, and (ii) if subsurface environments do not establish and/or maintain anaerobic conditions. It is anticipated that only shortlist VOCs will be analyzed during annual groundwater monitoring events, although select wells may continue to have dissolved gas analysis completed if the dissolved methane concentrations are high (greater than or equal to 10 mg/L).

After the initial 2-year plume stability monitoring period, annual groundwater monitoring of short-list VOCs will continue after the short-term CAOs are met or decreasing trends are established to determine when long-term groundwater CAOs (i.e., MCLs) will be achieved. Once a groundwater monitoring well achieves long-term groundwater CAOs for two consecutive years, future groundwater sampling from that monitoring well will be discontinued following EPA review and approval.

Monitoring well MW-54 located west of Forsythe Street and north of Hamilton Avenue, which is hydraulically upgradient from the planned remedy implementation, will be used to assess the potential contribution from the third-party Off-Site TCE plume to groundwater conditions. The planned remedial injections will address the comingled groundwater impacts along and downgradient of Forsythe Street and provide long-term treatment through enhanced anaerobic bioremediation; however, monitoring of upgradient conditions will be used to assess if contaminant flux from the western plume is re-impacting the Off-Site treatment area.

To allow for a comparison of methane soil gas concentrations before and after in-situ injection activities, IWM Consulting will obtain one round of baseline dissolved methane concentrations for all performance monitoring wells and methane soil gas concentrations at each residence with an operating

SSDS/SMDS (if access is granted). The baseline methane soil gas concentrations will be established using a field instrument (GEM 5000 or similar model) before initiating the injection activities. Additional field screen readings will be obtained if the dissolved methane concentrations in the adjacent performance monitoring wells are greater than or equal to 10 mg/L. If dissolved methane concentrations in groundwater during performance monitoring exceed the 10 mg/L threshold, then soil gas should be monitored in the monitoring wellhead to verify that soil gas is not detected more than 10% of the lower explosive limit. Should soil gas within the wellhead exceed 10% of the lower explosive limit, then collection of an exterior soil gas sample adjacent to the monitoring well with the exceedance will be completed. If the exterior soil gas concentration is also detected more than 10% of the lower explosive limit, then additional assessment or mitigation at nearby potential receptors will be considered. In-situ injection in the area of concern utilizing a potassium sulfate (Glaser's salt) or magnesium sulfate (Epsom salt) amendment to temporarily increase reducing conditions from methanogenic levels will be considered for methane mitigation, if necessary.

Additional field screening for methane gas before SSDS/SMDS deactivation is not warranted if the closest adjacent groundwater monitoring wells exhibit dissolved methane gas concentrations of less than 10 mg/L. However, if the dissolved methane concentration is still greater than or equal to 10 mg/L at the time of system deactivation evaluation, an additional round of field screening for methane soil gas will be completed as part of the system deactivation evaluation process.

5.4.2 SSDS Monitoring

SSDS monitoring will be completed as described in the Long-Term OM&M plan provided in **Appendix B**. The monitoring schedules, developed in accordance with the IDEM guidance document, are as follows:

Schedule 1	Schedule 2
Annual visual inspection of the building for major renovations	Annual visual inspection of the building for major renovations
Annual visual inspection of the vapor mitigation system, in particular the pressure or manometer gauges, to verify proper operation.	Annual visual inspection of the vapor mitigation system, in particular the pressure or manometer gauges, to verify proper operation.
Annual (winter season) IA/SGss sampling events during the 1st, 2nd, and 5th year and every 5th year thereafter **until the VI pathway has been interrupted or the source of the COC concentrations has been remediated**. The sampling should occur on the lowest routinely occupied floor to ensure that IA concentrations are below RIA SLs and do not present a health risk.	Annual (winter season) IA/SGss sampling events during the 1st, 2nd, and 4th year and every other year thereafter **until the VI pathway has been interrupted or the source of the COC concentrations has been remediated**. The sampling should occur on the lowest routinely occupied floor to ensure that IA concentrations are below RIA SLs and do not present a health risk.

Additional vapor sampling of the private residences with mitigation systems is not needed since the VI exposure pathway has been eliminated and subsequent VI sampling events conducted at the private residences post-installation of the mitigation systems have documented that VI is not a complete exposure pathway. The VI mitigation systems will continue to be inspected on an annual basis.

Amphenol has upgraded the mitigation systems to include telemetry to verify system operation remotely. The next sub-slab vapor and indoor air (i.e., basement) sampling event at a private residence should be completed during confirmation sampling steps necessary for permanent vapor mitigation system deactivation.

5.4.3 SSDS Shut-down Confirmation Sampling

Following the attainment of short-term groundwater CAOs at a performance monitoring well located adjacent to a private residence with an active vapor mitigation system for two consecutive quarters or sampling events, the SSDS (and SMDS, if present) at that private residence will be deactivated for 30 days to allow stabilization of subsurface soil vapors. A confirmation paired sub-slab vapor and basement indoor air sample will then be collected to verify that sub-slab vapors and indoor air meet the applicable Residential Sub-Slab Soil Vapor and Indoor Air CAOs and to demonstrate that vapor intrusion is not a concern after deactivation.

The confirmation vapor samples will be collected in individually certified clean, laboratory-provided, stainless-steel, 6-liter summa canisters. The summa canisters will be equipped with 24-hour flow regulators (~4.16 milliliters per minute (mL/minute) flow rate) and the samples will be obtained over 24 hours.

The intake of the outside ambient air sample will be obtained from a height of approximately six feet, thus the sample canisters may be placed upon a small platform or attached to a shepherd's hook (or similar apparatus). Outside ambient air samples will be collected during SSDS confirmatory shutdown air/sub-slab vapor sampling events to document ambient air conditions outside of the residence. Since the groundwater pump and treat remediation system will no longer be operating, ambient air sample locations from between the residence and the Site will no longer be collected. The only ambient air sample collected will be from the up-wind direction from the residence at the time the sampling begins. The outside ambient air sampling procedures will follow the standard operating procedures outlined in the IWM Consulting SOP H, as documented in the site-specific QAPP.

The basement indoor air sample will be obtained from a height corresponding to the typical breathing height (four to six feet above the surface). The sample obtained from the crawlspace will be obtained at a height approximately 12 inches above the ground surface of the crawlspace. The soil vapor sample will be obtained directly from the sub-slab vapor sampling point (minimum installation 24-hours before sampling), once the sampling point has been confirmed to be tight and is properly purged. The starting and ending time of each sample, along with the initial and final vacuum measurements of the summa canister will be recorded during the vapor sampling activities. The vapor sampling activities are deemed complete when the vacuum on the summa canister is between three and five inches of mercury or the pre-determined timeframe is reached, whichever occurs first. Care will be taken to not allow the vacuum to reach zero.

All of the samples will be labeled in the field utilizing the sample tags attached to the summa canisters by the laboratory. The information included on the sample labels includes the sample ID, sample date, sample time, and the requested analysis. A site-specific chain-of-custody will also be completed and includes all of the pertinent sampling information (i.e., sample ID, sample date, sample start and end time, initial and final field pressure readings, summa canister ID, flow controller ID, field PID readings (if applicable), and the requested analysis). The wind speed and direction will also be recorded during the sampling event. A limited Indoor Air Survey will be completed during the sampling activities, which will primarily only focus on items within the basement and crawlspace (if present).

All of the samples collected will be submitted under chain-of-custody control to Pace National located in Nashville, Tennessee for laboratory analysis of shortlist VOCs using analytical method TO-15. The samples will be analyzed using a combination of EPA Method TO-15 and EPA Method TO-15 SIM. Specifically, EPA Method TO-15 SIM will be utilized when analyzing for VC, 1,2-DCA, and TCE to meet the most stringent USEPA Regional Screening Levels. A standard turnaround time will be requested from the laboratory and the results of the sampling event are anticipated to be received approximately two weeks from the date the samples are collected in the field.

For QA/QC purposes, one field duplicate sample will be collected at a rate of one sample per every 20 confirmatory samples per sampling media and will be analyzed for the same analytical parameters. The duplicate sample will be attached to the parent sample with a brass tee fitting (ensuring only one common air intake) and Nyaflow or Tygon tubing. Both the parent sample and duplicate sample will have their own flow regulator.

If data indicate all sub-slab vapor and indoor air sample results are less than the applicable CAOs, then Amphenol will submit for the USEPA's review and approval for the permanent deactivation of the SSDS. If the sampling event occurred during the winter heating season, when the highest concentrations are expected, IWM Consulting will notify the USEPA that active vapor mitigation is no longer warranted and no further sampling will occur. However, if the sampling event did not occur during the winter heating season, one additional sampling event will be conducted during the winter season to confirm the initial sampling results. Again, if the data indicates all sub-slab vapor and indoor air concentrations are less than the applicable CAOs, then Amphenol will submit for the USEPA's review and approval for the permanent deactivation of the SSDS and no additional sampling will be conducted.

If the USEPA agrees that active mitigation is no longer warranted, the property owner will be provided an option to operate and maintain the mitigation system at their own cost or IWM Consulting can permanently remove the system components. If the post-system deactivation results indicate a sub-slab soil gas or indoor air concentration greater than the applicable CAOs, then the mitigation system may be reactivated or additional sampling may be necessary to further evaluate the potential VI exposure pathway.

5.4.4 Progress Reporting and Performance Data Evaluation

Following completion of the initial performance monitoring event after the final remedy has been implemented, a progress report will be submitted to the USEPA detailing the baseline and initial performance groundwater results. Thereafter, during the quarterly plume attenuation or stability monitoring period, progress reports will be generated semi-annually to report groundwater results collected during the reporting period to the USEPA. The progress reports will present groundwater elevation data, inferred groundwater flow direction, and groundwater analytical results which will be followed by an evaluation of performance or plume monitoring data relative to the attainment of short-term CAOs and trend analysis of dissolved cVOC concentrations in groundwater. In addition to trend analysis, the evaluation of performance data will also examine groundwater geochemistry to determine if groundwater conditions are conducive to anaerobic biodegradation. A more detailed trend analysis using Mann-Kendall or a similar method will be provided to the USEPA after the 2-year plume attenuation monitoring period has been completed.

5.5 Implementation Preparation

This section summarizes logistical elements to be addressed in preparation for and to facilitate the implementation of the remedial activities.

5.5.1 Utility Locating

Before injection activities, techniques will be used to locate potential underground utilities and conduits. Techniques will include review of available site drawings, as-builts, construction plans, and surveys, conducting geophysical surveys, and conducting site reconnaissance. Four potential geophysical methods may be used: magnetics; electromagnetics; ground penetrating radar, and/or electromagnetic line location. Magnetics and electromagnetics are used to identify potential conduits. These features are detected due to the presence of the ferrous and electrically conductive material of their construction. Ground penetrating radar is used as a follow-up technology to characterize identified magnetic or electromagnetic anomalies. Tracer lines were also installed along all of the new sewer laterals that were installed as part of the OIM so all of these lines should be able to be traced and located before initiating the injection/drilling activities.

Additionally, IUPPS will be contacted at least 48 hours in advance to identify the location of public utilities within the work area. Proposed injection areas will be marked with white paint or surveyors flagging as required by IUPPS. IUPPS will contact utility owners of record within the Site vicinity and notify them of a plan to penetrate the subsurface to complete injections. Utility owners of record will be expected to mark the position of their utilities on the ground surface throughout the designated area, where applicable. A minimum of five feet from a marked utility structure will be maintained during in-situ injection activities and at least 10 feet will be maintained from a residential basement or the OIM sanitary sewer trench located within the City ROW, as conditions allow.

5.5.2 Mobilization and Hours of Operation

Mobilization will consist primarily of transporting the contractor’s injection equipment, drill rigs, and materials to the Site and Off-Site staging areas. The mobilization task will also consist of setting up storage containers or a new utility service for water supply for mixing injection materials. Because the On-Site work area is part of a commercial-industrial property, but located adjacent to a residential area, typical On-Site operations will be conducted between the hours of 7 AM and 6 PM daily, up to seven days a week. Injections completed within the former plating room of the Site facility building may occur after hours (5 PM to 7 AM) or on weekends to avoid disturbance to facility operation personnel.

Since the Off-Site operations are primarily within a residential area, typical Off-Site operations will be conducted between the hours of 8 AM and 6 PM daily, Monday through Friday. However, some of the Off-site injection areas on the west side of Forsythe Street are located along commercial properties and these activities may be conducted on a Saturday.

5.5.3 Water Supply

Water for the mixing of amendments will be secured by tapping into the existing on-site potable water supply line at the On-Site facility structure. Water will be placed in holding tanks to temporarily store mixing water for both On-Site and Off-Site injections. Ideally, On-Site and Off-Site in-situ injection activities will be conducted simultaneously, but it is not required and is dependent upon subcontractor availability. If Off-Site access is secured, a holding tank may be placed on commercial Off-Site properties located along Forsythe Street. Before mixing with amendments, the municipally supplied potable water may be field checked for chlorine content and potentially de-chlorinated, if necessary.

5.6 Restoration

Site restoration activities will be conducted after the injection activities have been completed. Surfaces at Off-Site injection locations can be immediately restored as additional injection events are not anticipated. However, On-Site injection locations may be restored after areas have been determined to be remediated and additional injection events will not be required. It is expected that site restoration may consist of final grading (most likely by hand or through the use of a skid steer) of the injection areas to remove ruts caused by the drill rig or injection equipment to match the surrounding existing grades and completion of the graded areas with grass seed and straw. The importing and spreading of clean topsoil may be required. Any boreholes installed within concrete or asphalt will be restored with similar materials.

Following the attainment of Off-Site CAOs, SSDSs (above-ground piping and fans) will be removed from residential structures or the property owners will be provided an option to keep them in place and operate/maintain them at their own expense. Additionally, sub-slab vapor monitoring points previously installed in slab-on-grade structures (that did not require vapor mitigation systems) will be scheduled for removal/abandonment upon *SSCMIWP* approval, since historical sampling activities have already confirmed that vapor intrusion is not a complete exposure pathway for these structures. The sub-slab vapor monitoring points within basements of residential structures may be removed after the achievement of Off-Site CAOs within the vicinity of a corresponding residential structure. The slab boreholes (including SSDS extraction points) will be repaired/patched with Portland cement.

5.7 Construction Completion Report

Within 90 days of completing construction of the Final Remedy, a Construction Completion Report will be submitted to document how the completed project is consistent with the USEPA's Final Decision and this *Final SSCMIWP*. The Construction Completion Report will be submitted to the USEPA following the completion of On-Site and Off-Site injection activities and groundwater monitoring results completed up to that point. Groundwater monitoring results, including remaining 2-year plume stability or attenuation monitoring period results and annual groundwater monitoring results, will be submitted in accordance with the Post-Closure Care Plan requirements. The Construction Completion Report, at a minimum, will include the following elements:

- Purpose;
- Summary of the corrective measures, design criteria, and certification that the corrective measures were constructed in accordance with the SSCMIWP;
- Explanation and description of any modifications to the SSCMIWP and necessity;
- Results of any performance monitoring, indicating how the implementation of the corrective measures compares to the design criteria and trend/stability monitoring results;
- Summary of any significant activities that occurred during the implementation of the corrective measures, including a discussion of problems encountered and how they were addressed;
- Final as-built showing final in-situ injection and performance monitoring well locations;
- A Long-Term Monitoring and Maintenance Plan for USEPA review and approval; and
- Conclusions and recommendations for additional remediation or groundwater monitoring activities.

5.8 Long-Term Monitoring & Maintenance Plan

The Long-Term Monitoring and Maintenance Plan will consist of two primary elements: long-term monitoring and the Environmental Restrictive Covenant. The long-term monitoring element is covered within Sections 5.2.6, 5.3.4, 5.4, and 6.7 of this document and will be further summarized in the Final Remedy Construction Completion Report. The Environmental Restrictive Covenant will be provided under a separate cover.

The purpose of long-term monitoring is to identify proposed monitoring points to evaluate the long-term effectiveness of the implemented FR; the analytical parameters and sampling frequency; short and long-term CAOs; any long-term management needs, including financial assurances; threshold criteria that will be used to determine if supplemental remediation activities are warranted; and the proposed regulatory reporting frequency.

Environmental Restrictive Covenant

- Provides an enforceable institutional control on the property prohibiting certain activities or zoning to ensure any residual contaminants do not pose a potential unacceptable risk of exposure;
- The anticipated controls include restricting current and future use of the Site property to commercial/industrial and prohibiting the installation or use of a water well for industrial or potable use; and
- The ERC will be recorded on the deed of the Site property and will notify current and future owners of the property that these restrictions are in place.

The ERC will be drafted and submitted to the USEPA for review before finalizing and recording the ERC on the property deed. The draft ERC will be submitted as a standalone document after the Final Remedy has been implemented but before regulatory closure is issued for the Site.

Additionally, Amphenol will submit an annual certification that all controls are in place and remain effective and provide financial assurance documentation, as long as required. Long-term remedies will be reviewed and inspected on a 5-year basis to ensure the remedy is functioning as intended, the exposure assumptions, toxicity data, cleanup levels, and CAOs are still valid, and that any information that comes to light that could call into question the protectiveness of the remedy is considered until Site closure is complete.

5.9 Corrective Measure Completion Report

The Corrective Measure Completion Report will be prepared when Amphenol believes that the corrective measure completion criteria, including the CAOs, have been met and to justify why the corrective measure and/or monitoring may cease. The report will include the following elements:

- Purpose
- Summary description of the corrective measures
- Description of corrective measure completion criteria
- Demonstration that the criteria have been met, including laboratory results of groundwater, sub-slab vapor, and basement indoor air monitoring
- Any additional test results
- Summary of additional significant activities and inspection findings
- Photographs

Demonstration that the cleanup standards have been achieved will be based on an evaluation of the laboratory results (groundwater, sub-slab vapor, and basement indoor air) and documentation showing that the concentrations of VOCs in groundwater are decreasing or stable and do not constitute an unacceptable risk to human health or the environment. The report will be submitted to the USEPA for review and approval.

6.0 PROJECT MANAGEMENT

6.1 Organizational Chart

Amphenol has contracted with IWM Consulting to conduct corrective action activities at this Site. IWM Consulting has assembled a project team of geologists, environmental scientists, field geologists, and subcontractors to support the proposed work activities. An updated project organizational chart is included in **Figure 6-1**. A description of the role and responsibilities of each key project team member is provided below.

Amphenol Corporation

Performing Respondent

Ms. Erika Frank is the Manager, EHS & Sustainability, Americas Region for Amphenol, including overall responsibility for environmental activities at this facility. As Amphenol's Environmental

Manager, Ms. Frank will be responsible for communication with the USEPA and overall management of the SSCMIWP contractor, IWM Consulting.

IWM Consulting

Principal-in-Charge

As a Vice President of IWM Consulting, Mr. Bradley Gentry, LPG, will serve as the designated Principal-in-Charge. He has the authority to commit company resources as needed for this project. As Principal-in-Charge, he will be responsible for ensuring that necessary resources are committed to meet the schedule requirements and will make regular contact with the Technical Manager to ensure that project needs are being met. Mr. Gentry has approximately 29 years of environmental consulting experience and has extensive experience working on IDEM and USEPA site investigation and corrective action projects. In particular, Mr. Gentry has worked on this site in some capacity since 1996 and has been the IWM Consulting assigned Senior Project Manager for this project. He understands the regulatory framework surrounding this project.

Technical Manager

As Technical Manager for IWM Consulting, Mr. Christopher Parks, LPG, will be responsible for overall technical direction (working closely with the QA/QC Advisor and Principal-in-Charge), management of IWM Consulting project staff, subcontractor management, and controlling project budget and schedule. Mr. Parks is a Licensed Professional Geologist and has over 22 years of experience in conducting site investigations and implementation of remediation activities at a wide variety of commercial and industrial sites. Mr. Parks has also been directly involved with developing and implementing the investigation and OIM activities at the Site since 2018.

QA/QC Advisors

Mr. Christopher Schoo, our designated QA/QC Advisor, will be responsible for the implementation of IWM Consulting's QA/QC Plan, including providing support in the review of deliverables. Mr. Schoo has over 26 years of experience in conducting site investigations and implementation of remediation activities at a wide variety of commercial and industrial sites. Please note that only the confirmation closure samples (not performance or routine groundwater sampling) will be submitted to a third party for QA/QC validation.

Database Management

As database manager, Mr. Garrett Page will provide support in data management during the implementation of SSCMIWP activities. Mr. Page has three years of experience in database management on a wide variety of environmental projects.

Field Operations

As project manager of field operations, Mr. Christopher Schoo will be responsible for conducting field operations and direct subcontractor oversight for the implementation of SSCMIWP activities. Mr. Schoo has over 26 years of experience in conducting site investigations and implementation of remediation activities at a wide variety of commercial and industrial sites. This includes the implementation of field investigation and remediation activities, including soil, soil vapor, and groundwater sampling, subsurface injections of ISCR and ISCO materials, and subcontractor field management.

Subcontractors

Key subcontractors selected as part of IWM Consulting's project team consist of the following:

- IET for supply injection equipment, labor for ISCR/ISCO installation, ISCR/ISCO materials, and drilling subcontractors.
- Regenesis Remediation Services for the supply of injection equipment, labor for PRBs/ISCR installation, ISCR/carbon substrate materials, and drilling subcontractors.
- Pace Analytical Services, a NELAC-certified laboratory, for analysis of groundwater samples, confirmation sub-slab soil vapor and IA samples, and other samples.
- Mason Locating Services, GPRS, Inc., Bloodhound Underground, and/or American Locating Services, to provide private utility locating services before injection activities.
- Laboratory Data Consultants, Inc. for the data validation of confirmation soil, groundwater, and vapor laboratory analytical results.

Each of these companies has a proven track record of successful performance in their respective fields of expertise and some of them have also worked with IWM Consulting on this and/or other sites.

6.2 Record Keeping

A field logbook will be maintained during the injection activities. The field logbook will serve to document observations, personnel on site, equipment arrival and departure times, and other project information. Logbook entries will be complete and accurate to permit reconstruction of field activities. Logbooks will be bound with consecutively numbered pages. Each page will be dated and all entries will be legible, written in black or blue ink, and signed by the individual making the entries. If an error is made, corrections will be made by crossing a line through the error and entering the correct information. Corrections will be dated and initialed.

6.3 Health and Safety

Primary site safety issues include proper management of in-situ injection activities, control of methane generation to the subsurface (as described in Sections 5.4.1.3 and 5.4.1.4), potential exposure pathways, and traffic control.

If a spill occurs during the mixing or injection of the ISCR, ISCO, or bioremediation materials, injection personnel will secure, isolate, and dilute the injection materials with water. All of the injection materials are considered non-hazardous and will be handled according to specifications as outlined on each material's safety data sheets.

In-situ injection safety issues include the presence of subsurface utilities in the area of injections. Public and private utility locations will be completed before the initiation of injection activities in the work areas.

It is anticipated that the paved area west of the facility structure, which is enclosed within a 6-foot chain-link fence and gate, will be utilized to store materials and equipment when not being utilized by injection contractors. Additionally, open lawn areas owned by other private commercial companies may be utilized as staging areas for Off-Site in-situ injection activities within the ROW, dependent on approved Site access agreements. IDW generated during the proposed work activities will also be temporarily stored within the fenced-in area.

Additionally, contractors completing injection activities within the ROW will work with traffic controls to minimize the disruption of traffic and potential threats to contractor employees and traffic safety. A maintenance of traffic plan will be submitted to the City of Franklin before the initiation of injection activities within or adjacent to the ROW or public street. Although injection points are not anticipated to be installed within any City streets, the injection trailer or drill rig may likely have to be temporarily staged in the street during the injection activities being completed just off the edge of the street. During work activities within the ROW, traffic cones, signs, and/or flaggers may be utilized to divert traffic from the areas near work activities.

Before the beginning of each day’s activities, a tailgate health and safety meeting will be held. Everyone working at the Site will be required to be familiar with the health and safety plan and attend the daily tailgate meetings or health and safety briefings. Everyone working at the Site will be required to initially sign the site-specific health and safety plan to demonstrate that they are familiar with the health and safety plan and sign a separate sign-in sheet each day indicating that they participated in the daily tailgate meeting. IWM Consulting’s On-Site representative will maintain these signature sheets.

An updated site-specific HASP has been developed and provides the following information:

- Identification of tasks and potential hazards associated with each task;
- List of key personnel;
- PPE that may be used at the Site;
- Employee health and safety training requirements;
- Emergency contingency information;
- Procedures for spill containment;
- Site control measures, as necessary; and
- Decontamination procedures

The HASP will be implemented by the Site Safety Officer during Site work activities. All IWM Consulting personnel and subcontractors who work on this project are required to comply with this HASP. The selected injection sub-contractor(s) will also prepare and provide their own HASP before initiating work at the Site. A copy of the IWM Consulting updated HASP has been included as **Appendix D**.

6.4 Waste Management Practices

During the implementation of the in-situ injection activities, some injection material may surface from paths of least resistance (i.e., previous boring locations or injection locations) and the material will need to be recovered to the extent practical, containerized, and reused or disposed of. The contractors completing the injection activities will be responsible for completing the recovery, removal, and reuse or disposal of the surfaced injection material.

Waste management practices for IDW (i.e., purged groundwater, soil cuttings, and/or soil cores) will be completed in accordance with RCRA Subtitle C requirements. Soil and groundwater generated during sampling activities may be disposed of as non-hazardous waste using a Contained-In Determination (if the media meets the analytical criteria) issued by the IDEM or may be disposed of as a hazardous listed waste at an RCRA Subtitle C hazardous waste landfill. All of the IDW and recovered injectant material will be containerized in the appropriate containers (55-gallon drums or super-sacks) and temporarily stored on-site, within the fenced-in area west of the main Site building.

6.5 Quality Assurance Project Plan

The original QAPP for the Site was presented to the USEPA in 1991 by representatives from WW Engineering and Science. The final revision date of the QAPP was May 25, 1991, and the QAPP was subsequently approved by the USEPA as part of the historical RFI/CMS activities. Updates to the QAPP were periodically made throughout the history of the assessment and remediation activities.

Beginning in 2018, IWM Consulting updated the QAPP by providing the USEPA with IWM Consulting-specific SOPs and laboratory-specific certifications for the analysis being conducted during each phase of the supplemental assessment and remediation activities. The IWM Consulting field SOPs and laboratory certifications were reviewed and approved by the USEPA as part of the work plan approval process. The key QA/QC sampling criteria that will be followed during future sampling activities are as follows:

- One field duplicate sample will be collected at a rate of one sample per every 10 confirmatory samples per sampling media and analyzed for the same analytical parameters;
- One MS/MSD sample will be collected at a rate of one sample per every 20 confirmatory samples per sampling media and analyzed for the same analytical parameters;
- One trip blank for VOC analysis will accompany each cooler shipment that contains samples for VOC analyses; and
- One equipment blank per sampling media will be obtained per day and analyzed for the same analytical parameters.

Please note that the supplemental analysis outlined in Section 5.3 of this SSCMIWP will not have duplicate, MS/MSD, or equipment blank samples obtained as part of the QA/QC process since this is for informational purposes only and is not being utilized for closure purposes.

In accordance with the request from the USEPA, a standalone QAPP will be submitted to the USEPA for review and approval before implementing any future sampling activities relating to this *SSCMIWP*. The QAPP will include the relevant IWM Consulting field SOPs that were previously approved by the USEPA and the current laboratory certifications applicable to the implementation of this SSCMIWP.

6.6 Community Relations Plan

The Community Relations Plan is intended to provide information and seek community input as the project is conducted and completed. It will include the following elements:

- Initial informational mailings to the City of Franklin DPW and those residents and businesses directly affected by the work activities which are located on Forsythe Street and Hamilton Avenue. The letter will provide details to the affected residents and businesses and what should be expected during work activities (i.e., roadway lane closures, schedules, anticipated sequencing of injections). This mailing will be sent approximately two weeks before initiating in-situ injection work activities.
- IWM Consulting will provide the USEPA biweekly progress summaries during in-situ injection work activities that may be posted to their website for a broader distribution to the community. These summaries may also be presented and discussed with the community stakeholders during regularly scheduled USEPA progress calls. The frequency of these calls will be determined by the USEPA.
- As the On-Site consultant for Amphenol, IWM Consulting will update adjacent property owners on maintenance of traffic, property access issues, SSDS operations/confirmation sampling, and project schedules via door-to-door communication with those directly impacted during in-situ injection work activities.
- A single point of contact will be established for the public or media to call with questions regarding the project. The designated point of contact will be Kirstin Safakas, the USEPA Community Involvement Coordinator for the Site, who may be contacted at safakas.kirstin@epa.gov or (312) 919-4621.
- All correspondence to the public will be directed under the supervision of the USEPA.
- During the implementation of work activities, access to the in-situ injection work areas will be restricted and the general public is prohibited from entering the work area. Questions regarding the work activities will be directed to the USEPA Community Involvement Coordinator for the Site.

6.7 Estimated Cost & Financial Assurance

IWM Consulting has included a table in **Appendix E** which summarizes the estimated cost to implement the proposed SSCMIWP activities and conduct up to five years of groundwater monitoring.

This is an estimate only and the actual cost incurred will be dependent upon the laboratory results obtained during future performance and plume stability monitoring activities.

As part of the Final Remedy, the Respondents under the RCRA Section 3008(h) AOC require financial assurance to complete corrective action, including constructing the proposed remedy and monitoring Site conditions following remedy construction, as needed, by securing an appropriate financial instrument consistent with the requirements of 40 C.F.R. §§ 264.142 and 264.144. After successfully completing the construction phase of the remedy, USEPA may reduce the amount of the financial assurance to the amount necessary to cover the anticipated remaining costs of the remedy, including any yearly operation and maintenance costs. Financial assurance documentation will be provided under a separate cover per the Administrative Order of Consent.

6.8 Schedule

IWM Consulting has included Gannt Charts displaying the anticipated project schedule for the corrective action and short-term (less than or equal to five years) monitoring activities. Please note that the schedule included in **Appendix F** is dependent on several assumptions, including contractor and in-situ product availability, when the Off-Site access agreements are obtained, and weather. The goal is to start implementing the compliance well installation in June 2024 and corrective actions in July 2024. The anticipated project schedule assumes the following:

- The USEPA approves this Final SSCMIWP and QAPP;
- Off-Site access agreements are obtained before July 15, 2024;
- The selected contractor(s) and in-situ products are available; and
- There are no unusually long wet periods or cold stretches that would prohibit the implementation of the fieldwork activities.

If any of the above assumptions are not met, then the schedule will be altered accordingly to account for the length of the delays.

7.0 REFERENCES

Earth Tech. November 1996. "Report of Additional Corrective Measures Studies for the Former Amphenol Facility, Franklin, Indiana". Technical document, Earth Tech.

FRTR. April 2023. "Permeable Reactive Barriers, Schematic" https://www.frtr.gov/matrix/Permeable-Reactive-Barriers, Permeable Reactive Barrier Schematic.

IT Corporation. August 1985. "Site Assessment". Revised Final Technical document, IT Corporation.

IT Corporation. June 1994. "RCRA Facility Investigation". Technical document, IT Corporation.

IWM Consulting. July 2018. "Ambient Air Investigation Work Plan". Technical document, IWM Consulting Group, LLC.

IWM Consulting. September 2018. "Vapor Intrusion Investigation – Exterior Soil Gas Sampling Work Plan". Technical document, IWM Consulting Group, LLC.

IWM Consulting. September 2018. "Residential Vapor Intrusion Investigation Work Plan for Priority Residences". Technical document, IWM Consulting Group, LLC.

IWM Consulting. September 2018. "Sewer Gas Vapor Intrusion Investigation Work Plan". Technical document, IWM Consulting Group, LLC.

IWM Consulting. October 2018. "Off-Site Groundwater Investigation Work Plan". Technical document, IWM Consulting Group, LLC.

IWM Consulting. February 2019. "Additional Off-Site Groundwater Investigation Work Plan". Technical document, IWM Consulting Group, LLC.

IWM Consulting. February 2019. "Design-Level Data Soil Investigation Work Plan". Technical document, IWM Consulting Group, LLC.

IWM Consulting. June 2019. "Off-Site Interim Measure Work Plan and Response to Comments". Technical document, IWM Consulting Group, LLC.

IWM Consulting. August 2019. "Off-Site Interim Measure Work Plan Addendum". Technical document, IWM Consulting Group, LLC.

IWM Consulting. September 2019. "Conditionally Approved OIM Work Plan – Response to Comments". Technical document, IWM Consulting Group, LLC.

IWM Consulting. October 2019. "Off-site Groundwater Treatment Pilot Study". Technical document, IWM Consulting Group, LLC.

IWM Consulting. January 2020. "Off-Site Interim Measure Construction Completion Report". Technical document, IWM Consulting Group, LLC.

IWM Consulting. January 2020. "On-Site Sewer Vapor Intrusion Investigation Work Plan". Technical document, IWM Consulting Group, LLC.

IWM Consulting. February 2020. "On-Site Soil Investigation Work Plan". Technical document, IWM Consulting Group, LLC.

IWM Consulting. April 2020. "On-Site Sewer Gas Vapor Intrusion Investigation Summary Report". Technical document, IWM Consulting Group, LLC.

IWM Consulting. September 2020. "Off-Site Groundwater Treatment Pilot Study Evaluation Report". Technical document, IWM Consulting Group, LLC.

IWM Consulting. March 2021. "Second Supplemental Corrective Measure Study". Draft technical document, IWM Consulting Group, LLC.

IWM Consulting. March 2022. "Second Supplemental Corrective Measure Study". Final technical document, IWM Consulting Group, LLC.

Regenesis. March 2023. "FluxTracer® Results: Darcy Velocity, Mass Flux, and Contaminant Concentrations". Final technical document. Regenesis.

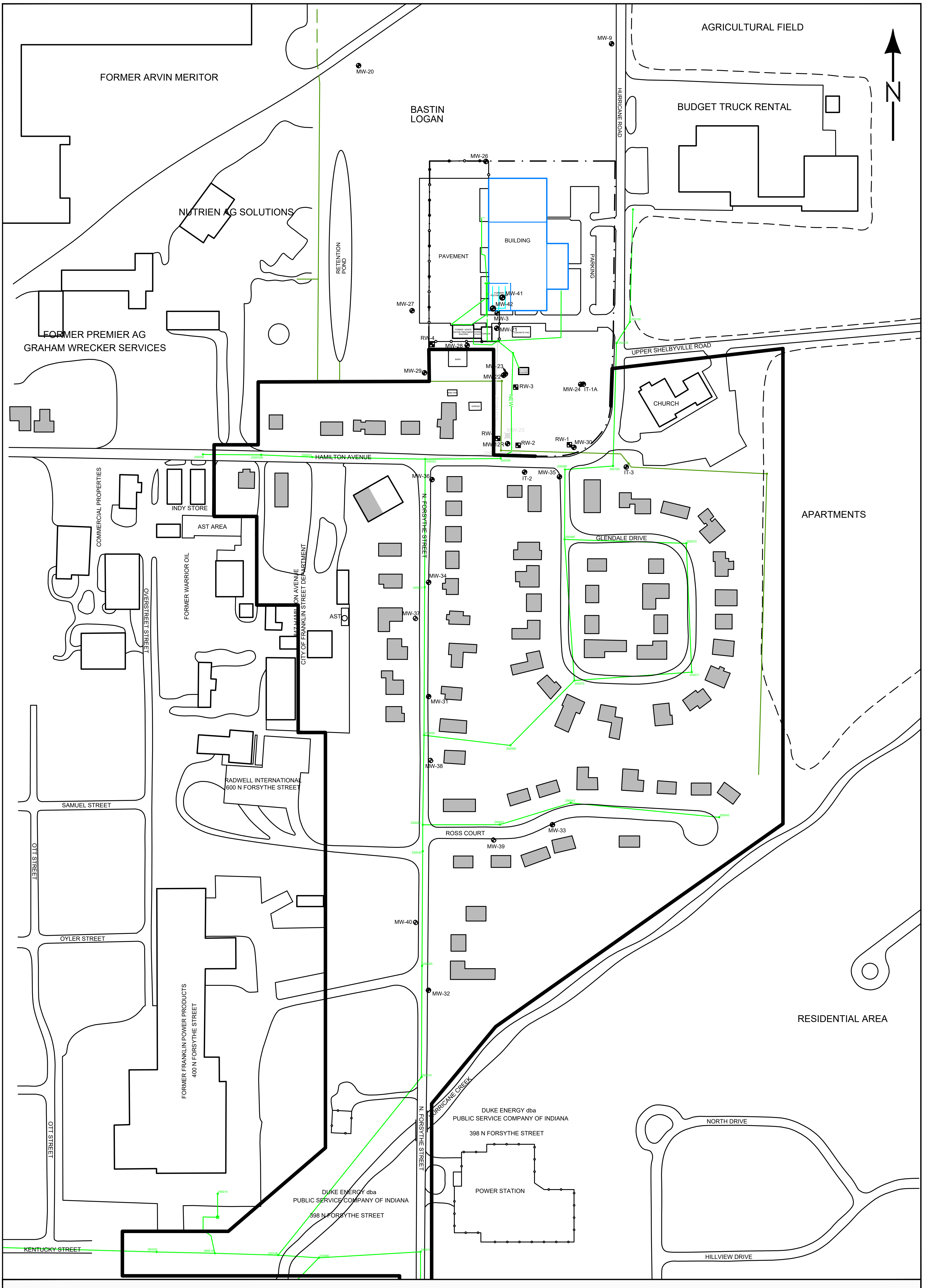
USEPA. March 2000. "EPA Threshold and Balancing Criteria", Attachment One of Fact Sheet #3, Final Remedy Selection for Results-Based RCRA Corrective Action. U.S. Environmental Protection Agency, Washington D.C.

USEPA. March 2016. "RCRA Corrective Measure Study Bulletin". U.S. Environmental Protection Agency, Washington D.C.

USEPA. May 1994. "Final RCRA Corrective Action Plan".
Office of Solid Waste and Emergency Response, EPA 520-R-94-004, U.S. Environmental Protection Agency, Washington D.C.

USEPA. September 2012. "A Citizen's Guide to In Situ Chemical Oxidation" 542-F-12-011. U.S. Environmental Protection Agency, Washington D.C.

Figures



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- STEEL-CASED MONITORING WELL
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- STUDY AREA BOUNDARY

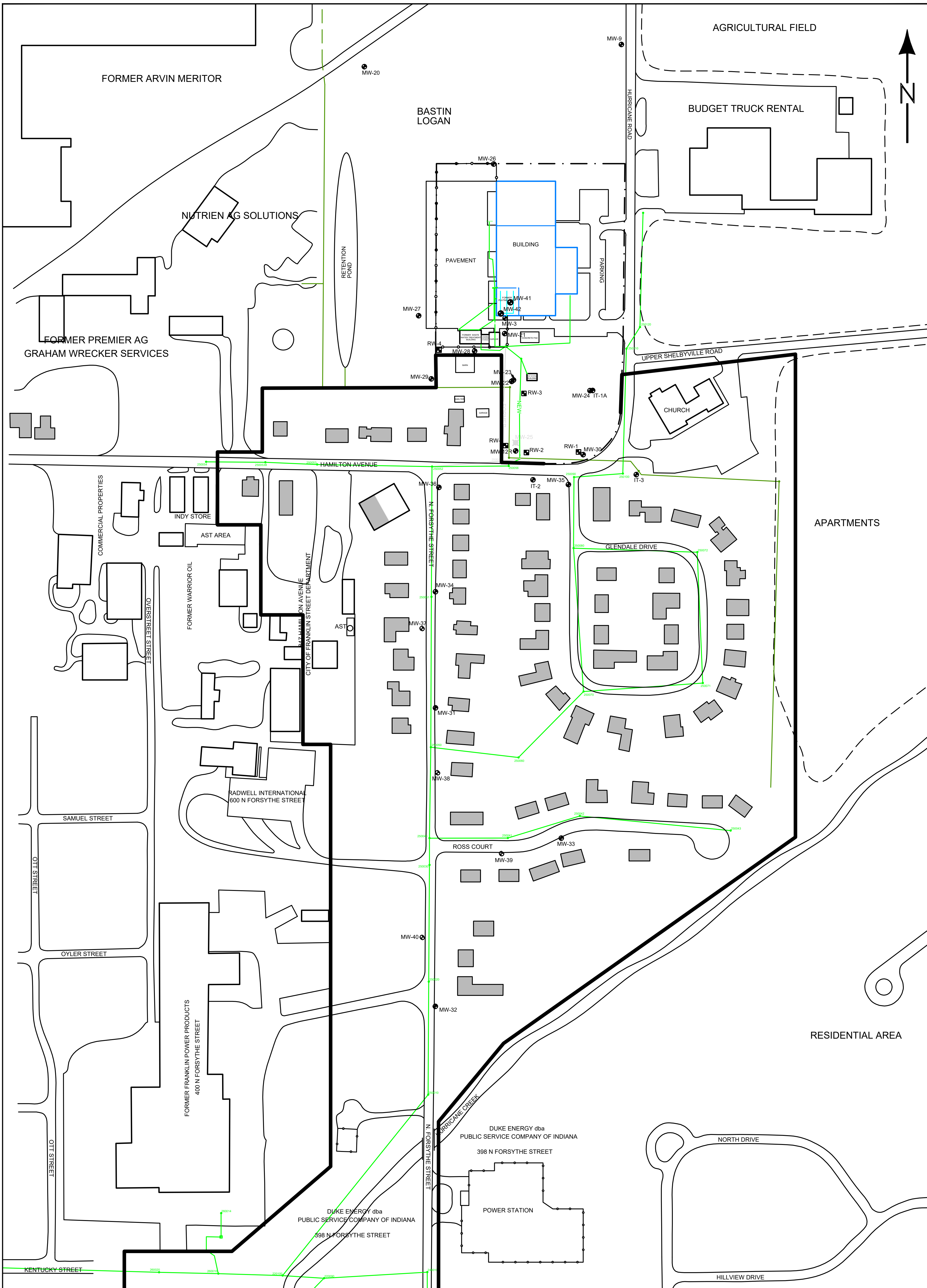
0' 200'
SCALE IN FEET

DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 5/23/24
IN.AMP18.04
DWG. NO. CMIWP test

FIG 1-2
SITE VICINITY MAP

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP

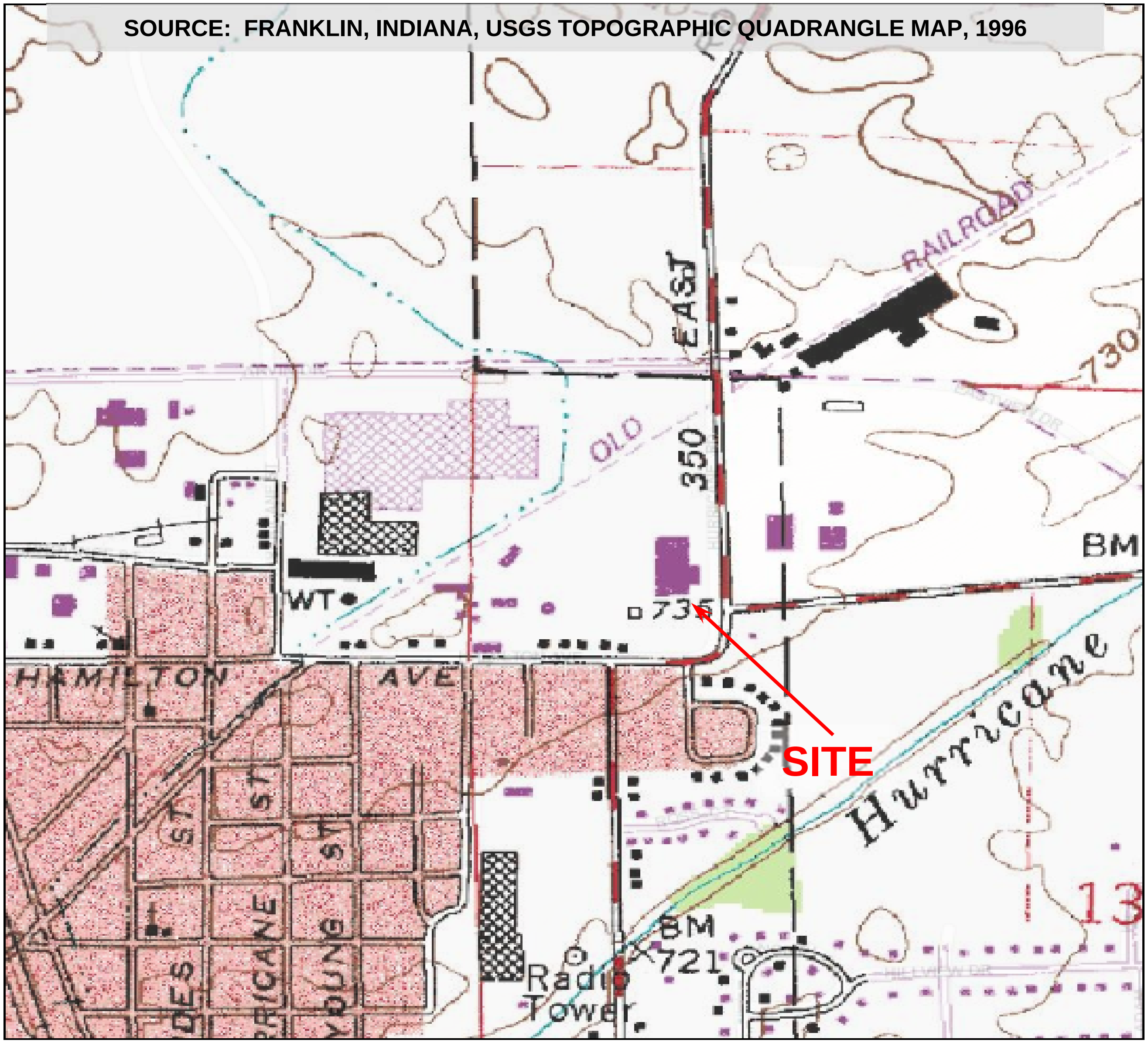


LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- STEEL-CASED MONITORING WELL
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- RESIDENTIAL HOME
  - * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- STUDY AREA BOUNDARY

0' 200'
SCALE IN FEET

DRAWN BY: L. STRUM	FIG 1-2	FORMER BENDIX FACILITY RFI/CMS	IWM CONSULTING GROUP
DATE: 9/27/99	SITE VICINITY MAP	980 HURRICANE ROAD	
REVISED: 5/23/24		FRANKLIN, INDIANA	
IN.AMP18.04			
DWG. NO. CMIWP test			



IWM CONSULTING GROUP

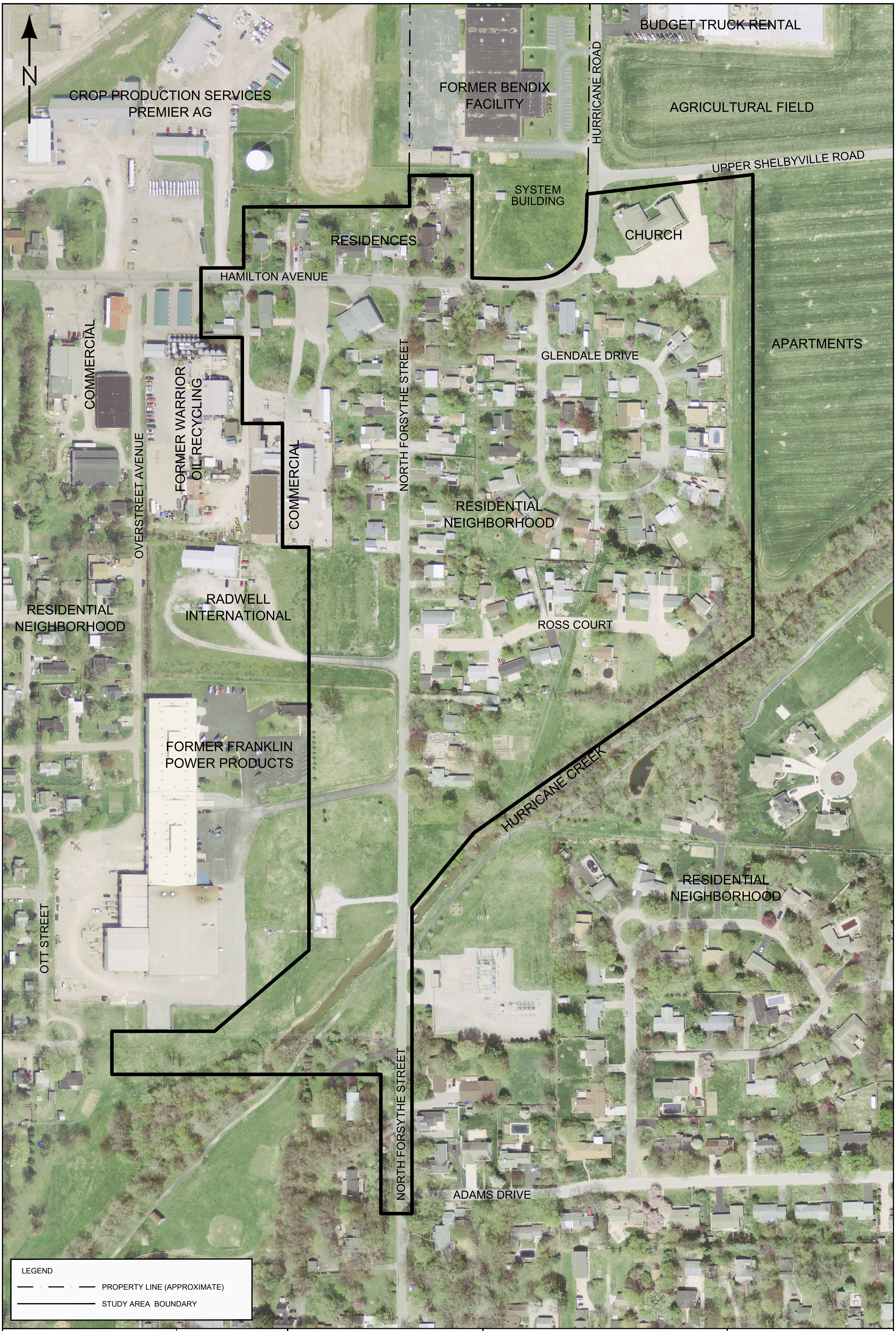
7428 Rockville Road
Indianapolis, IN 46214

(317) 347-1111
Fax: (317) 347-9326

Project	Task	Size	Date
IN.AMP.18	04	A	10/26/2020

TITLE **FIGURE 2-1 – Site Location Map**
Former Bendix Facility
980 Hurricane Road
Franklin, Indiana

CLIENT **Amphenol Corporation**



0' 200'
SCALE IN FEET

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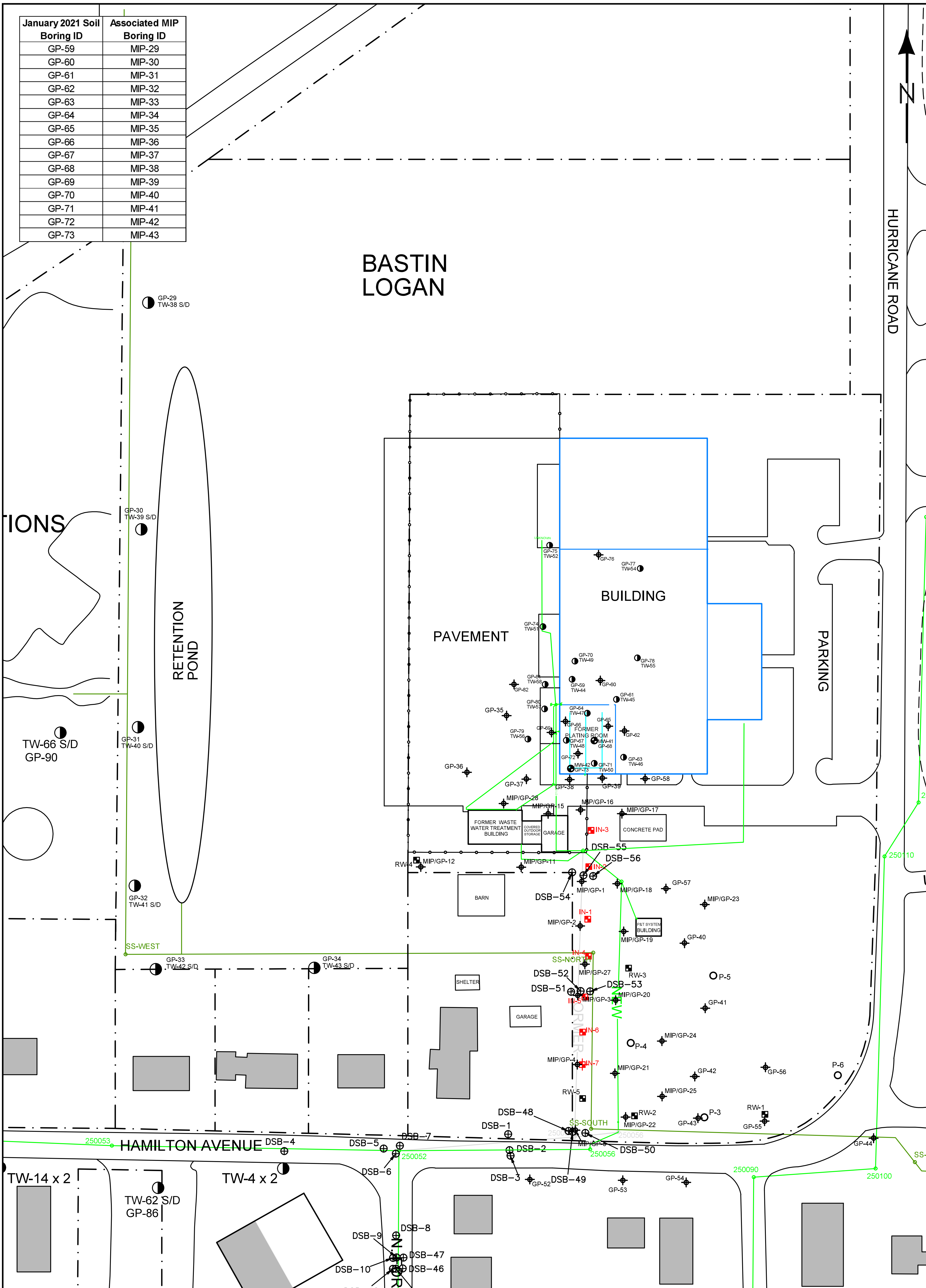
DATE: 9/27/99
REVISED: 5/23/24
IN.AMP18.04
DWG. NO. CMIWP test

FIGURE 2-2
STUDY
AREA MAP

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM
CONSULTING GROUP

January 2021 Soil Boring ID	Associated MIP Boring ID
GP-59	MIP-29
GP-60	MIP-30
GP-61	MIP-31
GP-62	MIP-32
GP-63	MIP-33
GP-64	MIP-34
GP-65	MIP-35
GP-66	MIP-36
GP-67	MIP-37
GP-68	MIP-38
GP-69	MIP-39
GP-70	MIP-40
GP-71	MIP-41
GP-72	MIP-42
GP-73	MIP-43



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PIEZOMETERS
- MIP/GEOPROBE BORING
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- STEEL-CASED MONITORING WELL
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- TEMPORARY WELL/SOIL BORING LOCATION
- DSB SOIL BORING LOCATION
- INJECTION WELL

0' 80'
SCALE IN FEET

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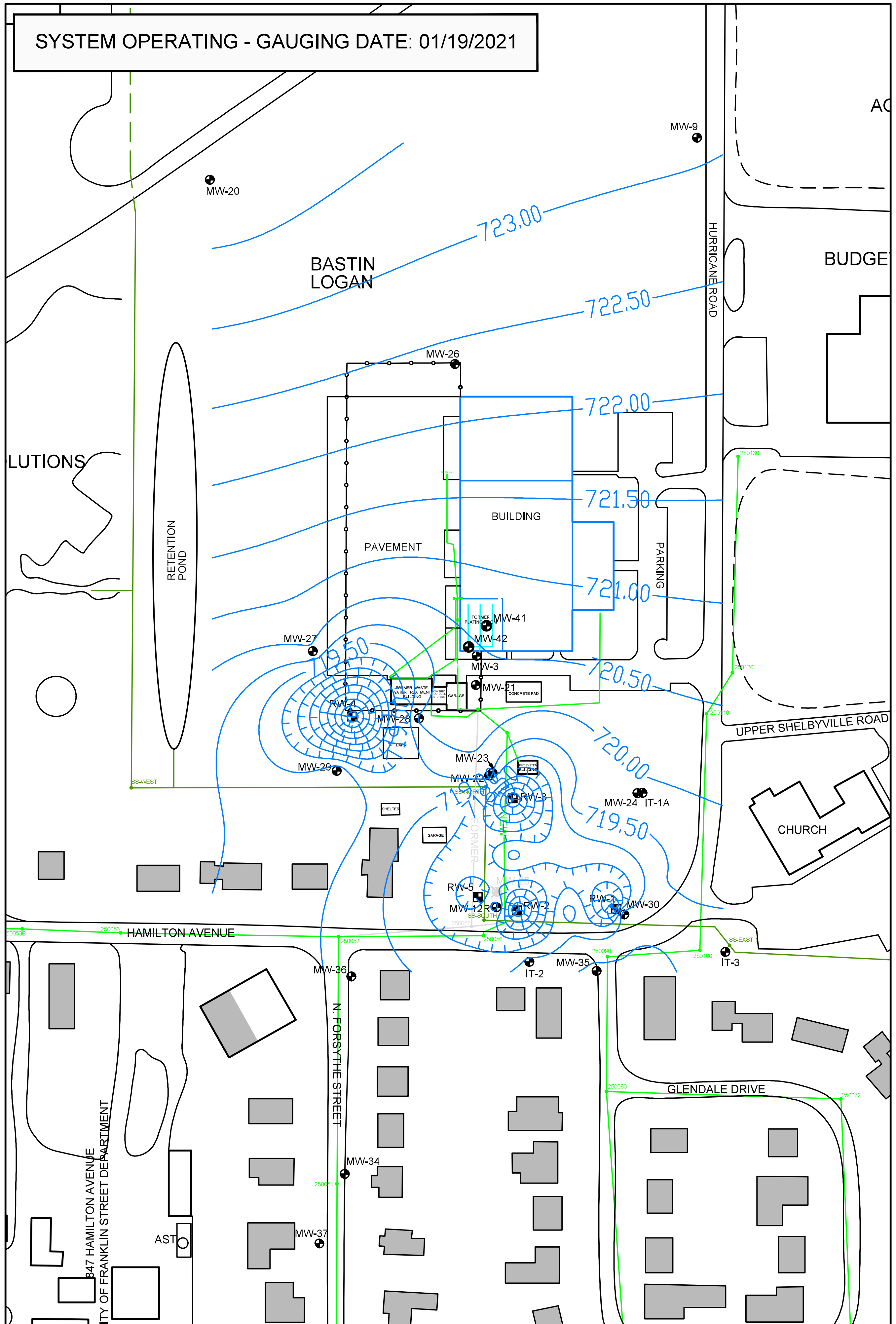
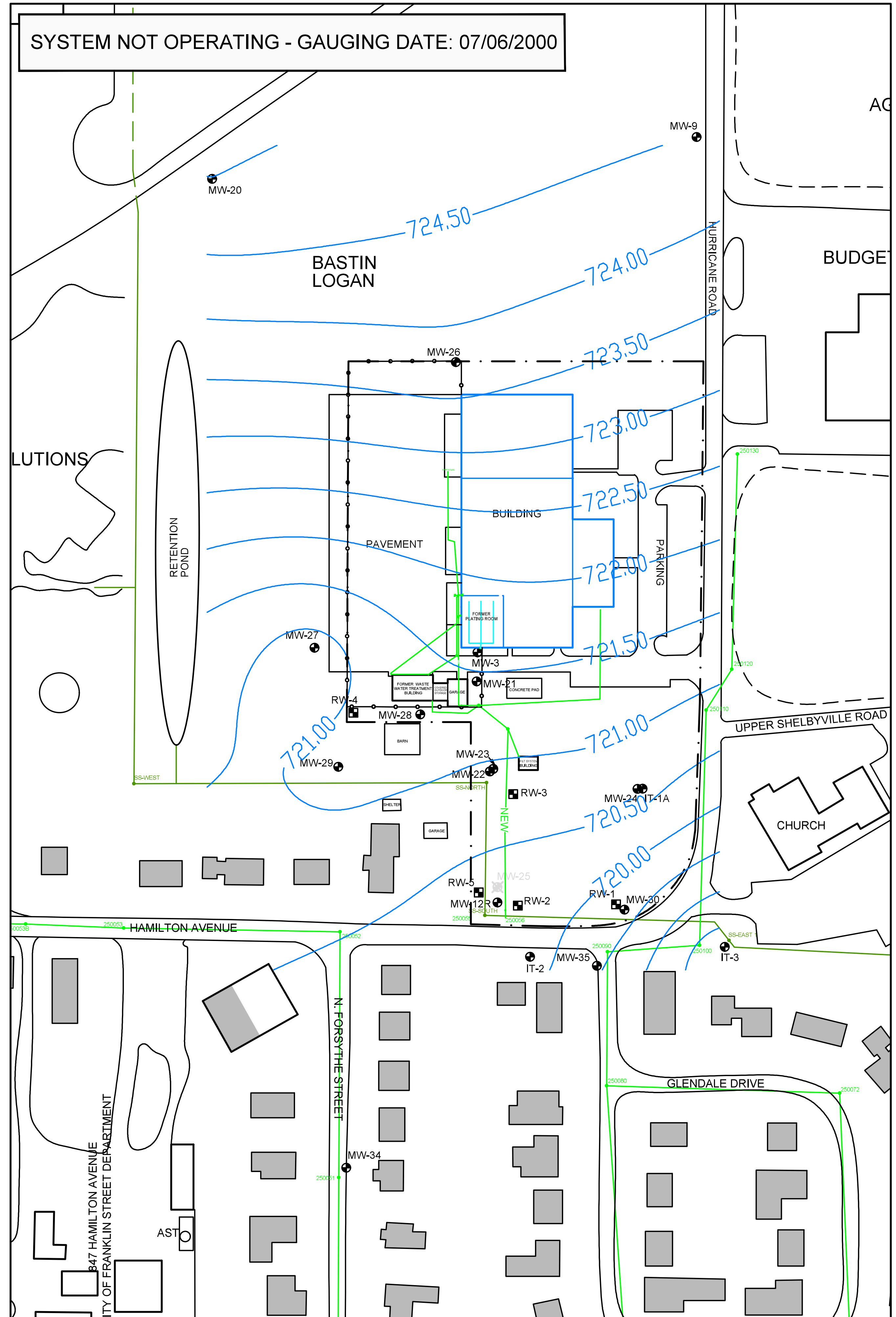
DATE: 9/27/99
REVISED: 5/23/24
IN.AMP18.04
DWG. NO. CMIWP test

FIGURE 2-3
SITE PLAN

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP





LEGEND

- PROPERTY LINE (APPROX.)
- STORM SEWER
- SANITARY SEWER
- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- 721.0 POTENTIOMETRIC SURFACE (CONTOUR INTERVAL = 0.5 FT.)

FIGURE 2-4
GROUNDWATER POTENTIOMETRIC MAP

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

N

0' 150'
SCALE IN FEET

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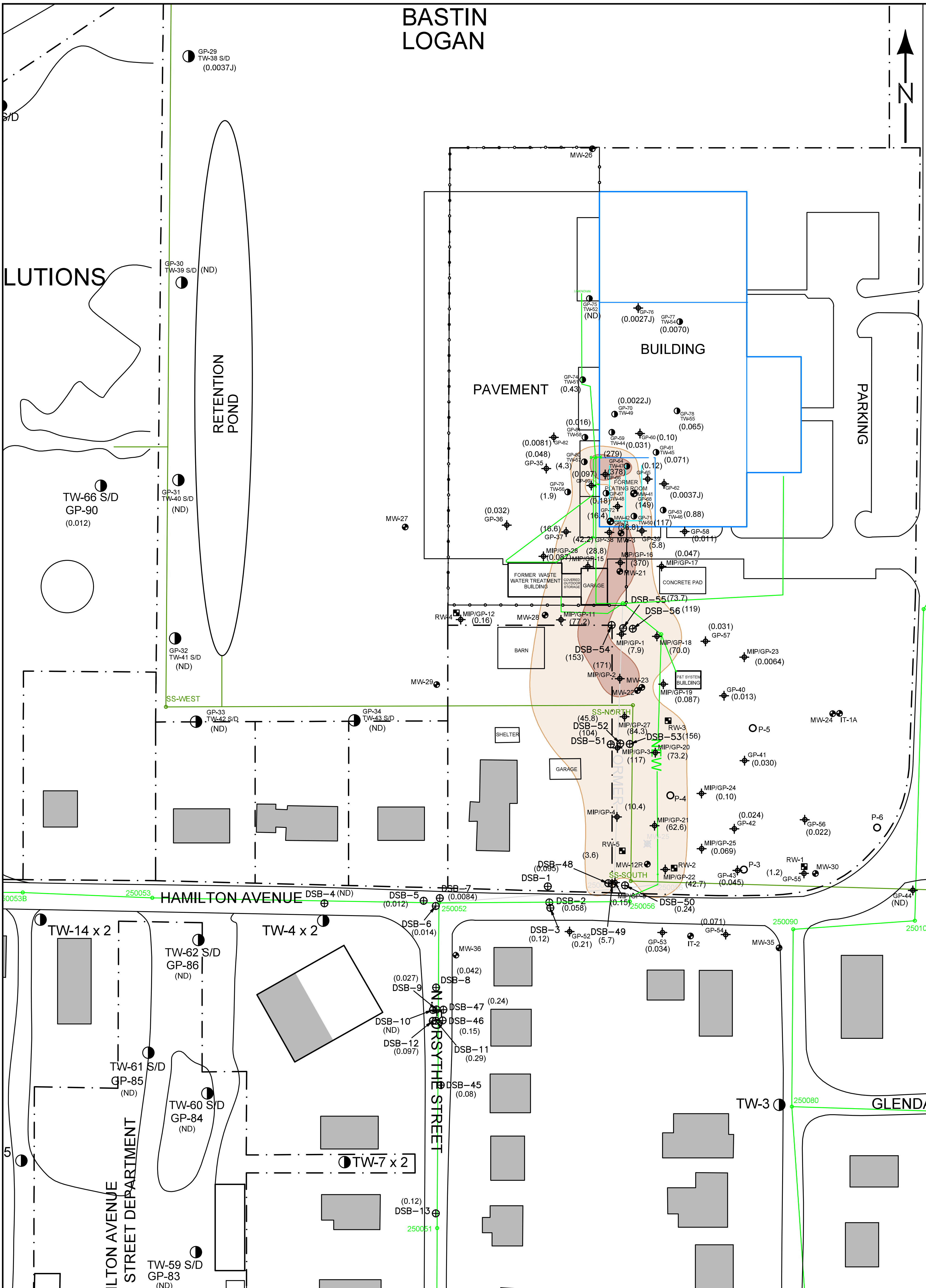
IN.AMP18.04
DWG. NO. CMIWP test



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PIEZOMETERS
- MIP/GEOPROBE BORING
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- TEMPORARY WELL/SOIL BORING LOCATION
- DSB SOIL BORING LOCATION
- RESIDENTIAL HOME
  - * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- PCE > RECALCULATED MIGRATION TO GROUNDWATER SCREENING LEVEL (2.667 mg/kg)
- PCE > EXCAVATION WORKER SOIL EXPOSURE SCREENING LEVEL (170 mg/kg)
- ND NON-DETECT

0' 80'
SCALE IN FEET

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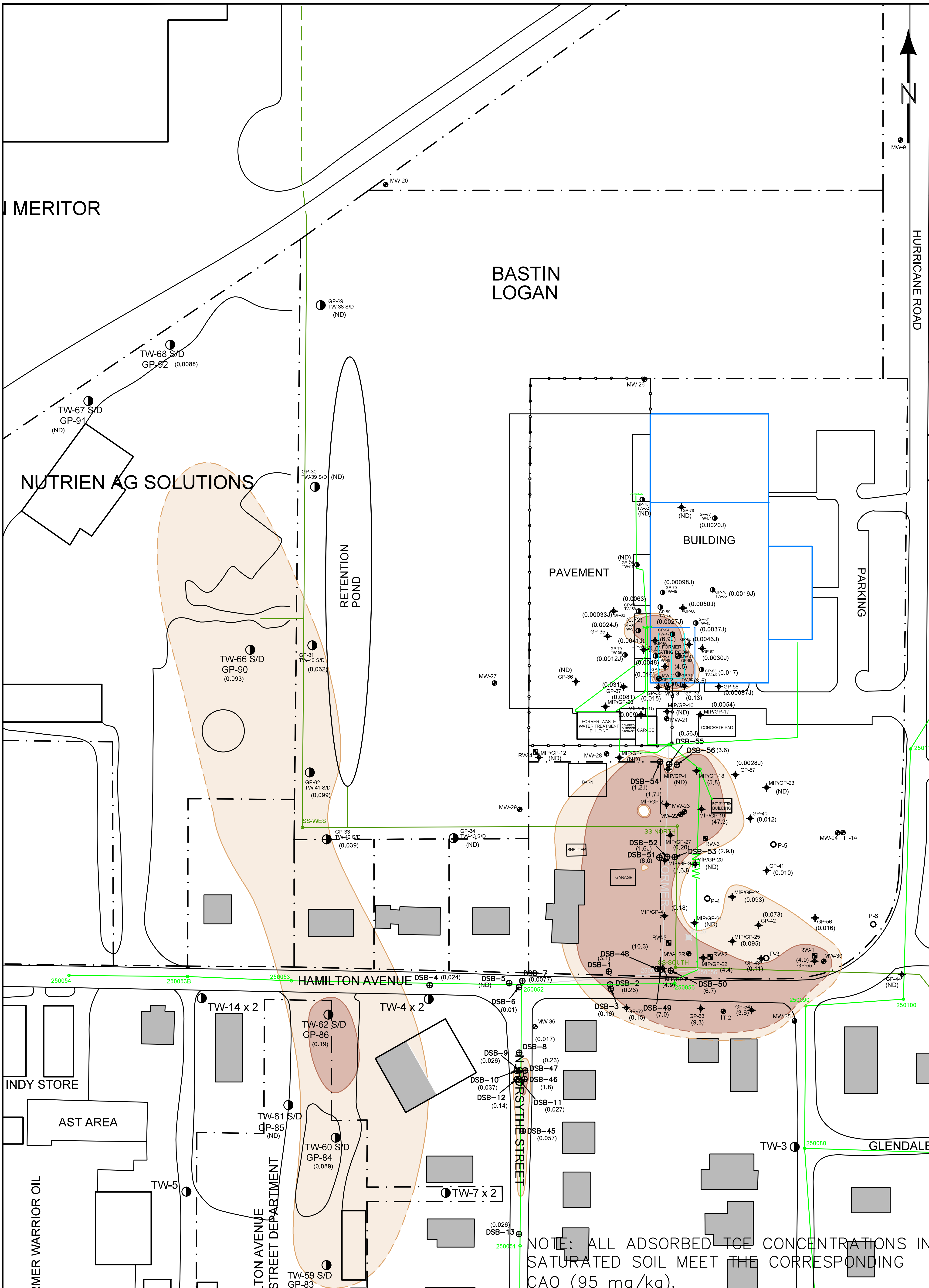
DATE: 9/27/99	
REVISED: 5/23/24	
IN.AMP18.04	
DWG. NO. CMIWP test	

FIGURE 2-5
SOIL ANALYTICAL RESULTS
PCE WITHIN UNIT B

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PIEZOMETERS
- MIP/GEOPROBE BORING
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- TEMPORARY WELL/SOIL BORING LOCATION
- DSB SOIL BORING LOCATION
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- TCE > MIGRATION TO GROUNDWATER SCREENING LEVEL (0.036 mg/kg)
- TCE > RECALCULATED MIGRATION TO GROUNDWATER SCREENING LEVEL (0.153 mg/kg)
- ND NON-DETECT

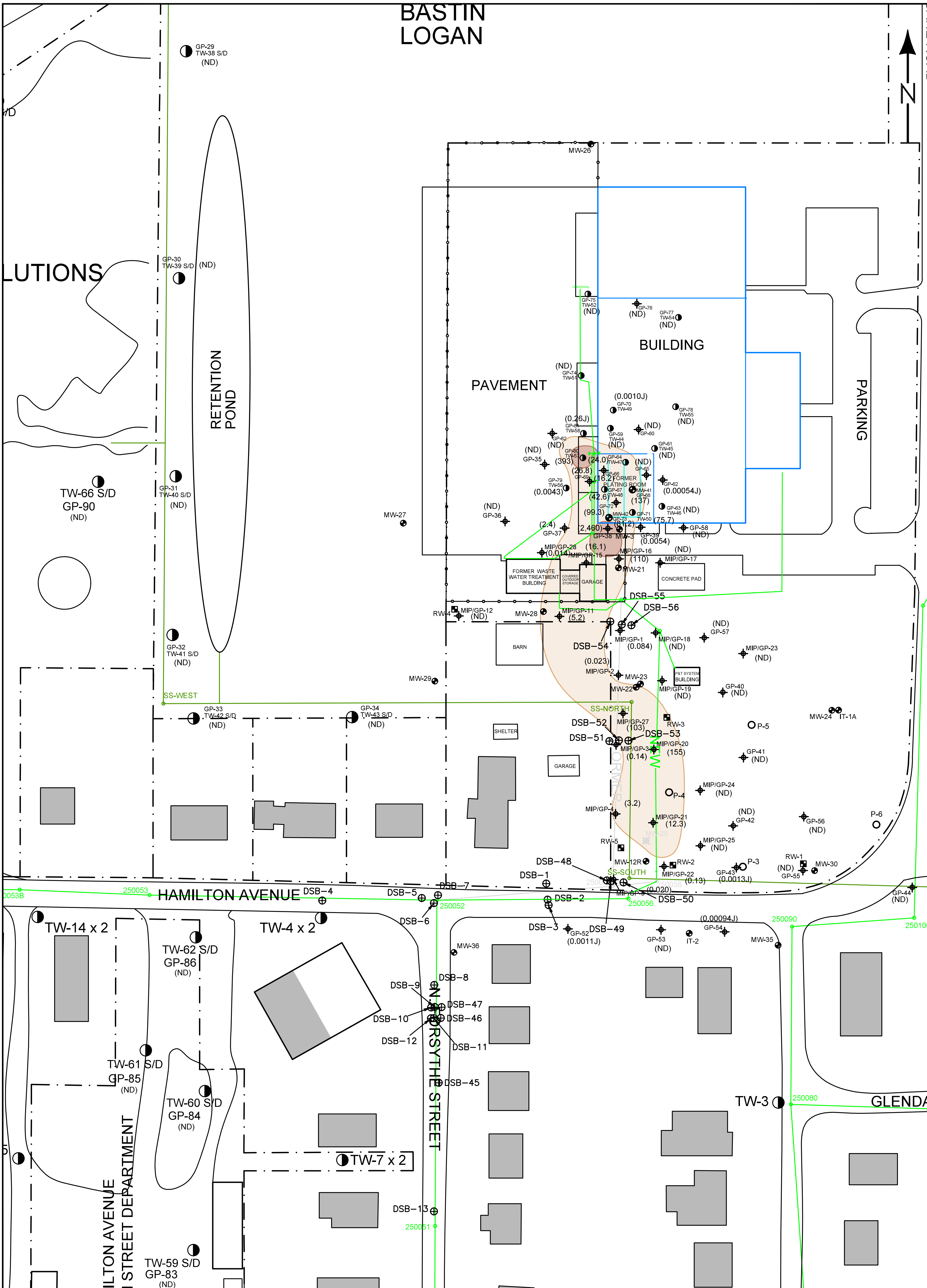
0' 100'
SCALE IN FEET

DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 5/23/24
IN.AMP18.04
DWG. NO. CMIWP test

FIGURE 2-6
SOIL ANALYTICAL RESULTS
TCE WITHIN UNIT B

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PIEZOMETERS
- MIP/GEOPROBE BORING
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- TEMPORARY WELL/SOIL BORING LOCATION
- DSB SOIL BORING LOCATION
- RESIDENTIAL HOME * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- PCE > RECALCULATED MIGRATION TO GROUNDWATER SCREENING LEVEL (2.667 mg/kg)
- PCE > EXCAVATION WORKER SOIL EXPOSURE SCREENING LEVEL (170 mg/kg)
- ND NON-DETECT

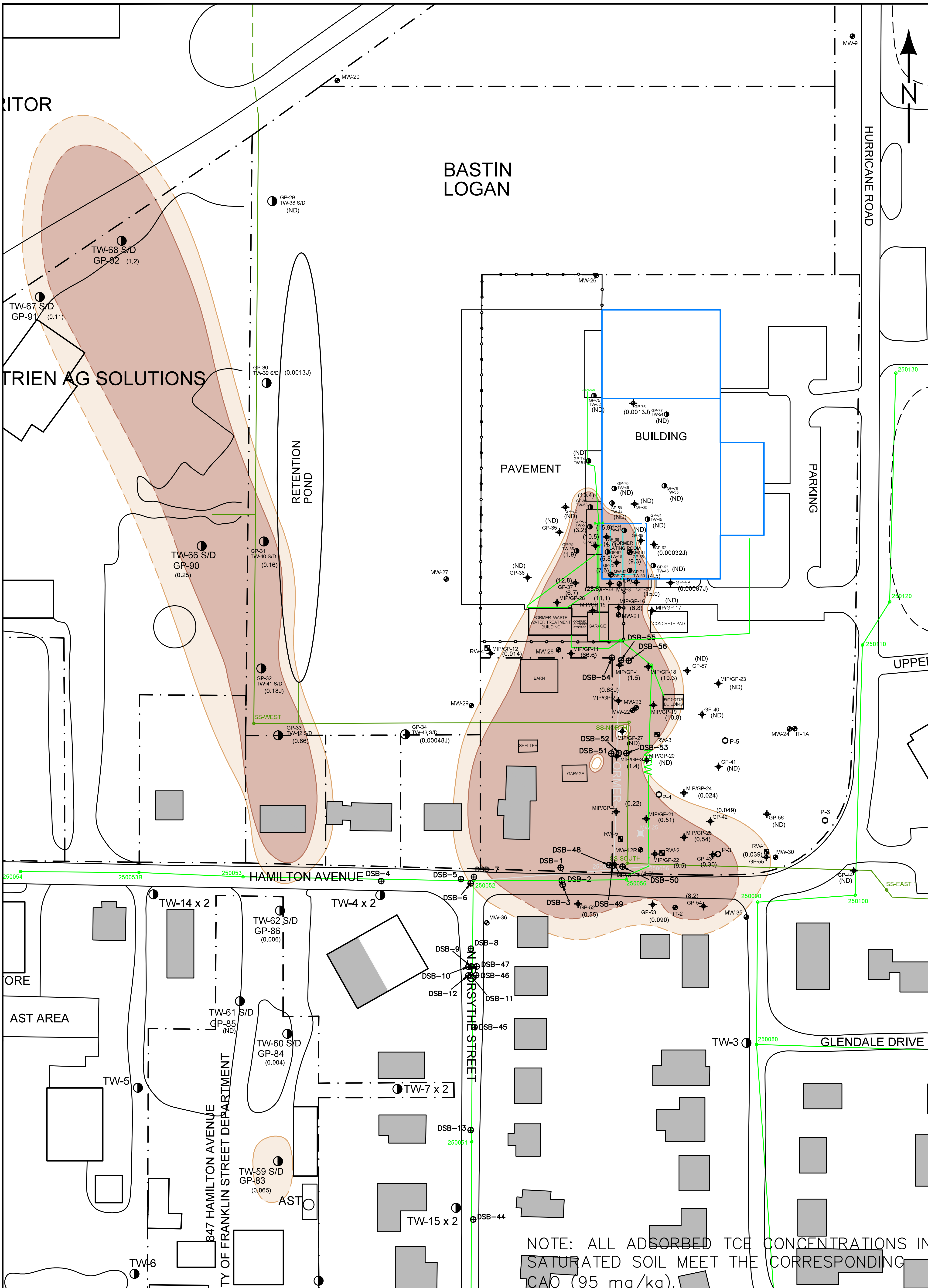
0' 80'
SCALE IN FEET

DRAWN BY: L. STRUM	
DATE: 9/27/99	
REVISED: 5/23/24	
IN.AMP18.04	
DWG. NO. CMIWP test	

FIGURE 2-7
SOIL ANALYTICAL RESULTS
PCE WITHIN TOP OF UNIT C

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PIEZOMETERS
- MIP/GEOPROBE BORING
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- TEMPORARY WELL/SOIL BORING LOCATION
- DSB SOIL BORING LOCATION
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- TCE > MIGRATION TO GROUNDWATER SCREENING LEVEL (0.036 mg/kg)
- TCE > RECALCULATED MIGRATION TO GROUNDWATER SCREENING LEVEL (0.153 mg/kg)
- ND NON-DETECT

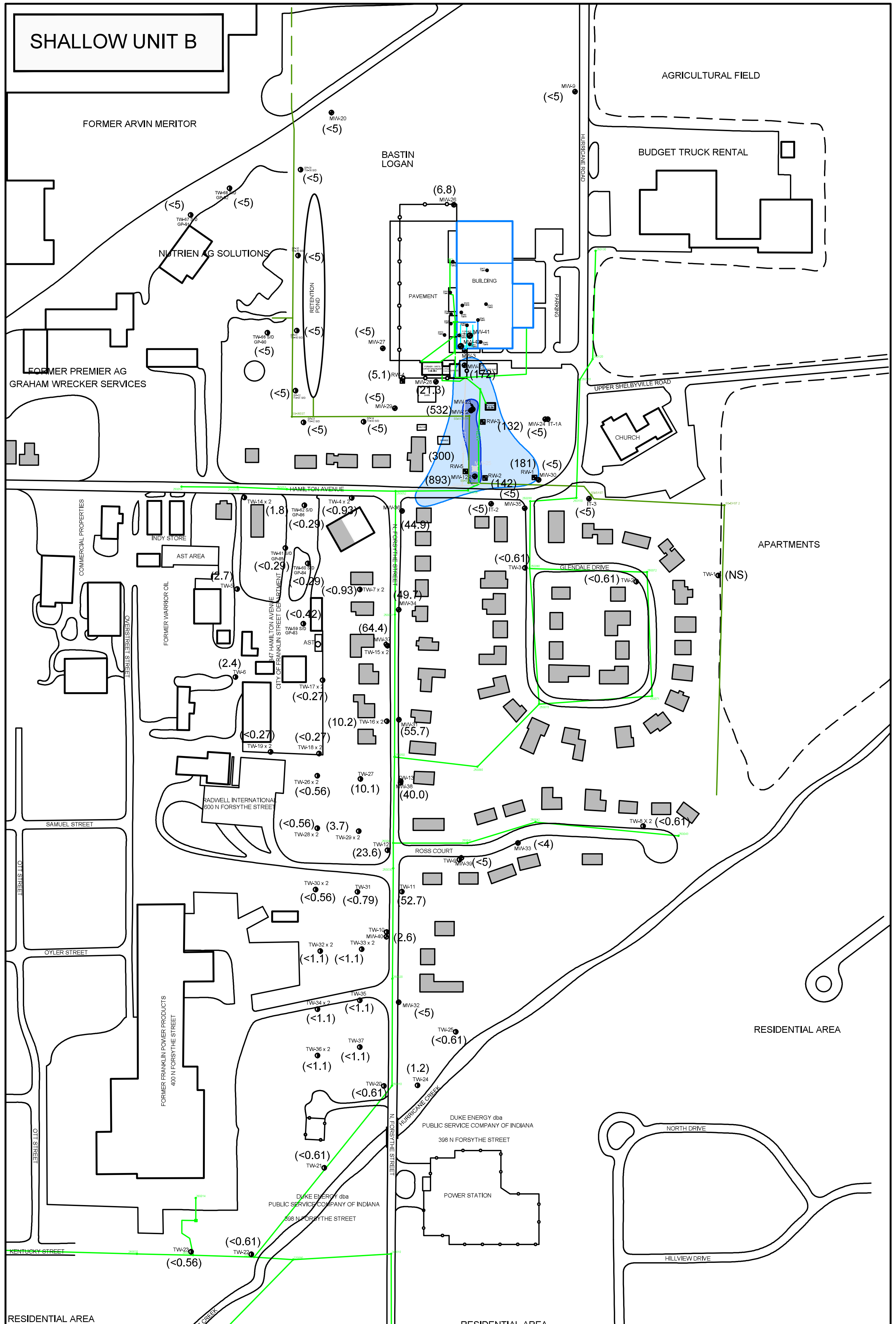
0' 100'
SCALE IN FEET

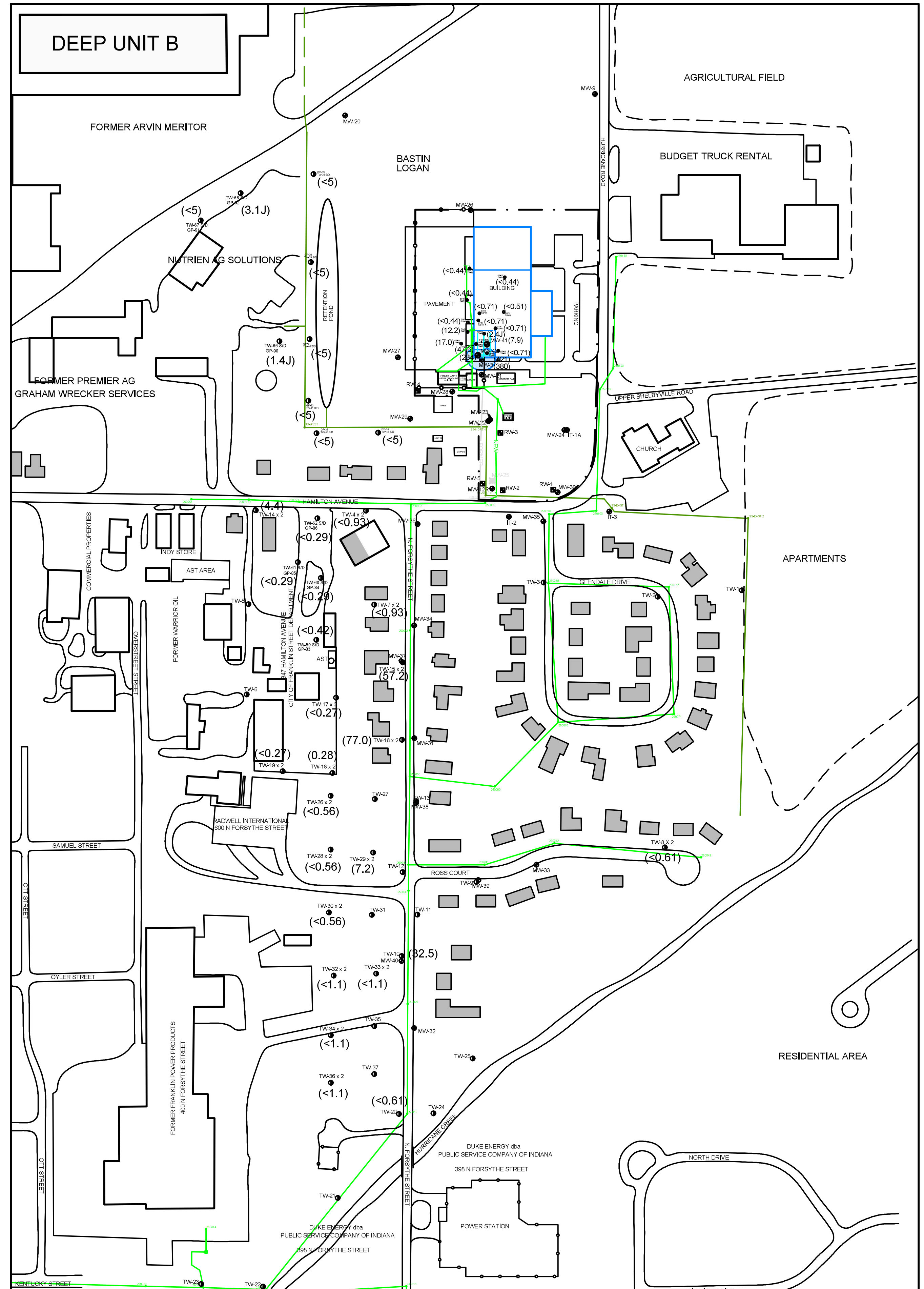
DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 5/23/24
IN.AMP18.04
DWG. NO. CMIWP test

FIGURE 2-8
SOIL ANALYTICAL RESULTS
TCE WITHIN TOP OF UNIT C

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP





Data utilized from:
- Temporary well sampling on October 24-25, 2018, March 5-7, 2019, July 1-2, 2019, October 21-22, 2020, January 14-19, 2021, August 16-17, 2021, and January 17-19, 2022.
- Semi-annual groundwater & quarterly system sampling events in October & November 2020.

LEGEND

PROPERTY LINE (APPROX.)
STORM SEWER
SANITARY SEWER

ABANDONED MONITORING WELL
MONITORING WELL
RECOVERY WELL
TEMPORARY WELLS

RESIDENTIAL HOME
* DETACHED GARAGES & SHEDS NOT SHOWN

NON-RESIDENTIAL STRUCTURE

PRIMARY BUILDING WALLS

PCE CONCENTRATION >110 ug/L (RESIDENTIAL SCREENING LEVEL)

PCE CONCENTRATION >470 ug/L (COMMERCIAL/INDUSTRIAL SCREENING LEVEL)

(153) PCE CONCENTRATION AT MONITORING POINT IN ug/L

NOTE: LONG-TERM CLEANUP OBJECTIVE = MCL 5 ug/L

FIGURE 2-9
GROUNDWATER PCE ISOCONCENTRATION MAP

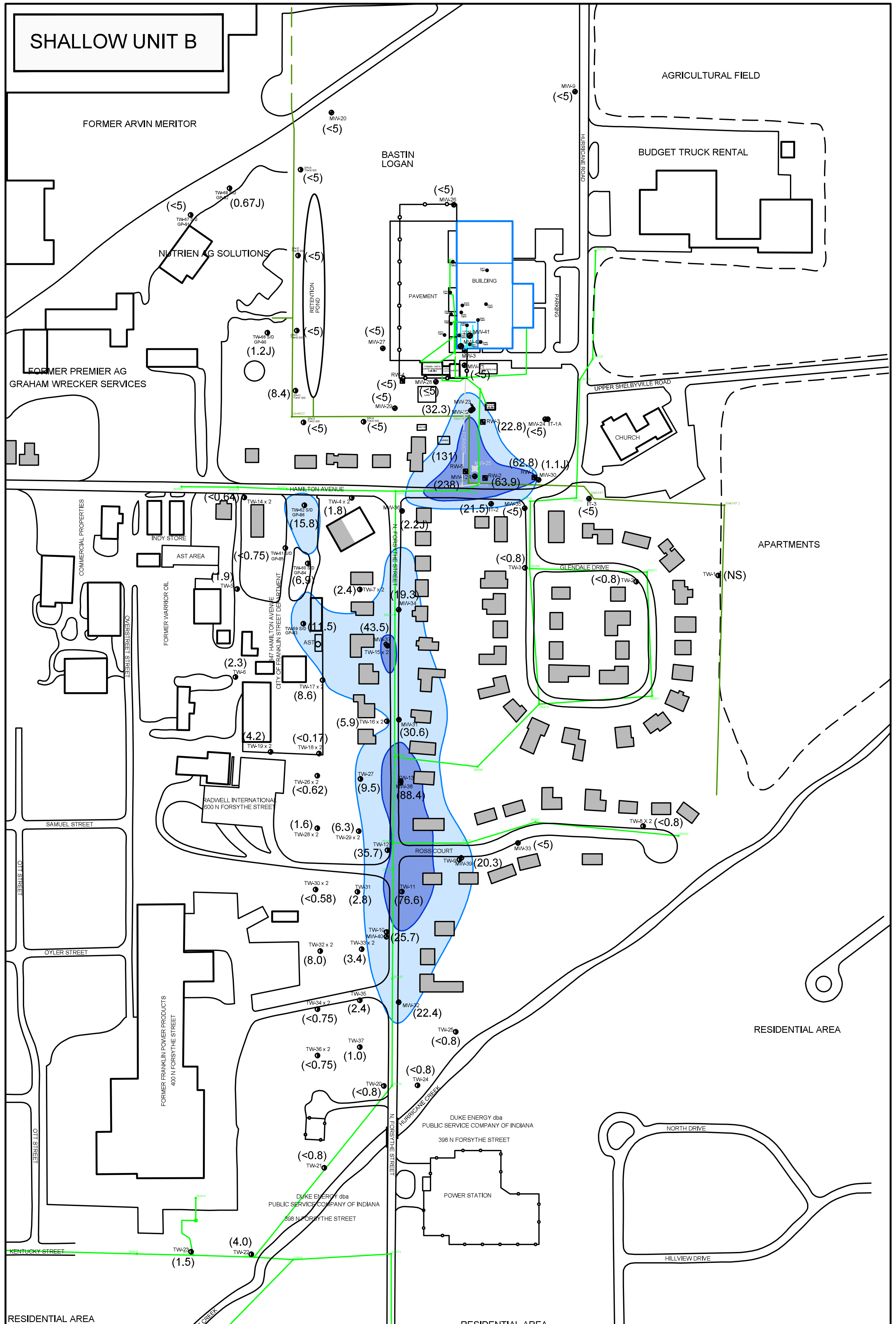
FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

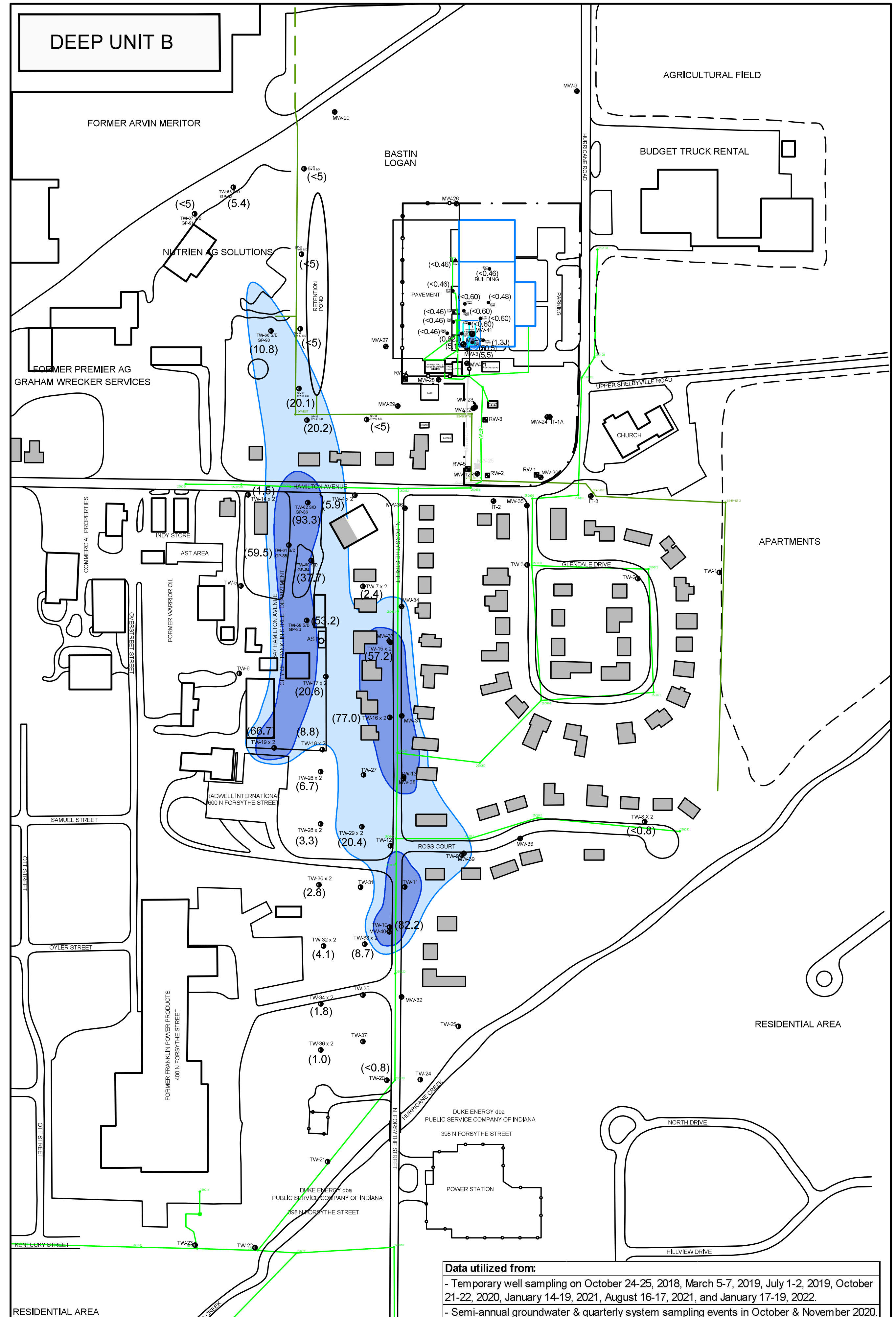
N

0' 300'
SCALE IN FEET

IWM CONSULTING GROUP

DRAWN BY: C.NEWELL
DATE: 06/09/2020
REVISED: 5/23/24
IN.AMP18.04
DWG. NO. CMIWP test





LEGEND

PROPERTY LINE (APPROX.)
STORM SEWER
SANITARY SEWER
ABANDONED MONITORING WELL
MONITORING WELL
RECOVERY WELL
TEMPORARY WELLS
RESIDENTIAL HOME
* DETACHED GARAGES & SHEDS NOT SHOWN
NON-RESIDENTIAL STRUCTURE
PRIMARY BUILDING WALLS
TCE CONCENTRATION >9.1 ug/L (RESIDENTIAL SCREENING LEVEL)
TCE CONCENTRATION >38 ug/L (COMMERCIAL/INDUSTRIAL SCREENING LEVEL)
(153) TCE CONCENTRATION AT MONITORING POINT IN ug/L

NOTE: LONG-TERM CLEANUP OBJECTIVE = MCL 5 ug/L

FIGURE 2-10
GROUNDWATER TCE ISOCONCENTRATION MAP

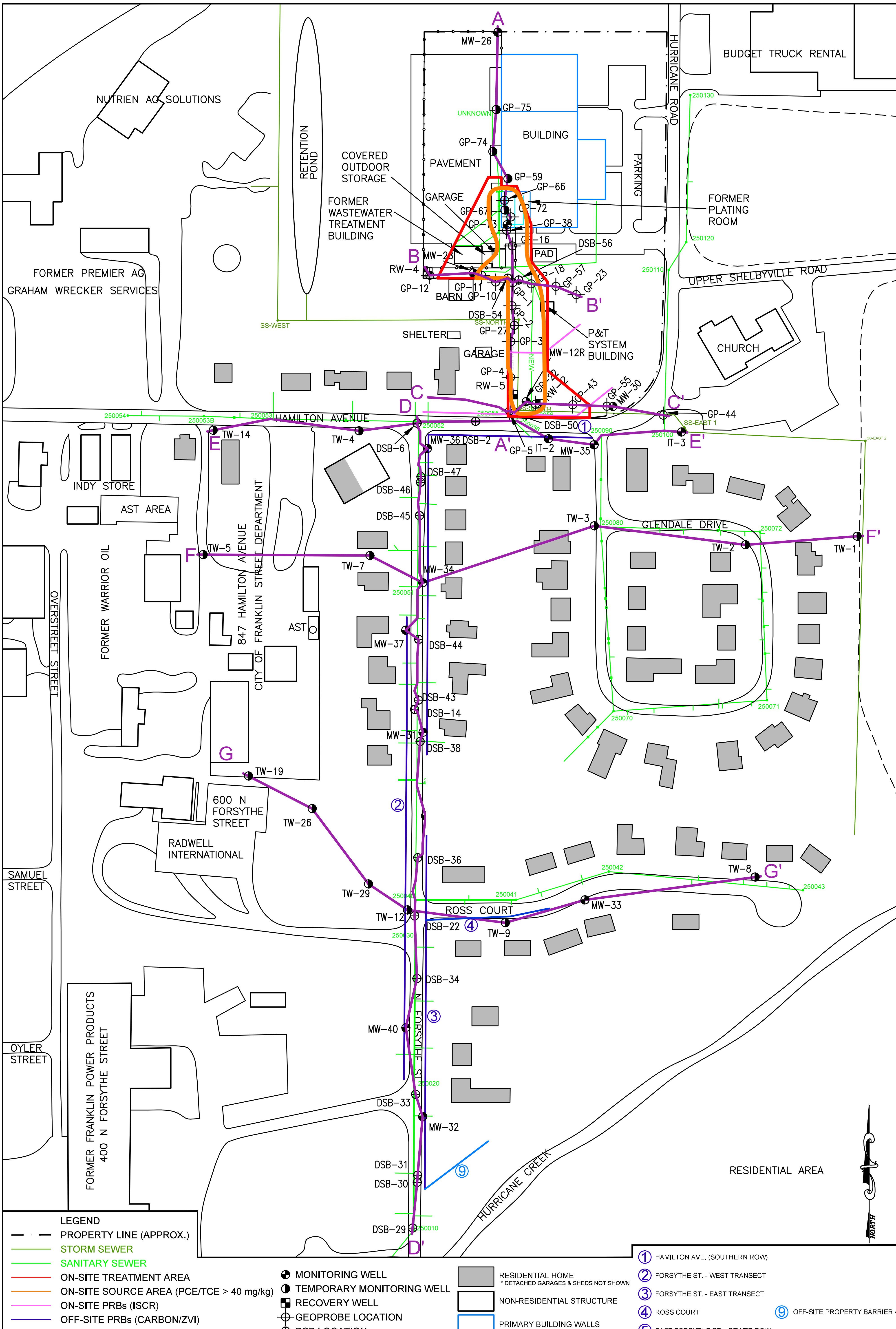
FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

N

0' 300'
SCALE IN FEET

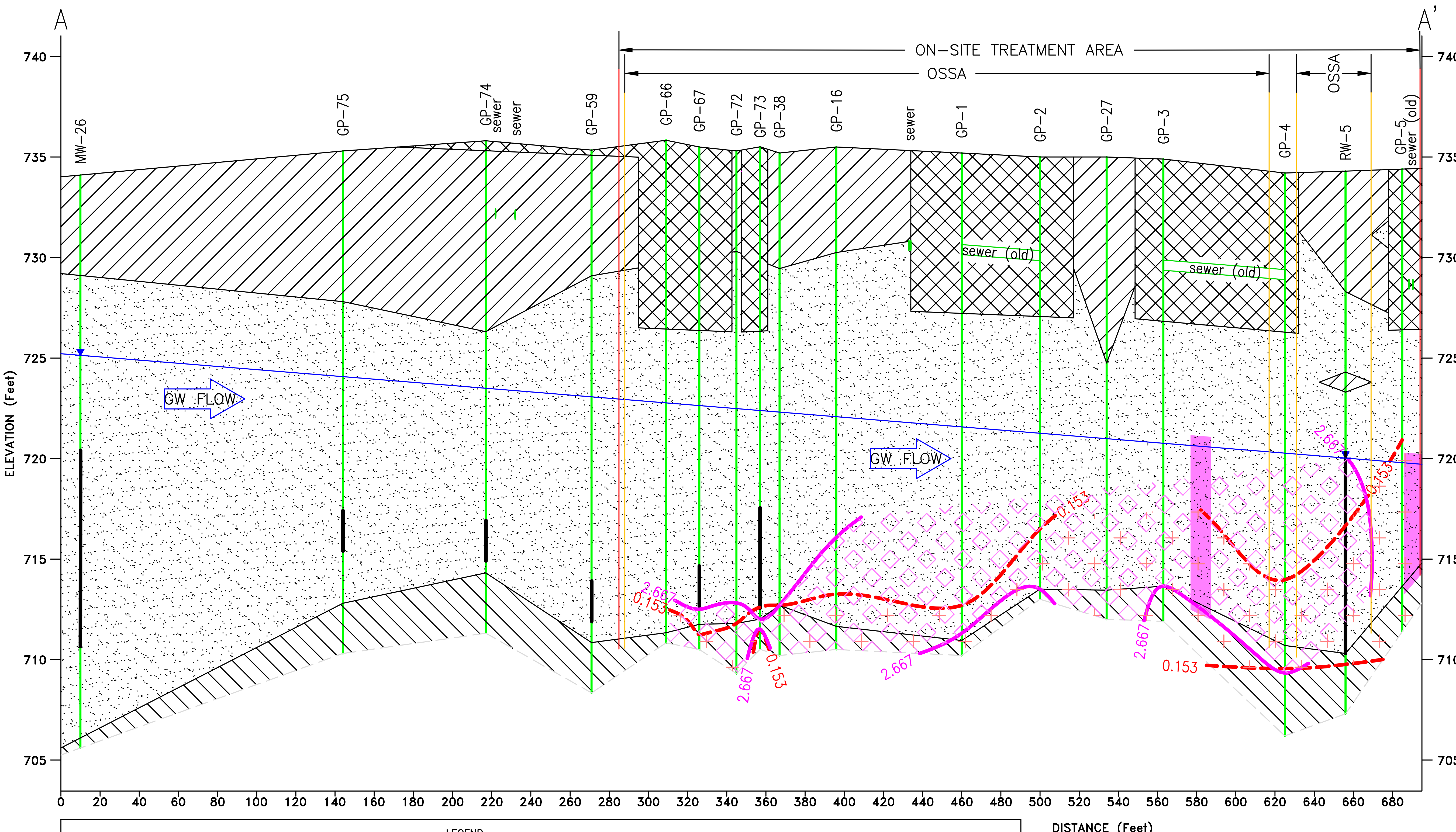
IWM CONSULTING GROUP

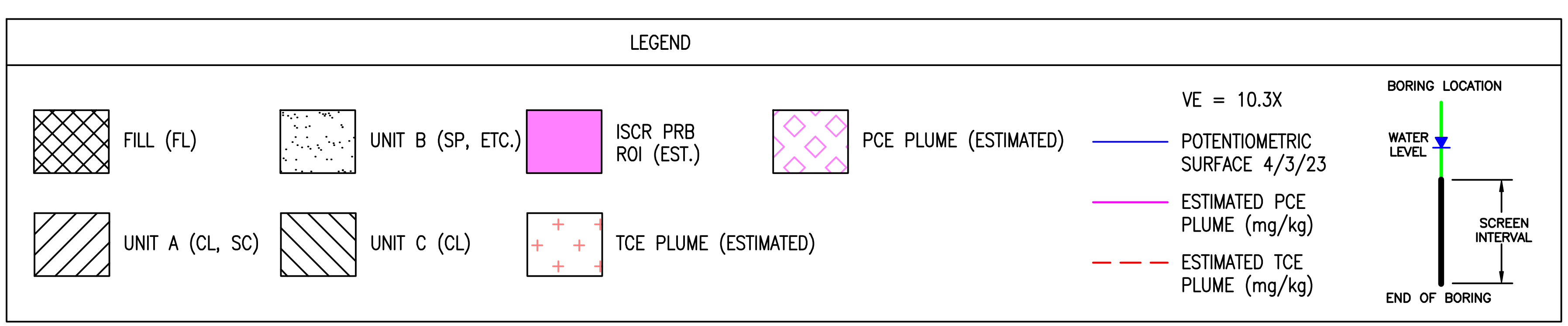
DRAWN BY: C.NEWELL
DATE: 06/09/2020
REVISED: 5/23/24
IN.AMP18.04
DWG. NO. CMIWP test



DRAWN BY: L. STRUM	FIGURE 2-11	FORMER BENDIX FACILITY RFI/CMS
DATE: 9/27/99	CROSS SECTION	980 HURRICANE ROAD
REVISED: 5/23/24	LOCATION MAP	FRANKLIN, INDIANA
IN.AMP18.04		
DWG. NO. Amp. Sect. Map		

IWM CONSULTING GROUP





NOTE: PUMP AND TREAT SYSTEM WAS FULLY OPERATIONAL DURING APRIL 3, 2023 GROUNDWATER GAUGE EVENT

NOTE: OSSA – ON-SITE SOURCE AREA

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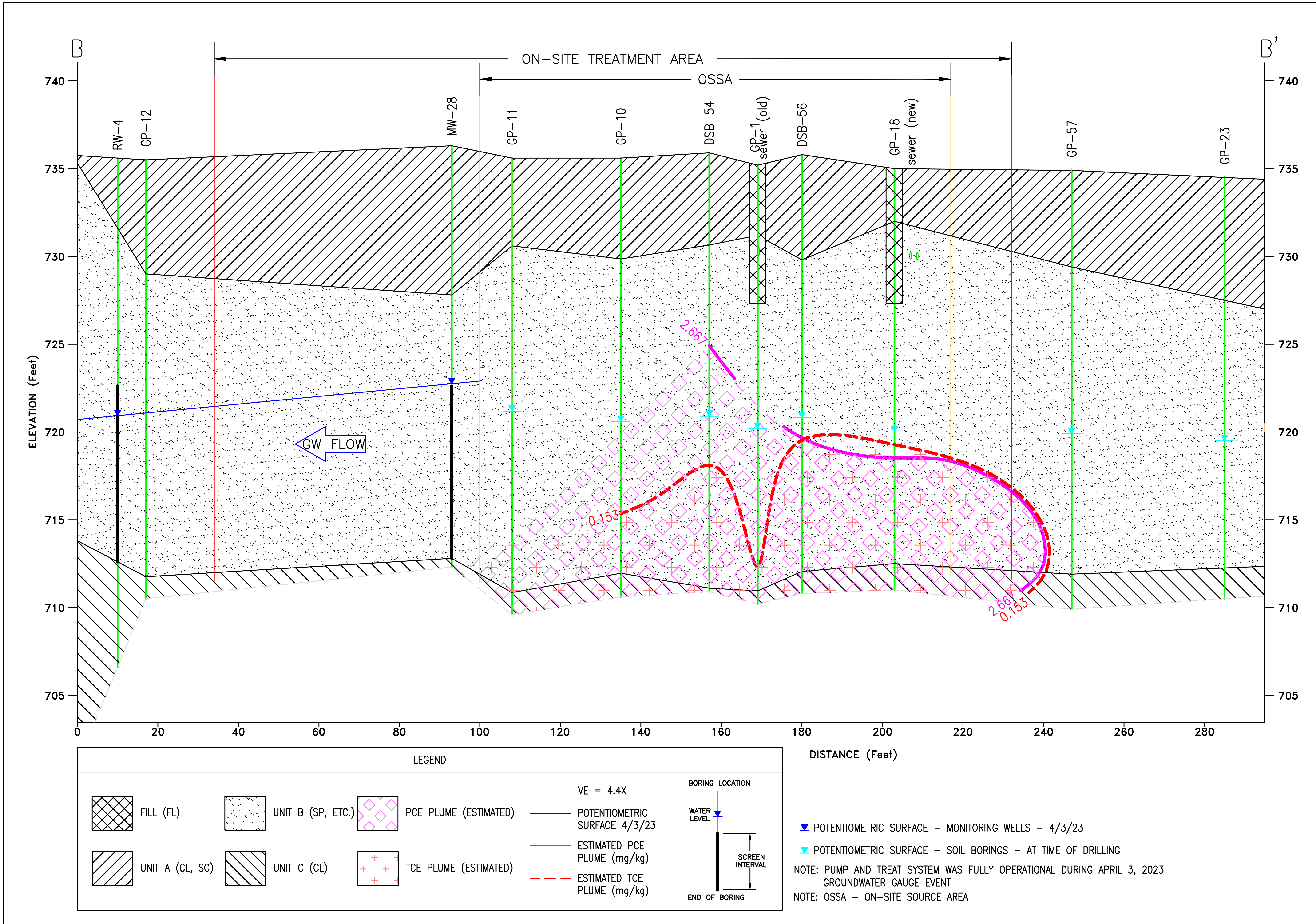
FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

DRAWN BY: WEA
DATE: 5/8/23
REVISED: 08/09/23
IN.AMP18.04
#Amphenol XSections.dwg

FIGURE 2-12a
CROSS-SECTION A-A'

Scale as depicted



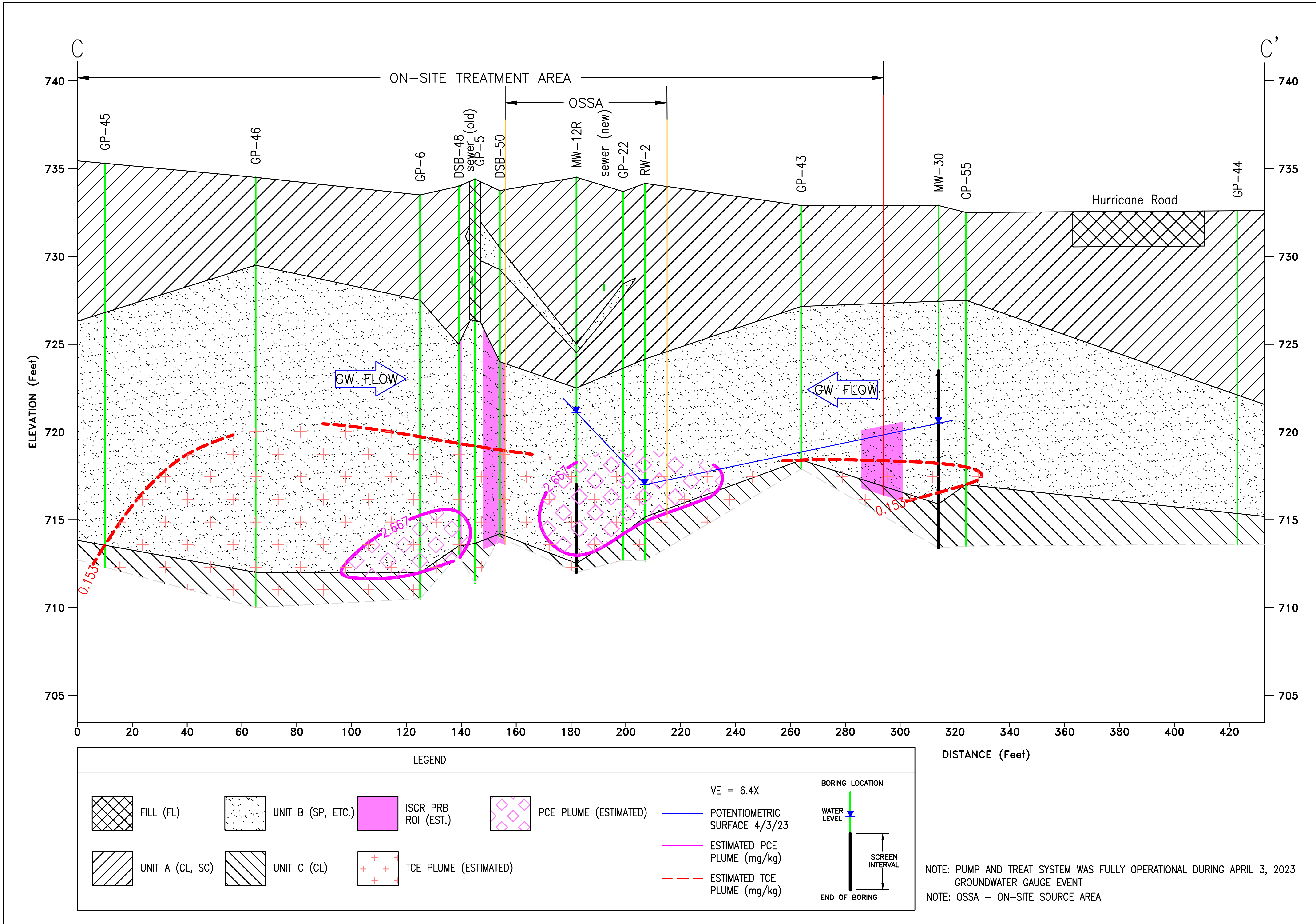
IWM CONSULTING GROUP

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

DRAWN BY: WEA
DATE: 5/8/23
REVISED: 8/08/23
IN.AMP18.04
#Amphenol XSections.dwg

FIGURE 2-12b
CROSS-SECTION B-B'

Scale as depicted



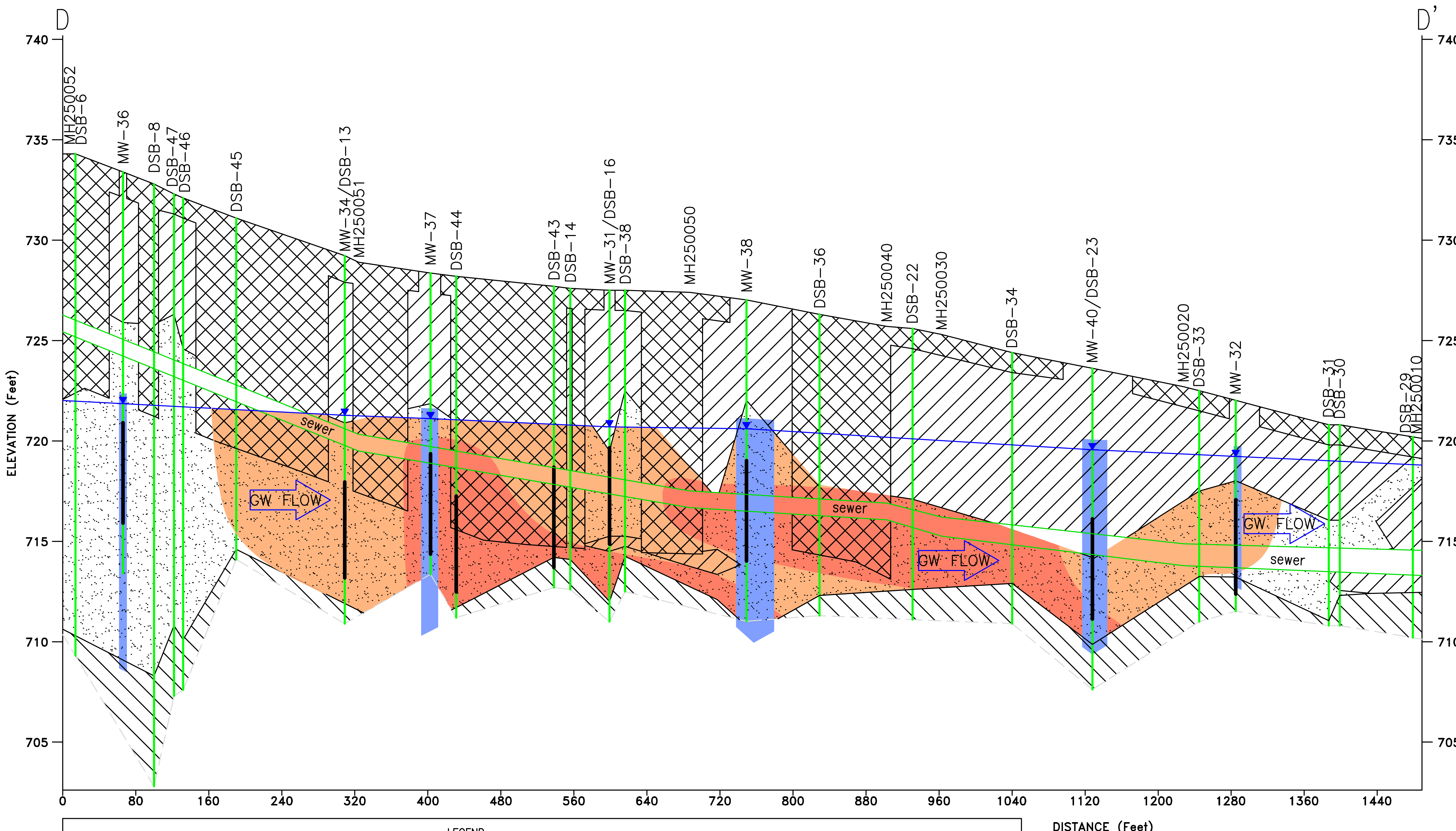
IWM CONSULTING GROUP

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

DRAWN BY: WEA
DATE: 5/8/23
REVISED: 08/09/23
IN.AMP18.04
#Amphenol XSections.dwg

FIGURE 2-12c
CROSS-SECTION C-C'

Scale as depicted



LEGEND

FILL (FL)	UNIT B (SP, ETC.)	PRB ROI (EST.) CARBON/ZVI	TCE PLUME (EST.) > RES. (9.1 ug/L)
UNIT A (CL, SC)	UNIT C (CL)	TCE PLUME (EST.) > C/I (38 ug/L)	

VE = 22X

POTENTIOMETRIC SURFACE 4/3/23

BORING LOCATION

WATER LEVEL

SCREEN INTERVAL

END OF BORING

NOTE: PUMP AND TREAT SYSTEM WAS FULLY OPERATIONAL DURING APRIL 3, 2023 GROUNDWATER GAUGE EVENT

NOTE: For simplicity, the sanitary sewer was projected through the entire section. All deeper sections of fill are from the remedial sewer excavation.

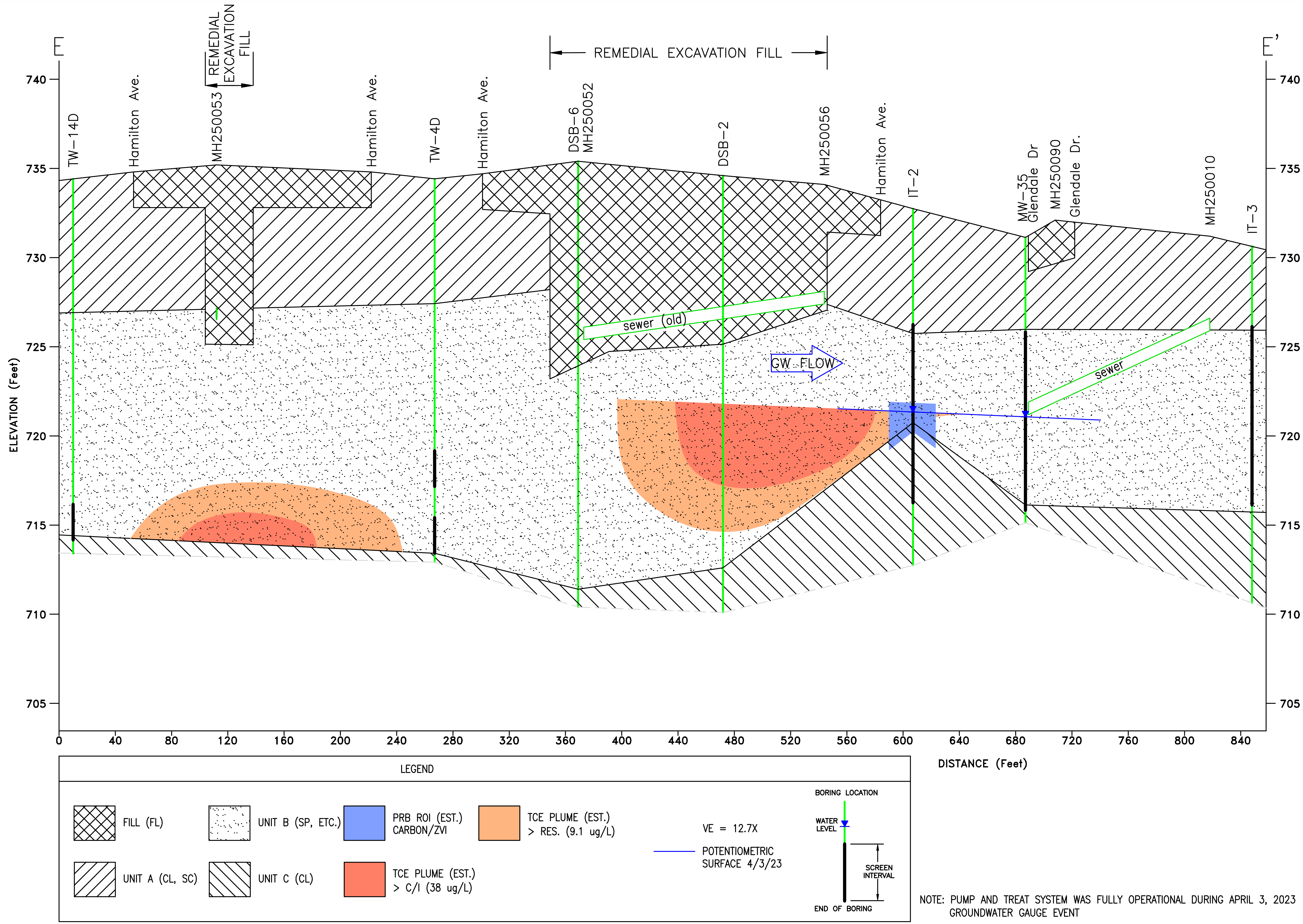
IWM CONSULTING GROUP

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

DRAWN BY: WEA
DATE: 5/11/23
REVISED: 08/09/23
IN.AMP18.04
#Amphenol XSections.dwg

FIGURE 2-12d
CROSS-SECTION D-D'

Scale as depicted



NOTE: PUMP AND TREAT SYSTEM WAS FULLY OPERATIONAL DURING APRIL 3, 2023 GROUNDWATER GAUGE EVENT

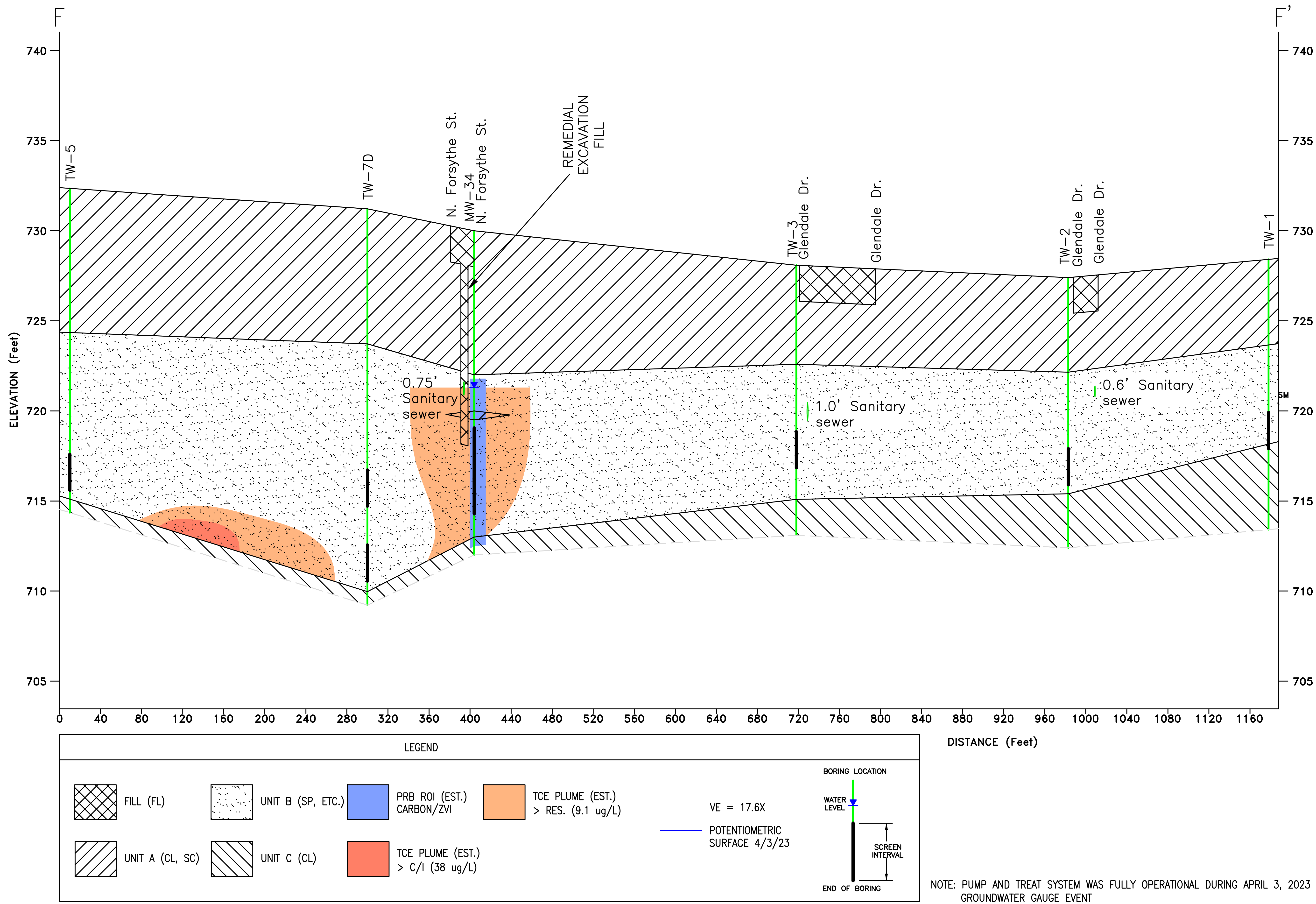
IWM CONSULTING GROUP

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

DRAWN BY: WEA
DATE: 5/9/23
REVISED: 08/09/23
IN.AMP18.04
#Amphenol XSections.dwg

FIGURE 2-12e
CROSS-SECTION E-E'

Scale as depicted

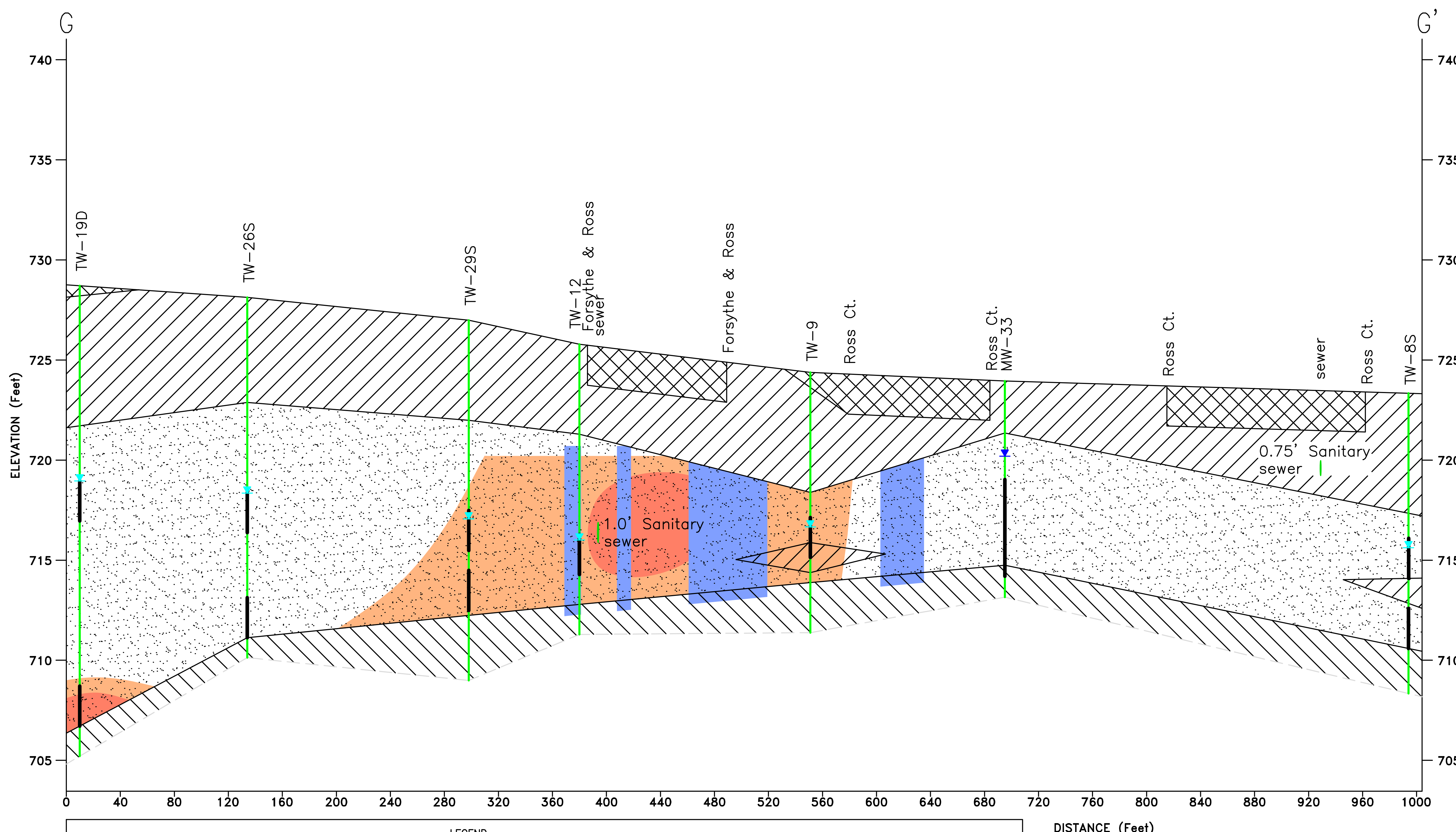


FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

DRAWN BY: WEA
DATE: 5/9/23
REVISED: 08/09/23
IN.AMP18.04
#Amphenol XSections.dwg

FIGURE 2-12f
CROSS-SECTION F-F'

Scale as depicted



LEGEND

FILL (FL)	UNIT A (CL, SC)
UNIT B (SP, ETC.)	UNIT C (CL)
PRB ROI (EST.) CARBON/ZVI	TCE PLUME (EST.) > C/I (38 ug/L)
TCE PLUME (EST.) > RES. (9.1 ug/L)	

VE = 14.8X

POTENTIOMETRIC SURFACE 4/3/23

BORING LOCATION

WATER LEVEL

SCREEN INTERVAL

END OF BORING

POTENTIOMETRIC SURFACE – MONITORING WELLS – 4/3/23

POTENTIOMETRIC SURFACE – SOIL BORINGS – AT TIME OF DRILLING

NOTE: PUMP AND TREAT SYSTEM WAS FULLY OPERATIONAL DURING APRIL 3, 2023 GROUNDWATER GAUGE EVENT

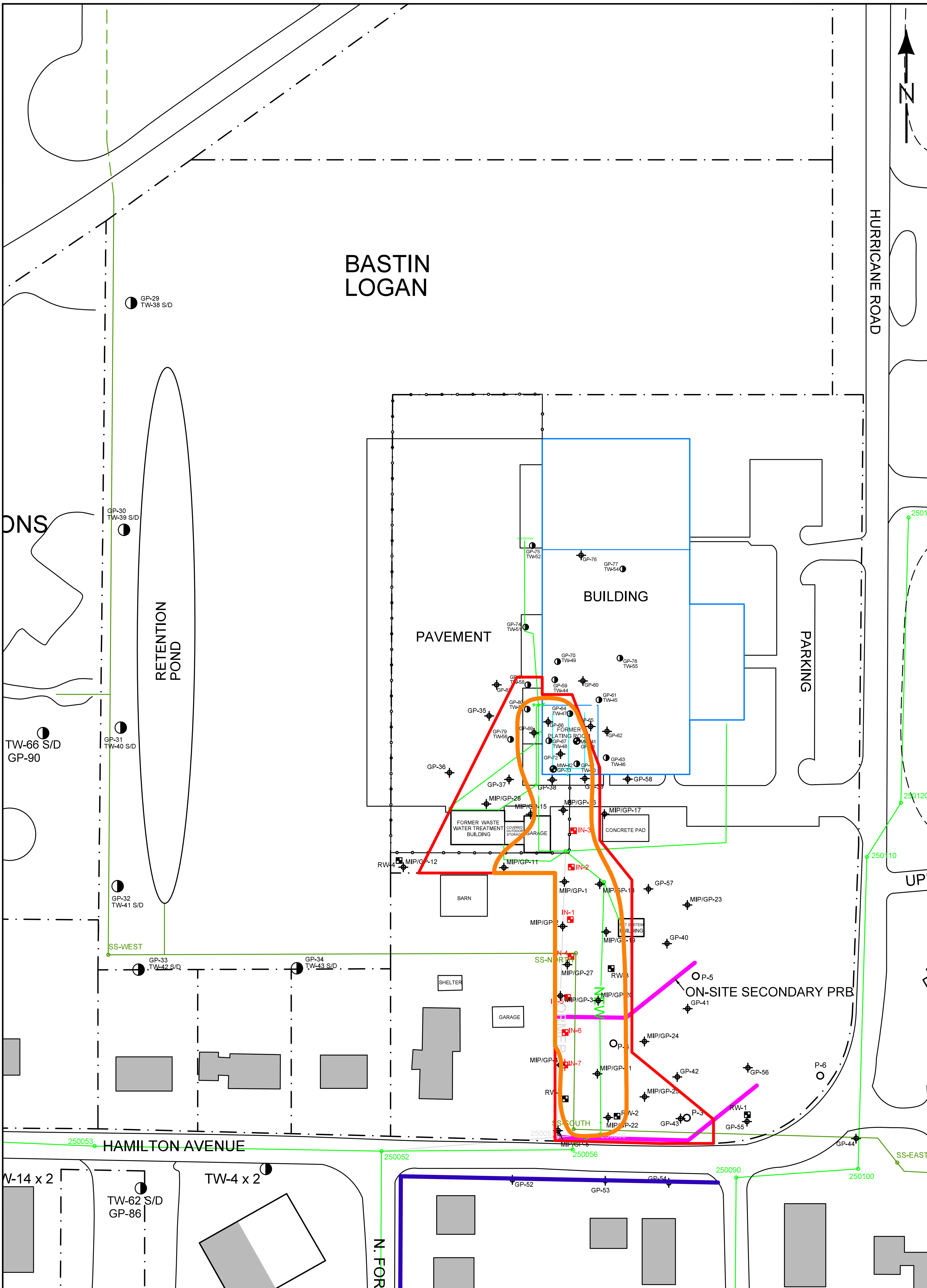
IWM CONSULTING GROUP

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

DRAWN BY: WEA
DATE: 5/9/23
REVISED: 08/09/23
IN.AMP18.04
#Amphenol XSections.dwg

FIGURE 2-12g
CROSS-SECTION G-G'

Scale as depicted



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PIEZOMETERS
- MIP/GEOPROBE BORING
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- TEMPORARY WELL/SOIL BORING LOCATION
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- ON-SITE TREATMENT AREA
- ISCR PERMEABLE REACTIVE BARRIER
- CARBON/ISCR PERMEABLE REACTIVE BARRIER
- ON-SITE SOURCE AREA (PCE/TCE > 40 mg/kg)

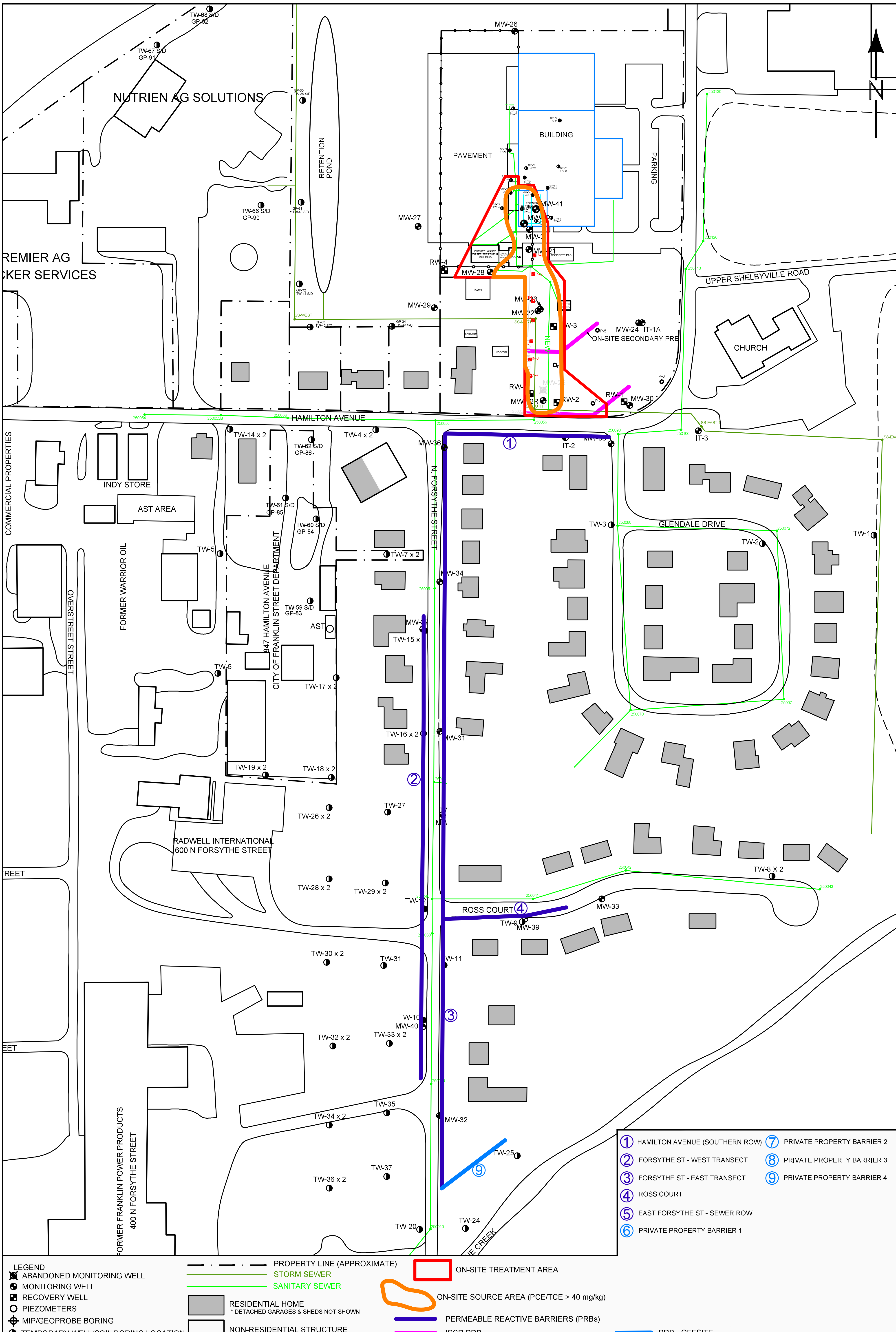
0' 80'
SCALE IN FEET

DRAWN BY: L. STRUM	
DATE: 9/27/99	
REVISED: 5/23/24	
IN.AMP18.04	
DWG. NO. CMIWP test	

FIGURE 4-1
PROPOSED ON-SITE TREATMENT AREA

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP



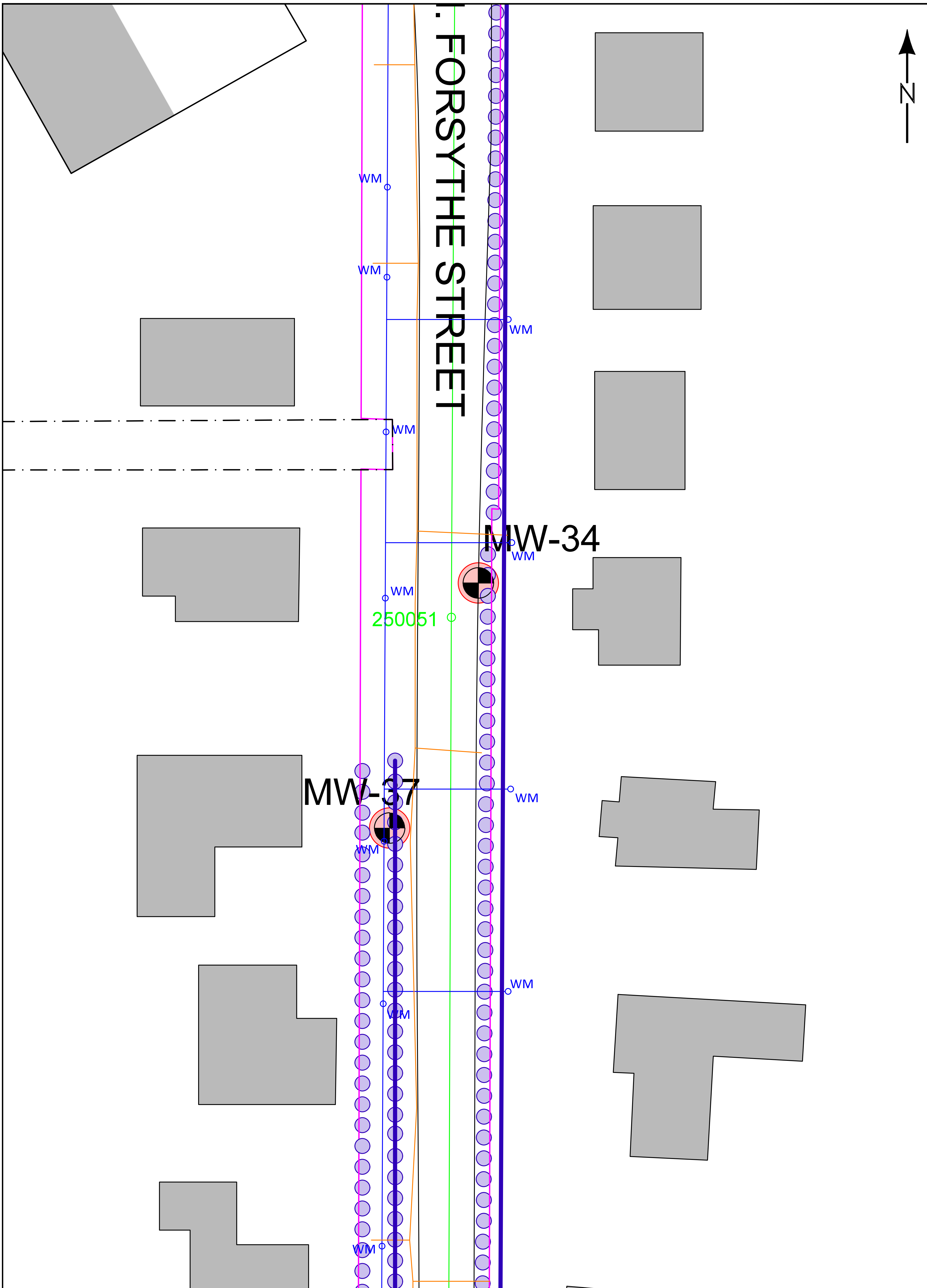
0' 150'
SCALE IN FEET

DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 5/23/24
IN.AMP18.04
DWG. NO. CMIWP test

FIGURE 4-2
PROPOSED OFF-SITE REMEDIATION AREA WITH PPI REMOVED

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP



LEGEND
ABANDONED MONITORING WELL
MONITORING WELL
RECOVERY WELL

PROPERTY LINE (APPROXIMATE)
STORM SEWER
SANITARY SEWER
WATER LINE
GAS LINE
RIGHT-OF-WAY

RESIDENTIAL HOME
* DETACHED GARAGES & SHEDS NOT SHOWN
NON-RESIDENTIAL STRUCTURE
PERMEABLE REACTIVE BARRIERS (PRBs)
PRB - OFFSITE ACCESS DEPENDENT

INJECTION POINT - "W" PATTERN OUTSIDE R-O-W IS ACCESS DEPENDENT
SPACING BETWEEN POINTS IS 5-7 FEET
INJECTION POINT - PERPENDICULAR PRBs
SPACING BETWEEN POINTS IS 5-7 FEET
PROPOSED MW FOR OFF-SITE CA PERFORMANCE MONITORING
EXISTING MW FOR OFF-SITE CA PERFORMANCE MONITORING

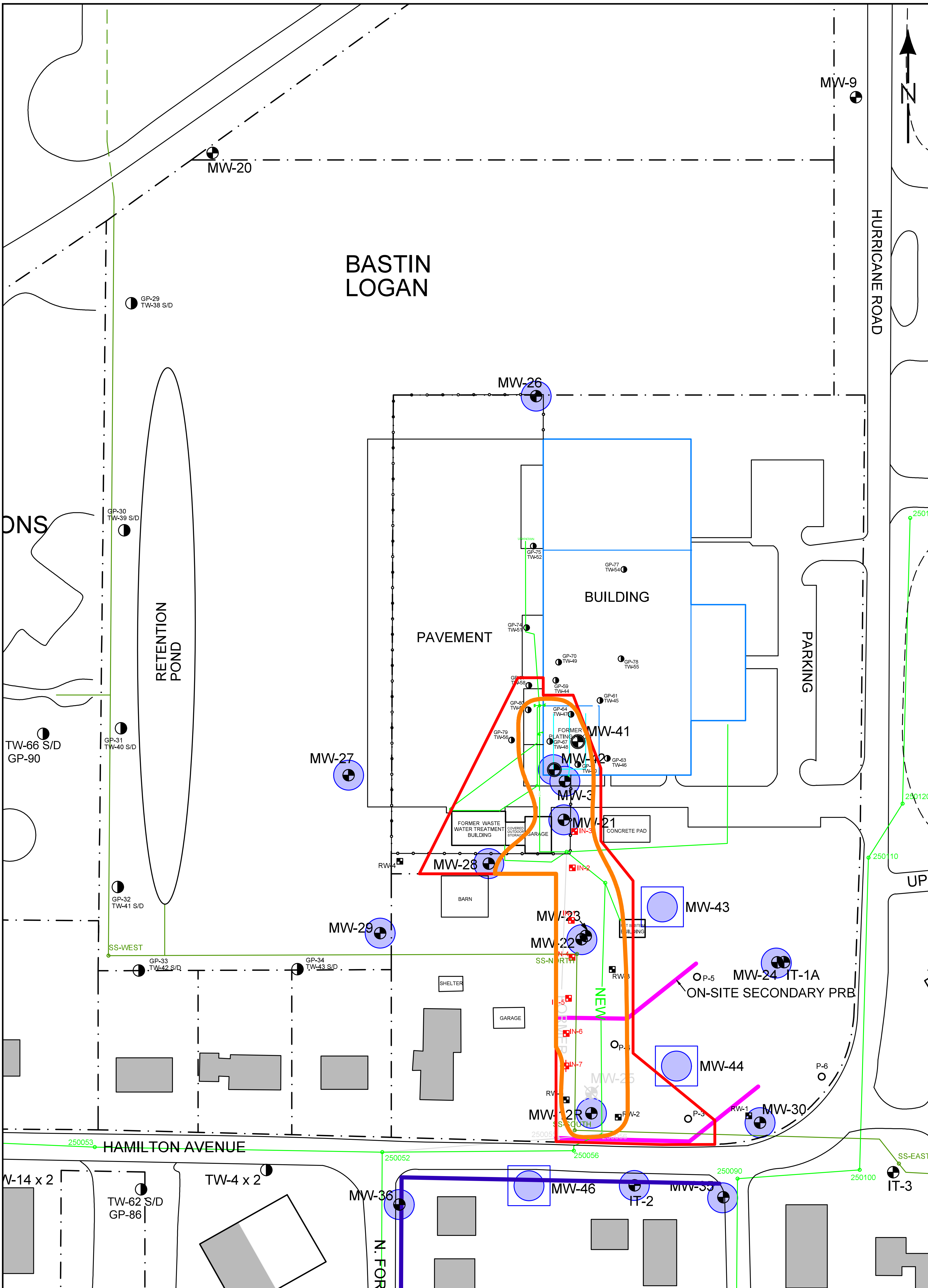
0' 30'
SCALE IN FEET

DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 5/23/24
IN.AMP18.04
DWG. NO. CMIWP test

FIGURE 4-3
ZOOM VIEW -
PORTION OF PROPOSED
FORSYTHE STREET PRB
WITH PPI REMOVED

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP



LEGEND
- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PIEZOMETERS
- MIP/GEOPROBE BORING
- TEMPORARY WELL/SOIL BORING LOCATION

- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE

- ON-SITE TREATMENT AREA
- ON-SITE SOURCE AREA (PCE/TCE > 40 mg/kg)
- CARBON/ISCR PERMEABLE REACTIVE BARRIER
- ISCR PRB

- PROPOSED ON-SITE PERFORMANCE MONITORING WELL
- EXISTING ON-SITE PERFORMANCE MONITORING WELL

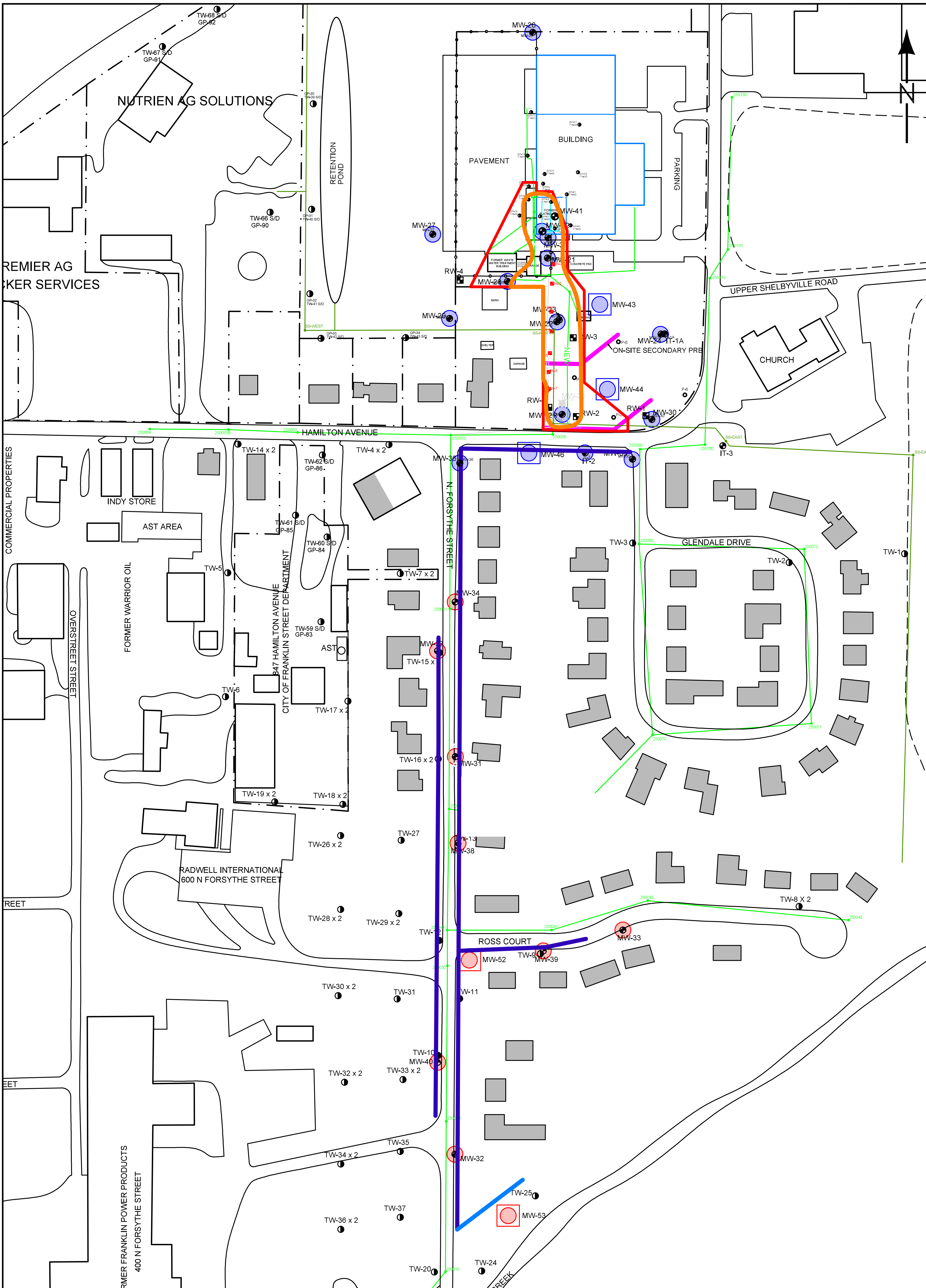
0' 80'
SCALE IN FEET

DRAWN BY: L. STRUM	
DATE: 9/27/99	
REVISED: 5/23/24	
IN.AMP18.04	
DWG. NO. CMIWP test	

FIGURE 5-1
PROPOSED ON-SITE
PERFORMANCE MONITORING
WELL LOCATIONS
WITH PPI REMOVED

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM
CONSULTING GROUP



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PIEZOMETERS
- MIP/GEOPROBE BORING
- TEMPORARY WELL/SOIL BORING LOCATION
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- RESIDENTIAL HOME
  - * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- ON-SITE TREATMENT AREA
- ON-SITE SOURCE AREA (PCE/TCE > 40 mg/kg)
- PERMEABLE REACTIVE BARRIERS (PRBs)
- PRB - OFFSITE
- ISCR PRB
- PROPOSED ON-SITE PERFORMANCE MONITORING WELL
- PROPOSED EXISTING ON-SITE PERFORMANCE MONITORING WELL
- PROPOSED OFF-SITE PERFORMANCE MONITORING WELL
- PROPOSED EXISTING OFF-SITE PERFORMANCE MONITORING WELL

0' 150'
SCALE IN FEET

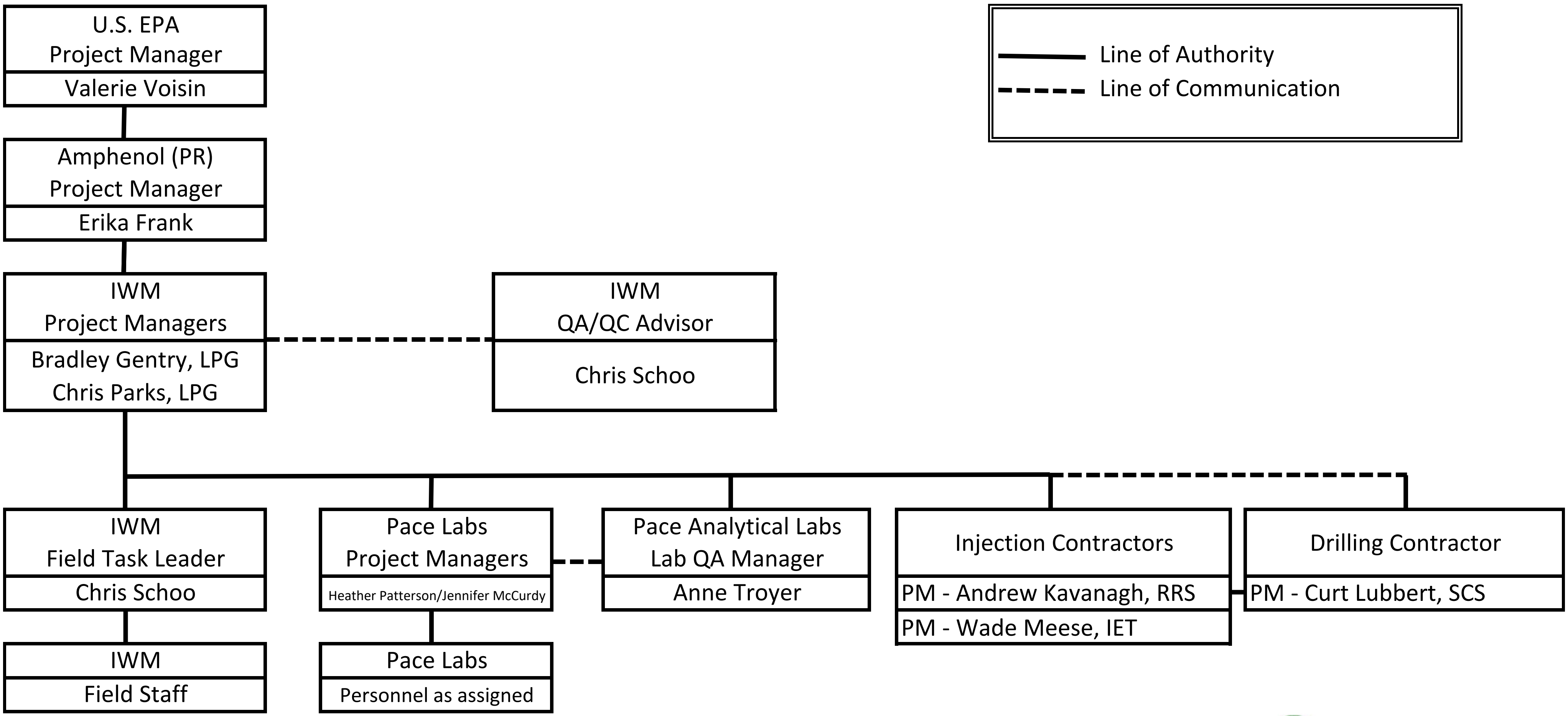
DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 5/23/24
IN.AMP18.04
DWG. NO. CMIWP test

FIGURE 5-2
PROPOSED OFF-SITE PERFORMANCE MONITORING WELL LOCATIONS WITH PPI REMOVED

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP

Figure 6-1
Project Organizational Chart
Former Bendix Facility
EPA ID # IND 044 587 848
980 Hurricane Road, Franklin, IN



Tables

Table 1
Site Hydrogeologic Information Summary
Former Bendix Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Hydraulic Conductivity (feet/day)	Minimum	Maximum	Average
MIP Investigation (2020-2021)[1]	Too low to measure	46 to 83	68 (maximums)
Pump Test (MW-31)[2]	22.7 (test 1)	34 (test 2)	28.4
Pump Test (MW-33)[2]	--	59.5	59.5
Pump Test (MW-34)[2]	--	87.9	87.9
Pump Test (MW-12)[3]	--	42.5	42.5
Pump Test (MW-24)[3]	--	249.5	249.5
Grain Size Analysis (SB-6 - 15.0-16.0')[3]	--	70.9	70.9
Grain Size Analysis (MW-22 - 17.0-19.0')[3]	--	34.0	34.0
Grain Size Analysis (MW-24 - 18.0-20.0')[3]	--	22.4	22.4

Transmissivity (gallon/day/foot)	Minimum	Maximum	Average
Pump Test (MW-31)[2]	625 (test 1)	959 (test 2)	792
Pump Test (MW-33)[2]	--	2,484	2,484
Pump Test (MW-34)[2]	--	4,927	4,927
Pump Test (MW-12)[3]	--	2,200	2,200
Pump Test (MW-24)[3]	--	11,300	11,300

Permeability (cm/sec)	Results
Geotechnical Soil Testing for Unit C - MW-31 (13-14' BLS)[2]	5.2×10^{-8}
Geotechnical Soil Testing for Unit C - SB-1F (5-5.5' BLS)[2]	4.0×10^{-8}

Notes:
MIP: Membrane Interface Probe with Hydraulic Profiling Tool
[1]: MIP investigations completed on May 18 through 22, 2020 and January 11 through 14, 2021 by Columbia Technologies, LLC
[2]: Pump tests & geotechnical soil testing completed by Earth Tech in April 1996 as part of the *Report of Additional Corrective Measures Studies* for the *Former Amphenol Facility, Franklin, Indiana* dated November 19, 1996.
[3]: Pump tests and grain size analysis completed by WW Engineering & Science in September 1992 as part of the *RCRA Facility Investigation* dated June 1994.

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Table 2 (Part I of IV)
Responses to USEPA Technical Comments on the SSCMI Workplan (June 2, 2023)
Former Bendix Facility
980 Hurricane Road, Franklin, IN

July 21, 2023 USEPA Technical Comments on the SSCMIWP

General Comment Number	EPA Technical Comment	Amphenol Response
1	Figure 2-6 (Soil Analytical Results TCE within Unit B) shows the trichloroethylene (TCE) in soil analytical results within Unit B. The elevated concentrations of TCE extend to the east to RW-1, MW-30 and GP-55. In addition, Figure 2-8 (Soil Analytical Results TCE within top of Unit C) illustrates the TCE in soil concentrations in the upper portion of Unit C and extend to the west beyond the residential structure and GP-51; however, there are few data points to the west to bound the extent of TCE contamination. The on-site source area and on-site treatment areas do not extend to these areas on the east and west of the site. Thus, it is not clear how TCE concentrations in these areas will be addressed. The SSCMIWP, dated June 2, 2023, needs to include a description on how the TCE concentrations in soil in these areas will be addressed or monitored.	While Figure 2-6 and Figure 2-8 display TCE in soil in excess of Migration to Groundwater (0.036 mg/kg) and Recalculated Migration to Groundwater Screening Levels (0.153 mg/kg TCE) to the east (RW-1, MW-30, and GP-55) and west (beyond GP-51), the exceedances were only observed in the saturated soil sampling zones and all of the saturated soil at the Site meets the TCE Corrective Action Objective (CAO) (95 mg/kg TCE – Excavation Worker Direct Contact) for saturated soil. The CAO was approved in the USEPA Statement of Basis (USEPA, May 2022) (SB) and Final Decision (USEPA March 2023) (FD) documents. The figures will be updated with a note that TCE concentrations in saturated soil meet the corresponding CAO. Dissolved TCE in groundwater will be addressed in these areas using enhanced bioremediation. In-Situ Chemical Reduction (ISCR) amendments [i.e., Zero-Valent Iron (ZVI) with Provect-IR] will be utilized within permeable reactive barriers (PRBs) up-gradient and/or adjacent to these areas and the treated area will extend vertically to the top of Unit C. The ISCR amendments are designed to accelerate dechlorination of the chlorinated volatile organic compounds (cVOCs) via both abiotic and microbial processes, as discussed in the SSCMIWP. These remedial applications are designed to reduce mass flux from upgradient treatment areas and induce groundwater conditions for enhanced anaerobic biodegradation.
2	Figure 2-10 (Groundwater TCE Isoconcentration Map) shows a TCE plume in the deep Unit B extending from TW-66 S/D south to TW-19. However, this area does not appear to be addressed by the proposed Off-Site Remediation Area shown on Figure 4-2 (Proposed Off-Site Remediation Area). Please include a description or rationale for how the current SSCMIWP proposal will address this area.	Figure 2-10 does indeed show a dissolved TCE plume near the base of Unit B extending from the northwest (TW-66 S/D) to the southeast (TW-19). The figure exhibits a secondary, third-party plume located west of the Site, west of Forsythe Street, and north of Hamilton Avenue, emanating from the northwest of the Site. This third-party plume extends south-southeast across Hamilton Avenue, where it appears to comingle with the Site-related groundwater impacts along Forsythe Street. As noted in Section 2.5.2 of the SSCMIWP, this third-party plume is not the focus of the SSCMIWP. Amphenol has proposed to install a series of PRBs on the west side of Forsythe Street, in the area where the two plumes appear to become co-mingled in an effort to address the third-party plume as it enters into the residential area along Forsythe Street. Performance monitoring wells to the west of the Site (MW 54) and west of Forsythe Street (MW-50), as displayed on Figure 5-2 of the SSCMIWP, are being installed to monitor dissolved chemical of concern (COC) concentrations in groundwater to better assess how impacts from the third party plume may
3	In-Situ Chemical Oxidation (ISCO) and ISCR are proposed to be implemented in the source area and treatment area as an area wide injection in rows as an offset "W" grid pattern. However, the SSCMIWP needs to indicate where the injections will begin and what direction the injections will progress - hydraulically upgradient, downgradient or side-gradient. Injections typically entail introduction of hundreds of gallons of water in each injection point which cause temporary mounding and may push the groundwater plume outward or downgradient. Provide details on the implementation plan, and how the plume migration may be controlled. Please also provide a figure depicting a closeup along Forsythe of the injections, monitoring well locations, and distance from the road.	Additional explanation in Sections 4.4.2, 5.2.1, 5.2.3, 5.2.4, and 5.3.2 and a new figure (Figure 4-3) have been included in the SSCMIWP.
4	Include discussion of potential reactions between the ISCO injectants and subsurface utilities that may be in contact with the injectants, to include the materials used in the lining of the storm and sanitary sewers. Groundwater mounding can occur during injections and the injectant may impact additional subsurface utilities presently above the water table. Revise the SSCMIWP to address this potential issue.	Additional explanation in Section 5.2.3 has been included in the SSCMIWP.
5	The SSCMIWP does not appear to have adequate areas for evaluating potential injectant loss. For example, Hurricane Creek and the northwest drainage ditch. In addition, provide a discussion on contingencies should injectants reach surface water bodies. Revise the SSCMIWP to address this issue.	Additional explanation in Sections 5.2.3, 5.2.4, 5.3.2, and 5.3.4 have been included in the SSCMIWP.
6	Although column testing indicated that ISCO can be successfully followed by ISCR, it is likely that field injection ISCR application rates will need to be increased and possibly require multiple injections to fully reverse groundwater ORP. Revise the *SSCMIWP* to include these locations or provide a rationale for why this is not needed.	Column testing did indicate that ISCO can successfully be followed by ISCR at this Site. During batch reactor testing, all of the ISCO-dosed reactors reached or approached the background ORP conditions towards the end of their 20-day reaction monitoring period. Since ISCO reactions are completed in a relatively short time period (days to weeks), following the completion of ISCO injection activities, groundwater ORP conditions are expected to "quickly" return (within weeks) to baseline ORP levels. However, both baseline (prior to ISCO injections) and post ISCO injection (monitored routinely during injections and on a weekly basis post conclusion of the injection activities) groundwater ORP conditions will be monitored and the ORP readings will dictate when the subsequent ISCR injection activities will commence. IWM Consulting anticipates that subsurface conditions (ORP value of approximately 200 mV or less – which is a typical site background level) will be conducive for ISCR injections within 30-days after the ISCO injections. Thus, competing ISCO and ISCR chemistries should not overlap and the ISCO/ISCR amendments are not wasted on converting the subsurface environment from aerobic to anaerobic conditions. Further explanation of the decision-making steps on when to transition from ISCO to ISCR is provided in the response to General Comment 8.
7	The SSCMIWP does not evaluate if bypass of the PRBs will occur. Revise the SSCMIWP to include a plan on how to monitor and evaluate if bypass of the PRBs is occurring.	Additional explanation in Section 5.4.1.3 has been included in the SSCMIWP.
8	The SSCMIWP provides discussion that indicates there are many variations in the remediation plan such that additional injections might be needed, or applications of ISCR in the on-site source area, as well as adding amendments as subsequent applications, or applications based on transects or grids, etc. Each variation is said to be based on observed groundwater conditions and chlorinated volatile organic compound (cVOC) mass reductions. A flow chart showing the decision-making steps needs to be provided to illustrate the contingencies and what will trigger the need for additional treatment of variations in injectants, application strategies, and amendments. Revise the SSCMIWP to include this flow chart with decision steps.	Flow charts relating to the On-Site and Off-Site work progressions have been included in the SSCMIWP in Sections 5.1 and 5.3.

Table 2 (Part I of IV)
Responses to USEPA Technical Comments on the SSCMI Workplan (June 2, 2023)
Former Bendix Facility
980 Hurricane Road, Franklin, IN

July 21, 2023 USEPA Technical Comments on the SSCMIWP

General Comment Number	EPA Technical Comment	Amphenol Response
9 (Part A)	Section 3.2 (Numerical Corrective Action Objectives and Reference Values) states no additional sewer vapor sampling for cVOCs will be conducted, due to the lining and treatment activities previously completed. However, the injections may cause short circuiting or changes in flow patterns as well as production of methane (even with the use of Provect IR, which is formulated to reduce methane generation), thus sewer vapor monitoring / field screening is recommended. Revise the SSCMIWP to include this monitoring or provide additional rationale for excluding it.	Per the SSCMIWP, groundwater samples from the performance monitoring wells will be collected and analyzed for dissolved gases, including methane. The contingency plans for elevated dissolved methane (≥ 10 mg/L) are outlined in Sections 5.4.1.3 and 5.4.1.4. Obtaining accurate and defensible (i.e., knowing the source) methane gas data from an active municipal storm or sanitary sewer line is difficult. Consequently, no methane gas monitoring activities are planned within the On-Site storm sewer itself, but IWM Consulting may utilize existing On-Site performance monitoring wells (with a portion of the screened intervals above the water table) MW-12R, MW-22, MW 29, and MW-30 to field monitor methane soil gas concentrations before, during, and after the ISCR injection activities, if dissolved methane concentrations exceed 10 mg/L in those monitoring wells. The methane soil gas concentrations will be obtained directly from the monitoring well headspace using a GEM 5000 (or similar instrument) following the procedures outlined in IWM Consulting SOP F – Field Screening, which is included in the site-specific Quality Assurance Project Plan (QAPP). If methane concentrations in soil gas are detected in excess of 10% of the lower explosive limit (LEL), then methane mitigation will be completed as outlined in Section 5.4.1.3 of the SSCMIWP. Methane soil gas monitoring is neither required nor typically done during the ISCO injections because the production of methane from ISCO remediation activities is uncommon. The On-Site sanitary sewer line is buried within Unit A (silty clay) and located at a depth less than 6 feet bgs. This is above the unsaturated portion of Unit B and thus any potential methane generated during the ISCR injection activities will significantly decrease in concentration as the methane migrates upward through the oxygen rich, unsaturated portion of Unit B. These factors, when combined, supports the fact that monitoring of methane within or around any On-Site sanitary sewer lines or other shallow utilities is not warranted.
9 (Part B)	Prior Section 3.2 EPA Comment Response Continued:	The risk of methane production associated with the Off-Site PRB injections is low given the type of material being injected and based on the results of the October 2019 pilot study, which indicated an average dissolved methane concentrations less than 0.1 mg/L. However, as outlined in the SSCMIWP, groundwater samples from the Off-Site performance monitoring wells will also be analyzed for dissolved gases (including methane) to further evaluate the generation and presence of methane in the Off-Site treatment areas.
10	Because of the potential for generation of methane during the degradation process, and presence of sensitive receptors, the Sub-Slab Depressurization Systems (SSDS)/Sub-Membrane Depressurization Systems (SMDS) need to be monitored or field screened for methane prior to initiation of injections and periodically thereafter and at the time of SSDS/SMDS evaluation for shut down. Revise the SSCMIWP to include this monitoring or field screening.	Additional explanation in Sections 5.4.1.3 and 5.4.1.4 have been included in the SSCMIWP.

Table 2 (Part II of IV)
Responses to USEPA Technical Comments on the SSCMI Workplan (June 2, 2023)
Former Bendix Facility
980 Hurricane Road, Franklin, IN

July 21, 2023 USEPA Technical Comments on the SSCMIWP

Performance Monitoring Comment Number	EPA Technical Comment	Amphenol Response
1	New or additional monitoring well recommendations. These are also described in further detail in the Monitoring Comments below. New groundwater monitoring wells may be needed in several locations at the ISCO/ISCR interface to monitor ORP/dissolved oxygen (DO) and confirm remedial progress. 1) A new well or MW-30 should be included within the performance monitoring program. This will help monitor the VOCs that migrate from on-site toward the neighborhood by IT-3. 2) A monitoring well west of the pink PRB (Figure 4-2) that is 30-50 ft away along the western side. MW-29 may fit this data point if it is about 30-50 ft from the	Additional explanation in Section 5.4.1.2 has been included in the SSCMIWP.
2	The SSCMIWP proposes to initiate ISCR inside the On-Site Source Area as a potential contingency. However, the SSCMIWP needs to include discussion on how the On-Site Source Area conditions will be monitored to determine if it is appropriate to initiate ISCR. According to Figure 5-1 (Proposed On Site Performance Monitoring Well Locations), there are only a few monitoring points in the center of the On-Site Source Area. Additional monitoring wells or post-remedial membrane interface probe confirmation needs to be conducted to more thoroughly monitor remedial progress and confirm that CAOs have been met. Revise the SSCMIWP to include these additional wells or probes.	Additional explanation in Section 5.4.1.3 has been included in the SSCMIWP.
3	Only six monitoring wells will be used to monitor remedial progress for meeting CAOs in a 74,000-square foot area. Given the heterogeneous nature of the hydrogeology and different proposed treatment methods (i.e., ISCO only and ISCO/ISCR), additional monitoring wells need to be added to the source area to better confirm CAOs are met. At least two of these additional monitoring wells should be situated to monitor performance of the ISCO/ISCR remediation. Please revise the SSCMIWP to include additional monitoring wells within the source area or within the orange PRB in Figure 5-1.	Additional explanation in Section 5.4.1.3 has been included in the SSCMIWP.
4	The proposed extent of the On-Site Source Area treatment and the On-Site Treatment Area do not include RW-1. In addition, the downgradient PRB on the south side of Hamilton Avenue does not extend as far east as RW-1. Figure 2-9 (Groundwater PCE Isoconcentration Map) shows the tetrachloroethylene (PCE) groundwater concentration at RW-1 exceeded residential screening levels in the upper portion of Unit B. Thus, it is not clear how the groundwater impacts in the vicinity of RW-1 will be mitigated. The SSCMIWP should be amended to include discussion on how the groundwater impacts at RW-1 will be addressed. Groundwater performance monitoring in this area is also recommended.	Per Figure 5.1 of the SSCMIWP, an On-Site ISCR PRB is being installed immediately upgradient of RW-1, which will remediate the groundwater in this area of the Site as discussed in response to General Comment 1. Since the two (2) existing Off-Site groundwater monitoring wells (IT-3 and MW-35) hydraulically downgradient of RW-1 do not currently exhibit any dissolved VOC concentrations in excess of the proposed CAOs, the proposed Off-Site PRB south of Hamilton Avenue was not extended east of Glendale Drive.
5	Many of the existing monitoring wells (MW-31, MW-34, MW-37, MW-38, MW-40) are located within or very close to the injections. While the groundwater sampling results from these wells is important for monitoring remedial progress, additional monitoring wells should be installed between the two PRBs to monitor remedial progress in this area. The PRBs can be expected to remediate groundwater within their ROI relatively quickly. However, performance of the PRBs outside their ROI is far more uncertain and needs to be monitored to confirm that CAOs are met throughout the treatment area, not just within the PRBs. If possible, additional monitoring wells should be located 30 to 50 feet east of the PRB to monitor effectiveness of the PRBs outside of the PRB footprint to ensure that CAOs are achieved in this area. Please revise the SSCMIWP to propose additional wells, if possible, or a rationale for the current wells proposed and their distance from the proposed PRB locations.	Additional explanation in Sections 4.3.4 and 5.4.1.2 have been included in the SSCMIWP.

Table 2 (Part III of IV)
Responses to USEPA Technical Comments on the SSCMI Workplan (June 2, 2023)
Former Bendix Facility
980 Hurricane Road, Franklin, IN

July 21, 2023 USEPA Technical Comments on the SSCMIWP

Specific Comment Number	EPA Technical Comment	Amphenol Response
1	Section 1.4, Chronology of Investigations & Interim Measures, Page 3. Section 1.4 indicates that a source area beneath the former plating room was remediated using ISCO in 2011 to 2012. Because ISCO is again planned for implementation, further discussion in the SSCMIWP needs to be provided on the effectiveness of the ISCO remediation previously performed at the site. The SSCMIWP should also discuss any changes in design that are proposed due to the outcome of the previous ISCO remediation.	Additional explanation regarding the the ISCO Source Area treatment has been included in Section 4.3.3 of the SSCMIWP.
3	Section 3.2.1, Soil CAOs, Page 12. The CAOs for COCs in Soil table in Section 3.2.1 lists the numerical CAOs for cVOCs in soil. The excavation worker soil exposure direct contact screening level for PCE is listed at 170 milligrams per kilogram (mg/kg). However, the Statement of Basis Table 2 lists this exposure route screening level at 70 mg/kg. The excavation worker soil exposure direct contact screening level for PCE needs to be revised to 70 mg/kg to be consistent with the Statement of Basis.	The excavation worker direct contact CAO of 170 mg/kg for PCE is a default screening level established by the Indiana Department of Environmental Management (IDEM) in the Remediation Closure Guide and this value was listed as 170 mg/kg in both the Second Supplemental Corrective Measure Report (SSCMS) dated March 22, 2022 and the SSCMIWP. The Statement of Basis appears to have inadvertently listed the CAO for PCE as 70 mg/kg due to a typographical error since the USEPA never specified to Amphenol that they were not in agreement with proposed CAOs listed in the SSCMS. Since the CAO of 170 mg/kg is protective of construction workers and the discrepancy is only related to a typographical error in the Statement of Basis, Amphenol suggests that changing the excavation worker direct contact screening level for PCE from 170 mg/kg to 70 mg/kg is not warranted.
4	Section 3.3, Selected Corrective Measures, Page 16. The text states: "Sequential injections with the oxidizing and reducing agents for source zone remediation are expected to reduce both adsorbed and dissolved phase cVOCs to non-toxic end products with no long-term accumulation of daughter products, such as vinyl chloride, and to create a clean waterfront to migrate downgradient, reducing plume concentrations to meet short-term CAOs." However, this conceptual remediation model appears optimistic. Similar to a pump and treat system, it will take many pore volume flushes of the clean waterfront to achieve CAOs and because pore volume flushes will be based on natural seepage velocity, instead of assisted by active pumping, the remedial timeframe to achieve CAOs outside the PRB ROI is likely several years. Please revise to add the timeframe may be on the order of years to decades to achieve short-term and long term CAOs. This comment also applies to the long-term performance of the Off-Site PRBs at remediating groundwater downgradient from the PRBs.	Section 3.1 of the SSCMIWP identifies an estimated time period of 5-years to reach the short term CAOs and 10-years to reach the long-term CAOs. Although it is not possible to definitively know the exact length of time required to meet the CAOs, these timeframes do not appear to be overly optimistic given the results of the previous pilot studies, the bench-scale testing that was completed in 2023, the mass of reagents that will be injected, and the extensive lateral area that is being targeted for treatment under the SSCMIWP. The 2023 studies indicate that the selected ISCO and ISCR program can quickly (days to months) desorb source COC and destroy the dissolved COCs by approximately 85% in a single application within the impacted soil matrix. Conversely, a traditional pump and treat system achieves little or no COC destruction, but rather relies solely on collecting COCs that must then be treated above ground before the pumped groundwater is disposed. Pump-and-treat remediation only recovers COCs in the dissolved-phase contaminants, which encourages the slow desorption of COCs from the solid phase due to equilibrium partitioning. For this reason, pump and treat remediation typically requires decades and many pore volume replacements to reach CAOs. The approaches and mechanisms involved in the pump-and-treat collection of COCs compared with the proposed in-situ destruction of COCs are so contrasting and distinct as to render a discussion of "pore volume flushes" not appropriate as a comparison metric. As previously discussed, the results of the On-Site ISCO (MFR) activities completed in 2011/2012 and the results of the 2019 Off-Site Pilot Study confirm that the contaminants can be expeditiously remediated, with continued long-term reductions in contaminant concentrations well outside the PRB ROI, for years after the injection activities. No changes to the SSCMIWP text are warranted.
5	Section 4.4.2, On-Site Source Area Mass Reduction through ISCO, Page 25. This section indicates that a reduction in cVOC concentrations of 50 to 70 percent is expected from the ISCO injection. The source of, or assumptions used, to determine this expected destruction rate needs to be provided in the discussion. Revise this section to include this discussion.	Section 4.4.2 of the SSCMIWP has been updated to reflect this information and the source of the assumptions made regarding the expected destruction rate.
6	Section 4.4.3, On-Site Treatment Area Mass Reduction through ISCR, Page 27. This section indicates that a reduction in cVOC concentrations of 50-70 percent is expected from the ISCR injection. The source of, or assumptions used, to determine this expected destruction rate needs to be provided in the discussion. Revise this section to include this	Section 4.4.3 of the SSCMIWP has been updated to reflect this information and the source of the assumptions made regarding the expected destruction rate.
7	Section 4.3, Pre-Design Assessments, Page 17. This section includes discussions of pre-design assessments; however, no summary of the pilot scale test is provided. The SSCMIWP needs to be revised to include a summary of the pilot scale test for completeness and to allow an understanding of how the design parameters were determined and how they will be modified if pilot testing indicates that field implementation results differ from design assumptions. Revise this section to include this information.	Section 4.3, Pre-Design Assessments have been updated to briefly highlight the results of the Off-Site Groundwater Treatment Pilot Study Evaluation Report. Based upon the results of the Pilot Study, subsequent bench testing, and the fact that Off-Site monitoring well MW-35 still (~ 3.75 years later) exhibits non-detectable concentrations of cVOCs and a negative ORP, no changes needed to be made to the Off Site remedial program. The information will be summarized under a new subsection (Section 4.3.4 – Off-Site Groundwater Treatment Pilot Study) and a copy of the Off-Site Groundwater Treatment Pilot Study Evaluation Report dated September 28, 2020 will be included as an attachment in Appendix C of the SSCMIWP.
8	Section 4.4.4, On-Site PRBs to Reduce Dissolved Mass Flux, Page 28. ZVI with carbon-based sorptive media (i.e., activated carbon) is being considered for the ISCR PRBs. Activated carbon sorptive media will likely enhance reduction of cVOC concentrations in groundwater; however, details were not provided on how and when the decision to add activated carbon will be made. Revise this section to provide details on how and when the decision to add activated carbon sorptive media will be made.	The initial On-Site ISCR PRBs will not include activated carbon but the analytical results obtained during the subsequent performance monitoring events will dictate when, or if, activated carbon will be added to any new On-Site ISCR PRBs (if warranted). The determination as to whether activated carbon addition is warranted will include evaluation of groundwater concentration reductions, concentration trends, assessment of dissolved phase mass flux, and comparison of downgradient groundwater conditions to short-term CAOs and remedial timeframe. Please refer to the flow chart provided in Section 5.1 of the SSCMIWP for specifics regarding the decision matrix.
9	Section 4.4.5, Off-Site PRBs for Groundwater Treatment, Page 29. The SSCMIWP states that the PRBs will be advanced vertically to the Unit B/Unit C interface. However, the geological cross section in Figures 2-12a through 2-12g show considerable undulation in the elevation of this interface. As such, this section needs to provide discussion on how this interface will be determined during field implementation. Revise this section to include details on how this interface will be determined during field implementation.	The Unit B/Unit C interface is very obvious when conducting drilling activities at the Site because Unit C is very stiff to hard and the direct push drilling units encounter refusal once they reach the top 1-2 feet of Unit C. In addition to this indicator, a series of exploratory borings will be installed prior to and/or during the injection activities for each Off-Site PRB, as detailed in Section 5.3.2 of the SSCMIWP. The borings will be spaced every 50-100 feet along the length of the PRB and the soil will be visually inspected and logged to document the depth to the top of Unit C. Section 4.4.5 of the SSCMIWP has been updated to include this information.
10	Section 4.4.6, Contingency Measures, Page 29. The text discusses potential short-circuiting of injection material and that it will be monitored in nearby manholes. The injection materials might short-circuit in the more permeable backfill/pipe bedding material of the sewers; thus, discussion needs to be added on how this potential loss of injection materials will be monitored. Revise this section to address this issue.	Section 4.4.6 of the SSCMIWP has been updated to include discussion regarding short-circuiting monitoring.

Table 2 (Part III of IV)
Responses to USEPA Technical Comments on the SSCMI Workplan (June 2, 2023)
Former Bendix Facility
980 Hurricane Road, Franklin, IN

July 21, 2023 USEPA Technical Comments on the SSCMIWP

Specific Comment Number	EPA Technical Comment	Amphenol Response
11	Section 4.5, Required Permits, Page 29. Note that Underground Injection Control Permits may be required for this activity.	Underground Injection Control Permits are not required for projects in Indiana. Section 4.5 of the SSCMIWP has been updated.
12	Section 5.2, On-site Soil and Groundwater Remediation, Page 31. This section discusses the ISCO and ISCR compounds to include the pounds or gallons to be injected. However, the SSCMIWP does not include any information on the dosage of the injectants. Revise the SSCMIWP to include the injectant dosage, such as pounds of injectant per gallon of water. The total anticipated volume of water to be introduced into the aquifer should also be included. In addition, the proposed injection pressure needs to be provided and the pressure should be appropriate for the site to reduce the potential for short-circuiting. Finally, provide the proposed flow rate of injectants as well or indicate how pilot testing will be conducted to guide full-scale implementation.	Section 5.2 of the SSCMIWP provides the volumetric or weight dosages proposed for each area or transect (as well as the planned number of injection points). This section has been updated to include the anticipated volume of material dosing for each injection point and the anticipated injection pressures. Please keep in mind that these are the anticipated dosages per point and injection pressures, but the actual volumes and pressures may vary based on conditions that are encountered during the injection activities. However, the overall dosage for each PRB should be consistent with what is being proposed in the SSCMIWP, and injection pressures will be limited based on the actual injection depths and estimated overburden pressure to prevent fracturing of soils and minimize potential for short-circuiting or daylighting. The actual dosage, volume, and injection pressures will be documented and provided to the USEPA as part of the Construction Completion Report.
13	Section 5.2.1, On-Site PRBs, Page 31. This section states that the Hamilton Avenue PRB is designed to operate for an extended lifetime of at least 10 years. However, Provect IR product literature states that field data has shown a longevity of over four years, and states "it appears that Provect-IR will persist at least 5 years." (https://www.provectusenvironmental.com/marketing/guidelines/Provect-IR-IRM_Longevity Analysis FINAL.pdf) Provect-IR has a solid track record of successful implementations at cVOC sites; however, stating a persistence of 10 years appears overly optimistic. Further details on how the persistence of Provect-IR was estimated to be twice as long as product literature needs to be provided. Please provide an alternative to access and replenish the Provect IR at the end of the 5-year lifetime.	The On-Site PRB consists of multiple components that have varying expected lifespans and create subsurface conditions that will continue to be effective at promoting reductive dechlorination. The combination of Provect-IR and ZVI will create a longer lasting reducing environment than Provect-IR alone. This in combination with anaerobic amendments (ZVI, Provect-IR, and EVO) being emplaced upgradient via future ISCR injections will increase the longevity of the PRB as anoxic water is entering the barrier. A major component of the PRB is ZVI (~4,700-lbs) and the reductive environment created by the injection program will preserve the reactive surfaces of the iron, resulting in an overall expected lifespan in excess of 10 years. Remedial performance monitoring will document the remedial progression and groundwater conditions, which will determine if additional contingency applications are necessary as discussed in the SSCMIWP. Section 5.2.1 of the SSCMIWP has been updated to include this language.
14	Section 5.2.4, On-Site ISCR and Enhanced Anaerobic Bioremediation. Page 36. The text has a discrepancy in the definition of the on-site treatment area. This section states that the on-site treatment area is 74,000 square feet, however Section 4.2.1 (On-Site Remediation Area) describes the 74,000 square foot area as the on-site remediation area and describes the on-site treatment area as being 43,500 square feet. The text needs to be amended to provide consistent descriptions for clarity.	Section 4.2.1 was reviewed and modified to make references to On-Site Treatment Area and On-Site Source Area and the remainder of the document was reviewed to verify consistentcy throughout the SSCMIWP.
15	Section 5.3.2 Off-Site PRBs, Page 38. This section states that the off-site PRBs should be viable for a minimum of 10 years. However, further details on how the lifetime was estimated needs to be provided. Revise this section to address this issue.	The Off-Site PRB consists of multiple components that have varying expected lifespans and create subsurface conditions that continue to be effective at promoting reductive dechlorination. The combination of granular activated carbon (PlumeStop) and S-MZVI will create a long-lasting reducing environment. Based on current Off-Site groundwater COC concentrations and using two different groundwater velocity estimates (183 feet/year and 350 feet/year), Regenesis completed two separate modeling scenarios to demonstrate anticipated performance 10 years post-application. Both modeling scenarios demonstrated that the barrier should still be effective at 10 years post-application. This in combination with anaerobic amendments (ZVI, Provect-IR, and EVO) being emplaced upgradient via the planned On-Site ISCR injections will further increase the longevity of the PRBs as anoxic water is entering the barriers. Section 5.3.2 of the SSCMIWP has been updated to include this language and the Regenesis modeling information has been included in Appendix
16	Section 5.3.2 Off-Site PRBs, Page 38. The SSCMIWP states that test borings will be installed approximately every 50 to 100 feet of linear PRB installation to verify PRB installation injection depths. However, it is not clear what is being verified. Provide clarification on what is being verified, such as the depth to the top of the Unit C geological unit.	The purpose of these borings is to confirm the depth to the top of Unit C. Section 5.3.2 has been updated to include clarification on why the borings are being installed.
17	Section 5.4, Remedial Performance and Progress Monitoring, Page 40. The text states that if groundwater concentrations meet short-term groundwater CAOs off-site, then additional injection events or active remediation will not be required. However, in the event on-site groundwater exceedances are still present, there is still a threat to the off-site groundwater. Thus, this statement needs to be revised to indicate that additional injection events or active remediation may be required. Revise this section to address this issue.	Section 5.4 has been updated to include language stating that additional injection events or active remediation may be warranted even if short-term CAOs are met for Off-Site monitoring wells, depending upon the contaminant concentrations observed along the hydraulically down-gradient perimeter of the Site and in the vicinity of potential VI receptors.
18	Section 5.4.1.1, Performance Monitoring Well Installation, Page 41. The text states that the monitoring wells will be installed to approximately three to four feet below the observed groundwater table. However, the groundwater contamination is noted to be in the lower portion of the Unit B, thus the proposed depth will not intercept the contaminant plume in areas where unit B is thicker. As such, it appears the performance monitoring wells need to be installed to intercept the depth interval that is likely to contain the highest groundwater concentrations.	As stated in Section 5.4.1.1, the effectiveness of the implemented remediation activities will be based on remediating the groundwater to levels that are protective of vapor intrusion. Since vapor intrusion emanating from dissolved phase VOCs are associated with volatilization of contaminated groundwater in the upper 2-3 feet of the groundwater table, the risk of vapor intrusion originating from deeper water bearing zones is minimal and not likely to occur based on the available groundwater buffer and associated low aqueous diffusivity. In order for this to occur, the contaminants would need to migrate upward through the shallower groundwater zone and these contaminants would be detected through collection of groundwater samples obtained from the upper portion of the groundwater table, as proposed in the SSCMIWP. However, one or more deeper groundwater samples may periodically be obtained through the use of temporary sampling points On-Site or from existing groundwater monitoring wells that are currently screened at the base of Unit B. In fact, according to the boring logs/well construction diagrams, the 16 existing wells have a screened interval 5' or less in length and the bottom of the screened interval extends to or just above the base of Unit B. Two (2) On-Site and a minimum of eight (8) Off-Site performance monitoring wells have screens installed to or near the base of Unit B and will be monitored on a regular basis and will provide adequate information to evaluate the effectiveness of the implemented remedial activities at deeper depths. Additional explanation has been included in Section 5.4.1.1.
19	Section 5.4.1.3, On-Site Corrective Measure Performance Monitoring Plan, Page 44. The plan states that once a groundwater monitoring well achieves long-term groundwater CAOs for two consecutive years, future groundwater sampling from that monitoring well will be discontinued. However, the text should be revised to include "following EPA review and approval."	Section 5.4.1.3 has been updated to include "following EPA review and approval".
20	Section 5.4.3, SSDS Shut-down Confirmation Sampling, Page 47. This section includes discussion of an outside ambient air sample; however, details on this sampling are limited. The SSCMIWP needs to provide additional discussion of when and where an outside ambient air sample will be collected and how the data will be used. Revise this section to provide more detail on the ambient air sampling.	Outside ambient air samples will be collected during SSDS confirmatory shutdown air/sub-slab vapor sampling events. Since the groundwater pump and treat remediation system will no longer be operating, ambient air sample locations from between the residence and the Site will no longer be collected. The only ambient air sample collected will be from the up-wind direction from the residence at the time the sampling begins. The outside ambient air sampling procedures will follow the standard operating procedures outlined in the IWM Consulting SOP H, as documented in the site-specific QAPP. This information regarding ambient air sampling has been updated in Section 5.4.3.

Table 2 (Part III of IV)
Responses to USEPA Technical Comments on the SSCMI Workplan (June 2, 2023)
Former Bendix Facility
980 Hurricane Road, Franklin, IN

July 21, 2023 USEPA Technical Comments on the SSCMIWP

Specific Comment Number	EPA Technical Comment	Amphenol Response
21	Section 5.5.3, Water Supply, Page 50. The plan states that water will be either secured from an off-site source or by tapping into the on-site water supply line. Clarify if the water that might be secured from an off-site source is potable water.	The water for mixing amendments for in-situ injection activities will be obtained from an On-Site potable water supply source. This information has been updated within Section 5.5.3.
22	Figures, Figure 2-9 Groundwater PCE Isoconcentration Map. Unless other data indicates otherwise, the plume extent in the unmonitored area between MW-36 and IT-2 needs to be dashed as it appears to be inferred. Revise Figure 2-9 to address this issue.	The dissolved PCE plume extent in the unmonitored area between MW-36 and IT-2 has been dashed as it is inferred. The Figure 2-9 has been updated accordingly.
23	Figures, Figure 2-12b Cross-Section B-B'. This figure indicates the location of the sewer (new); however, no information on its depth or width is provided. In addition, the groundwater level is depicted only on the western portion of the drawing. An inferred groundwater level should be added to the drawing based on the site contour map and observations during geoprobing. Revise this figure to address this issue.	Potentiometric surface information was not included on Figure 2-12b, with the exception of monitoring well MW-28 and recovery well RW-4, as the majority of the boring locations were temporary wells and the data was collected at separate time intervals. Groundwater elevations at the time of drilling for the remaining borings have been added and noted on Figure 2-12b.
24	Figures. Figures 2-12a through 2-12g include the potentiometric surface as measured on April 3, 2023. However, it is not clear if this data was collected when the pump and treat system was operating or if it was inactive at the time. Add a note to the legend of these figures to clarify the status of the pump and treat system, during groundwater elevation data collection.	The potentiometric surface information from April 3, 2023 included on Figures 2-12a through 2-12g was collected when the pump and treat system was operational. The figures have been revised and noted accordingly.
25	Figures. Figure 2-12g does not include potentiometric surface information. The figure needs to be revised to show the potentiometric surface.	Potentiometric surface information was not included on Figure 2-12g, with the exception of monitoring well MW-33, as the majority of the boring locations were temporary wells and the data was collected at separate time intervals. Groundwater elevations at the time of drilling for these remaining borings have been added and noted on Figure 2-12g.

Table 2 (Part IV of IV)
Responses to USEPA Technical Comments on the SSCMI Workplan (June 2, 2023)
Former Bendix Facility
980 Hurricane Road, Franklin, IN

EVALUATION OF THE AUGUST 11, 2023 RESPONSE TO EPA COMMENTS

Comment Number	EPA Technical Comment	Amphenol Response
1	**Evaluation of the Response to General Comment 3:** The response addresses the comment, however, note that the closeup figure along Forsythe is labelled as Figure 4-3, not Figure 5-3 as stated in the response	The figure number was misstated as Figure 5-3 in the initial response to comments and has been included as Figure 4-3 in the SSCMIWP, as appropriate for the section of the report in which it is referenced.
2 (Part A)	**Evaluation of the Response to General Comment 5:** Response to General Comment 5 states: "The anticipated radius of influence (ROI) of the injected material is not anticipated to exceed approximately 10 feet during injection. However, the response also indicates, following injection, the injected materials (ZVI with carbon-based sorptive media) are not mobile as they are solid materials and thus, the width of the permeable reactive barriers (PRBs) zone of influence is anticipated to be approximately 20 feet. Attached to this evaluation of the RTCs, is a modified figure showing the PRB zone of influence, assuming at 10 to 15-foot radius of influence for each injection point. As shown in the figure, a significant portion of the groundwater plumes are present outside the PRB zone of influence footprint. Treatment of contaminated groundwater upgradient of the PRBs will be minimal and will rely on contaminant mass flow to the PRBs treatment zones—a process that is far slower than a pump-and-treat system. The required time for the contaminant mass to naturally desorb and advect to the PRB treatment zone will be many years, if not decades. Contaminated groundwater downgradient of the PRBs will be left untreated. As such, the SSCMI Workplan needs to provide rationale demonstrating how contaminated groundwater outside the PRB treatment zones will be addressed.	The Off-Site PRBs are designed to treat groundwater migrating downgradient as it passes through each PRB. This will result in downgradient flow of treated groundwater and the anaerobic PRB amendments (ZVI) will also stimulate downgradient biodegradation (reductive dichlorination) through ZVI reduction of redox potential and the decrease in available dissolved cVOCs through the addition of activated carbon (PlumeStop). During the Off-Site Pilot Study (completed during OIM activities in October 2019 and discussed in Section 4.3.4), decreases in chlorinated hydrocarbon concentrations were observed up to 60 feet away from the injection points. However, the addition of a chlorinated solvent bacterial reducing inoculation will be incorporated into the Off-Site PRBs and has been updated in Sections 4.4.5 and 5.3.2. This progress will be monitored in Off-Site Treatment Area performance wells, such as MW-32, MW-33, MW-34, MW-37, MW-38, MW-39, MW-40, MW-47, MW-48, MW-49, MW-50, MW-51, MW-52, and MW-53.
2 (Part B)	If groundwater outside the PRB treatment zones does not meet corrective action objectives (CAOs) in a reasonable timeframe, provide a contingency plan describing the steps that will be taken meet CAOs in these areas.	Section 5.3 and 5.3.4 discuss the contingency measures for the On-Site remediation area. Following the completion of PRB in-situ injection activities, if the overall average conditions of the Off-Site remediation area do not meet the necessary reducing conditions (ORP of at least -100 mV) which promote halorespiring bacteria to multiply and consume cVOCs or if short-term CAOs are not achieved within the required timeframe (5 years), then additional remediation will be evaluated, including completing supplemental in-situ injection events.
3 (Part A)	**Evaluation of the Responses to General Comments 6 and 8**: The responses to General Comments 6 and 8 included text regarding the transition from in situ chemical oxidation (ISCO) to in situ chemical reduction (ISCR)/enhanced reductive dechlorination (ERD) and a decision chart depicting how. However, additional information needs to be included on the decision chart, including noting that dissolved oxygen (DO) concentrations need to be below 2 milligrams per liter (mg/L).	This has been added to the decision chart as a criterion.
3 (Part B)	Further, Sections 3.3 (Selected Corrective Measures) and 4.2.2 (Off-Site Remediation Area) of the SSCMI Workplan indicate the (PRBs) will consist of ISCR and/or carbon-based product to promote biodegradation of chlorinated volatile organic compounds (VOCs) in groundwater. However, evidence of naturally-occurring bacterial degradation of trichloroethene (TCE) at the site is limited (i.e., there are comparatively low concentrations of cis-1,2-dichloroethene and vinyl chloride), indicating a potential lack of indigenous TCE-degrading bacteria, such as dehalococcoides (DHC), in site groundwater. The highly oxidizing conditions necessary for successful ISCO implementation is likely to further reduce indigenous bacterial populations. If no viable population of TCE degrading bacteria is present, include bacterial inoculation as part of ISCR to increase the effectiveness of the PRBs.	Previous microbial analysis of groundwater was completed on groundwater from wells MW22, MW-30 and MW-42 by Microbial Insights in 2021. The samples demonstrated the presence of chlorinated hydrocarbon degrading bacteria, including dehalococcoides (DHC), dehalobacter spp. (DHBt), desulfitobacterium spp. (DSB), and dehalobium chlorocoercia (DECO), as well as sulfate reducing bacteria. Higher populations were detected in wells MW-22 and MW-42 that have elevated COC concentrations, and the analysis was done after previous ISCO application in the vicinity of MW-42 which indicates the resilience of the bacterial communities. MW-30, which exhibits COC concentrations below MCLs, still had detectable microbial populations, but at lower counts. However, bacterial inoculation will be referenced as a contingency measure in section 5.2.6 and has been included on the decision chart.
3 (Part C)	Finally, the decision flow chart is unclear what specific criteria will be considered for including granular activated carbon (GAC). The text states only, "evaluate injection of activated carbon amendment to downgradient property boundary PRB." GAC can be a very effective and long-lasting amendment for the treatment of dilute chlorinated solvent groundwater plumes; however, more definitive decision criteria is needed to evaluate when GAC injections would be conducted. Revise the SSCMI Workplan to address these issues.	The decision flowchart has been updated to provide more detail on the criteria for determining the need for contingency application of activated carbon to the PRB and/or evaluation of potential application of bacterial inoculation. The contingency addition of activated carbon amendment to the downgradient property boundary PRB will be implemented if downgradient monitoring wells (MW-24, MW-30, MW-35, MW-46 and IT-2) do not meet short-term CAOs and are not projected to meet these CAOs within 5-years of treatment. Similarly, contingency bioinnoculation will be implemented in the source treatment area if short-term CAOs are not met within 3 years and wells MW-12R, MW-43 and MW-45 do not exhibit decreasing COC concentration trends.

Appendices

Appendix A

Safety Data Sheets

REGENESIS
Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier	**PlumeSTOP®**
Other means of identification	None.
Recommended use	Soil and Groundwater Remediation.
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name	Regenesis
Address	1011 Calle Sombra San Clemente, CA 92673
Telephone	949-366-8000
E-mail	CustomerService@regenesis.com
Emergency phone number	CHEMTREC" at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.

Label elements

Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of wastes and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Water	7732-18-5	>75
Colloidal activated carbon <2.5 µm	7440-44-0	<25
Proprietary additives		≤2

Composition comments	All concentrations are in percent by weight unless otherwise indicated.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.

Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	If you feel unwell, seek medical advice (show the label where possible). Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Carbon dioxide, alcohol-resistant foam, dry chemical, water spray, or water fog.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Combustion products may include: carbon monoxide, carbon dioxide, sodium oxides, metal oxides.
Special protective equipment and precautions for firefighters	Use protective equipment appropriate for surrounding materials.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials. Use water spray to keep fire-exposed containers cool.
General fire hazards	This material will not burn until the water has evaporated. Residue can burn. When dry may form combustible dust concentrations in air.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Avoid contact with spilled material. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	This product is miscible in water. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Avoid contact with skin and eyes. Avoid prolonged exposure. Observe good industrial hygiene practices. Wash thoroughly after handling. Wear appropriate personal protective equipment (See Section 8).
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Protect from freezing.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
Colloidal activated carbon ≤2.5 μm (CAS 7440-44-0)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Colloidal activated carbon ≤2.5 μm (CAS 7440-44-0)	TWA	2.5 mg/m3	Respirable.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear approved chemical safety goggles.
Skin protection	
Hand protection	Rubber, neoprene or PVC gloves are recommended. Wash hands after handling.
Other	Avoid contact with the skin. Wear suitable protective clothing.
Respiratory protection	Not normally needed. In case of insufficient ventilation, wear suitable respiratory equipment. If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Aqueous suspension.
Color	Black.
Odor	Odorless.
Odor threshold	Not available.
pH	8 - 10
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not flammable.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	1 - 1.2
Solubility(ies)	
Solubility (water)	Miscible
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials. Keep from freezing.
Incompatible materials	Strong oxidizing agents. Water reactive materials.

Hazardous decomposition products Combustion may produce: carbon oxides.

11. Toxicological information

Information on likely routes of exposure

Inhalation Prolonged inhalation may be harmful.

Skin contact Prolonged or repeated skin contact may result in minor irritation.

Eye contact Direct contact with eyes may cause temporary irritation.

Ingestion Expected to be a low ingestion hazard.

Symptoms related to the physical, chemical and toxicological characteristics Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity Not expected to be acutely toxic.

Components	Species	Test Results
Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)		
Acute		
Inhalation		
LC50	Rat	> 8500 mg/m³, air
Oral		
LD50	Rat	> 2000 mg/kg, (Female)

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Mobility in soil Expected to be temporarily highly mobile in soil.

Other adverse effects None known.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products: Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging: Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not established.

15. Regulatory information

US federal regulations: All components are listed on or exempt from the U.S. EPA TSCA Inventory List.
This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories: Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical: No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA): Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Not regulated.

US. New Jersey Worker and Community Right-to-Know Act

Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)

US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

Not Listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 26-February-2015

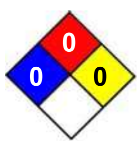
Revision date -

Version # 01

Further information HMIS® is a registered trade and service mark of the American Coatings Association (ACA).

HMIS® ratings
Health: 0
Flammability: 0
Physical hazard: 0

NFPA ratings



Disclaimer Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

REGENESIS
Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier	**PlumeSTOP® Nutrients**
Other means of identification	None.
Recommended use	Soil and Groundwater Remediation.
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name	Regenesis
Address	1011 Calle Sombra San Clemente, CA 92673
Telephone	949-366-8000
E-mail	CustomerService@Regenesis.com
Emergency phone number	CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.

Label elements

Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.

Precautionary statement

Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Dusts may irritate the respiratory tract, skin and eyes.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO_2). Apply extinguishing media carefully to avoid creating airborne dust.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers. Avoid dust formation.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Avoid the generation of dusts during clean-up. Collect dust using a vacuum cleaner equipped with HEPA filter. This product is miscible in water. Stop the flow of material, if this is without risk. Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water. Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Minimize dust generation and accumulation. Provide appropriate exhaust ventilation at places where dust is formed. Practice good housekeeping.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	TWA	3 mg/m3	Respirable particles.
		10 mg/m3	Inhalable particles.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Ensure adequate ventilation, especially in confined areas. Local exhaust is suggested for use, where possible, in enclosed or confined spaces.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses with side shields (or goggles). Unvented, tight fitting goggles should be worn in dusty areas.
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
Skin protection	
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation, use MSHA/NIOSH approved dust respirator.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Solid.
Form	Powder.
Color	White.
Odor	Odorless.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	The product is non-combustible.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Completely soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.

Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use. Ammonia fumes may be released upon heating.
Conditions to avoid	Contact with incompatible materials. Excessive heat.
Incompatible materials	Strong oxidizing agents. Bases.
Hazardous decomposition products	Ammonia fumes may be released upon heating.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Dust may irritate respiratory system.
Skin contact	Dust or powder may irritate the skin.
Eye contact	Dust may irritate the eyes.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Dusts may irritate the respiratory tract, skin and eyes.

Information on toxicological effects

Acute toxicity	Not expected to be acutely toxic.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	This product is completely water soluble and will disperse in soil.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Ammonium sulfate	7783-20-2	40-50

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Ammonium sulfate (CAS 7783-20-2)

US. New Jersey Worker and Community Right-to-Know Act

Not listed.

US. Pennsylvania Worker and Community Right-to-Know Law

Ammonium sulfate (CAS 7783-20-2)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

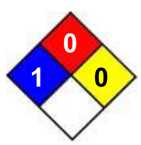
Issue date 07-January-2016

Revision date -

Version # 01

HMIS® ratings Health: 1
Flammability: 0
Physical hazard: 0

NFPA ratings



Disclaimer Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

Safety Data Sheet (SDS)

OSHA HazCom 2012 Standard 29 CFR 1910.1200. Prepared to GHS Rev03.

Printing date 01/25/2016 *Reviewed on 02/01/2022*

* 1 Identification

· ***Product identifier***

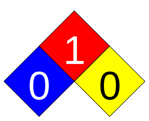
· ***Trade name: Provect-IR ISCR Reagent (Antimethanogenic)***
· ***Product description***
Remediation product for the treatment of soil, sediment and groundwater. Not for use in potable water sources.

· ***Details of the supplier of the safety data sheet***
· ***Manufacturer/Supplier:***
Provectus Environmental Products, Inc.
PO Box 358
Freeport, IL 61032
Phone: 815-650-2230
Fax: 815-650-2230
www.provectusenvironmental.com
· ***Emergency telephone number:*** 815-650-2230

* 2 Hazard(s) identification

· ***Classification of the substance or mixture***
The product is not classified according to the Globally Harmonized System (GHS).

· ***Label elements***
· ***GHS label elements*** Non-Regulated Material
· ***Hazard pictograms*** Non-Regulated Material
· ***Signal word*** Non-Regulated Material
· ***Hazard statements*** Non-Regulated Material
· ***Hazard description:***
CONTAINMENT HAZARD: Any vessel that contains wetted reagent must be vented due to potential pressure build up from fermentation gases.
· ***Classification system:***
· ***NFPA ratings (scale 0 - 4)***



Health = 0
Fire = 1
Reactivity = 0

· ***HMIS-ratings (scale 0 - 4)***

HEALTH	0
FIRE	1
REACTIVITY	0

Health = 0
Fire = 1
Reactivity = 0

3 Composition/information on ingredients

	Proprietary	40 to 90%
7439-89-6	iron	5 to 90%
4075-81-4	calcium dipropionate	0 to 4%

· ***Chemical characterization: Mixtures***
· ***Description:*** Mixture of the substances listed below with nonhazardous additions.

· ***Dangerous components:***			
8013-01-2	Yeast extracts	STOT SE 3, H335	0.5 to 5%

(Contd. on page 2)

(Contd. of page 1)

9000-30-0	Guar gum	STOT SE 3, H335; Eye Irritant 2B, H320; Combustible Dust	0 to 5%
7757-83-7	sodium sulfite	Acute Toxicity 4, H302	0 to 2%

· ***Additional information:*** Product contains red yeast rice

4 First-aid measures

· ***Description of first aid measures***
· ***After inhalation:*** Remove person to fresh air. If signs/symptoms continue, get medical attention.
· ***After skin contact:*** Wash off with soap and water. Get medical attention if irritation develops.
· ***After eye contact:*** Flush with water for 5 minutes
· ***After swallowing:***
Rinse mouth with water and afterwards drink plenty of milk or water. Call a poison control center or doctor immediately for treatment advice.
· ***Most important symptoms and effects, both acute and delayed*** No further relevant information available.
· ***Indication of any immediate medical attention and special treatment needed***
No further relevant information available.

5 Fire-fighting measures

· ***Extinguishing media***
· ***Suitable extinguishing agents:***
CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· ***Special hazards arising from the substance or mixture*** No further relevant information available.
· ***Advice for firefighters***
· ***Protective equipment:*** No special measures required.

* 6 Accidental release measures

· ***Personal precautions, protective equipment and emergency procedures*** Not required.
· ***Environmental precautions:*** Do not allow to enter sewers or potable water sources.
· ***Methods and material for containment and cleaning up:***
Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry. Sweep or vacuum up spillage and place in vented container.
· ***Reference to other sections***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

* 7 Handling and storage

· ***Precautions for safe handling*** No special measures required.
· ***Information about protection against explosions and fires:*** Combustible material

· ***Conditions for safe storage, including any incompatibilities***
· ***Storage:***
· ***Requirements to be met by storerooms and receptacles:***
CONTAINMENT HAZARD: Any vessel that contains wetted reagent must be vented due to potential pressure build up from fermentation gases.
· ***Information about storage in one common storage facility:*** Not required.
· ***Further information about storage conditions:***
Keep tightly closed in a dry and cool place. Keep away from open flames, hot surfaces and sources of ignition. Any material that is wetted must be vented due to potential pressure build up from fermentation gases.

(Contd. on page 3)

Safety Data Sheet (SDS)

OSHA HazCom 2012 Standard 29 CFR 1910.1200. Prepared to GHS Rev03.

Printing date 01/25/2016 *Reviewed on 02/01/2022*

Trade name: Provect-IR ISCR Reagent

(Contd. of page 2)

· ***Specific end use(s)*** No further relevant information available.

* 8 Exposure controls/personal protection

· ***Additional information about design of technical systems:*** No further data; see section 7.

· ***Control parameters***
· ***Components with occupational exposure limits:***
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
· ***Additional information:***
Dry or powdered ingredients are combustible. Dispersal of finely divided dust from products into air may form mixtures that are ignitable and explosive. Minimize airborne dust generation and eliminate sources of ignition.

· ***Exposure controls***
· ***Personal protective equipment:***
· ***General protective and hygienic measures:***
The usual precautionary measures for handling chemicals should be followed.
· ***Breathing equipment:*** Not required.
· ***Protection of hands:*** Not required.
· ***Eye protection:*** Not required.

* 9 Physical and chemical properties

· ***Information on basic physical and chemical properties***
· ***General Information***

· ***Appearance:***	
Form:	Solid
Color:	Brown to Green
· ***Odor:***	Pleasant
· ***Odor threshold:***	Not determined.
· ***pH-value:***	Not applicable.
· ***Change in condition***	
Melting point/Melting range:	Not determined.
Boiling point/Boiling range:	Undetermined.
· ***Flash point:***	Not applicable.
· ***Flammability (solid, gaseous):***	Not determined.
· ***Ignition temperature:***	
Decomposition temperature:	Not determined.
· ***Auto igniting:***	Product is not self-igniting.
· ***Danger of explosion:***	Dry or powdered ingredients are combustible. Dispersal of finely divided dust from products into air may form mixtures that are ignitable and explosive. Minimize airborne dust generation and eliminate sources of ignition.
· ***Explosion limits:***	
Lower:	Not determined.
Upper:	Not determined.
· ***Vapor pressure:***	Not applicable.
· ***Density:***	Not determined.

(Contd. on page 4)

Safety Data Sheet (SDS)

OSHA HazCom 2012 Standard 29 CFR 1910.1200. Prepared to GHS Rev03.

Printing date 01/25/2016 Reviewed on 02/01/2022

Trade name: Provect-IR ISCR Reagent

(Contdd. of page 3)

· **Relative density**	Not determined.
· **Vapor density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water:	Soluble.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Solvent content:**	
Organic solvents:	0.0 %
Solids content:	100.0 %
· **Other information**	No further relevant information available.

10 Stability and reactivity

· ***Reactivity*** No further relevant information available.
· ***Chemical stability*** Product is stable under normal conditions.
· ***Thermal decomposition / conditions to be avoided:*** No decomposition if used according to specifications.
· ***Possibility of hazardous reactions*** No dangerous reactions known.
· ***Conditions to avoid*** No further relevant information available.
· ***Incompatible materials:*** No further relevant information available.
· ***Hazardous decomposition products:*** No dangerous decomposition products known.

* 11 Toxicological information

· ***Information on toxicological effects***
· ***Acute toxicity:***
· ***Primary irritant effect:***
· ***on the skin:*** No irritant effect.
· ***on the eye:*** Product dust may cause eye irritation.
· ***Sensitization:*** No sensitizing effects known.
· ***Additional toxicological information:***
The product is not subject to classification according to internally approved calculation methods for preparations:
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.

· ***Carcinogenic categories***

· ***IARC (International Agency for Research on Cancer)***
None of the ingredients is listed.
· ***NTP (National Toxicology Program)***
None of the ingredients is listed.
· ***OSHA-Ca (Occupational Safety & Health Administration)***
None of the ingredients is listed.

12 Ecological information

· ***Toxicity***
· ***Aquatic toxicity:*** No further relevant information available.

(Contd. on page 5)

Safety Data Sheet (SDS)

OSHA HazCom 2012 Standard 29 CFR 1910.1200. Prepared to GHS Rev03.

Printing date 01/25/2016 *Reviewed on 02/01/2022*

Trade name: Provect-IR ISCR Reagent

(Contdt. of page 4)

· ***Persistence and degradability*** No further relevant information available.
· ***Bioaccumulative potential*** No further relevant information available.
· ***Mobility in soil*** No further relevant information available.
· ***Additional ecological information:***
· ***General notes:*** Water hazard class 1 (Self-assessment): slightly hazardous for water
· ***Results of PBT and vPvB assessment***
· ***PBT:*** Not applicable.
· ***vPvB:*** Not applicable.
· ***Other adverse effects*** No further relevant information available.

13 Disposal considerations

· ***Waste treatment methods***
· ***Recommendation:*** Smaller quantities can be disposed of with household waste.

· ***Uncleaned packaging:***
· ***Recommendation:*** Disposal according to official regulations municipal.
· ***Recommended cleansing agent:*** Water, if necessary with cleansing agents.

* 14 Transport information

· ***UN-Number***	
· ***DOT, ADR, ADN, IMDG, IATA***	Non-Regulated Material
· ***UN proper shipping name***	
· ***DOT, ADR, ADN, IMDG, IATA***	Non-Regulated Material
· ***Transport hazard class(es)***	
· ***DOT, ADR, ADN, IMDG, IATA***	
· ***Class***	Non-Regulated Material
· ***Packing group***	
· ***DOT, ADR, IMDG, IATA***	Non-Regulated Material
· ***Environmental hazards:***	
· ***Marine pollutant:***	No
· ***Special precautions for user***	Not applicable.
· ***Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code***	Not applicable.
· ***UN "Model Regulation":***	-

15 Regulatory information

· ***Safety, health and environmental regulations/legislation specific for the substance or mixture***
· ***Sara***

· ***Section 355 (extremely hazardous substances):***

None of the ingredients is listed.

· ***Section 313 (Specific toxic chemical listings):***

None of the ingredients is listed.

· ***TSCA (Toxic Substances Control Act):***

7439-89-6	iron
4075-81-4	calcium dipropionate
8013-01-2	Yeast extracts
9000-30-0	Guar gum
7757-83-7	sodium sulfite

(Contd. on page 6)

Safety Data Sheet (SDS)

OSHA HazCom 2012 Standard 29 CFR 1910.1200. Prepared to GHS Rev03.

Printing date 01/25/2016 Reviewed on 02/01/2022

Trade name: Provect-IR ISCR Reagent

(Contd. of page 5)

· ***Proposition 65***

· ***Chemicals known to cause cancer:***
None of the ingredients is listed.

· ***Chemicals known to cause reproductive toxicity for females:***
None of the ingredients is listed.

· ***Chemicals known to cause reproductive toxicity for males:***
None of the ingredients is listed.

· ***Chemicals known to cause developmental toxicity:***
None of the ingredients is listed.

· ***Carcinogenic categories***

· ***EPA (Environmental Protection Agency)***
None of the ingredients is listed.

· ***TLV (Threshold Limit Value established by ACGIH)***
None of the ingredients is listed.

· ***NIOSH-Ca (National Institute for Occupational Safety and Health)***
None of the ingredients is listed.

· ***GHS label elements*** Non-Regulated Material
· ***Hazard pictograms*** Non-Regulated Material
· ***Signal word*** Non-Regulated Material
· ***Hazard statements*** Non-Regulated Material

· ***National regulations:***
The product is subject to be labeled according with the prevailing version of the regulations on hazardous substances.

· ***State Right to Know***

	Proprietary	40-90%
7439-89-6	iron	5-90%
4075-81-4	calcium dipropionate	2-12%
8013-01-2	Yeast extracts STOT SE 3, H335	≤ 2.5%
9000-30-0	Guar gum STOT SE 3, H335; Eye Irrit. 2B, H320; Combustible Dust	≤ 2.5%
7757-83-7	sodium sulfite Acute Tox. 4, H302	≤ 2.5%

All ingredients are listed.

· ***Chemical safety assessment:*** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· ***Date of preparation / last revision*** 01/23/2016 / 4
· ***Abbreviations and acronyms:***
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association

(Contd. on page 7)

Safety Data Sheet (SDS)

OSHA HazCom 2012 Standard 29 CFR 1910.1200. Prepared to GHS Rev03.

Printing date 01/25/2016 *Reviewed on 02/01/2022*

Trade name: Provect-IR ISCR Reagent

(Contd. of page 6)

ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
Acute Tox. 4: Acute toxicity, Hazard Category 4
Eye Irrit. 2B: Serious eye damage/eye irritation, Hazard Category 2B
STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3

· **** Data compared to the previous version altered.***
SDS / MSDS Created by MSDS Authoring Services (www.MSDSAuthoring.com)

REGENESIS
Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier **S-MicroZVI or S-MZVI**

Other means of identification None.

Recommended use Remediation of contaminants in soil and groundwater.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Regenesis

Address 1011 Calle Sombra
San Clemente, CA 92673 USA

General information 949-366-8000

E-mail CustomerService@regenesis.com

Emergency phone number For Hazardous Materials Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC 24/7 at:

USA, Canada, Mexico 1-800-424-9300

International 1-703-527-3887

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement The mixture does not meet the criteria for classification.

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response Wash hands after handling.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information Contact with acids liberates very toxic gas.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Glycerol	56-81-5	40 - 50
Zero valent iron	7439-89-6	30 - 50
Iron(II) sulfide	1317-37-9	1 - 4

Composition comments All concentrations are in percent by weight unless otherwise indicated.
Components not listed are either non-hazardous or are below reportable limits.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO_2).
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Combustion products may include: carbon oxides, iron oxides.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	This material will not burn until the water has evaporated. Residue can burn. When dry may form combustible dust concentrations in air.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Avoid prolonged exposure. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Glycerol (CAS 56-81-5)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses with side shields (or goggles).

Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
Skin protection	
Other	Wear suitable protective clothing.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Viscous metallic suspension.
Color	Dark gray
Odor	Slight.
Odor threshold	Not available.
pH	7 - 8 (When mixed with water) 10 (As shipped)
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	3000 cP (77 °F (25 °C))
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Contact with acids will release highly flammable and highly toxic hydrogen sulfide gas. Can react with some acids with the evolution of hydrogen.
Conditions to avoid	Contact with incompatible materials. Avoid drying out product. May generate combustible dust if material dries.
Incompatible materials	Strong oxidizing agents. Acids.

Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Spray mist may irritate the respiratory system. For dry material: Dust may irritate respiratory system.
Skin contact	Prolonged or repeated exposure may cause minor irritation.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	May cause discomfort if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity	Not expected to be acutely toxic.

Components	Species	Test Results
Glycerol (CAS 56-81-5)		
Acute		
Dermal		
LD50	Rabbit	> 18700 mg/kg
Oral		
LD50	Rat	27200 mg/kg

Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.
Further information	Contains an ingredient known to produce adverse effects in a small percentage of hypersensitive individuals exhibited as respiratory distress and allergic skin reactions.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components		Species	Test Results
Glycerol (CAS 56-81-5)			
Aquatic			
Acute			
Crustacea	EC50	Daphnia magna	> 10000 mg/l, 24 Hours

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Partition coefficient n-octanol / water (log Kow)

Glycerol (CAS 56-81-5)	-1.76

Mobility in soil No data available.

Other adverse effects None known.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

15. Regulatory information

US federal regulations This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

Glycerol (CAS 56-81-5)	Other Flavoring Substances with OSHA PEL's

US state regulations

US. Massachusetts RTK - Substance List

Glycerol (CAS 56-81-5)

US. New Jersey Worker and Community Right-to-Know Act

Glycerol (CAS 56-81-5)

US. Pennsylvania Worker and Community Right-to-Know Law

Glycerol (CAS 56-81-5)

US. Rhode Island RTK

Glycerol (CAS 56-81-5)

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Zero valent iron (CAS 7439-89-6)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

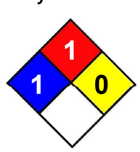
Issue date 27-December-2018

Revision date -

Version # 01

HMIS® ratings Health: 1
Flammability: 1
Physical hazard: 0

NFPA ratings



Disclaimer Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

SAFETY DATA SHEET
(Antimethanogenic) Anaerobic Biostimulant
ERD-CH4™: ERD-CH4™ (+DVI optional)

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **ERD-CH4™: ERD-CH4™ (+DVI)**
GENERAL USE: **Bioremediation of halogenated organics and metals**

MANUFACTURER:

Provectus Environmental Products, Inc
2871 W. Forest Rd. #2
Freeport, IL 61032
(815) 650-2230

EMERGENCY TELEPHONE:

Within USA and Canada: 1-800-424-9300
+1 703-527-3887 (collect calls accepted)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Product is generally recognized as safe. May cause irritation exposure to eyes. Long term contact to skin may cause some drying and minor irritation.

3. COMPOSITION INFORMATION ON INGREDIENTS

Proprietary mixture of fatty acids, glycerol, vegetable oils, garlic*, yeast extracts*, organic iron* and emulsifying agent.

INGREDIENT:	CAS NO.	% WT	% VOL	Toxic Release Inventory (TRI) Listed Chemicals
Iron (Fe)(*)	7439-89-6	0 – 20	NA	NA
Glycerol	56-81-5	2 – 10	NA	NA
Oleic Acid	112-80-1	20 – 50	NA	NA
Food Grade Veg Oil	8001-22-7	10 – 50	NA	NA
Potable Water	7732-18-5	10 – 40	NA	NA
Yeast Extracts(*)	8013-01-2	0 – <5	NA	NA
Garlic(*)	539-86-6	0 – <10	NA	NA

*(some formulations contain these materials)

4. FIRST AID MEASURES

EYES: Immediately flush with water for up to 15 minutes. If irritation persists, seek medical attention.

SKIN: Rinse with water. Irritation is unlikely, but if irritation occurs or persists, seek medical attention.

INGESTION: Generally safe to ingest but not recommended.

INHALATION: No first aid required.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Deluge with water

FIRE/EXPLOSION HAZARDS: Product is combustible only at temperatures above 600C

FIRE FIGHTING PROCEDURES: Use flooding with plenty of water, carbon dioxide or other inert gasses. Wear full protective clothing and self-contained breathing apparatus. Deluging with water is the best method to control combustion of the product.

FLAMMABILITY LIMITS: non-combustible

SENSITIVITY TO IMPACT: non-sensitive

SENSITIVITY TO STATIC DISCHARGE: non-sensitive

6. ACCIDENTAL RELEASE MEASURES

Confine and collect spill. Transfer to an approved DOT container and properly dispose. Do not dispose of or rinse material into sewer, stormwater or surface water. Discharge of product to surface water could result in depressed dissolved oxygen levels and subsequent biological impacts.

7. HANDLING AND STORAGE

HANDLING: Protective gloves and safety glasses are recommended.

STORAGE: Keep dry. Use first in, first out storage system. Keep container tightly closed when not in use. Avoid contamination of opened product. Avoid contact with reducing agents.

8. EXPOSURE CONTROLS – PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
ERD-CH4	NA	NA	NA

ENGINEERING CONTROLS: None are required

PERSONAL PROTECTIVE EQUIPMENT

EYES and FACE: Safety glasses recommended
RESPIRATOR: none necessary
PROTECTIVE CLOTHING: None necessary
GLOVES: rubber, latex or neoprene recommended but not required

9. PHYSICAL AND CHEMICAL PROPERTIES

Odor:	none to mild pleasant organic odor
Appearance:	milky
Auto-ignition Temperature	Non-combustible
Boiling Point	>600 C
Melting Point	NA
Density	0.90 - 1.02 gram/cc
Solubility	infinite
pH	7-9

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID: Do not contact with strong oxidizers
STABILITY: product is stable
POLYMERIZATION: will not occur
INCOMPATIBLE MATERIALS: strong oxidizers
HAZARDOUS DECOMPOSITION PRODUCTS:

11. TOXICOLOGICAL INFORMATION

Acute Toxicity
A: General Product Information
Acute exposure may cause mild skin and eye irritation.
B: Component Analysis - LD50/LC50

No information available.

B: Component Analysis - TDLo/LDLo
TDLo (Oral-Man) none

Carcinogenicity
A: General Product Information
No information available.
B: Component Carcinogenicity
Product is not listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

Epidemiology
No information available.

Neurotoxicity
No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity
Discharge to water may cause depressed dissolved oxygen and subsequent ecological stresses

Environmental Fate
No potential for food chain concentration

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Material is not considered hazardous, but consult with local, state and federal agencies prior to disposal to ensure all applicable laws are met.

14. TRANSPORT INFORMATION

NOTE: The shipping classification information in this section (Section 14) is meant as a guide to the overall classification of the product. However, transportation classifications may be subject to change with changes in package size. Consult shipper requirements under I.M.O., I.C.A.O. (I.A.T.A.) and 49 CFR to assure regulatory compliance.

US DOT Information
Shipping Name: Not Regulated
Hazard Class: Not Classified
UN/NA #: Not Classified
Packing Group: None
Required Label(s):None

50th Edition International Air Transport Association (IATA):
Not hazardous and not regulated

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

Material is not regulated under IMDG

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III

SECTION 311 No Hazard for Immediate health Hazard
SECTION 312 No Threshold Quantity
SECTION 313 Not listed

CERCLA NOT REGULATED UNDER CERCLA

TSCA NOT REGULATED UNDER TSCA

CANADA (WHIMS): NOT REGULATED

16. OTHER INFORMATION

HMIS:

Health	0
Flammability	0
Physical Hazard	0
Personal Protection	E

E: Safety Glasses, gloves

SAFETY DATA SHEET
HYDROGEN PEROXIDE, 50%

1. PRODUCT AND COMPANY IDENTIFICATION

Product Information

Product name:	HYDROGEN PEROXIDE 50% (ALL GRADES)
Synonyms:	H_2O_2 50%
Molecular formula:	H_2O_2
Chemical family:	peroxides
Molecular weight:	34.01 g/mol
Product use:	Bleaching agent, Oxidizing agent, Cosmetics, Water treatment

Details of the supplier of the safety data sheet

Company	Compass Remediation Chemicals 2028 East Ben White Blvd #240-1974 Austin, TX 78741
Telephone	(866) 221-9167

Emergency telephone number

Emergency Phone #: CHEMTREC 1-800-424-9300

2. HAZARDS IDENTIFICATION

Emergency Overview

Color:	colorless
Physical state:	liquid
Odor:	pungent

***Classification of the substance or mixture:**

Oxidizing liquids, Category 2, H272
Oral: Acute toxicity, Category 3,
H301 Skin corrosion, Category 1C,
H314 Serious eye damage, Category
1, H318
Specific target organ toxicity - single exposure, Category
3, H335 Chronic aquatic toxicity, Category 3, H412

*For the full text of the H-Statements mentioned in this Section, see Section 16

GHS-Labelling

Hazard pictograms: 

Signal word: **Danger**

Hazard Statements:
H272 : May intensify fire; oxidiser.
H301 : Toxic if swallowed.
H314 : Causes severe skin burns and eye damage.
H335 : May cause respiratory irritation.
H412 : Harmful to aquatic life with long lasting effects.

Prevention:
P210 : Keep away from heat.
P220 : Keep/Store away from clothing/ combustible materials.
P221 : Take any precaution to avoid mixing with combustibles.
P261 : Avoid breathing gas/mist/vapours/spray.
P264 : Wash skin thoroughly after handling.
P270 : Do not eat, drink or smoke when using this product.
P271 : Use only outdoors or in a well-ventilated area.
P273 : Avoid release to the environment.
P280 : Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
P301 + P310 : IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. P301 + P330 + P331 : IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 : IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305 + P351 + P338 : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 : Immediately call a POISON CENTER or doctor/ physician. P363 : Wash contaminated clothing before reuse.
P370 + P378 : In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Storage:
P403 + P233 : Store in a well-ventilated place. Keep container tightly closed. P405 : Store locked up.

Disposal:
P501 : Dispose of contents/ container to an approved waste disposal plant.

Supplemental information:

Potential Health Effects:
If swallowed:
May cause: gastrointestinal symptoms, ulceration, burns, accumulation of fluid in the lungs which may be delayed for several hours, (severity of effects depends on extent of exposure).

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Wt/Wt	GHS Classification**
HYDROGEN PEROXIDE	7722-84-1	50 %	H271, H301, H332, H335, H314, H318, H412
Water	7732-18-5	50 %	Not classified

**For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

Inhalation:
If inhaled, remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Skin:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Remove contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.

Eyes:
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Ingestion:
If swallowed, DO NOT induce vomiting unless directed to do so by medical personnel. Call a Poison Control Center. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person. Rinse mouth.

Notes to physician:
Exposure to material may cause delayed lung injury resulting in pulmonary edema and pneumonitis. Exposed individuals should be monitored for 72 hours after exposure for the onset of delayed respiratory symptoms.

5. FIREFIGHTING MEASURES

Extinguishing media (suitable):
water spray, water fog

Protective equipment:
Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand / NIOSH approved or equivalent).

Further firefighting advice:
Oxidizing material
In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Decomposition will release oxygen, which will intensify a fire.
Cool closed containers exposed to fire with water spray.
Closed containers of this material may explode when subjected to heat from surrounding fire. Do not allow run-off from fire-fighting to enter drains or water courses.
Fire-fighting equipment should be thoroughly decontaminated after use.

Fire and explosion hazards:
Solutions above 65% are especially hazardous as they do not contain enough water to remove the heat of decomposition by evaporation.
Explosive when mixed with combustible material. Avoid breathing fumes from fire exposed material.

6. ACCIDENTAL RELEASE MEASURES

In case of spill or leak:
Prevent further leakage or spillage if you can do so without risk. Evacuate area of all unnecessary personnel. Ventilate the area. Eliminate all ignition sources. Avoid generation of vapors. Avoid contact with cellulose, paper, sawdust or similar substances. Risk of self-ignition or promotion of fires. Combustible materials exposed to hydrogen peroxide should be rinsed immediately with large amounts of water to ensure that all the hydrogen peroxide is removed. Contain and collect spillage with non-combustible absorbent material such as clean sand, earth, diatomaceous earth or non-acidic clay and place into suitable properly labeled containers for prompt disposal. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

7. HANDLING AND STORAGE

Handling

General information on handling:
Do not taste or swallow.
Do not get in eyes, on skin, or on clothing. Avoid breathing vapor or mist.
Keep from contact with clothing and other combustible materials. Keep away from heat, sparks and flames.
Use only with adequate ventilation. Wash thoroughly after handling.
Wear fire/ flame resistant/ retardant clothing. Prevent product contamination.
Keep only in the original container. Store in tightly closed container.
DO NOT CUT, DRILL, GRIND, OR WELD ON OR NEAR THIS CONTAINER.
Emptied container retains vapor and product residue.
Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. Avoid contamination.

Storage

General information on storage conditions:
Store in tightly closed container. Store in cool, dry, well ventilated area away from sources of ignition such as flame, sparks and static electricity. Store out of direct sunlight in a cool well-ventilated place. Store in original container.
Store away from combustibles and incompatible materials. Refer to National Fire Protection Association (NFPA) 430, Code for the Storage of Solid and Liquid Oxidizers.

Storage incompatibility – General:
Store separate from acids, alkalies, reducing agents, and combustibles.
Store separate from: Metallic oxides Organic materials

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne Exposure Guidelines:

HYDROGEN PEROXIDE (7722-84-1)

US. ACGIH Threshold Limit Values

Time weighted average	1 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR

1910.1000) PEL:	1 ppm (1.4 mg/m3)

Only those components with exposure limits are printed in this section. Limits with skin contact designation above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required. Limits with a sensitizer designation above mean that exposure to this material may cause allergic reactions.

Engineering controls:
Investigate engineering techniques to reduce exposures below airborne exposure limits or to otherwise reduce exposures. Provide ventilation if necessary to minimize exposures or to control exposure levels to below airborne exposure limits (if applicable see above).If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

Respiratory protection:
Avoid breathing vapor or mist. Where airborne exposure is likely or airborne exposure limits are exceeded (if applicable, see above), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. Consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure or where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Skin protection:
Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. When handling this material, gloves of the following type(s) should be worn:
Neoprene

Polyvinylchloride

Impervious butyl rubber gloves

Wear a face shield, chemical goggles and chemical resistant clothing such as an approved splash protective suit made of SBR Rubber, PVC, Gore-Tex or a HAZMAT Splash Protective Suit (Level A, B, or C) when splashing may occur (such as connecting/disconnecting, mechanical first break). For foot protection, wear boots made of NBR, PVC, polyurethane, or neoprene. Overboots made of Latex or PVC, as well as firefighter boots or specialized HAZMAT boots are also permitted. DO NOT wear any form of boot or overboots made of nylon or nylon blends. DO NOT use cotton, wool or leather, as these materials react RAPIDLY with higher concentrations of hydrogen peroxide. Rinse immediately if skin is contaminated. Remove contaminated clothing and shoes immediately. Thoroughly rinse the outside of gloves and protective clothing with water prior to removal. Completely submerge hydrogen peroxide contaminated clothing or other materials in water prior to drying. Residual hydrogen peroxide, if allowed to dry on materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

Eye protection:
Where there is potential for eye contact, wear a face shield, chemical goggles, and have eye flushing equipment immediately available.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	colorless
Physical state:	liquid
Odor:	pungent
Odor threshold:	No data available
Flash point	None.
Auto-ignition temperature:	Not applicable
Lower flammable limit (LFL):	Not applicable
Upper flammable limit (UFL):	Not applicable
pH:	No data available
Density:	1.196 g/cm3 (68 °F (20 °C))
Vapor pressure:	18 mmHg (68 °F (20 °C))
Relative vapor density:	1.0
Vapor density:	not determined
Boiling point/boiling range:	237 °F (114 °C)
Freezing point:	-62 °F (-52 °C)
Evaporation rate:	No data available
Solubility in water:	completely soluble
% Volatiles:	100 %
Molecular weight:	34.01 g/mol
Oil/water partition coefficient:	No data available
Thermal decomposition	No data available
Flammability:	See GHS Classification in Section 2

10. STABILITY AND REACTIVITY

Stability:
This material is chemically stable under normal and anticipated storage, handling and processing conditions.

Materials to avoid:
Metals
Organic materials
Reducing agents
Metallic oxides
Dusts
Combustible materials (e.g., wood, sawdust)
Alkaline materials

Conditions/hazards to avoid:
Material decomposes with the potential to produce a rupture of unvented closed containers.

Hazardous decomposition products:
This material decomposes if contaminated, causing fire and possible explosions. Oxygen can be liberated at temperatures above ambient.

11. TOXICOLOGICAL INFORMATION

Data for HYDROGEN PEROXIDE 50% (ALL GRADES)

Acute toxicity

Oral:
Toxic if swallowed. (Rat) LD50 = 225 - 1,200 mg/kg. (50 %) (as aqueous solution)
Dermal:
Practically nontoxic. (Rat) LD50 = 9,200 mg/kg. (70 %) (as aqueous solution)
Inhalation:
No deaths occurred. (Rat) 4 h LC0 > 0.17 mg/l. (50 %) (saturated vapor)
Specific target organ toxicity - single exposure:
May cause respiratory irritation.
Skin Irritation:
Causes severe skin burns. (Rabbit) (1 h) (50 %) (aqueous solution)
Eye Irritation:
Causes serious eye damage. (Rabbit) (70 %) (aqueous solution)

12. ECOLOGICAL INFORMATION

Chemical Fate and Pathway
Data on this material and/or a similar material are summarized below.

Ecotoxicology
Data on this material and/or a similar material are summarized below.

13. DISPOSAL CONSIDERATIONS

Waste disposal:
Dilution with water is the preferred method of disposal. Dispose of in accordance with federal, state and local regulations. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

Take appropriate measures to prevent release to the environment.

14. TRANSPORT INFORMATION

US Department of Transportation (DOT)

UN Number	:	2014
Proper shipping name	:	Hydrogen peroxide, aqueous solutions
Class	:	5.1
Subsidiary hazard class	:	(8)
Packaging group	:	II
Marine pollutant	:	no

International Maritime Dangerous Goods Code (IMDG)

UN Number	:	2014
Proper shipping name	:	HYDROGEN PEROXIDE, AQUEOUS SOLUTION
Class	:	5.1
Subsidiary hazard class	:	(8)
Packaging group	:	II
Marine pollutant	:	no

15. REGULATORY INFORMATION

Chemical Inventory Status

EU. EINECS	EINECS	Conforms to
US. Toxic Substances Control Act	TSCA	The components of this product are all on the TSCA Inventory.
Australia. Industrial Chemical (Notification and Assessment) Act	AICS	Conforms to
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)	DSL	All components of this product are on the Canadian DSL.
Japan. Kashin-Hou Law List	ENCS (JP)	Does not conform
Korea. Existing Chemicals Inventory (KECI)	KECI (KR)	Conforms to
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	PICCS (PH)	Does not conform
China. Inventory of Existing Chemical Substances	IECSC (CN)	Does not conform

United States – Federal Regulations

SARA Title III – Section 302 Extremely Hazardous Chemicals:

Chemical Name	CAS-No.	SARA Reportable Quantities	SARA Threshold Planning Quantity
HYDROGEN PEROXIDE	7722-84-1	1000 lbs	1000 lbs

SARA Title III - Section 311/312 Hazard Categories:
Acute Health Hazard, Fire Hazard, Reactivity Hazard

SARA Title III – Section 313 Toxic Chemicals:
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - Reportable Quantity (RQ):

The components in this product are either not CERCLA regulated, regulated but present in negligible concentrations, or regulated with no assigned reportable quantity.

United States – State Regulations

New Jersey Right to Know

Chemical Name	CAS-No.
Water	7732-18-5
HYDROGEN PEROXIDE	7722-84-1

New Jersey Right to Know – Special Health Hazard Substance(s)

Chemical Name	CAS-No.
HYDROGEN PEROXIDE	7722-84-1

Pennsylvania Right to Know

Chemical Name	CAS-No.
Water	7732-18-5
HYDROGEN PEROXIDE	7722-84-1

Pennsylvania Right to Know – Environmentally Hazardous Substance(s)

Chemical Name	CAS-No.
HYDROGEN PEROXIDE	7722-84-1

California Prop. 65

This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive defects.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H272 May intensify fire; oxidiser.
H301 Toxic if swallowed.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H332 Harmful if inhaled.
H335 May cause respiratory irritation.
H412 Harmful to aquatic life with long lasting effects.

Disclaimer

The information contained herein is accurate to the best of our knowledge. However, data, safety standards and government regulations are subject to change and, therefore, holders and users should satisfy themselves that they are aware of all current data and regulations relevant to their particular use of product. COMPASS REMEDIATION CHEMICALS DISCLAIMS ALL LIABILITY FOR RELIANCE ON THE COMPLETENESS OR ACCURACY OR THE INFORMATION INCLUDED HEREIN. COMPASS REMEDIATION CHEMICALS MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTIABILITY OR FITNESS FOR PARTICULAR USE OR PURPOSE OF THE PRODUCT DESCRIBED HEREIN. All conditions relating to storage, handling, and use of the product are beyond the control of Compass Remediation Chemicals and shall be the sole responsibility of the holder or user of the product.

SAFETY DATA SHEET

Creation Date 24-Nov-2010 **Revision Date** 24-Dec-2021 **Revision Number** 5

1. Identification

Product Name	**Sodium Persulfate**
Cat No. :	**BP26371, O61141, 06114500**
CAS No	7775-27-1
Synonyms	Sodium peroxydisulfate
Recommended Use	Laboratory chemicals.
Uses advised against	Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Oxidizing solids	Category 3
Acute oral toxicity	Category 4
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Respiratory Sensitization	Category 1
Skin Sensitization	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
May intensify fire; oxidizer

Harmful if swallowed
Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause respiratory irritation

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing should not be allowed out of the workplace
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep/Store away from clothing/ other combustible materials
Take any precaution to avoid mixing with combustibles
Inhalation
If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation or rash occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Sodium persulfate	7775-27-1	>95

4. First-aid measures

General Advice	If symptoms persist, call a physician.
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.
Most important symptoms and effects	May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Flooding quantities of water.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Oxidizing Properties	Oxidizer
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Oxidizer: Contact with combustible/organic material may cause fire. Containers may explode when heated or if contaminated with water. Decomposes violently at elevated temperatures. May ignite combustibles (wood paper, oil, clothing, etc.).

Hazardous Combustion Products
Sulfur oxides.
Sulfur oxides. Oxygen.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	2	2	OX

6. Accidental release measures

Personal Precautions	Use personal protective equipment as required. Ensure adequate ventilation. Avoid dust formation.
Environmental Precautions	Should not be released into the environment.

Methods for Containment and Clean Up Keep in suitable, closed containers for disposal. Sweep up and shovel into suitable containers for disposal. Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Avoid dust formation. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from clothing and other combustible materials.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Do not store near combustible materials. Keep away from acids. Protect from moisture. Incompatible Materials. Strong oxidizing agents. Acids. Strong reducing agents. Combustible material.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Sodium persulfate	TWA: 0.1 mg/m³			TWA: 0.1 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	White
Odor	Odorless
Odor Threshold	No information available
pH	5 - 7 550 g/l H_2O
Melting Point/Range	100 °C / 212 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	2.6
Solubility	Soluble in water

Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	180 °C
Viscosity	Not applicable
Molecular Formula	Na2 O8 S2
Molecular Weight	238.09

10. Stability and reactivity

Reactive Hazard Yes

Stability Oxidizer: Contact with combustible/organic material may cause fire.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation. Exposure to moisture. Combustible material. Exposure to moist air or water.

Incompatible Materials Strong oxidizing agents, Acids, Strong reducing agents, Combustible material

Hazardous Decomposition Products Sulfur oxides, Oxygen

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information
Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium persulfate	LD50 = 895 mg/kg (Rat)	LD50 > 10000 mg/kg (Rabbit)	LC50 > 21.6 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin

Sensitization May cause sensitization by inhalation and skin contact

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium persulfate	7775-27-1	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains. .

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium persulfate	Not listed	LC50: = 771 mg/L, 96h static (Oncorhynchus mykiss) LC50: = 771 mg/L, 96h static (Lepomis macrochirus)	Not listed	EC50: = 133 mg/L, 48h (Daphnia magna)

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT
- **UN-No** UN1505
- **Proper Shipping Name** SODIUM PERSULFATE
- **Hazard Class** 5.1
- **Packing Group** III

TDG
- **UN-No** UN1505
- **Proper Shipping Name** SODIUM PERSULFATE
- **Hazard Class** 5.1
- **Packing Group** III

IATA
- **UN-No** UN1505
- **Proper Shipping Name** SODIUM PERSULPHATE
- **Hazard Class** 5.1
- **Packing Group** III

IMDG/IMO
- **UN-No** UN1505
- **Proper Shipping Name** SODIUM PERSULPHATE
- **Hazard Class** 5.1
- **Packing Group** III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Sodium persulfate	7775-27-1	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Sodium persulfate	7775-27-1	X	-	231-892-1	X	X	X	X	X	KE-12369

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium persulfate	-	X	-	-	-

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Sodium persulfate	7775-27-1	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) -	Seveso III Directive (2012/18/EC) -	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)

		Qualifying Quantities for Major Accident Notification	Qualifying Quantities for Safety Report Requirements		
Sodium persulfate	7775-27-1	Not applicable	Not applicable	Not applicable	Not applicable

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 24-Nov-2010
Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Appendix B

Long-Term Operations, Maintenance & Monitoring Plan (Vapor Mitigation Systems)

Long-Term Operations Maintenance and Monitoring Plan
Priority Residences #4, #5, #14, #22, #29, #31, and #36
Franklin, Johnson County, Indiana

BACKGROUND

Amphenol Corporation (Amphenol) contracted a qualified vapor mitigation contractor [Vapor Intrusion Specialists, LLC (VIS)] to complete the installation of vapor intrusion (VI) mitigation systems beneath Priority Residences (PRs) #4, #5, #14, #22, #29, #31, and #36 to mitigate any potential for vapor intrusion due to chlorinated volatile organic compounds (cVOCs), including tetrachloroethylene (PCE) and trichloroethylene (TCE). Sub-Slab Depressurization Systems (SSDS) were installed beneath the basement slabs of PRs #4, #5, #14, #22, #29, #31, and #36 and Sub-Membrane Depressurization Systems (SMDS) were installed in the partial crawl spaces at PRs #5 and #22. IWM Consulting is providing this document to summarize post-vapor mitigation system installation operations, maintenance, and monitoring (OM&M) requirements.

The vapor mitigation systems were installed on the following dates:

- **PR #4**: October 2018
- **PR #5**: September 2018
- **PR #14**: December 2018
- **PR #22**: December 2018
- **PR #29**: July 2019
- **PR#31**: July 2020
- **PR #36**: January 2019

The following sections provide details regarding diagnostic testing, proposed verification vapor sampling post-installation, and proposed long-term system operations, maintenance, and monitoring activities.

ACTIVE SSDS and SMDS LONG TERM OM&M PLAN

Vapor Monitoring Plans

Before vapor mitigation activities, sub-slab soil gas (SGss) or exterior soil gas (SGe) concentrations ranged widely in the PRs. Before the mitigation activities, SGss or SGe samples exhibited COC concentrations above their corresponding Indiana Department of Environmental Management (IDEM) Remediation Closure Guide (RCG) Calculated SGss or SGe Screening Level (SL) [using an attenuation factor of 0.03 (for SGss) or 0.1 (for SGe) per IDEM Technical Guidance Document *Attenuation Factors* dated September 29, 2016].

- One PR (#5) exhibited an SGss concentration less than two times the corresponding SGss SL.

- Three PRs (#4, #31, and #36) exhibited an SGss concentration greater than two times but less than 10 times the corresponding SGss SL.
- Three PRs (#14, #22, and #29) exhibited an SGss or SGe concentration greater than 10 times the corresponding SGss or SGe SL.
- Three PRs (#14, #22, and #29) exhibited indoor air concentrations greater than RCG Residential Indoor Air (RIA) SLs which appeared to be at least partially originating from beneath the structure itself. However, based on the repair activities completed to each structure's plumbing systems, it is more likely that the indoor air detections were from a combination of sewer gas leaks and potential VI.

Once a vapor mitigation system is installed, diagnostic testing and verification sampling are performed. Diagnostic testing will verify that the mitigation system meets its performance specifications and establish an operational baseline. Additionally, verification sampling will be conducted to show that the mitigation system is operating effectively and reducing IA contaminant concentrations below IA SLs. The first verification sampling event should be conducted a minimum of 30 days after the mitigation system is activated. Regardless of the vapor mitigation technique selected, IA sampling is a necessary line of evidence to confirm the mitigation system is performing as expected. Visual documentation of a sub-slab vacuum pressure differential during the OM&M phase will confirm steady-state operational conditions and provide a line of evidence that the mitigation system continues to prevent VI instead of continued IA testing.

Routine long-term OM&M of the vapor mitigation system is necessary for as long as it is used to interrupt the VI pathway. This OM&M plan has been developed for each PR in which a vapor mitigation system was installed and specifies the requirements for and frequency of vapor mitigation system inspection based on IDEM's *Vapor Remedy Selection and Implementation Draft Interim Guidance Document* dated February 2014 (updated July 2019). This guidance provides the following tables on appropriate mitigation system inspection and IA sampling intervals. However, site-specific data and professional judgment should be used when finalizing the long-term OM&M Plan.

Pre-Mitigation IA Concentration

SGss/SGe Concentration	IA < SL	SL < IA < 2x SL	2x SL < IA < 10x SL	IA > 10x SL
SGss/SGe < SL	None Anticipated	None Anticipated	None Anticipated	None Anticipated
SL < SGss/SGe < 2x SL	None Anticipated	Schedule 1	Schedule 2	Schedule 2
2x SL < SGss/SGe < 10x SL	Schedule 1 or conduct ongoing sampling	Schedule 1	Schedule 2	Schedule 2
SGss/SGe > 10x SL	Schedule 2	Schedule 2	Schedule 2	Schedule 2

Currently, no deviations from the IDEM guidance document have been made. The mitigation monitoring schedules are as follows:

Schedule 1	**Schedule 2**
Annual visual inspection of the building for major renovations	Annual visual inspection of the building for major renovations
Annual visual inspection of the vapor mitigation system, in particular the pressure or manometer gauges, to verify proper operation.	Annual visual inspection of the vapor mitigation system, in particular the pressure or manometer gauges, to verify proper operation.
Annual (winter season) IA sampling events during the 1st, 2nd, and 5th year and every 5th year thereafter **until the VI pathway has been interrupted by another method or the source of the COC concentrations has been remediated**. The IA sampling should occur on the lowest routinely occupied floor to ensure that IA concentrations are below RIA SLs and do not present a health risk.	Annual (winter season) IA sampling events during the 1st, 2nd, and 4th year and every other year thereafter **until the VI pathway has been interrupted by another method or the source of the COC concentrations has been remediated**. The IA sampling should occur on the lowest routinely occupied floor to ensure that IA concentrations are below RIA SLs and do not present a health risk.

Based on pre-mitigation concentrations and the schedules outlined above, IWM Consulting generally followed Schedule 1 or Schedule 2 (as applicable) when pre-emptively implementing the monitoring plans before submission of this Long-Term OM&M Plan. Tables detailing the monitoring schedules are included in the following tables:

Monitoring Schedule 1 Table, Part A

Building Identification	***Verification Sub-Slab Vapor Concentration Post Mitigation System Installation***	***Monitoring Schedule***[Note1]
PR #4, PR #31, and PR #36	Pre-mitigation, since no IA concentrations were detected above RCG RIA SL and the SGss concentrations were greater than two (2) times and less than ten (10) times the corresponding SGss SL, an SSDS was pre-emptively installed at each PR; vapor sampling results post system activation have been below RIA SLs	1

[Note1]: Corresponds to the schedules outlined in *Table 2* and *Table 3* of the *IDEM Vapor Remedy Selection and Implementation Draft Interim Guidance*, dated February 2014 (updated July 2019).

Monitoring Schedule 1 Table, Part B

Task To Be Completed	***Frequency***
Routine visual inspection of the buildings for major renovations	**Annually**
Routine visual inspection of the vapor mitigation system, in particular, the pressure or manometer gauges	**Annually**
Review the indoor air vapor results to document contaminant concentrations over time	Upon receipt of the results for each indoor air vapor sampling event.
Collection of up to three (3) indoor air vapor samples (sub-slab, basement, and duplicate) and one (1) outside ambient air sample for laboratory analysis of select VOCs using Method TO-15	Annually (winter season) for 1st, 2nd, and 5th year. A minimum of 1 sampling event has already occurred for each PR and all indoor air concentrations were < RIA SLs. **Visual inspection of the mitigation systems will continue to be completed on an annual basis but no additional indoor air sampling events are scheduled since post-system startup results confirm that the mitigation systems are operating as designed and active source remediation will be implemented. However, a minimum of one round of verification sampling (~30 days after the system shut down) will be collected after the system is deactivated to confirm that active mitigation is no longer warranted**

Monitoring Schedule 2 Table, Part A

Building Identification	***Verification Sub-Slab Vapor Concentration Post Mitigation System Installation***	***Monitoring Schedule***[Note1]
PR #14, PR #22, and PR #29	Pre-mitigation, since IA concentrations were detected above but less than ten (10) times RCG RIA SLs and the SGss or SGe concentrations were greater than ten (10) times the corresponding SGss or SGe SL, an SSDS or combination SSDS and SMDS were installed at each PR; vapor sampling results post system activation have been below RIA SLs	2

Note1: Corresponds to the schedules outlined in *Table 2* and *Table 3* of the *IDEM Vapor Remedy Selection and Implementation Draft Interim Guidance*, dated February 2014 (updated July 2019).

Monitoring Schedule 2 Table, Part B

Task To Be Completed	***Frequency***
Routine visual inspection of the buildings for major renovations	**Annually**
Routine visual inspection of the vapor mitigation system, in particular, the pressure or manometer gauges	**Annually**
Review the IA results to document contaminant concentrations over time	Upon receipt of the results for each IA sampling event.
Collection of up to four (4) IA and SGss samples [sub-slab, crawlspace (if present), basement, and duplicate] and one (1) outside ambient air sample for laboratory analysis of select VOCs using Method TO-15	Annually (winter season) for 1st, 2nd, and 4th year and every other year thereafter. A minimum of 1 sampling event has already occurred for each PR and all indoor air concentrations were < RIA SLs. **Visual inspection of the mitigation systems will continue to be completed on an annual basis but no additional indoor air sampling events are scheduled since post-system startup results confirm that the mitigation systems are operating as designed and active source remediation will be implemented. However, a minimum of one round of verification sampling (~30 days after the system shut down) will be collected after the system is deactivated to confirm that active mitigation is no longer warranted**

IWM Consulting has performed a minimum of one indoor air verification sampling event at each PR during the winter "worst-case scenario" post-mitigation system startup. The IA and sub-slab samples were and will be obtained as previously approved in the *Residential Vapor Intrusion Investigation Work Plan for Priority Residences* dated September 19, 2019. The SSDS (and SMDS, where present) at each PR remained operational during the sampling activities. No additional vapor sampling events are scheduled to be conducted until confirmation sampling for permanent deactivation of the vapor mitigation systems is completed.

Since the TCE SGss concentration was only slightly above the SGss SL and all IA COC concentrations were below the applicable RIA SLs, no additional monitoring is required for PR #5. However, since an SSDS was installed at this PR, on an annual basis, a visual inspection of the structure will be completed to ensure there have not been any significant changes, such as remodeled areas or additions to the structure. Additionally, a routine inspection of the system will be completed, including a review of the system's differential pressure gauge to verify the system is operating properly.

Vapor Mitigation System Diagnostic Testing and Verification Sampling Activities

All of the PRs with an operating vapor mitigation system have had a minimum of 1 verification sampling event, diagnostic testing/inspection event, and annual inspection. The following table summarizes the system startup and subsequent verification sampling/inspection events.

PR ID	Vapor Mitigation System Start-up Date	Post Vapor Mitigation Startup Inspection/PFE Testing Date	Supplemental Annual Inspections	Post Vapor Mitigation Verification Sampling Date
PR #4	10/10/2018	10/11/2018	12/22/2020; 4/13/2023	2/01/2019; 1/30/2020; 4/14/2023
PR #5	9/28/2018	10/09/2018	12/22/2020; 7/25/2022; 3/21/2023	2/14/2019; 2/21/2020
PR #14	12/12/2018	12/12/2018	12/22/2020; 9/27/2022; 2/20/2023	2/19/2019; 1/10/2020; 2/01/2023
PR #22	12/05/2018	12/05/2018	12/22/2020; 7/26/2022; 2/24/2023	2/19/2019; 1/24/2020; 2/03/2023
PR #29	7/26/2019	7/30/2019	12/21/2020; 7/26/2022; 2/21/2023	1/15/2020; 2/01/2023
PR #31	7/14/2020	7/14/2020	12/22/2020; 7/28/2022; 4/21/2023	2/05/2021
PR #36	1/14/2019	1/14/2019	12/21/2020	3/01/19; 1/24/2020

In addition to the annual inspection dates listed above, the operational status and condition of the mitigation system were noted during each post-vapor mitigation system verification sampling event. Laboratory analytical results of historical VI sampling events at each PR were included in the *Second Supplemental Corrective Measure Study* submitted to the USEPA in March 2022.

System Design

System designs for each PR are described in the *VI System Installation Reports* which were completed by Vapor Intrusion Specialists, LLC (VIS) and have been included as **Appendix A**.

A manual outlining the system specifications will be kept at the IWM Consulting main office.

System Monitoring

- Each PR, except PR #36 (awaiting receipt of an updated access agreement), was recently (1st to 2nd Quarter 2023) equipped with a wireless telemetry system that continuously monitors the operational status and pressure being applied to the SSDS and/or SMDS extraction point manifold and is set up to notify IWM Consulting if any operational failures are experienced. This telemetry system minimizes the possibility of the SSDS and/or SMDS being deactivated for any extended period since the IWM Consulting personnel are notified immediately if there are any SSDS and/or SMDS operational failures.

- An annual SSDS and/or SMDS component monitoring form and SSDS and/or SMDS checklist will be filled out during each inspection by trained IWM Consulting personnel or other personnel designated by the owner. Examples of the SSDS and/or SMDS component monitoring form and the SSDS and/or SMDS checklist to be completed during each visit are included in **Appendix B**.

- The mitigation system troubleshooting form is available onsite for the occupant of each PR and is included in **Appendix C**.

System Maintenance

- IWM Consulting, under contract with the Respondent, will perform OM&M activities on the SSDS and/or SMDS periodically following the proposed monitoring schedule to ensure that all components are functioning properly.

- System repairs will be scheduled on an as-needed basis. If IWM Consulting receives a remote telemetry notification indicating a system failure, then IWM Consulting and/or VIS personnel will mobilize to the PR within 48 business hours (access dependent) to inspect and restart (if possible) the mitigation system and expeditiously work to repair/replace the faulty equipment if necessary.

System Termination

- Upon off-site groundwater results in the vicinity of each of these select PRs reaching corrective action objectives, IWM Consulting will evaluate the possibility of terminating the operation of the active SSDS and/or SMDS and converting the system to a passive configuration (i.e., deactivating fans). As outlined in the *Vapor Remedy Selection and Implementation Draft Interim Guidance Document* created in February 2014 (updated July 2019) by the IDEM, this would include shutting down the active SSDS and/or SMDS and conducting "worst-case scenario" vapor intrusion sampling in the Winter or Summer seasons, no sooner than 30 days following mitigation fan shut-down to allow redevelopment of pre-mitigation conditions. If data indicate all sub-slab and IA sample results are less than the applicable SLs, then the system will remain deactivated. If the sampling event occurred during the winter "worst-case" sampling period, IWM Consulting will notify the USEPA that active vapor mitigation is no longer warranted and no further sampling will occur. However, if the sampling event did not occur during the winter “worse-case” sampling period, one additional sampling event will be conducted during the winter season to confirm the initial sampling results. Again, if the data indicates all sub-slab vapor and indoor air concentrations are less than the applicable SLs, then the USEPA will be notified that the mitigation system will remain deactivated and no additional sampling will be conducted. If the USEPA agrees that active mitigation is no longer warranted, the property owner will be provided an option to operate and maintain the mitigation system at their own cost or IWM Consulting can permanently remove the system components. If the initial post-system deactivation results indicate a sub-slab soil gas or IA concentration greater than the applicable SLs, then the mitigation system may be reactivated or additional sampling may be necessary to further evaluate the potential VI exposure pathway.

Appendix A
VI System Installation Reports

TABLE OF CONTENTS

Prepared for: Bradley E. Gentry
IWM Consulting Group, LLC

Site: Priority Residence #4
Franklin, IN 46131

Table of Contents

INSTALLATION REPORT

November 15, 2018

Bradley E. Gentry, LPG
IWM Consulting Group, LLC
VP/Brownfield Coordinator
7428 Rockville Rd.
Indianapolis, IN 46214

VIS Job No. VI18011.01
Sub-Slab Depressurization System
Priority Residence #4
Franklin, IN 46131

RE: Vapor Mitigation System Installation Report
Sub-Slab Depressurization System Installation
Priority Residence #4
Franklin, IN 46131
October 8th through October 10th 2018

Dear Mr. Gentry,

Vapor Intrusion Specialists, LLC (VIS) is pleased to provide a Vapor Mitigation System Installation Report that summarizes the scope of work performed for Priority Residence #4 located in Franklin, IN (Site). The Scope of work performed at the Site is described in the initial VIS Proposal and specific field activities completed are described below.

Scope of Work:

- VIS installed a sub-slab depressurization system (SSDS) using a RadonAway RP265 fan to create an even distribution of negative pressure underneath the building slab. This was accomplished by one (1) extraction point located in the northeast corner of the basement.
- The SSDS is comprised of the following: 4-inch schedule 40 solid core piping

for the extraction point and vertical exhaust run totaling approximately 25 feet of pipe; the 5-inch cored extraction point was created by removing approximately 5 gallons of substrate material and placed in to a 55-gallon drum labeled “Hazardous material TCE and PCE impacted soil” which is located on the Former Amphenol Facility Property located at 980 Hurricane Road, Franklin, IN; one (1) U-tube manometer, one (1) ball valve and one (1) RadonAway RP265 fan.

- A RadonAway RP265 fan was mounted and installed with a service switch on the northeastern corner of the house and was hardwired by Midwest Electric Company, Inc. (licensed electrician) to the main electrical panel located on the western wall near the washer and dryer in the basement. Midwest Electric also ran a dedicated receptacle for the sump pump.
- The old pedestal sump pump had to be removed in order to completely seal the sump basin. A new 1/3 HP Zoeller sump pump and check valve was installed. A new sump lid was installed with 4” “view port” for future servicing purposes. The sump lid was secured to the concrete using 1- ¾” tapcons and sealed with mold resistant silicone. As a secondary precaution, a Drainjer was also installed in the sump lid in order to deal with any potential basement flooding. As a side note, the HVAC system currently has a slow leak and is flooding the basement floor near the bottom on the staircase landing.
- VIS conducted post installation Pressure Field Extension (PFE) testing utilizing one (1) vapor pin previously installed by IWM Consulting and three (3) previously drilled ½” holes utilized for initial diagnostic testing conducted by VIS. During the final round of post PFE testing the mitigation system was fully calibrated utilizing one (1) ball valve installed on the extraction point, in order to distribute the negative pressure across the entire slab.
- The SSDS was fully operational on October 10, 2018 and the post PFE testing was conducted on 10/11/18. The post PFE testing confirmed that the SSDS was successfully creating a negative pressure beneath the slab of the building.

Please Note:

- A figure depicting the SSDS layout is included as **Figure 1.**
- Photos taken post installation have been included as **Attachment 1.**
- Post PFE results are included as **Attachment 2.**
- VIS's radon mitigation certification is included as **Attachment 3.**
- The VI Mitigation Installation Checklist is included as **Attachment 4.**
- An O&M manual for the mitigation fan is included as **Attachment 5.**
- An estimated annual Operating Costs is included as **Attachment 6.**
- RadonAway RP265 fan warranty is included as **Attachment 7.**
- SDS sheets are included as **Attachment 8.**

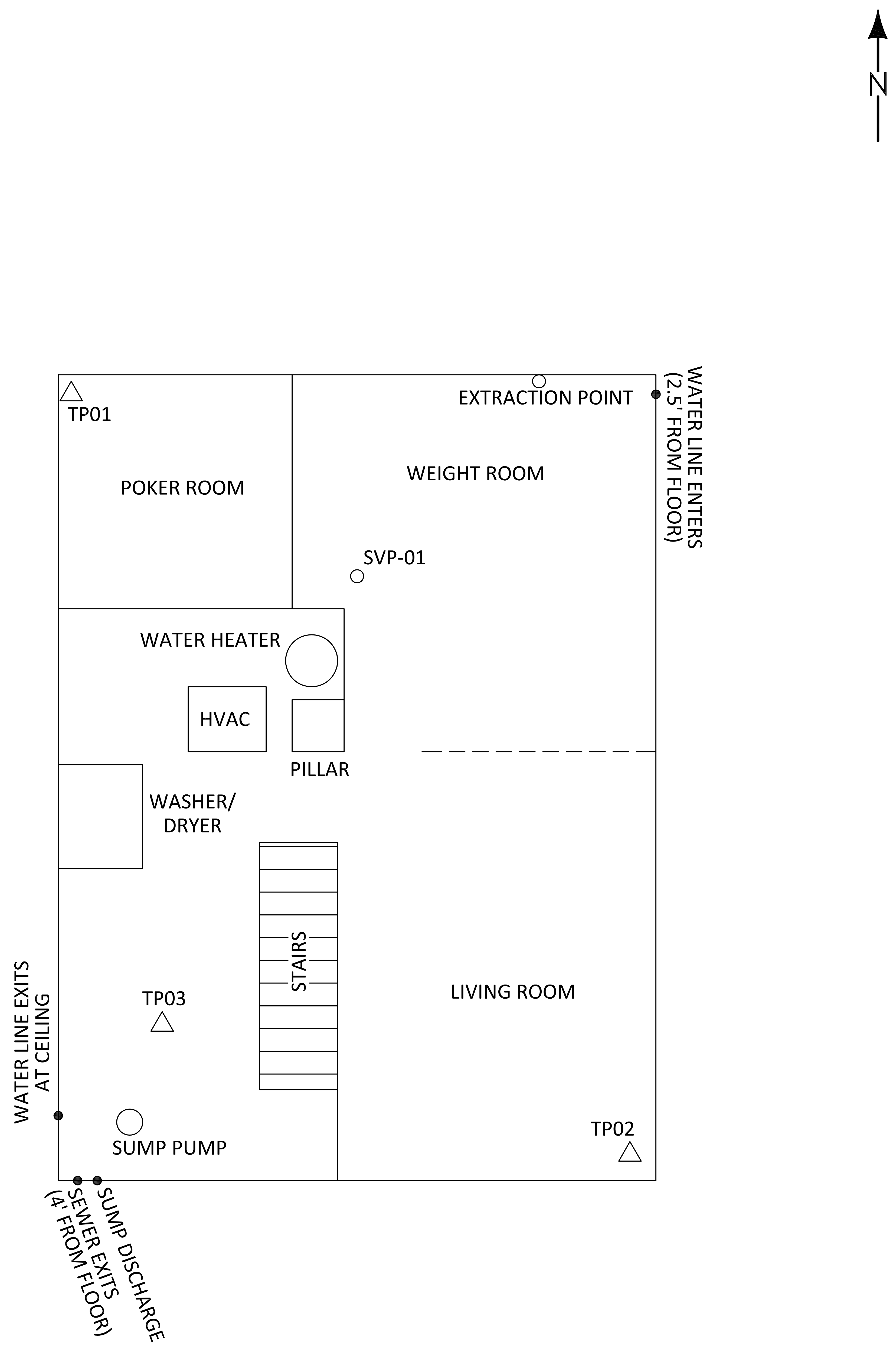
Conclusion:

VIS submits this report as written and visual documentation that the contracted scope of work for the vapor mitigation system, as described in the initial proposal, was successfully completed to the approval of client. After performing our final round of PFE testing, we were able to analyze the data collected in the field. Based off of the negative pressure readings collected, on October 11th, 2018 the SSDS is providing sufficient Radius of Influence (ROI) to depressurize the entire footprint of the homes sub-slab. Please do not hesitate to contact me via email (awatt@vaporintrusion.us) or telephone (812-929-9070) with any questions you might have regarding this report.

Respectfully Submitted,

Alex Watt
Associate Project Manager
Vapor Intrusion Specialists, LLC
7428 Rockville Road
Indianapolis, IN 46214
NRPP Certification: 108383 RMT
Indiana Mitigator License: RTM00783

Figure 1
System Layout



DRAWN BY: C. NEWELL
DATE: 11/15/2018
REVISED: 11/15/2018
HWPA #111291-01
DWG. NO. 111291S1

FIGURE 1
VAPOR MITIGATION SYSTEM
LAYOUT MAP
(PRIORITY RESIDENCE #4)

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

VAPOR INTRUSION SPECIALISTS

Attachment 1
Installation Photographs

SSDS Installation Photographs – Priority Residence #4, Franklin, IN

Photo #1: Extraction point located in the northeast corner of the basement.

Photo #2: Final U-tube reading after system calibration was 2.0” water column

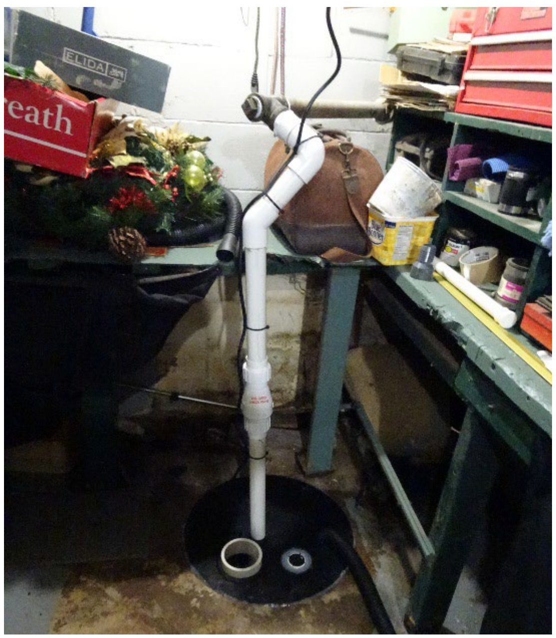


Photo #3: New sump pump and check valve installed. New sealed lid mechanically fastened and equipped with view port and Drainjer.

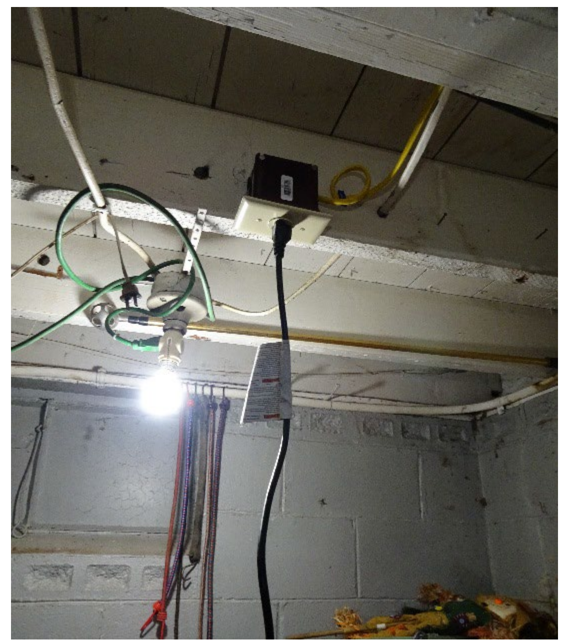


Photo #4: New dedicated receptacle was wired for the sump pump.

SSDS Installation Photographs – Priority Residence #4, Franklin, IN

Photo #5: RP265 was mounted and installed with a service switch on the northeastern corner of the house.

Photo #6: Closeup view of fan, model number, and serial number.

Photo #7: Picture of 4” vertical exhaust stack ran 12 inches above the roof line.

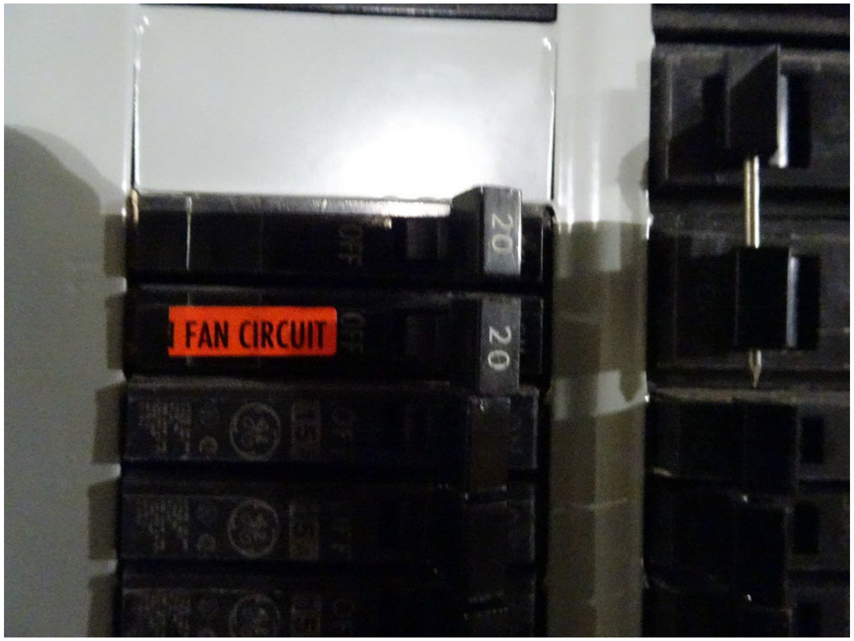


Photo #8: Fan was wire to a dedicated circuit breaker in the main electrical panel.

Attachment 2
Post PFE Results

VAPOR INTRUSION SPECIALISTS
7428 Rockville Road, Indianapolis, Indiana 46214 | cell 812-929-9070

PFE Field Data Sheet

Property Name: Residential house

Property Address: Priority Residence #4, Franklin, IN

PFE Testing Date: 10/11/18

Professional: Alex Watt

Notes: Slab was approximately 4-5" thick and the sub slab material consisted of sand/medium sized rock.

Test Point	(Vacuum Inches of Water)	(Distance from EP-1)
TP01	-0.023	~18'
TP02	-0.020	~30'
TP03	-0.046	~26'
VP	-0.099	~10'

Attachment 3
Mitigation Certifications

NRPP™
NATIONAL RADON PROFICIENCY PROGRAM

Alex Hoskins Watt

Has satisfactorily fulfilled the requirements set forth by the
National Radon Proficiency Program and is therefore certified as a:

Residential Mitigation Provider

NRPP ID 108383 RMT
Expires 12/31/2019

Valid for specific activities or measurement devices, which can be verified with NRPP. State and local agencies may have additional requirements.

NATIONAL RADON PROFICIENCY PROGRAM
AARST

In witness Whereof,
I have subscribed my name as a
Representative of NRPP

Janna Sinclair

Janna Sinclair
NRPP Credentialing Coordinator

Indiana State Department of Health
Lead and Healthy Homes
2 N. Meridian Street, 5J
Indianapolis, Indiana 46204 (317) 234-4423

Radon Mitigator License

Certificate Number	Status	Expire Date
RTM00783	Active	12/31/2018

Alex H. Watt

Jerome M. Adams, MD, MPH
State Health Commissioner
Indiana State Department of Health

STATE FORM 49122 (9-98)

Indiana State Department of Health
Lead and Healthy Homes
2 N. Meridian Street, 5J
Indianapolis, Indiana 46204 (317) 234-4423

Primary Radon Tester License

Certificate Number	Status	Expire Date
RTP00763	Active	12/31/2019

Alex H. Watt

Kristina Box, MD, FACOG
Kristina Box, MD, FACOG
State Health Commissioner
Indiana State Department of Health

STATE FORM 49122 (9-98)

Attachment 4
Checklist

Post Installation Checklist

Client: Brad Gentry

Date: 11/15/18

Site Address: Priority Residence #4, Franklin, IN

System Install Date: 10/08-10/10/18

Site Contact:

Fan Model: RP265

Piping	Yes	No	N/A
Are all system pipes Schedule 40 solid core PVC?	X		
Are all extraction point locations permanently sealed?	X		
Does any system piping obstruct windows, doors or service access points?		X	
Are all horizontal pipe runs supported at least every 6 feet?	X		
Are all vertical pipes supported at least every 8 feet?	X		
Do horizontal runs slope towards extraction pits for drainage?	X		
Were permanent test ports installed on the exhaust stack(s)?		X	
Was a varmint guard installed on the exhaust stack(s)?		X	
If the exhaust stack penetrates the roof, was it sealed by a licensed roofer? If so, who?			X

Fans	Yes	No	N/A
Was the fan mounted/ installed level?	X		
Was the fan installed with a condensate by-pass?	X		
Was the fan installed with flexible Fernco fittings for vibration reduction?	X		
Is the exhaust stack at least 10 feet above grade, 10 feet from any doors, windows, or air intakes and at least 2 feet above the top of any openings to a conditioned space?	X		
Was the fan mounted in the attic space of a building?		X	
Was the fan mounted on the exterior of a building? If so, where? (NE *corner*)	X		

Make/ Model of Fan(s)   RadonAway RP265

Post Installation Checklist

Vapor Barrier	Yes	No	N/A
Are the crawl space(s) free of debris?			X
Has a Sub-membrane depressurization system been installed?			X
Was a minimum of 6 mil or thicker membrane used in system installation?			X
Were heavy traffic areas reinforced with extra material/ membrane?			X
Were all membrane seams overlapped a minimum of 12 inches and sealed properly?			X
Was the vapor barrier secured/ anchored to the wall using double sided tape and polyurethane caulk?			X
Was the vapor barrier secured/ anchored to the wall using termination bars/ wooden furring strips and polyurethane caulk?			X
Has a 3" or 4" perforated pipe been installed underneath the vapor barrier?			X
Are all utility entry or exit points, foundation or other penetrations sealed properly?			X

Electrical	Yes	No	N/A
Has the electrical work been performed by a licensed electrician? If so, who? *Midwest Electric Company, Inc.*	X		
Is the fans outside service switch mounted in a weather tight enclosure?	X		
In the panel, is the mitigation system clearly marked/ labeled and visible from at least three feet away?	X		
Has a run-time meter been installed, and been installed in a weather tight enclosure?		X	
Has a KW meter been installed?		X	
Was the fan installed with a power cord no longer than 6 feet next to a non- GFCI receptacle?			X

Post Installation Checklist

Labels and System Monitors	Yes	No	N/A
Were the extraction point(s) installed with a U-tube/ Magnehelic gauge? If so, which? *U-tube*	X		
Was there a Vacuum/ Audible alarm installed in case of system failure?		X	
Are system pipes, membranes and sump pump lids clearly labeled and easily identifiable?	X		
Was there a system label installed with company contact information in case of emergency?		X	

Sump Pit	Yes	No	N/A
Is there a sump pit(s) located in the building? If so, where? *Southwest corner*	X		
Does the sump have an adequate cover installed, and is it properly anchored and sealed?	X		
Are all penetrations in sump lid properly sealed?	X		
Has the sump pit been used as an extraction point?		X	
Does the sump lid have a view port for observation and maintenance purposes?	X		

Testing	Yes	No	N/A
Was Diagnostic testing performed before system install?	X		
Was Post Diagnostic testing performed to confirm system performance?	X		

Reporting	Yes	No	N/A
Has an as built drawing been completed showing system layout?	X		
Have all test point(s) and extraction point(s) locations and data been inserted in to system drawing?	X		
Has the system install been documented with photographs?	X		

Post Installation Checklist

Field Notes

Basement slab thickness ranged between 4 and 5-inches. The HVAC system has a current slow leak and is flooding part of the basement floor near the staircase. Replaced sump pump and then installed and sealed/secured a new sump lid with associated view port.

Technician's signature:

Alex Watt
____

Attachment 5

Vapor Mitigation System Operation and Maintenance

We advise consultants, maintenance personnel or property owners to conduct routine visual inspections of all SSDS/SMDS to verify that system components are operating properly. The inspection should include but not limited to the following:

- Observe the magnehelic gauges for pressure indication; a pressure of “0.0” indicates that there is a problem with system piping or fan operations.
- Observe the mitigation fan(s) and note any abnormal sounds or noises coming from the fan including buzzing, scraping, rattling, or etc. If any abnormal noises or sounds are audible, contact VIS.
- Most mitigation fans are factory sealed and designed to be maintenance free for the life of the fan.
- Should the fans’ casing be opened or the factory seal broken, any service warranty may be voided.
- Factory maintenance documentation has been provided to consultant with recommended schedule for maintenance of fans if required.
- Inspect the PVC piping of the system for damage or cracks. If any damage occurs to the PVC piping, contact VIS piping supports and hangers should also be inspected for wear and integrity.
- Roof penetrations for system exhaust piping should be inspected to assure no moisture or other intrusion is apparent.
- Any significant changes to building or structure can and may affect system performance. VIS should be advised of planned changes beforehand to avoid any possible performance issues or system failure.

Contact VIS for additional service & Maintenance should any occasion arise that may cause concern that the SSDS or SMDS is not functioning properly as vapor intrusion may no longer be mitigated to meet performance criteria to which VIS completed mitigation.

Attachment 6
Annual Operating Costs

RadonAway	kWh	Estimated Cost Per Year
RP265	.09 cent per	$90.00

Attachment 7
Fan Warranty

The world's leading radon fan manufacturer

RP, GP, XP Pro Series Installation Instructions

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** For General Ventilating Use Only. Do Not Use to Exhaust Hazardous, Corrosive or Explosive Materials, Gases or Vapors. See Vapor Intrusion Application Note #AN001 for important information on VI Applications. RadonAway.com/vapor-intrusion

2. **NOTE:** Fan is suitable for use with solid state speed controls; however, use of speed controls is not generally recommended.

2. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.

3. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.

4. **NOTICE!** There are no user serviceable parts located inside the fan unit.
Do NOT attempt to open. Return unit to the factory. (See Warranty, p. 8, for details.)

5. **WARNING!** Do not leave fan unit installed on system piping without electrical power for more than 48 hours. Fan failure could result from this non-operational storage.

6. **WARNING!** TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

   a) Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer. (See p. 8.)

   b) Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.

   c) Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire rated construction.

   d) Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent backdrafting. Follow the heating equipment manufacturers' guidelines and safety standards such as those published by any National Fire Protection Association, and the American Society for Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), and the local code authorities.

   e) When cutting or drilling into a wall or ceiling, do not damage electrical wiring and other hidden utilities.

   f) Ducted fans must always be vented to outdoors.

   g) If this unit is to be installed over a tub or shower, it must be marked as appropriate for the application and be connected to a GFCI (Ground Fault Circuit Interrupter) protected branch circuit.

RadonAway

RP Series	GP Series	XP Series
RP140 | P/N 28460	GP201 | P/N 28465	XP151 | P/N 28469
RP145 | P/N 28461	GP301 | P/N 28466	XP201 | P/N 28470
RP260 | P/N 28462	GP401 | P/N 28467	
RP265 | P/N 28463	GP501 | P/N 28468	
RP380 | P/N 28464		

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The RP, GP and XP Series Radon Fans are intended for use by trained, professional, certified/licensed radon mitigators. The purpose of these instructions is to provide additional guidance for the most effective use of RP, GP and XP Series Fans. These instructions should be considered supplemental to EPA/radon industry standard practices, state and local building codes and regulations. In the event of a conflict, those codes, practices and regulations take precedence over these instructions.

1.2 FAN SEALING

The RP, GP and XP Series Fans are factory sealed; no additional caulk or other materials are required to inhibit air leakage.

1.3 ENVIRONMENTALS

The RP, GP and XP Series Fans are designed to perform year-round in all but the harshest climates without additional concern for temperature or weather. For installations in an area of severe cold weather, please contact RadonAway for assistance. When not in operation, the fan should be stored in an area where the temperature is never less than 32 degrees F or more than 100 degrees F.

1.4 ACOUSTICS

The RP, GP and XP Series Fans, when installed properly, operate with little or no noticeable noise to the building occupants. The velocity of the outgoing air should be considered in the overall system design. In some cases the “rushing” sound of the outlet air may be disturbing. In these instances, the use of a RadonAway Exhaust Muffler is recommended.

(To ensure quiet operation of inline and remote fans, each fan shall be installed using sound attenuation techniques appropriate for the installation. For bathroom and general ventilation applications, at least 8 feet of insulated flexible duct shall be installed between the exhaust or supply grille(s) and the fan(s). RP, GP and XP Series Fans are not suitable for kitchen range hood remote ventilation applications.)

1.5 GROUND WATER

In the event that a temporary high water table results in water at or above slab level, water may be drawn into the riser pipes, thus blocking air flow to the RP, GP and XP Series Fan. The lack of cooling air may result in the fan cycling on and off as the internal temperature rises above the thermal cutoff. Should this condition arise, it is recommended that the fan be turned off until the water recedes, allowing for return to normal operation.

1.6 SLAB COVERAGE

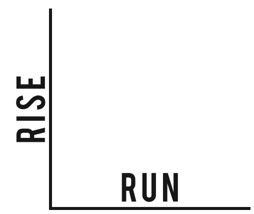
The RP, GP and XP Series Fans can provide coverage up to 2000+ sq. ft. per slab penetration. This will primarily depend on the sub-slab material in any particular installation. In general, the tighter the material, the smaller the area covered per penetration. Appropriate selection of the RP, GP and XP Series Fan best suited for the sub-slab material can improve the slab coverage. The RP, GP and XP Series have a wide range of models to choose from to cover a wide range of sub-slab materials. The RP140 and 145 are best suited for general purpose use. The RP 260 can be used where additional airflow is required, and the RP265 and RP 380 are best suited for large slab, high airflow applications. Additional suction points can be added as required. It is recommended that a small pit (5 to 10 gallons in size) be created below the slab at each suction hole.

1.7 CONDENSATION & DRAINAGE

Condensation is formed in the piping of a mitigation system when the air in the piping is chilled below its dew point. This can occur at points where the system piping goes through unheated space such as an attic, garage or outside. The system design must provide a means for water to drain back to a slab hole to remove the condensation. The RP, GP and XP Series Fan MUST be mounted vertically plumb and level, with the outlet pointing up for proper drainage through the fan. Avoid mounting the fan in any orientation that will allow water to accumulate inside the fan housing. The RP, GP and XP Series Fans are NOT suitable for underground burial.

For RP, GP and XP Series Fan piping, the following table provides the minimum recommended pipe diameter and pitch under several system conditions.

Pipe Diameter	Minimum Rise per Ft of Run*		
	@25 CFM	@50 CFM	@100 CFM
4”	1/8”	1/4”	3/8”
3”	1/4”	3/8”	1 1/2”



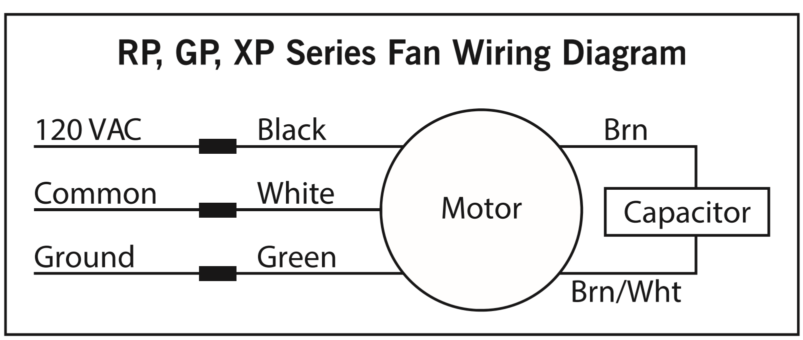
See p. 7 for detailed specifications.

1.8 SYSTEM MONITOR & LABEL

A System Monitor, such as a manometer (P/N 50017) or audible alarm (P/N 28001-2, 28001-4 or 28421), is required to notify the occupants of a fan system malfunction. A System Label (provided with Manometer P/N 50017) with instructions for contacting the installing contractor for service and identifying the necessity for regular radon tests to be conducted by the building occupants must be conspicuously placed in a location where the occupants frequent and can see the label.

1.9 ELECTRICAL WIRING

The RP, GP and XP Series Fans operate on standard 120V, 60Hz AC. All wiring must be performed in accordance with National Fire Protection (NFPA) National Electrical Code, Standard #70, current edition, for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a UL Listed watertight conduit. Ensure that all exterior electrical boxes are outdoor rated and properly sealed to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.



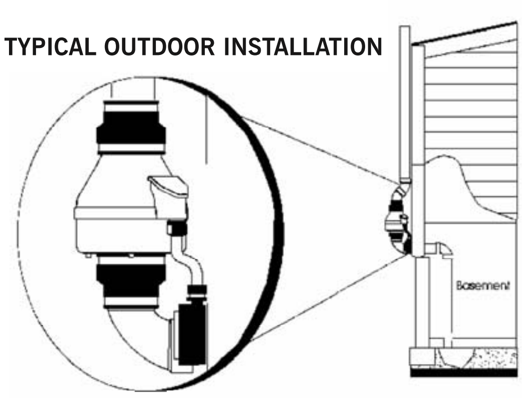
1.10 SPEED CONTROLS

The RP, GP and XP Series Fans are rated for use with electronic speed controls; however, speed controls are generally not recommended. If used, the recommended speed control is Pass & Seymour Solid State Speed Control (Cat. No. 94601-1).

2.0 INSTALLATION

The RP, GP and XP Series Fans can be mounted indoors or outdoors. (It is suggested that EPA and radon mitigation standards recommendations be followed in choosing the fan location.) The GP fans have an integrated mounting bracket; RP and XP Series Fans may be mounted directly on the system piping or fastened to a supporting structure by means of an optional mounting bracket.
The ducting from the fan to the outside of the building has a strong effect on noise and fan energy use. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated airflow.

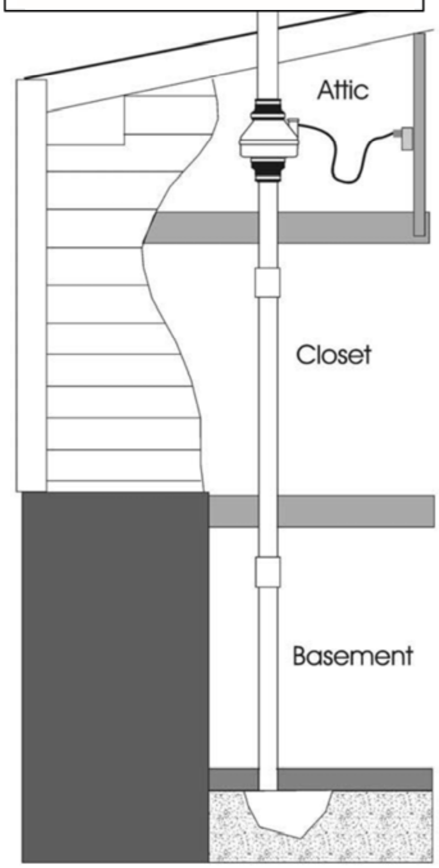
TYPICAL OUTDOOR INSTALLATION



2.1 MOUNTING

Mount the RP, GP and XP Series Fan vertically with outlet up. Insure the unit is plumb and level. When mounting directly on the system piping assure that the fan does not contact any building surface to avoid vibration noise.

TYPICAL INDOOR INSTALLATION



2.2 MOUNTING BRACKET (optional)

The RP and XP Series Fans may be optionally secured with the RadonAway P/N 25007 mounting bracket. Foam or rubber grommets may also be used between the bracket and mounting surface for vibration isolation.

2.3 SYSTEM PIPING

Complete piping run, using flexible couplings as a means of disconnect for servicing the unit and for vibration isolation. As the fan is typically outside of the building thermal boundary and is venting to the outside, installation of insulation around the fan is not required.

2.4 ELECTRICAL CONNECTION

Connect wiring with wire nuts provided, observing proper connections (See Section 1.9). Note that the fan is not intended for connection to rigid metal conduit.

2.5 VENT MUFFLER (optional)

Install the muffler assembly in the selected location in the outlet ducting. Solvent weld all connections. The muffler is normally installed at the end of the vent pipe.

2.6 OPERATION CHECKS & ANNUAL SYSTEM MAINTENANCE

______ **Verify** all connections are tight and **leak-free**.

______ **Ensure** the RP, GP and XP Series Fan and all ducting are **secure and vibration-free**.

______ **Verify system vacuum pressure** with manometer. **Insure** vacuum pressure is within normal operating range and **less than** the maximum recommended operating pressure.
(Based on sea-level operation, at higher altitudes reduce by about 4% per 1000 feet)
(Further reduce Maximum Operating Pressure by 10% for High Temperature environments.)
See Product Specifications. If this is exceeded, increase the number of suction points.

______ **Verify Radon levels** by testing to EPA Protocol and applicable testing standards.

THE FOLLOWING CHARTS SHOW THE PERFORMANCE OF THE RP, GP and XP SERIES FANS

RP Series Product Specifications

Typical CFM Vs. Static Pressure "WC									
Model	0"	.25"	.5"	.75"	1.0"	1.25"	1.5"	1.75"	2.0"
RP140	135	103	70	14	-	-	-	-	
RP145	166	146	126	104	82	61	41	21	3
RP260	251	209	157	117	70	26	-	-	-
RP265	375	330	282	238	204	170	140	108	70
RP380	531	490	415	340	268	200	139	84	41

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
RP140	15 - 21 watts	0.7" WC
RP145	41 - 72 watts	1.7" WC
RP260	47-65 watts	1.3" WC
RP265	95 - 139 watts	2.3" WC
RP380	96 - 138 watts	2.0" WC

**Reduce by 10% for High Temperature Operation **Reduce by 4% per 1000 ft. of altitude.*

Model	Size	Weight	Inlet/Outlet	L.2
RP140	8.5"H x 9.7" Dia.	5.5 lbs	4.5"OD (4.0" PVC Sched 40 size compatible)	25
RP145	8.5"H x 9.7" Dia.	5.5 lbs	4,5" OD	15
RP260	8.6"H x 11.75" Dia.	5.5 lbs	6.0" OD	48
RP265	8.6"H x 11.75" Dia.	6.5 lbs	6.0" OD	30
RP380	10.53"H x 13.41" Dia.	11.5 lbs	8.0" OD	57

L.2 = Estimated Equivalent Length of Rigid Metal Ducting resulting in .2" WC pressure loss for Duct Size listed. Longer Equivalent Lengths can be accommodated at Flows Lower than that at .2" WC pressure loss (see CFM Vs Static Pressure "WC Table).

XP Series Product Specifications

Typical CFM Vs. Static Pressure "WC						
	0"	.5"	1.0"	1.5"	1.75"	2.0"
XP151	150	115	69	-	-	-
XP201	112	95	70	40	-	-

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
XP151	45 - 60 watts	1.3" WC
XP201	45 - 66 watts	1.7" WC

**Reduce by 10% for High Temperature Operation **Reduce by 4% per 1000 ft. of altitude.*

Model	Size	Weight	Inlet/Outlet
XP151	9.5"H x 8.5" Dia.	6 lbs	4.5"OD (4.0" PVC Sched 40 size compatible)
XP201	9.5"H x 8.5" Dia.	6 lbs	4.5" OD

GP Series Product Specifications

Typical CFM Vs. Static Pressure "WC							
	1.0"	1.5"	2.0"	2.5"	3.0"	3.5"	4.0"
GP201	54	42	11	-	-	-	-
GP301	64	54	41	4	-	-	-
GP401	-	61	52	44	22	-	-
GP501	-	-	66	58	50	27	4

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
GP201	31-65 watts	1.8" WC
GP301	56-100 watts	2.3" WC
GP401	62-128 watts	3.0" WC
GP501	68 - 146 watts	3.8" WC

**Reduce by 10% for High Temperature Operation **Reduce by 4% per 1000 ft. of altitude.*

Model	Size	Weight	Inlet/Outlet
GP201	13"H x 12.5" Dia.	12 lbs	3.5"OD (3.0" PVC Sched 40 size compatible)
GP301	13"H x 12.5" Dia.	12 lbs	3.5" OD
GP401	13"H x 12.5" Dia.	12 lbs	3.5" OD
GP501	13"H x 12.5" Dia.	12 lbs	3.5" OD

RP, XP and GP Series Additional Specifications

Model	Recommended Duct	PVC Pipe Mounting	Thermal Cutout	Insulation Class
RP140	3" or 4" Schedule 20/40 PVC	Mount on the duct pipe or with optional mounting bracket. For Ventilation: 4", 6" or 8" Rigid or Flexible Ducting.	130°C/266°F	Class B Insulation
RP145			130°C/266°F	Class F Insulation
RP260			150°C/302°F	
RP265			150°C/302°F	
RP380	6" Schedule 20/40 PVC Pipe		150°C/302°F	
XP151	3" or 4" Schedule 20/40 PVC	Fan may be mounted on the duct pipe or with integral flanges.	120°C/248°F	Class B Insulation
XP201				
GP201	3" or 4" Schedule 20/40 PVC	Fan may be mounted on the duct pipe or with integral flanges.	120°C/248°F	Class B Insulation
GP301				
GP401				
GP501				

Continuous Duty
3000 RPM
Thermally Protected
RP, GP Residential and Commercial
XP Residential Only
Rated for Indoor or Outdoor Use

LISTED
Electric Fan

Intertek
77728

Conforms to
UL STD. 507
Certified to
CAN/CSA STD.
C22.2 No.113

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the RadonAway® RP, GP and XP Series Fan for shipping damage within 15 days of receipt. **Notify RadonAway of any damages immediately.** RadonAway is not responsible for damages incurred during shipping. However, for your benefit, RadonAway does insure shipments.

There are no user serviceable parts inside the fan. **Do not attempt to open the housing.** Return unit to factory. (See Warranty below).

Install the RP, GP and XP Series Fan in accordance with all EPA, ANSI/AARST standard practices, and state and local building codes and regulations.

Provide a copy of this instruction or comparable radon system and testing information to the building occupants after completing system installation.

Warranty

RadonAway® warrants that the RP, GP (excluding GP500) and XP Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of 12 months from the date of purchase or 18 months from the date of manufacture, whichever is sooner (the "Warranty Term").

RadonAway® will replace any fan which fails due to defects in materials or workmanship during the Warranty Term. This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not cover damage in shipment unless the damage is due to the negligence of RadonAway®.

The Fan must be returned (at Owner's cost) to the RadonAway® factory. Any Fan returned to the factory will be discarded unless the Owner provides specific instructions along with the Fan when it is returned regardless of whether or not the Fan is actually replaced under this warranty. Proof of purchase must be supplied upon request for service under this Warranty.

5-YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway® will extend the Warranty Term of the fan to 60 months (5 years) from date of purchase or 66 months from date of manufacture, whichever is sooner, provided that the fan is installed by a professional radon mitigation contractor. Proof of purchase and/or proof of professional installation may be required for service under this warranty. No extended warranty is offered outside the Continental United States and Canada beyond the standard 12 months from the date of purchase or18 months from the date of manufacture, whichever is sooner.

RadonAway® is not responsible for installation, removal or delivery costs associated with this Warranty.

LIMITATION OF WARRANTY

EXCEPT AS STATED ABOVE, THE RP, GP (excluding GP500) and XP SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULARPURPOSE.

IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping costs, including insurance, to and from factory.

RadonAway® 3 Saber Way
Ward Hill, MA 01835 USA TEL (978) 521-3703
FAX (978) 521-3964
Email to: Returns@RadonAway.com

Record the following information for your records:

Serial Number: ______________________ Purchase Date: ______________

Attachment 8
SDS Sheets

MATERIAL SAFETY DATA SHEET

1) PRODUCT AND COMPANY IDENTIFICATION

THE DOW CHEMICAL COMPANY
Midland Michigan 48674
USA

24-Hour Emergency Phone Number: 989-636-4400
Customer Service: 800-366-4740

PRODUCT NAME : GREAT STUFF* Gaps and Cracks
MATERIAL TYPE : One component system
ISSUE DATE : 04/26/2007
REVISION DATE : 01/25/2007

2) COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS Number	%
Prepolymer of MDI and Polyether polyol	mixture	40-70, 60-100%
Polymethylene polyphenyl Isocyanate containing approx. 40-50% MDI (4,4'methylene bisphenyl isocyanate) CAS# 101-68-8	9016-87-9	5-10,10-30%
Liquified Petroleum Mixture containing Isobutane (CAS#75-28-5), propane (CAS# 74-98-6) and dimethyl ether (CAS# 115-10-6)	mixture	10-30%

3) HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Sprayed or heated material harmful if inhaled. May cause allergic skin reaction. May cause allergic respiratory reaction and lung injury. Avoid temperatures above 105F (41C). Toxic flammable gases and heat are released under decomposition conditions. Toxic fumes may be released in fire situations. Reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this process.

EYE

May cause moderate eye irritation. May cause very slight transient (temporary) corneal injury.

SKIN

Prolonged or repeated exposure may cause slight skin irritation. May cause allergic skin reaction in susceptible individuals. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization. May stain skin. A single prolonged exposure is not likely to result in the material being absorbed in harmful amounts.

INGESTION

Single dose oral toxicity is considered to be low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.

INHALATION

At room temperature, vapors are minimal due to low vapor pressure. However, certain operations may generate vapor or aerosol concentrations sufficient to cause irritation or other adverse effects. Such operations include those in which the material is heated, sprayed or otherwise mechanically dispersed such as drumming, venting or

MATERIAL SAFETY DATA SHEET

pumping. Excessive exposure may cause irritation to upper respiratory tract and lungs, and pulmonary edema (fluid in the lungs). May cause respiratory sensitization in susceptible individuals. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Effects may be delayed. Decreased lung function has been associated with overexposure to isocyanates.

SYSTEMIC EFFECTS
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

TERATOLOGY
In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother.

CANCER INFORMATION
Lung tumors have been observed in laboratory animals exposed to aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

4) FIRST-AID MEASURES

EYE
Irrigate with flowing water immediately and continuously for 15 minutes. Remove contacts after first five minutes and continue washing. Consult medical personnel.

SKIN
Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. An MDI skin decontamination study demonstrated that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water.

INGESTION
If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

INHALATION
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN
No specific antidote. Provide supportive care. Treatment based on judgment of the physician in response to reactions of the patient. May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants, and antitussives may be of help. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed for 24-48 hours for signs of respiratory distress.

5) FIRE-FIGHTING MEASURES

FLAMMABLE PROPERTIES
Flash point: -156F, -104C

Method: Estimated

HAZARDOUS COMBUSTION PRODUCTS
During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include but are not limited to: nitrogen oxides, isocyanates, hydrogen cyanide, carbon monoxide, and carbon dioxide.

MATERIAL SAFETY DATA SHEET

OTHER FLAMMABILITY INFORMATION
Product reacts with water. Reaction may produce heat and/or gases. Reaction may be violent. Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is produced when product burns. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the atoignition temperatures possibly resulting in spontaneous combustion.

EXTINGUISHING MEDIA
Use carbon dioxide, dry chemical, foam, water fog or fine spray. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effective. Do not use direct water stream which can spread fire.

FIRE FIGHTING INSTRUCTIONS
Keep people away. Isolate fire area and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water is not recommended but may be applied in very large quantities as a fine spray when other extinguishing agents are not available. Contain fire water run-off if possible. Do not use direct water stream. May spread fire. Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Use water spray to cool fire exposed containers and fire affected zone until fire is out. Immediately withdraw all personnel from area in case of rising sound from venting safety devices or discoloration of the containers. Move containers from fire area if this is possible without hazard.

PROTECTIVE EQUIPMENT - FIRE FIGHTERS
Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant clothing with SCBA. If his will not provide sufficient fire protection; consider fighting fire from a remote location.

6) ACCIDENTAL RELEASE MEASURES

PROTECT PEOPLE
Avoid any contact. Barricade area. Clear non-emergency personnel from area. Keep upwind of spill. Ventilate area of leak or spill. The area must be evacuated and reentered by persons equipped for decontamination. Use appropriate safety equipment. If available, use foam to suppress vapors.

PROTECT THE ENVIRONMENT
Contain liquid to prevent contamination of soil, surface water or ground water. Keep out of ditches, sewers, and water supplies. Should the product enter sewers or drains, it should be pumped into a covered, vented container; the cover should be placed loosely on the container but not made pressure tight. Move to a well-ventilated area. Emergency services may need to be called to assist in the cleanup operation.

CLEAN-UP
Supplies of suitable decontaminant should always be kept available. Absorb with material such as: sawdust, vermiculite, dirt, sand, clay, cob grit, Milsorb. Avoid materials such as cement powder. Collect material in suitable and properly labeled OPEN containers. Do not place in sealed container. Prolonged contact with water results in a chemical reaction which may result in rupture of the container. Place in: polylined fiber pacs, plastic drums, or properly labeled metal containers. Remove to a well ventilated area. Clean up floor areas. Attempt to neutralize by suitable decontaminant solution: Formulation 1: sodium carbonate 5-10%; liquid detergent 0.2-2%; water to make up to 100%. OR Formulation 2: Concentrated ammonia solution 3-8%; liquid detergent 0.2-2%; water to make up to 100%. If ammonia is used, use good ventilation to prevent vapor exposure. If you have any questions on how to neutralize call The Dow Chemical

Company.

7) HANDLING AND STORAGE

HANDLING

Avoid contact of this product with water at all times during handling and storage. Use only with adequate ventilation. Keep equipment clean. Use disposable containers and tools where possible. Do not eat, drink, or smoke in working area.

STORAGE

Store in a dry place. The recommended storage temperature is between 32 - 90F (0-32C). Keep containers tightly closed when not in use. Protect containers from physical abuse. Avoid direct sunlight. DO NOT incinerate aerosol can.

8) EXPOSURE CONTROL/PERSONAL PROTECTION

ENGINEERING CONTROLS

Use only with adequate ventilation. Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and the people working at this point. Odor is inadequate warning of excessive exposure.

EYE/FACE PROTECTION

Use chemical goggles.

SKIN PROTECTION

Use protective clothing impervious to this material. Selection of specific items such as faceshield, gloves, boots, apron, or full-body suit will depend on operation. Consideration of all chemicals involved, time and the dexterity needed to safely complete the job must be considered. Solvents can significantly change the permeation of a chemical through a barrier. Work with your safety equipment supplier to obtain the best Personal Protective Equipment for the job. Nitrile gloves are often found to be appropriate for work with MDI. Butyl rubber, PVC and neoprene are also often chosen.

Remove contaminated clothing immediately, wash skin area with soap and water (warm water if available) and launder clothing before reuse. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and destroyed.

RESPIRATORY PROTECTION

Atmospheric levels should be maintained below the exposure guideline. When atmospheric levels may exceed the exposure guideline, use an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive-pressure air-supplying respirator (airline or self-contained breathing apparatus). For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus.

EXPOSURE GUIDELINES(S)

Methylene bisphenyl isocyanate (MDI): ACGIH TLV is 0.005 ppm TWA and OSHA PEL is 0.02 ppm Ceiling. PELs are in accord with those recommended by OSHA, as in the 1989 revision of PELs.

Isobutane: ACGIH TLV and OSHA PEL are 800 ppm.

Propane: ACGIH TLV is 2500 ppm TWA and OSHA PEL is 1000 ppm.

Dimethyl ether: ACGIH TLV is 1000 ppm TWA.

9) PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE

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liquid

VAPOR PRESSURE
4210 mm Hg at 21C/70F

SPECIFIC GRAVITY
1.1

10) STABILITY AND REACTIVITY

CHEMICAL STABILITY
Stable under recommended storage conditions.

CONDITIONS TO AVOID
Avoid temperatures above 120F, 49C. Avoid temperatures below 32F, 0C. Can react with itself at temperatures above 320F, 160C. Product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Pressure build-up can be rapid. Avoid moisture. Material reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this reaction.

INCOMPATIBILITY WITH OTHER MATERIALS
Avoid contact with acids, water, alcohols, amines, ammonia, bases, moist air, and strong oxidizers. Avoid contact with metals such as aluminum, brass, copper, galvanized metals, tin, zinc. Avoid contact with moist organic absorbents. Reaction with water will generate carbon dioxide and heat. Generation of gas can cause pressure buildup in closed systems. Avoid unintended contact with polyols. The reaction of polyols and isocyanates generate heat. Diisocyanates react with many materials and the rate of reaction increases with temperature as well as increased contact; these reactions can become violent. Contact is increased by stirring or if the other material mixes with the diisocyanate. Diisocyanates are not soluble in water and are denser than water and sink to the bottom, but react slowly at the interface. The reaction forms carbon dioxide gas and a layer of solid polyurea.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Gases are released during decomposition.

HAZARDOUS POLYMERIZATION
Can occur. Polymerization can be catalyzed by: strong bases and water. Can react with itself at temperatures above 320F (160C).

11) TOXICOLOGICAL INFORMATION

SKIN
MDI: The LD50 for skin absorption in rabbits is > 2000 mg/kg.

INGESTION
MDI: The oral LD50 for rats is > 10,000 mg/kg.

MUTAGENICITY
MDI: Mutagenicity data on MDI are inconclusive. MDI was weakly positive in some in-vitro (test tube) studies;

other in-vitro studies were negative. A mutagenicity study in animals was negative.

Dimethyl ether: In vitro mutagenicity studies were positive. Animal mutagenicity studies were negative in some cases and positive in others.

12) ECOLOGICAL INFORMATION

MOVEMENT & PARTITIONING
Based on information for MDI and polymeric MDI. In the aquatic or terrestrial

MATERIAL SAFETY DATA SHEET

environment, movement is expected to be limited by its reactivity with water forming predominantly insoluble polyureas.

DEGRADATION & PERSISTENCE
Based on information for MDI and polymeric MDI. In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.

ECOTOXICITY
Based on information for MDI and polymerc MDI. The measured ecotoxicity is that of the hydrolzed product, generally under conditions maximizing production of soluble species. Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 > 100 mg/L in most sensitive species). The LC50 in earthworm Eisenia foetida is > 1000 mg/kg.

13) DISPOSAL CONSIDERATIONS

DISPOSAL CONSIDERATIONS
FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

As a service to its customers, Dow can provide names of information resource to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 989-832-1556 for further details.

DISPOSAL
DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

14) TRANSPORT INFORMATION

US D.O.T.
Consumer Commodity ORM-D

15) REGULATORY INFORMATION

NOTICE
The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, expressed or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

REGULATORY INFORMATION
U.S. REGULATIONS

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SARA 313 INFORMATION: This product contains the following subject to the reporting

MATERIAL SAFETY DATA SHEET

requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME CAS NUMBER

-- -----------

Polymeric Diphenylmethane diisocyanate, CAS#9016-87-9

4,4'' Methylene bisphenol isocyanate, CAS# 101-68-8

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

PMDI/MDI: immediate and delayed health hazard

Isobutane/propane: fire hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

OSHA HAZARD COMMUNICATION STANDARD:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA,or SUPERFUND):

This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

Category:

Chemical Name	CAS#	RQ
Methylene bisphenyl isocyanate	101-68-8	5000 lbs
Isobutane	75-28-5	100 lbs
Propane	74-98-6	100 lbs
Dimethyl ether	115-10-6	100 lbs

CALIFORNIA PROPOSITION 65

This product contains no listed substances known to the state of California to cause cancer, birth defects or other reproductive harm.

PENNSYLVANIA STATE RIGHT TO KNOW HAZARDOUS SUBSTANCE:

Methylene bisphenyl isocyanate	101-68-8
Isobutane	75-28-5
Propane	74-98-6
Dimethyl ether	115-10-6

CANADIAN REGULATIONS

MATERIAL SAFETY DATA SHEET

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

D2A - respiratory tract sensitizer

D2B - eye or skin irritant, skin sensitizer

B3 - combustible liquid

Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer''s workplace education program.

- - - - -

CPR STATEMENT: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

- - - - -

HAZARDOUS PRODUCTS ACT INFORMATION: This product contains the following ingredients which are Controlled Products and/or on the Ingredient Disclosure List (Canadian HPA section 13 and 14):

COMPONENTS: CAS #

4,4'' Methylene bisphenol isocyanate   CAS# 101-68-8   2-15 wt %

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):

All substances in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16) OTHER INFORMATION

OTHER INFORMATION

VOC content: 158.1 grams/liter

No other information.

(TM), *, or (R) Indicates a trademark of The Dow Chemical Company.

MATERIAL SAFETY DATA SHEET

GC68101
12 00

DATE OF PREPARATION
Sep 9, 2016

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
GC68101
PRODUCT NAME
Geocel® 3300® Professional Grade Polyurethane Sealant, White
MANUFACTURER'S NAME
Geocel Products Group
A Business Unit of The Sherwin-Williams Company
101 W. Prospect Avenue
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	(800) 348-7615 www.geocelusa.com
Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units		Vapor Pressure
2	**1305-78-8**	**Calcium Oxide**			
		ACGIH TLV		Not Available	
		OSHA PEL		Not Available	
44	**1317-65-3**	**Calcium Carbonate**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	
2	**13463-67-7**	**Titanium Dioxide**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

HMIS Codes

Health	3*
Flammability	0
Reactivity	1

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.
EFFECTS OF OVEREXPOSURE
EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Redness and itching or burning sensation may indicate eye or excessive skin exposure.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.
CANCER INFORMATION
For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
Not Applicable	Not Applicable	Not Applicable	Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY
Not Applicable
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).
Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.
PROTECTIVE GLOVES
Required for long or repeated contact.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	12.55 lb/gal	1503 g/l
SPECIFIC GRAVITY	1.51	
BOILING POINT	Not Applicable	
MELTING POINT	Not Available	
VOLATILE VOLUME	0%	
EVAPORATION RATE	Not Available	
VAPOR DENSITY	Not Available	
SOLUBILITY IN WATER	Not Available	
pH	> 2.0, < 11.5	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

0.03 lb/gal	3 g/l	Less Water and Federally Exempt Solvents
0.03 lb/gal	3 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable
CONDITIONS TO AVOID
None known.
INCOMPATIBILITY
None known.
HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide
HAZARDOUS POLYMERIZATION
Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS
IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
1305-78-8	**Calcium Oxide**			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
1317-65-3	**Calcium Carbonate**			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
13463-67-7	**Titanium Dioxide**			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION
No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD
Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)
Not Regulated for Transportation.
Canada (TDG)
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IATA/ICAO
Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA PROPOSITION 65
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION
All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Oatey®

Lo-VOC SCAQMD 1168/316A Compliant

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

*** Section 1 - Product and Company Identification ***

MSDS #1402E

Part Numbers: Purple – 30755(TV), 30756(TV), 30757(TV), 30758, 30759, 30927 Clear - 30749, 30750, 30751, 30752, 30753, 30754, 31652, 31653

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

*** Section 2 - Hazards Identification ***

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Precautionary Statements

Prevention

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Keep away from heat/sparks/open flames and hot surfaces. - No smoking.
Keep container tightly closed.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/eye protection/face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/gas/mist/vapors.
Use only outdoors or in a well-ventilated area.

Response

If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.
If swallowed: Call a poison center or doctor/physician if you feel unwell. Rinse mouth. Do not induce vomiting.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
If exposed or concerned: Get medical advice/attention.
In case of fire: Use dry chemical, CO2, or foam to extinguish fire.

Storage

Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
78-93-3	Methyl ethyl ketone	25-40
67-64-1	Acetone	25-40
108-94-1	Cyclohexanone	15-30
109-99-9	Tetrahydrofuran	15-30

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

If material gets into eyes or if fumes cause irritation, immediately flush eyes with plenty of water until chemical is removed. If irritation persists, get medical attention immediately.

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

*** Section 6 - Accidental Release Measures ***

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other noncombusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Purple or clear	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.84 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	99.96%
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics (potassium, calcium and sodium hypochlorite) and hydrogen peroxides. May attack plastic, resins and rubber.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

J: Component Carcinogenicity

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Acetone (67-64-1)

Test & Species		Conditions
96 Hr LC50 Oncorhynchus mykiss	4.74 - 6.33 mL/L	
96 Hr LC50 Pimephales promelas	6210 - 8120 mg/L [static]	
96 Hr LC50 Lepomis macrochirus	8300 mg/L	
48 Hr EC50 Daphnia magna	10294 - 17704 mg/L [Static]	
48 Hr EC50 Daphnia magna	12600 - 12700 mg/L	

Methyl ethyl ketone (78-93-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	3130-3320 mg/L [flow-through]	
48 Hr EC50 Daphnia magna	>520 mg/L	
48 Hr EC50 Daphnia magna	5091 mg/L	
48 Hr EC50 Daphnia magna	4025 - 6440 mg/L [Static]	

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Required Label(s): None (Limited Quantities are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Acetone (67-64-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Methyl ethyl ketone (78-93-3)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Cyclohexanone (108-94-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Tetrahydrofuran (109-99-9)

CERCLA: 1000 lb final RQ; 454 kg final RQ

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Acetone	67-64-1	Yes	Yes	Yes	Yes	Yes	No
Methyl ethyl ketone	78-93-3	Yes	Yes	Yes	Yes	Yes	No
Cyclohexanone	108-94-1	Yes	Yes	Yes	Yes	Yes	No
Tetrahydrofuran	109-99-9	Yes	Yes	Yes	Yes	Yes	No

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Acetone	67-64-1	1 %
Methyl ethyl ketone	78-93-3	1 %
Cyclohexanone	108-94-1	0.1 %
Tetrahydrofuran	109-99-9	1 %

Additional Regulatory Information

A: General Product Information

This product contains trace amounts of chemicals known to the State of California to cause cancer. Under normal use conditions, exposure to these chemicals at levels above the State of California "No Significant Risk Level" (NSRL) are unlikely. The use of proper personal protective equipment (PPE) and ventilation guidelines noted in Section 8 will minimize exposure to these chemicals.

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

* * * Section 1 - Product and Company Identification * * *

MSDS #1102E

Part Numbers: Clear 30850, 30863, 30876(TV), 30882, 31008(TV), 31011, 31950, 31951, 31952, 31953
Gray 30349, 31093, 31094, 31095, 31105, 31118, 31978, 31979, 31980, 31981, 32050, 32051, 32052, 32210, 32211

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other non-combusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear or Gray	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.94 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	80-84% Maximum 510 g/L per SCAQMD Test Method 316A.
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Carcinogenicity

A: General Product Information

In 2012 USEPA Integrated Risk Information System (IRIS) reviewed a two species inhalation lifetime study on THF conducted by NTP (1998). Male rats developed renal tumors and female mice developed liver tumors while neither the female rats nor the male mice showed similar results. Because the carcinogenic mechanisms could not be identified clearly in either species for either tumor, the EPA determined that the male rat and female mouse findings are relevant to the assessment of carcinogenic potential in humans. Therefore, the IRIS review concludes that these data in aggregate indicate that there is "suggestive evidence of carcinogenic potential" following exposure to THF by all routes of exposure.

B: Component Carcinogenicity

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

PVC (Chloroethylene, polymer) (9002-86-2)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Supplement 7 [1987]; Monograph 19 [1979] (Group 3 (not classifiable))

Silica, amorphous, fumed, crystalline-free (112945-52-5)

IARC: Monograph 68 [1997] (listed under Amorphous silica) (Group 3 (not classifiable))

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Tetrahydrofuran (109-99-9)

Test & Species	Conditions

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Component Waste Numbers

Tetrahydrofuran (109-99-9)
RCRA: waste number U213 (Ignitable waste)

Cyclohexanone (108-94-1)
RCRA: waste number U057 (Ignitable waste)

Acetone (67-64-1)
RCRA: waste number U002 (Ignitable waste)

Methyl ethyl ketone (78-93-3)
RCRA: waste number U159 (Ignitable waste, Toxic waste)
200.0 mg/L regulatory level

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Consumer Commodity, ORM-D

IMDG Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): None (Limited Quantites are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

TABLE OF CONTENTS

Prepared for: **Bradley E. Gentry**
IWM Consulting Group, LLC

Site: **Priority Residence #5**
Franklin, IN 46131 (Site)

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INSTALLATION REPORT

November 15, 2018

Vapor Mitigation System
Priority Residence #5
Franklin, IN 46131 (Site)

Mr. Bradley Gentry
IWM Consulting Group
Indianapolis, IN, 46214
317-347-1111

Vapor Mitigation System Installation Report
Dates of SSDS/SMDS Installation Activities: September 17th – September 28th, 2018

Dear Mr. Gentry,

Vapor Intrusion Specialists, LLC (VIS) is pleased to provide a Vapor Mitigation System Installation Report that summarizes the scope of services performed at Priority Residence #5 located in Franklin, IN (Site). The Scope of services performed at the Site and specific field activities are described below.

Scope of Service:

- Before the start of the mitigation installation activities could begin, the foundation had major holes/ cracks that had to be sealed. Initially, VIS cleaned all foundation ruptures/ penetrations. Using approximately 200 pounds of high strength cement VIS patched the foundation imperfections. As the high strength cement was curing, VIS rigorously scrapped and clean all exterior basement walls. VIS then applied a trowel grade block and wall sealer in all cracks/ joints larger than ¼". Each exterior basement wall had three (3) coats of Ames Block and Wall sealer applied. Once the cement was dried on the basement floor, VIS applied one (1) coat of Ames Super Primer to the entire floor. Once the Super Primer was cured, VIS applied two (2) coats of Ames Safe "T" Deck floor sealer to the entire basement floor.

- VIS then installed a sub-slab depressurization system (SSDS) using a Fantech Rn4 fan to create a negative pressure with sufficient radius of influence (ROI) to mitigate beneath the entire portion of the basement slab. This was accomplished by using one (1) extraction point system which ran from north to south.
- The crawl space (located south of the basement) was also cleaned of debris and leveled so that the membrane would lay flat and not be punctured during the installation and operation of the sub-membrane depressurization system (SMDS). VIS installed a 70-foot section of 4-inch perforated corrugated pipe underneath the 6-mil dura-skrim and attached the corrugated pipe to the SSDS for constant negative pressure being distributed throughout the entire crawl space. The 6-mil dura-skrim was attach to the wall with a spray foam (Froth-Pak) around the entire perimeter. All membrane seams overlapped a minimum of 12 inches and were sealed using a 4" white tape.
- The SSDS/SMDS was comprised of the following major components: 4-inch schedule 40 solid core piping for the SSDS extraction point (centrally located in the basement) and the horizontal run totaling approximately 50 feet of pipe; a second SMDS extraction point was connected to approximately 70 feet of 4-inch perforated corrugated pipe located underneath the 6-mil dura-skrim in the crawlspace. The basement SSDS extraction point was installed using a 5" hammer drill and approximately 5 to 7 gallons of sand and medium gravel was removed from beneath the slab. Two (2) U-tube manometers were installed to measure the vacuum of each extraction point and two (2) ball valves were installed to regulate the vacuum being applied to each extraction point. One (1) Fantech Rn4 fan was installed with a service switch in a weather tight enclosure located on the western exterior of the house.
- The existing sump pump was removed in order to completely seal the sump basin. A new 1/3 HP Zoeller sump pump and check valve was installed. A new sump lid was installed with 4" "view port" for future servicing purposes. The sump lid was secured to the concrete using 1 ¾" tapcons and sealed with mold resistant silicone. Both ¾" condensate lines were sealed and installed with a pea trap in the lid to prevent vapors from back feeding back into the basement. As a secondary precaution, a Drainjer was also installed in the sump lid in order to deal with any potential basement flooding. It

was noted that the southeastern corner of the basement had water intrusion issues before installation activities began.

- A Fantech Rn4 fan was mounted and installed along the central portion of the western side of the building and was hardwired by a licensed electrician to a panel located in the pantry and labeled (Fan Circuit).
- VIS conducted post PFE testing utilizing one (1) vapor pin previously installed by IWM Consulting and five (5) previously drilled ½" holes utilized for initial diagnostic testing. The data collect in the field did confirm that the newly installed SSDS in the basement portion of the building and the SMDS in the crawl space is creating a sufficient negative pressure.

Please Note:

- A figure depicting the SSDS layout is included as **Figure 1.**
- Photos taken during the installation have been included as **Attachment 1.**
- VIS's radon mitigation certification is included as **Attachment 2.**
- The VI Mitigation Installation Checklist is included as **Attachment 3.**
- An O&M manual for the mitigation fan is included as **Attachment 4.**
- An estimate of Annual Operating Costs is included as **Attachment 5.**
- Manufacture warranty is included as **Attachment 6.**
- SDS sheets are included as **Attachment 7.**

Conclusion:

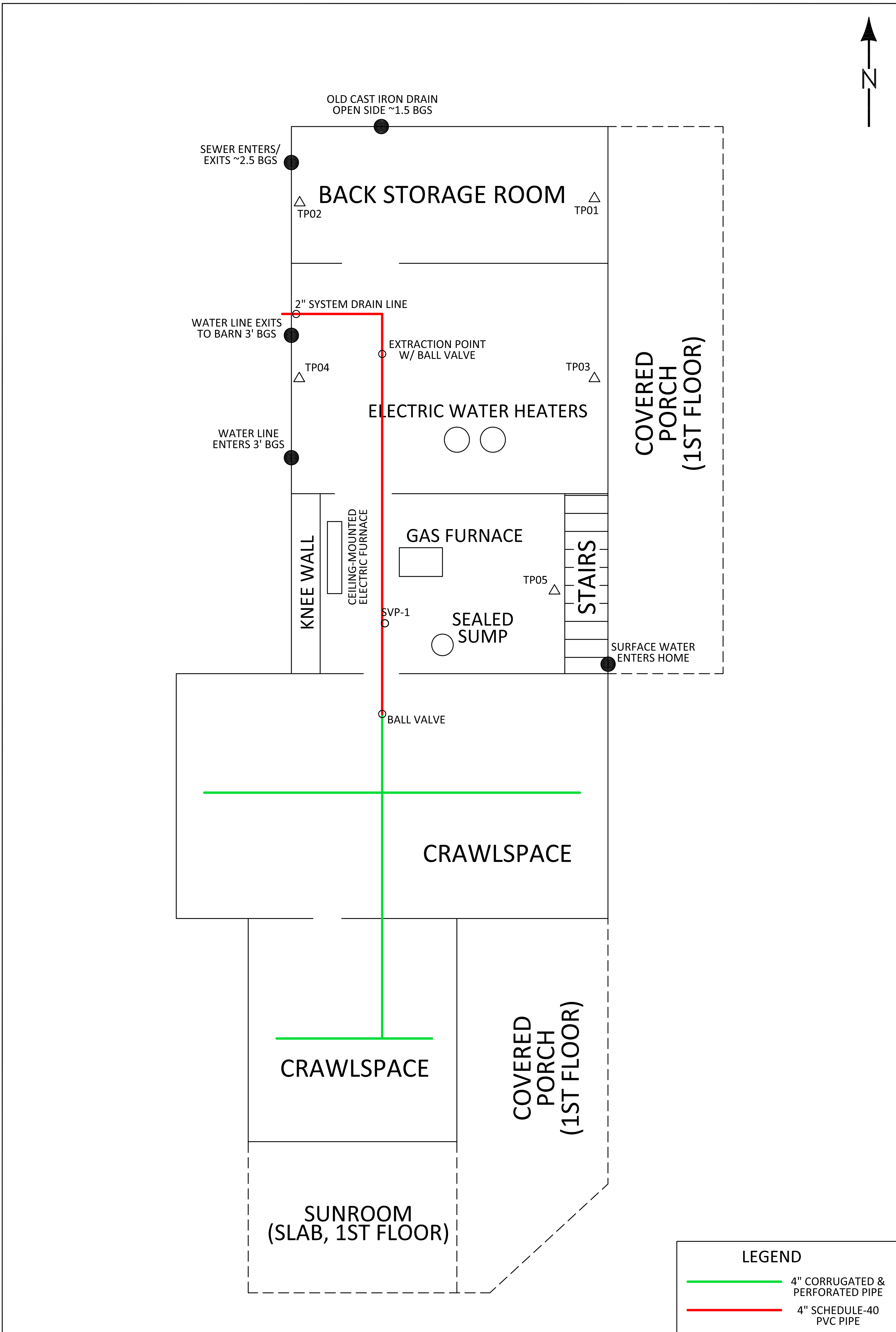
After the installation of this multi-faceted vapor mitigation system, a final walk through and post PFE readings were collected and analyzed. As per the system design, the vapor mitigation system is operating as specified and is generating sufficient negative pressures beneath the basement and within the crawlspace. Please do not hesitate to contact me via email (awatt@vaporintrusion.us) or telephone (812-929-9070) with any questions you might have regarding this report.

Respectfully Submitted,

Alex Watt
Associate Project Manager
Vapor Intrusion Specialists, LLC
7428 Rockville Road
Indianapolis, IN 46214
NRPP Certification: 108383 RMT
Indiana Mitigator License: RTM00783

Figure 1

System Layout



0' 6'
SCALE IN FEET

DRAWN BY: C. NEWELL
DATE: 11/15/2018
REVISED: 11/15/2018
HWPA #111291-01
DWG. NO. 111291S1

FIGURE 1
VAPOR MITIGATION SYSTEM
LAYOUT MAP
(PRIORITY RESIDENCE #5)

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

Attachment 1
Installation Photographs

Vapor Mitigation Installation Photographs – Priority Residence #5, Franklin, IN

Photo #1: Basement floor before install/repairs.

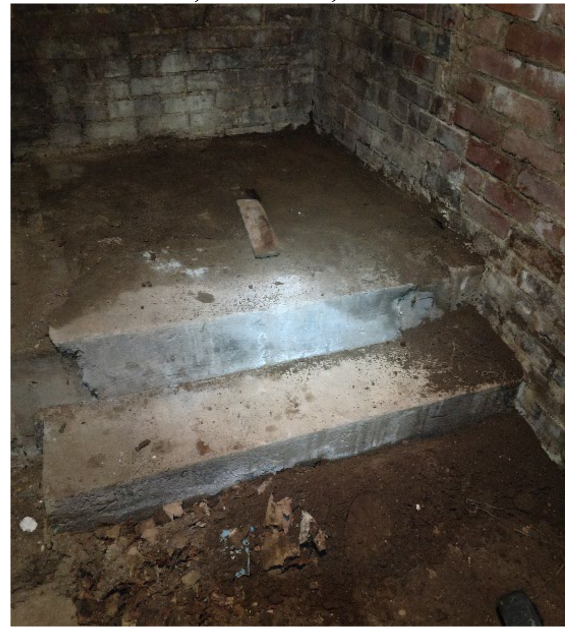


Photo #2: Bottom of staircase landing before install.

Photo #3: Crawlspace filled with debris and rubble prior to cleaning.

Photo #4: Star environmental encapsulating and removing asbestos wrapped ducting from crawlspace.

Vapor Mitigation Installation Photographs – Priority Residence #5, Franklin, IN

Photo Redacted.

Photo #5: Debris removed from crawlspace & work benches removed from basement.

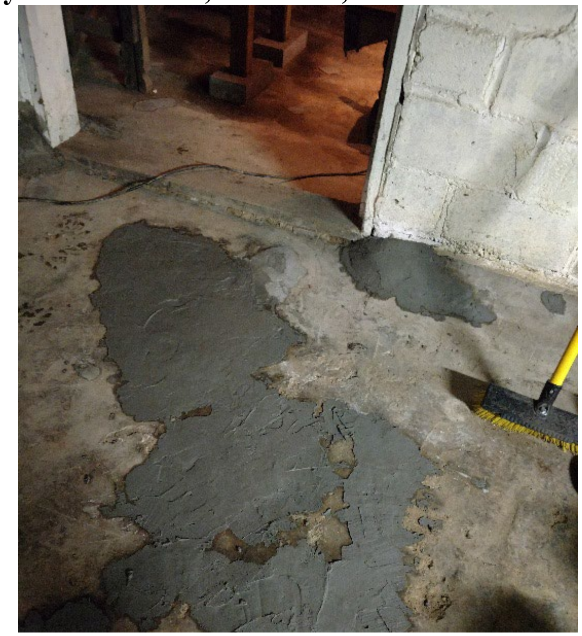


Photo #6: Approximately 200 pounds of high strength cement was used in patching the basement floor.

Photo #7: Basement floor patching continued.

Photo #8: Plastic sheeting was put up on the entry door at top of stairs to help prevent dust from entering the conditioned living space.

Vapor Mitigation Installation Photographs – Priority Residence #5, Franklin, IN

Photo #9: A Dri-eaz HEPA 500 air scrubber was on during all installation activities. The air scrubber was equipped with a HEPA, carbon and pre-filter.

Photo #10: All exterior basement walls were tuck pointed with a trowel grade block and wall sealer.

Photo #11: Each exterior basement wall was rigorously scrapped and cleaned. Each wall had three (3) coats of Ames Block and Wall sealer applied.

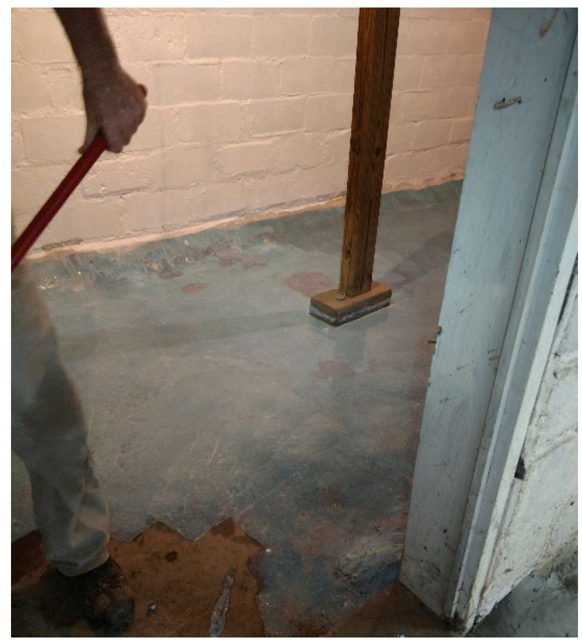


Photo #12: The basement floors were cleaned and primed by applying one (1) coat of Ames super primer.

Vapor Mitigation Installation Photographs – Priority Residence #5, Franklin, IN

Photo #13: Ames super primer application continued.

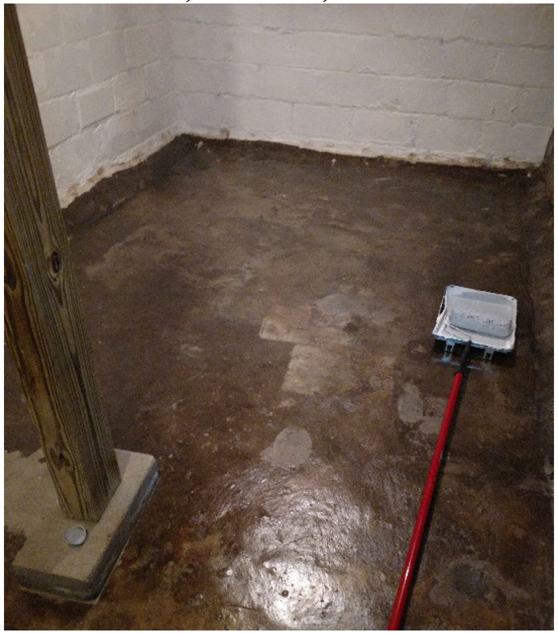


Photo #14: Ames super primer after its dried.

Photo #15: A total of two (2) coats of Ames Safe "T" Deck basement floor sealer was applied to the entire basement floor.

Photo #16: Ames Safe "T" Deck floor sealer continued.

Vapor Mitigation Installation Photographs – Priority Residence #5, Franklin, IN

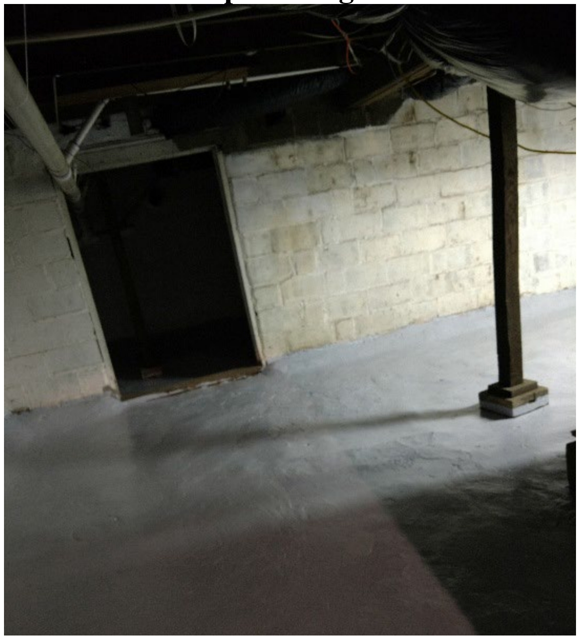


Photo #17: Ames Safe "T" Deck floor sealer continued.

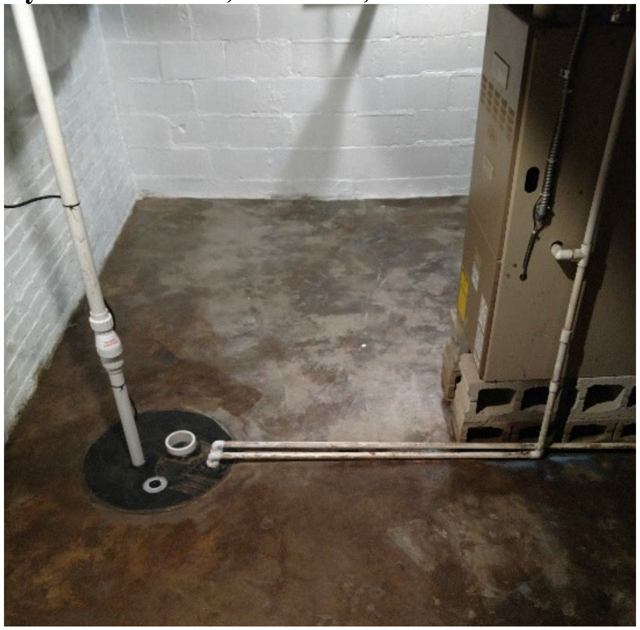


Photo #18: Sump pump was replaced, pit was sealed with silicone and a new lid was mechanically fastened.

Photo #19: After sealing the basement, VIS conducted PFE testing to determine system design.

Photo #20: Pressure field extension (PFE) testing in progress.

Vapor Mitigation Installation Photographs – Priority Residence #5, Franklin, IN

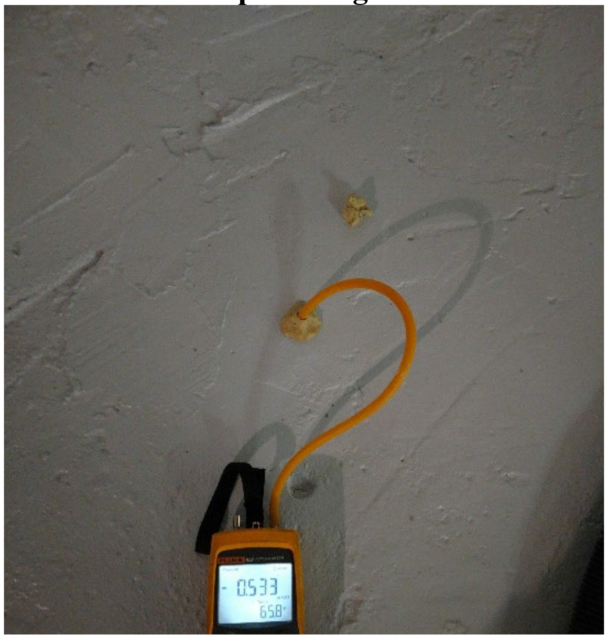


Photo #21: PFE testing continued.

Photo #22: Basement extraction point (centrally located). System installed with a ball valve, U-tube manometer and system labels.

Photo #23: Extraction point vertical to main horizontal run (horizontal pipe running south towards crawlspace). Pipe running west towards exhaust penetration.

Photo #24: Main horizontal run going south towards crawlspace continued.

Vapor Mitigation Installation Photographs – Priority Residence #5, Franklin, IN

Photo #25: Main horizontal run going south continued.

Photo #26: Main horizontal run going south transitions from basement to crawlspace.

Photo #27: Initial stages during the installation of the 4" perforated corrugated piping in the crawlspace.

Photo #28: Initial stages during the installation of the 4" perforated corrugated piping in the crawlspace (continued).

Vapor Mitigation Installation Photographs – Priority Residence #5, Franklin, IN

Photo #29: SMDS installation activities continued.

Photo #30: SSDS mitigation system from basement tied into 4” perforated piping within the crawlspace.

Photo #31: Mitigation fan wire to a 20-amp dedicated circuit breaker in the main electrical panel inside pantry.

Photo Redacted.

Photo #32: Fantech Rn4 mounted and installed with a service switch on westside of house.

Attachment 2
Mitigation Certifications

NRPP™
NATIONAL RADON PROFICIENCY PROGRAM

Alex Hoskins Watt

Has satisfactorily fulfilled the requirements set forth by the National Radon Proficiency Program and is therefore certified as a:

Residential Mitigation Provider

NRPP ID 108383 RMT
Expires 12/31/2019

Valid for specific activities or measurement devices, which can be verified with NRPP. State and local agencies may have additional requirements.

NATIONAL RADON PROFICIENCY PROGRAM
AARST

In witness Whereof,
I have subscribed my name as a
Representative of NRPP

Janna Sinclair

Janna Sinclair
NRPP Credentialing Coordinator

Indiana State Department of Health
Lead and Healthy Homes
2 N. Meridian Street, 5J
Indianapolis, Indiana 46204 (317) 234-4423

Radon Mitigator License

Certificate Number	Status	Expire Date
RTM00783	Active	12/31/2018

Alex H. Watt

Jerome M. Adams, MD, MPH
State Health Commissioner
Indiana State Department of Health

STATE FORM 49122 (9-98)

Indiana State Department of Health
Lead and Healthy Homes
2 N. Meridian Street, 5J
Indianapolis, Indiana 46204 (317) 234-4423

Primary Radon Tester License

Certificate Number	Status	Expire Date
RTP00763	Active	12/31/2019

Alex H. Watt

Kristina Box, MD, FACOG
Kristina Box, MD, FACOG
State Health Commissioner
Indiana State Department of Health

STATE FORM 49122 (9-98)

Attachment 3
Checklist

Post Installation Checklist

Client: IWM Consulting Group　　　　Date: 10/09/18

Site Address: Priority Residence #5, Franklin, IN

System Install Date: 09/18/18-09/24/18 & 09/24/18-09/28/18

Site Contact:　　　　Fan Model: Fantech Rn4

Piping	Yes	No	N/A
Are all system pipes Schedule 40 solid core PVC?	X		
Are all extraction point locations permanently sealed?	X		
Does any system piping obstruct windows, doors or service access points?		X	
Are all horizontal pipe runs supported at least every 6 feet?	X		
Are all vertical pipes supported at least every 8 feet?	X		
Do horizontal runs slope towards extraction pits for drainage?	X		
Were permanent test ports installed on the exhaust stack(s)?		X	
Was a varmint guard installed on the exhaust stack(s)?		X	
If the exhaust stack penetrates the roof, was it sealed by a licensed roofer? If so, who?		X	

Fans	Yes	No	N/A
Was the fan mounted/ installed level?	X		
Was the fan installed with a condensate by-pass?	X		
Was the fan installed with flexible Fernco fittings for vibration reduction?	X		
Is the exhaust stack at least 10 feet above grade, 10 feet from any doors, windows, or air intakes and at least 2 feet above the top of any openings to a conditioned space?	X		
Was the fan mounted in the attic space of a building?		X	
Was the fan mounted on the exterior of a building? If so, where? (**west side**)	X		

Make/ Model of Fan(s)　**Fantech Rn4**

Post Installation Checklist

Vapor Barrier	Yes	No	N/A
Are the crawl space(s) free of debris?	X		
Has a Sub-membrane depressurization system been installed?	X		
Was a minimum of 6 mil or thicker membrane used in system installation?	X		
Were heavy traffic areas reinforced with extra material/ membrane?	X		
Were all membrane seams overlapped a minimum of 12 inches and sealed properly?	X		
Was the vapor barrier secured/ anchored to the wall using double sided tape and polyurethane caulk?		X	
Was the vapor barrier secured/ anchored to the wall using termination bars/ wooden furring strips and polyurethane caulk? **(Closed cell spray foam)**	X		
Has a 3" or 4" perforated pipe been installed underneath the vapor barrier? **(4" pipe)**	X		
Are all utility entry or exit points, foundation or other penetrations sealed properly?	X		

Electrical	Yes	No	N/A
Has the electrical work been performed by a licensed electrician? If so, who? *Midwest Electric Company, Inc.*	X		
Is the fans outside service switch mounted in a weather tight enclosure?	X		
In the panel, is the mitigation system clearly marked/ labeled and visible from at least three feet away?	X		
Has a run-time meter been installed, and been installed in a weather tight enclosure?		X	
Has a KW meter been installed?		X	
Was the fan installed with a power cord no longer than 6 feet next to a non- GFCI receptacle?			X

Post Installation Checklist

Labels and System Monitors	Yes	No	N/A
Were the extraction point(s) installed with a U-tube/ Magnehelic gauge? If so, which? **U-tube**	X		
Was there a Vacuum/ Audible alarm installed in case of system failure?		X	
Are system pipes, membranes and sump pump lids clearly labeled and easily identifiable?	X		
Was there a system label installed with company contact information in case of emergency?		X	

Sump Pit	Yes	No	N/A
Is there a sump pit(s) located in the building? If so, where? **Southern portion of basement, in front of crawlspace.**	X		
Does the sump have an adequate cover installed, and is it properly anchored and sealed?	X		
Are all penetrations in sump lid properly sealed?	X		
Has the sump pit been used as an extraction point?		X	
Does the sump lid have a view port for observation and maintenance purposes?	X		

Testing	Yes	No	N/A
Was Diagnostic testing performed before system install?	X		
Was Post Diagnostic testing performed to confirm system performance?	X		

Reporting	Yes	No	N/A
Has an as built drawing been completed showing system layout?	X		
Have all test point(s) and extraction point(s) locations and data been inserted in to system drawing?	X		
Has the system install been documented with photographs?	X		

Post Installation Checklist

Field Notes

Basement slab thickness ranged from ½" to 4". Sealed cracks and joints in basement floor/walls and applied sealant to walls and floor of basement. Installed new sump pump and sump basin lid (mechanically fastened to the floor) equipped with dranjer plug and condensate drains. Post install PFE testing confirm negative pressure beneath the basement and in the crawlspace.

Technician's signature:

VAPOR INTRUSION SPECIALISTS
7428 Rockville Road, Indianapolis, Indiana 46214 | cell 812-929-9070

PFE Field Data Sheet

Property Name: Residential house

Property Address: Priority Residence #5, Franklin, IN

PFE Testing Date: 10/9/18

Professional: Alex Watt

Notes: Basement concrete slab varied in thickness from 1/2" to 4".

Test Point	(Vacuum Inches of Water)	(Distance from EP-1)
TP01	-0.032	~18'
TP02	-0.027	~18'
TP03	-0.049	~10'
TP04	-0.121	~10'
TP05	-0.026	~16'
VP	-0.034	~16'

Attachment 4
Vapor Mitigation System Operation and Maintenance

We advise consultants, maintenance personnel or property owners to conduct routine visual inspections of all SSDS/SMDS to verify that system components are operating properly. The inspection should include but not limited to the following:

- Observe the U-tube or magnehelic gauges for pressure indication; a pressure of 'O' indicates that there is a problem with system piping or fan operations.
- Observe the mitigation fan(s) and note any abnormal sounds or noises coming from the fan including buzzing, scraping, rattling, or etc. If any abnormal noises or sounds are audible, contact VIS.
- Most mitigation fans are factory sealed and designed to be maintenance free for the life of the fan.
- Should the fans' casing be opened or the factory seal broken, any service warranty may be voided.
- Factory maintenance documentation has been provided to consultant with recommended schedule for maintenance of fans if required.
- Inspect the PVC piping of the system for damage or cracks. If any damage occurs to the PVC piping, contact VIS piping supports and hangers should also be inspected for wear and integrity.
- Roof penetrations for system exhaust piping should be inspected to assure no moisture or other intrusion is apparent.
- Any significant changes to building or structure can and may affect system performance. VIS should be advised of planned changes beforehand to avoid any possible performance issues or system failure.

Contact VIS for additional service & Maintenance should any occasion arise that may cause concern that the SSDS or SMDS is not functioning properly as vapor intrusion may no longer be mitigated to meet performance criteria to which VIS completed mitigation.

Attachment 5

Annual Operating Costs

Radonaway Fans	Average KWH	Average Cost Per Year
RP140	*$0.0894*	$13.31
RP145	*$0.0894*	$42.29
RP260	*$0.0894*	$48.55
RP265	*$0.0894*	$88.50
RP380	*$0.0894*	$101.03
SF180	*$0.0894*	$42.29
GP201	*$0.0894*	$39.16
GP301	*$0.0894*	$56.39
GP401	*$0.0894*	$66.57
GP500	*$0.0894*	$78.31
GP501	*$0.0894*	$82.23
XP151	*$0.0894*	$40.72
XP201	*$0.0894*	$43.07
XP261	*$0.0894*	$66.57
HS2000	*$0.0894*	$164.46
HS3000	*$0.0894*	$117.47
HS5000	*$0.0894*	$250.61
Fantech Fans	**Average KWH**	**Average Cost Per Year**
HP2133	*$0.0894*	$13.31
Rn4	***$0.0894***	**$90.00**

VAPOR INTRUSION SPECIALISTS

Attachment 6
Fan Warranty

Installation and Operation Manual
Manuel d'installation et d'opération

Item #: 142001
Rev Date: 2017-11-03

Rn4

Inline Radon Fan

Ventilateur pour radon en ligne

Techical / Customer Support:

Support technique et service à la clientèle

United States / États-Unis Tel.: 800.747.1762 **Canada** Tel.: 800.565.3548

fantech®
a systemair company

Note	Warning / Important note Avertissement / Note importante	Information	Technical information Information technique	Practical tip Conseil pratique

DO NOT CONNECT POWER SUPPLY until fan is completely installed.
Make sure electrical service to the fan is in the locked "OFF" position.

1. This fan has rotating parts and safety precaution should be exercised during installation, operation and maintenance.

2. WARNING! TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS - OBSERVE THE FOLLOWING:
   a. Use this unit in the manner intended by the manufacturer. If you have any questions, contact your manufacturer's representative or contact us directly.

   b. CAUTION: Before installation, servicing or cleaning unit, switch power off at service panel and lock the service disconnection means to prevent power from being switched on accidentally. When the service disconnection means cannot be locked, securely fasten a prominent warning device, such as tag, to the panel.

   c. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.

   d. The combustion airflow needed for safe operation of fuel burning equipment may be affected by this unit's operation. Follow the heating equipment manufacturer's guidelines and safety standards such as those published by the National Fire Protection Association (NFPA), the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) and the local code authorities.

   e. When cutting or drilling into wall and ceiling, do not damage electrical wiring and other hidden utilities.

   f. Ducted fans must always be vented to the outdoors.

3. WARNING! Check voltage at the fan to see if it corresponds to the motor name plate.

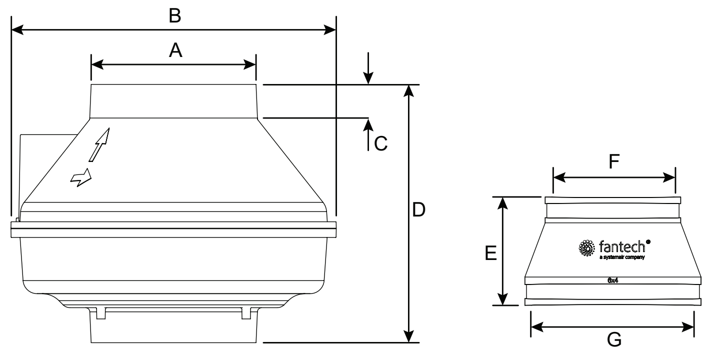
4. For radon mitigation use only. DO NOT use to exhaust hazardous or explosive materials and vapors.

5. Do not use this fan with any solid state speed control device.

GUARDS MUST BE INSTALLED WHEN FAN IS WITHIN REACH OF PERSONNEL OR WITHIN SEVEN (7) FEET OF WORKING LEVEL OR WHEN DEEMED ADVISABLE FOR SAFETY.

The ducting from this fan to the outside of the building has a strong effect on the air flow, noise and energy use of the fan. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated air flow.

DIMENSIONS



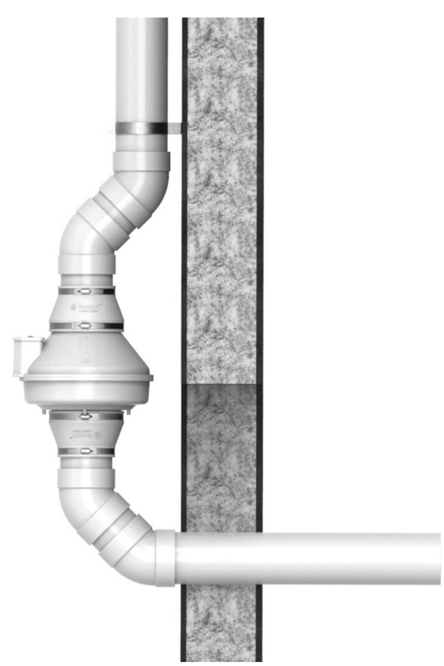
Model/ Modèle	A	B	C	D	E	F	G
Rn4-3	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)	4 (102)	3 1/2 (89)	6 (152)
Rn4-4	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)	4 (102)	4 1/2 (114)	6 (152)

Dimensions in inches (mm).
Dimensions en pouces (mm)

INSTALLATION

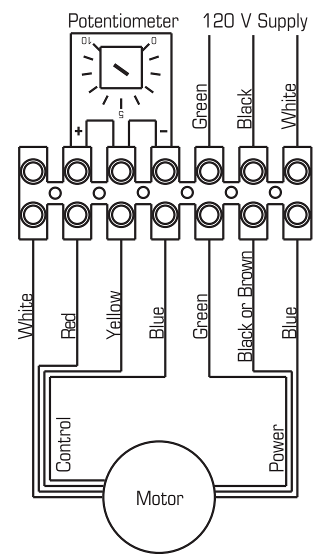
The Rn4-3 is designed for use with 3" schedule 40 PVC pipe.
The Rn4-4 is designed for use with 4" schedule 40 PVC pipe

Prior to installation, the suction pipe should be terminated at the exterior wall. The suction pipe should be installed with slight incline to drain water from the fan.



DO NOT connect fan directly to building structure

WIRING DIAGRAM



To reduce fan speed use a small screwdriver and turn potentiometer knob counter clockwise

WARRANTY

Five (5) Year Warranty

This warranty supersedes all prior warranties

DURING ENTIRE WARRANTY PERIOD:
Fantech will repair or replace any part which has a factory defect in workmanship or material. Product may need to be returned to the Fantech factory, together with a copy of the bill of sale and identified with RMA number.

FOR FACTORY RETURN YOU MUST:
- Have a Return Materials Authorization (RMA) number. This may be obtained by calling Fantech either in the USA at 1.800.747.1762 or in CANADA at 1.800.565.3548. Please have bill of sale available.
- The RMA number must be clearly written on the outside of the carton, or the carton will be refused.
- All parts and/or product will be repaired/replaced and shipped back to buyer; no credit will be issued.

OR
The Distributor may place an order for the warranty part and/or product and is invoiced. The Distributor will receive a credit equal to the invoice only after product is returned prepaid and verified to be defective.

FANTECH WARRANTY TERMS DO NOT PROVIDE FOR REPLACEMENT WITHOUT CHARGE PRIOR TO INSPECTION FOR A DEFECT. REPLACEMENTS ISSUED IN ADVANCE OF DEFECT INSPECTION ARE INVOICED, AND CREDIT IS PENDING INSPECTION OF RETURNED MATERIAL. DEFECTIVE MATERIAL RETURNED BY END USERS SHOULD NOT BE REPLACED BY THE DISTRIBUTOR WITHOUT CHARGE TO THE END USER, AS CREDIT TO DISTRIBUTOR'S ACCOUNT WILL BE PENDING INSPECTION AND VERIFICATION OF ACTUAL DEFECT BY FANTECH.

THE FOLLOWING WARRANTIES DO NOT APPLY:
- Damages from shipping, either concealed or visible. Claim must be filed with freight company.
- Damages resulting from improper wiring or installation.
- Damages or failure caused by acts of God, or resulting from improper consumer procedures, such as:
    1. Improper maintenance
    2. Misuse, abuse, abnormal use, or accident, and
    3. Incorrect electrical voltage or current.
- Removal or any alteration made on the Fantech label control number or date of manufacture.
- Any other warranty, expressed, implied or written, and to any consequential or incidental damages, loss or property, revenues, or profit, or costs of removal, installation or reinstallation, for any breach of warranty.

WARRANTY VALIDATION
- The user must keep a copy of the bill of sale to verify purchase date.
- These warranties give you specific legal rights, and are subject to an applicable consumer protection legislation. You may have additional rights which vary from state to state.

Limitation of Warranty and Liability

This warranty does not apply to any Fantech product or part which has failed as a result of faulty installation or abuse, incorrect electrical connections or alterations made by others, or use under abnormal operating conditions or misapplication of the product or parts. We will not approve for payment any repair not made by us or our authorized agent without prior written consent. The foregoing shall constitute our sole and exclusive warranty and our sole exclusive liability, and is in lieu of any other warranties, whether written, oral, implied or statutory. There are no warranties which extend beyond the description on the page hereof. In no event, whether as a result of breach of contract, or warranty or alleged negligence, defect incorrect advice or other causes, shall Fantech be liable for special or consequential damages, including, but not limited to, loss of profits or revenue, loss of use of equipment or any other associated equipment, cost of capital, cost of substitute equipment, facilities or services, downtime costs, or claims of customers of purchase for such damages. Fantech neither assumes or authorizes any person to assume for it any other liability in connection with the sale of product(s) or part(s). Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages so the above limitations and exclusions may not apply to you.

Warning

Fantech products are designed and manufactured to provide reliable performance, but they are not guaranteed to be 100% free from defects. Even reliable products will experience occasional failures and this possibility should be recognized by the user. If these products are used in a life support ventilation system where failure could result in loss or injury, the user should provide adequate backup ventilation, supplementary natural ventilation, failure alarm system, or acknowledge willingness to accept the risk of such loss or injury.

Attachment 7

SDS Sheets

SECTION 1 – IDENTIFICATION	
PRODUCT NAME	Ames'® Super Primer™
OTHER MEANS OF IDENTIFICATION	SP
END USE	Latex Paints & Coatings, water borne dispersion. For concrete, metal, wood and hard-to-stick surfaces such as stucco and concrete floors. May be used with all Ames acrylic based products.
MANUFACTURER	Ames Research Laboratories, Inc. Salem, Oregon 97302 Corporate Office: 1891 16th Street SE Salem, Oregon 97302-1436 (503) 588-3330
EMERGENCY PHONE NUMBER	1-888-345-0809 or Chemtrec 1-800-424-9300

SECTION 2 – HAZARD IDENTIFICATION	
CLASSIFICATION	Acute Toxicity, Dermal – 5: Serious Eye Damage/Eye Irritation – 2B: Acute Toxicity, Inhalation – 5:
SIGNAL WORD	WARNING
HAZARD STATEMENT	May be harmful in contact with skin (H313) Causes eye irritation (H320) May be harmful if inhaled (H333)
HAZARD PICTOGRAMS	N.A. – No Symbol
PRECAUTIONARY STATEMENT(S)	Wear protective gloves/protective clothing/eye protection/face protection. Avoid breathing dust/fume/gas/mist/vapor/spray. Use in well-ventilated area. If hands or other body parts come in contact, wash thoroughly after handling. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. (P305+P351+P338) If eye irritation persists: Get medical attention from a physician. (P337+P313) IF ON SKIN OR INHALED: Call a POISION CENTER or doctor/physician if you feel unwell. (P304+P312)
HAZARDS NOT OTHERWISE CLASSIFIED	N.A.

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS		
SUBSTANCE / MIXTURE	Mixture	
OTHER MEANS OF IDENTIFICATION	N. A.	
CAS # / IDENTIFIERS		
INGREDIENT NAME	% BY WEIGHT	CAS NUMBER
Proprietary Polymer*	90 – 100 %	Proprietary

Any concentrations shown in a range are to protect trade secret confidentiality or is due to batch variation. There are no additional ingredients present, which within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

SECTION 4 – FIRST AID MEASURES	
DESCRIPTION OF NECESSARY FIRST AID MEASURES	
EYE CONTACT	Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do so while rinsing. If eye irritation persists: Get medical attention from a physician.
INHALATION	Remove affected individual(s) to fresh air. Get medical attention from a physician if breathing difficulty develops.
SKIN CONTACT	Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops. Wash contaminated clothes before reuse.
INGESTION	If swallowed, rinse mouth thoroughly. Do not induce vomiting. Never give anything by mouth to an unconscious person. Seek medical attention if irritation persists or if concerned.
MOST IMPORTANT SYMPTOMS / EFFECTS, ACUTE AND DELAYED	
EYE CONTACT	May cause eye irritation
INHALATION	With good ventilation, exposure to vapors not expected to cause adverse effects.
SKIN CONTACT	Prolonged skin exposure may cause skin irritation.
INGESTION	No hazards anticipated from swallowing small incidental amounts during use of this product.
INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDS, IF NECESSARY	
EYE CONTACT	N/A
INHALATION	N/A
SKIN CONTACT	N/A
INGESTION	N/A

SECTION 5 – FIRE FIGHTING MEASURES	
EXTINGUISHING MEDIA: SUITABLE MEDIA	To extinguish combustible residues of this product, use water fog, CO2, dry chemical or chemical foam or alcohol-resistant foam.
EXTINGUISHING MEDIA: UNSUITABLE MEDIA	N/A
SPECIFIC HAZARDS ARISING FROM THE CHEMICAL	Under fire conditions, some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to hydrocarbons, CO and dense smoke.
SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS	Keep people away. Isolate fire area and deny unnecessary entry. Containers of this material may build up pressure if exposed to heat (fire). Use water spray to cool fire-exposed containers.
SPECIAL EQUIPMENT FOR FIRE-FIGHTERS	Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective clothing. If protective equipment is not available or not used, fight fire from a protected location or safe distance.

SECTION 6 – ACCIDENTAL RELEASE MEASURES	
PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES	
FOR NON-EMGERGENCY PERSONNEL	Avoid unnecessary exposure or contact. Barricade the area to restrict access. Persons not wearing protective equipment (see Section 8) should be excluded from the area of the spill until clean up has been completed.
FOR EMERGENCY PERSONNEL	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials.
ENVIRONMENTAL PRECAUTIONS	Stop leak at source when it is safe to do so. Dike and contain spill. Prevent spilled material from contaminating soil or entering drains, sewers, streams or other bodies of water.
METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP	
LARGE SPILLS	Avoid dilution with water to minimize the extent of the spill. Recover and recycle spilled latex if possible, otherwise, collect with absorbent material and transfer to appropriate containers for disposal. Water may be used for final cleaning of the affected area.
SMALL SPILLS	Same procedures as listed above for large spills.

SECTION 7 – HANDLING AND STORAGE	
PRECAUTIONS FOR SAFE HANDLING	
PROTECTIVE MEASURES	Use in a well ventilated area. Keep out of reach of children. If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminants below the respective exposure limits. Use goggles and gloves. Similar to most latex paints.
GENERAL HYGIENE	Practice reasonable care to avoid repeated, prolonged skin contact. Wash thoroughly after handling. Do not eat, drink, smoke or use personal products when handling chemical substances.
CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATABILITIES	Store at temperatures between 40° F (4.4° C) and 110° F (43.3° C). Keep container closed when not in use. PROTECT FROM FREEZING.

SECTION 8 – EXPOSURE CONTROL/PERSONAL PROTECTION				
OCCUPATIONAL EXPOSURE LIMITS				
	OSHA PEL 8-HR TWA	OSHA PEL STEL/Ceiling	ACGIH TLV-TWA	ACGIH TLV-STEL
Proprietary Polymer	N.E.	N.E.	N.E.	N.E.
CONTROLS				
ENGINEERING CONTROLS	Good general ventilation should be sufficient for most conditions.			
PERSONAL PROTECTIVE EQUIPMENT	Wear safety glasses with side shields or safety goggles. Wear clean, long-sleeved, body-covering clothing. Nitrile, Neoprene®, or rubber gloves should provide protection against skin contact. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, or areas are poorly vented, wear an approved air-purifying respirator.			

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE	
PHYSICAL STATE	Liquid
COLOR	Milky white
ODOR	Slight ammonia odor
ODOR THRESHOLD	N/A
pH	9.0 – 10
MELTING POINT	N/A
BOILING POINT	>200° F (93° C)
FREEZING POINT	32° F (0° C)
FLASH POINT	>200° F (93° C)
EVAPORATION RATE	Similar to Latex paint, water based Latex polymers
FLAMMABILITY (SOLID, GAS)	N/A
UPPER / LOWER FLAMMABILITY OR EXPLOSIVE LIMITS	N.A.
VAPOR PRESSURE	N/A
VAPOR DENSITY	N/A
RELATIVE DENSITY	N/A
SOLUBILITY(IES)	Product is sold as dilutable. Polymer component is insoluble.
PARTITION COEFFICIENT: N-OCTANOL / WATER	N/A
AUTO-IGNITION TEMPERATURE	N.A.
DECOMPOSITION TEMPERATURE	N/A
VISOCITY	25-300 cps (#2/100rpm/70˚F)
SPECIFIC GRAVITY	1.01 – 1.04

SECTION 10 – STABILITY AND REACTIVITY	
REACTIVITY	This product is not reactive under normal conditions.
CHEMICAL STABILITY	This product is stable under normal storage conditions and during its intended use.
POSSIBILITY OF HAZARDOUS REACTION	Will not occur under normal conditions.
CONDITIONS TO AVOID	Avoid freezing temperatures (less than 32° F or 0° C). Product stability may be affected.
INCOMPATIBLE MATERIALS	N/D
HAZARDOUS DECOMPOSITION PRODUCTS	N/D

SECTION 11 – TOXICOLOGICAL INFORMATION	
INFORMATION ON TOXICOLOGICAL EFFECTS	
ACUTE TOXICITY	May cause slight transient (temporary) eye irritation. Corneal injury unlikely. Short single exposure not likely to cause significant skin irritation. Prolonged and repeated exposure may cause slight skin irritation. Material may stick to skin causing irritation upon removal. A single, prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. With good ventilation, a single exposure to vapors is not expected to cause adverse effects. Single dose oral toxicity is considered to be extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.
IRRITATION / CORROSION	May cause slight irritation to skin and eyes.
SENSITIZATION	N.A.
MUTAGENICITY	N.A.
CARCINOGENICITY	N.A.
REPRODUCTIVE TOXICITY	N.A.
TETRAOGENICITY	N.A.
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)	N.A.
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE)	N.A.
ASPIRATION HAZARD	N.A.

INFORMATION ON LIKELY ROUTES OF EXPOSURE	Dermal is likely route of exposure.
POTENTIAL ACUTE HEALTH EFFECTS	
EYE CONTACT	May cause slight transient (temporary) eye irritation.
INHALATION	With good ventilation, a single exposure to vapors is not expected to cause adverse effects.
SKIN CONTACT	Short single exposure not likely to cause significant skin irritation. Prolonged and repeated exposure may cause slight skin irritation. Material may stick to skin causing irritation upon removal. A single, prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts.
INGESTION	Single dose oral toxicity is considered to be extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.
SYMPTOMS RELATED TO THE PHYSICAL, CHEMCIAL AND TOXICOLOGICAL CHARACTERISTICS	
EYE CONTACT	N/A
INHALATION	N/A
SKIN CONTACT	N/A
INGESTION	N/A
DELAYED AND IMMEDIATE EFFECTS AND ALSO CHRONIC EFFECTS FROM SHORT AND LONG TERM EXPOSURE	
SHORT TERM EXPOSURE – POTENTIAL IMMEDIATE EFFECTS	N/A
SHORT TERM EXPOSURE – POTENTIAL DELAYED EFFECTS	N/A
LONG TERM EXPOSURE – POTENTIAL IMMEDIATE EFFECTS	N/A
LONG TERM EXPOSURE – POTENTIAL DELAYED EFFECTS	N/A
POTENTIAL CHRONIC HEALTH EFFECTS	
GENERAL	N.A.
CARCINOGENICITY	N.A.

MUTAGENICITY	N.A.		
TERATOGENCITY	N.A.		
DEVELOPMENTAL EFFECTS	N.A.		
FERTILITY EFFECTS	N.A.		
NUMERICAL MEASURES OF TOXICITY (ACUTE TOXICITY ESTIMATE)	N.A.		
TOXICOLOGICAL DATA:			
INGREDIENT	ORAL RAT (LD50)	SKIN RABBIT (LD50)	INHALATION RAT (LC50)
Proprietary Polymer	N/A	N/A	N/A

SECTION 12 – ECOLOGICAL INFORMATION	
TOXICITY	Based largely or completely on information for similar material(s): Material is practically non-toxic to aquatic organisms on an acute basis (LC50 or EC50 > 100 mg/L in the most sensitive species tested).
PERSISTENCE AND DEGARDABILITY	The polymeric component is not expected to biodegrade.
BIOACCUMULATIVE POTENTIAL	N/A
MOBILITY IN SOIL	N/A
OTHER ADVERSE EFFECTS	N/A

SECTION 13 – DISPOSAL CONSIDERATIONS	
DISPOSAL CONSIDERATIONS	Do not dump into any sewers, on the ground, or into any body of water. All disposal methods must be in compliance with all Federal/State/Provincial and local laws and regulations. Waste characterizations and compliance with applicable laws are solely the responsibility of the waste generator.

SECTION 14 – TRANSPORTATION INFORMATION

Department of Transportation (DOT) - US	This product is not regulated by the DOT.
Transportation of Dangerous Goods (TDG) - Canada	This product is not regulated by the TDG.

	DOT Classification	TDG Classification	Mexico Classification	IMDG	IATA
UN NUMBER	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN PROPER NAME	-	-	-	-	-
PACKING GROUP	-	-	-	-	-
TRANSPORT HAZARD CLASS(ES)	-	-	-	-	-
ENVIRONMENTAL HAZARDS	No.	No.	No.	No.	No.
ADDITIONAL INFORMATION	**Special Provisions** Not Applicable	**Special Provisions** Not Applicable	**Special Provisions** Not Applicable	**Emergency Schedules (Ems)** Not Applicable	**Special Provisions** Not Applicable

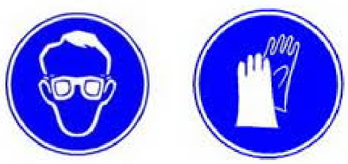
SPECIAL PRECATIONS FOR USERS:	Multi-model shipping descriptions are provided for information purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (sea, air, etc.), does not indicate that the product is packaged suitably for the mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport. People loading and unloading dangerous goods must be trained on all of the risks deriving from the substances and on all actions in case of emergency situations.
TRANSPORT IN BULK ACCORDING TO ANNEX II OF MARPOL II 73/78 AND THE IBC CODE	N.A
PROPER SHIPPING NAME	N.A
SHIP TYPE	N.A
POLLUTION CATEGORY	N.A

SECTION 15 – REGULATORY INFORMATION	
U.S. FEDERAL REGULATION	
OSHA	Not classified as hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)
CERCLA – SARA HAZARD CATEGORY	This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following category: None.
SARA SECTION 313	This product does not contain toxic chemical(s) at or above the de minimus concentrations subject to the reporting requirements of section 313 of Title III Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372.
TOXIC SUBSTANCES CONTROL ACT	TSCA Section 8(b) – Inventory Status: All components of this material are listed on or exempt from the TSCA inventory.
CALIFORNIA PROP. 65	This product may contain chemical(s) known to the state of California to cause cancer and/or birth defects or other reproductive harm.
INTERNATIONAL REGULATIONS	
CANADIAN EPA	This product complies with Domestic Substance List of the Canadian Environmental Agency.
CANADIAN WHMIS CLASS	This material is not classified as a controlled product under the WHMIS. Canadian Inventory Status: All components of this material are listed on the Canadian Domestic Substances List (DSL). Additional Canadian Regulatory Information: This product does not contain a substance present on the WHMIS Ingredient Disclosure List (IDL) at or above the specified concentration limit.

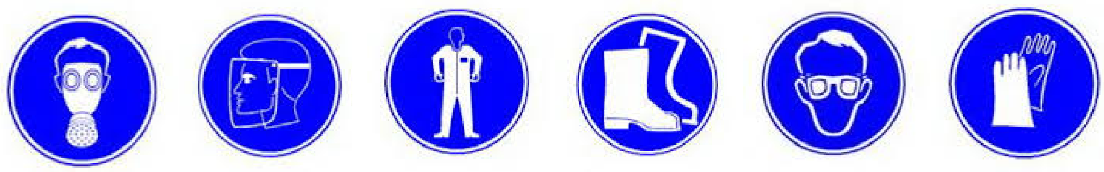
SECTION 16 – OTHER INFORMATION

HMIS RATINGS	HEALTH	FLAMMABILITY	REACTIVITY	PERSONAL PROTECTION
	1	0	0	B

EUROPEAN PRECAUTIONARY PICTOGRAMS
General:



If spraying or in poorly ventilated area:



PREVIOUS SDS REVISION DATE	6/07
REASON FOR REVISION	N/A
VOLATILE ORGANIC COMPOUNDS (VOC'S)	<50 grams/ltr
LEGEND	N.A. – Not Applicable, N.E. – Not Established, N.D. – Not Determined
ABBREVIATIONS USED	N/A – Information or data not available, NTP – National Toxicological Program, IARC – International Agency for Research on Cancer, NIOSH – National Institute of Occupational Safety and Health, PEL – Permissible Exposure Limit (8-hour TWA OSHA), TLV – Threshold Limit Value (8-Hour TWA ACGIH), STEL – Short Term Exposure Limit (15 min. TWA OSHA), C – Ceiling Value
NOTICE TO READER	It is recommended that each customer or recipient of this Safety Data Sheet (SDS) study it carefully and consult resources, as necessary or appropriate, to become aware of and understand the data contained in this SDS and any hazards associated with the product. This information is provided in good faith and believed to be accurate as of the effective date herein. However, no warranty, express or implied, is given, The information presented here applies only to the product as shipped. The addition of a material can change the composition, hazards and risks of the product. Regulatory requirements are subject to change and may differ between various locations and jurisdictions. The

	customer/buyer/user is responsible to ensure that their activities comply with all country, federal, state, provincial or local laws. The conditions for use of the product are not under the control of the manufacturer; the customer/buyer/user is responsible to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific SDS, the manufacturer cannot be responsible for the SDS's obtained from any other source. Note: This information must be included in all SDS that are copied and distributed for this material.

END OF SAFETY DATA SHEET

Ames'® Safe-T-Deck® Urethane Paint Tinted

Product Name (as used on Label and List)
Color: Tintable White, Grey, or Tan
Revision Date: 2-15-18

GHS Safety **D**ata **S**heets (SDS)

SECTION 1 – IDENTIFICATION	
PRODUCT NAME	Ames'® Safe-T-Deck® Urethane Paint Tintable White, Grey, Tan
OTHER MEANS OF IDENTIFICATION	SDUPTWXHRD, SDUPGYXHRD,SDUPTNXHRD
END USE	Latex paints and coatings, water borne dispersion
MANUFACTURER	Ames Research Laboratories, Inc. Salem, Oregon 97302 Corporate Office: 1891 16th Street SE Salem, Oregon 97302-1436 (503) 588-3330
EMERGENCY PHONE NUMBER	1-888-345-0809 or Chemtrec 1-800-424-9300

SECTION 2 – HAZARD IDENTIFICATION	
CLASSIFICATION	Acute Toxicity, Dermal – 5: Serious Eye Damage/Eye Irritation – 2B: Acute Toxicity, Inhalation – 5:
SIGNAL WORD	WARNING
HAZARD STATEMENT	May be harmful in contact with skin (H313) Causes eye irritation (H320) May be harmful if inhaled (H333)
HAZARD PICTOGRAMS	N.A. – No Symbol
PRECAUTIONARY STATEMENT(S)	Wear protective gloves/protective clothing/eye protection/face protection. Avoid breathing dust/fume/gas/mist/vapor/spray. Use only outdoors or in well-ventilated area. If hands or other body parts come in contact, wash thoroughly after handling. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. (P305+P351+P338) If eye irritation persists: Get medical attention from a physician. (P337+P313) IF ON SKIN OR INHALED: Call a POISION CENTER or doctor/physician if you feel unwell. (P304+P312)
HAZARDS NOT OTHERWISE CLASSIFIED	N.A.

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS		
SUBSTANCE / MIXTURE	Mixture	
OTHER MEANS OF IDENTIFICATION	N.A.	
CAS # / IDENTIFIERS		
INGREDIENT NAME	% BY WEIGHT	CAS NUMBER
Proprietary Acrylic Polymer	25 – 35 %	Proprietary
Polyurethane Dispersion Agent	25 – 35 %	Proprietary Mixture
Water	15 – 20 %	7732-18-5
Titanium Dioxide Pigment	10 – 15 %	Proprietary Mixture
2,2,4-Trimethyl-1,3-Pentanediol Monoisobutyrate	1 – 5 %	25265-77-4

Any concentrations shown in a range are to protect trade secret confidentiality or is due to batch variation. There are no additional ingredients present, which within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

SECTION 4 – FIRST AID MEASURES	
DESCRIPTION OF NECESSARY FIRST AID MEASURES	
EYE CONTACT	Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do so while rinsing. If eye irritation persists: Get medical attention from a physician.
INHALATION	Remove affected individual(s) to fresh air. Get medical attention from a physician if breathing difficulty develops.
SKIN CONTACT	Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops. Wash contaminated clothes before reuse.
INGESTION	If swallowed, rinse mouth thoroughly. Do not induce vomiting. Never give anything by mouth to an unconscious person. Seek medical attention if irritation persists or if concerned.
MOST IMPORTANT SYMPTOMS / EFFECTS, ACUTE AND DELAYED	
EYE CONTACT	May cause eye irritation
INHALATION	With good ventilation, exposure to vapors not expected to cause adverse effects.
SKIN CONTACT	Prolonged skin exposure may cause skin irritation.
INGESTION	No hazards anticipated from swallowing small incidental amounts during use of this product.
INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDS, IF NECESSARY	
EYE CONTACT	N/A
INHALATION	N/A
SKIN CONTACT	N/A
INGESTION	N/A

SECTION 5 – FIRE FIGHTING MEASURES	
EXTINGUISHING MEDIA: SUITABLE MEDIA	To extinguish combustible residues of this product, use water fog, CO2, dry chemical or chemical foam or alcohol-resistant foam.
EXTINGUISHING MEDIA: UNSUITABLE MEDIA	N/A
SPECIFIC HAZARDS ARISING FROM THE CHEMICAL	Under fire conditions, some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to hydrocarbons, CO and dense smoke.
SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS	Keep people away. Isolate fire area and deny unnecessary entry. Containers of this material may build up pressure if exposed to heat (fire). Use water spray to cool fire-exposed containers.
SPECIAL EQUIPMENT FOR FIRE-FIGHTERS	Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective clothing. If protective equipment is not available or not used, fight fire from a protected location or safe distance.

SECTION 6 – ACCIDENTAL RELEASE MEASURES	
PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES	
FOR NON-EMGERGENCY PERSONNEL	Avoid unnecessary exposure or contact. Barricade the area to restrict access. Persons not wearing protective equipment (see Section 8) should be excluded from the area of the spill until clean up has been completed.
FOR EMERGENCY PERSONNEL	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials.
ENVIRONMENTAL PRECAUTIONS	Stop leak at source when it is safe to do so. Dike and contain spill. Prevent spilled material from contaminating soil or entering drains, sewers, streams or other bodies of water.
METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP	
LARGE SPILLS	Avoid dilution with water to minimize the extent of the spill. Recover and recycle spilled latex if possible, otherwise, collect with absorbent material and transfer to appropriate containers for disposal. Water may be used for final cleaning of the affected area.
SMALL SPILLS	Same as above.

SECTION 7 – HANDLING AND STORAGE	
PRECAUTIONS FOR SAFE HANDLING	
PROTECTIVE MEASURES	Use in a well ventilated area. Keep out of reach of children. If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminants below the respective exposure limits. Use goggles and gloves. Similar to most latex paints.
GENERAL HYGIENE	Practice reasonable care to avoid repeated, prolonged skin contact. An eye wash station and a safety shower should be readily accessible to workers whenever this material is handled or stored.
CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATABILITIES	Store at temperatures between 40° F (4.4° C) and 110° F (43.3° C). Keep container closed when not in use. PROTECT FROM FREEZING.

SECTION 8 – EXPOSURE CONTROL/PERSONAL PROTECTION				
OCCUPATIONAL EXPOSURE LIMITS				
	OSHA PEL 8-HR TWA	OSHA PEL STEL/Ceiling	ACGIH TLV-TWA	ACGIH TLV-STEL
Proprietary Acrylic Polymer	N.E.	N.E.	N.E.	N.E.
Polyurethane Dispersion Agent	N.E.	N.E.	N.E.	N.E.
Titanium Dioxide	15 mg/m^3	N.E.	10 mg/m^3	N.E.
2,2,4-Trimethyl-1,3-Pentanediol Monoisobutyrate	N.E.	N.E.	N.E.	N.E.
CONTROLS				
ENGINEERING CONTROLS	Local exhaust ventilation may be necessary to control any air contaminants to within their respective exposure limits during the use of this product, However, good general ventilation should be sufficient for most conditions.			
PERSONAL PROTECTIVE EQUIPMENT	Wear safety glasses with side shields or safety goggles. Wear clean, long-sleeved, body-covering clothing. Nitrile, Neoprene®, or rubber gloves should provide protection against skin contact. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, or areas are poorly vented, wear an approved air-purifying respirator.			

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE	
PHYSICAL STATE	Liquid
COLOR	Tintable white, grey or tan
ODOR	Mild odor
ODOR THRESHOLD	N/A
pH	9.0-10.0
MELTING POINT	N/A
BOILING POINT	N/A
FREEZING POINT	N/A
FLASH POINT	N.A.
EVAPORATION RATE	N/A
FLAMMABILITY (SOLID, GAS)	N/A
UPPER / LOWER FLAMMABILITY OR EXPLOSIVE LIMITS	N.A.
VAPOR PRESSURE	N/A
VAPOR DENSITY	N/A
RELATIVE DENSITY	N/A
SOLUBILITY(IES)	Product is sold as dilutable. Polymeric components insoluble.
PARTITION COEFFICIENT: N-OCTANOL / WATER	N/A
AUTO-IGNITION TEMPERATURE	N.A.
DECOMPOSITION TEMPERATURE	N/A
VISOCITY	N/A
SPECIFIC GRAVITY	1.01-1.05

SECTION 10 – STABILITY AND REACTIVITY	
REACTIVITY	This product is not reactive under normal conditions.
CHEMICAL STABILITY	This product is stable under normal storage conditions and during its intended use.
POSSIBILITY OF HAZARDOUS REACTION	Will not occur under normal conditions.
CONDITIONS TO AVOID	Avoid freezing temperatures (less than 32° F or 0° C). Products decompose at elevated temperatures.
INCOMPATIBLE MATERIALS	Addition of chemicals, such as acids or multivalent metal salts, may cause coagulation.

HAZARDOUS DECOMPOSITION PRODUCTS	Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Thermal decomposition may produce various hydrocarbons and irritating, acrid vapors.

SECTION 11 – TOXICOLOGICAL INFORMATION	
INFORMATION ON TOXICOLOGICAL EFFECTS	
ACUTE TOXICITY	May cause slight irritation to skin, eyes, throat and respiratory tract.
IRRITATION / CORROSION	May cause slight irritation to skin, eyes, throat and respiratory tract.
SENSITIZATION	N.A.
MUTAGENICITY	N.A.
CARCINOGENICITY	N.A.
REPRODUCTIVE TOXICITY	N.A.
TETRAOGENICITY	N.A.
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)	N.A.
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE)	N.A.
ASPIRATION HAZARD	N.A.
INFORMATION ON LIKELY ROUTES OF EXPOSURE	Dermal is likely route of exposure.
POTENTIAL ACUTE HEALTH EFFECTS	
EYE CONTACT	May cause slight transient (temporary) eye irritation.
INHALATION	With good ventilation, a single exposure to vapors is not expected to cause adverse effects.
SKIN CONTACT	Short single exposure not likely to cause significant skin irritation. Prolonged and repeated exposure may cause slight skin irritation. Material may stick to skin causing irritation upon removal. A single, prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts.
INGESTION	Single dose oral toxicity is considered to be extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.
SYMPTOMS RELATED TO THE PHYSICAL, CHEMCIAL AND TOXICOLOGICAL CHARACTERISTICS	
EYE CONTACT	N/A
INHALATION	N/A

SKIN CONTACT	N/A
INGESTION	N/A
DELAYED AND IMMEDIATE EFFECTS AND ALSO CHRONIC EFFECTS FROM SHORT AND LONG TERM EXPOSURE	
SHORT TERM EXPOSURE – POTENTIAL IMMEDIATE EFFECTS	N/A
SHORT TERM EXPOSURE – POTENTIAL DELAYED EFFECTS	N/A
LONG TERM EXPOSURE – POTENTIAL IMMEDIATE EFFECTS	N/A
LONG TERM EXPOSURE – POTENTIAL DELAYED EFFECTS	N/A
POTENTIAL CHRONIC HEALTH EFFECTS	
GENERAL	N.A.
CARCINOGENICITY	N.A.
MUTAGENICITY	N.A.
TERATOGENCITY	N.A.
DEVELOPMENTAL EFFECTS	N.A.
FERTILITY EFFECTS	N.A.
NUMERICAL MEASURES OF TOXICITY (ACUTE TOXICITY ESTIMATE)	N.A.

TOXICOLOGICAL DATA:

INGREDIENT	ORAL RAT (LD50)	SKIN RABBIT (LD50)	INHALATION RAT (LC50)
Proprietary Acrylic Polymer	N/A	N/A	N/A
Polyurethane Dispersion Agent	N/A	N/A	N/A
Titanium Dioxide	10000 mg/kg	N/A	N/A
2,2,4-Trimethyl-1,3-Pentanediol Monoisobutyrate	6500 mg/kg	15200 mg/kg	N/A

SECTION 12 – ECOLOGICAL INFORMATION	
TOXICITY	Based largely or completely on information for similar material(s): Material is practically non-toxic to aquatic organisms on an acute basis (LC50 or EC50 > 100 mg/L in the most sensitive species tested).
PERSISTENCE AND DEGARDABILITY	The polymeric component is not expected to biodegrade.
BIOACCUMULATIVE POTENTIAL	N/A
MOBILITY IN SOIL	Not expected due to the product's high molecular weight.
OTHER ADVERSE EFFECTS	N/A

SECTION 13 – DISPOSAL CONSIDERATIONS	
DISPOSAL CONSIDERATIONS	Do not dump into any sewers, on the ground, or into any body of water. All disposal methods must be in compliance with all Federal/State/Provincial and local laws and regulations. Waste characterizations and compliance with applicable laws are solely the responsibility of the waste generator.

SECTION 14 – TRANSPORTATION INFORMATION					
Department of Transportation (DOT) - US			This product is not regulated by the DOT.		
Transportation of Dangerous Goods (TDG) - Canada			This product is not regulated by the TDG.		
	DOT Classification	TDG Classification	Mexico Classification	IMDG	IATA
UN NUMBER	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN PROPER NAME	-	-	-	-	-
PACKING GROUP	-	-	-	-	-
TRANSPORT HAZARD CLASS(ES)	-	-	-	-	-
ENVIRONMENTAL HAZARDS	No.	No.	No.	No.	No.
ADDITIONAL INFORMATION	**Special Provisions** Not Applicable	**Special Provisions** Not Applicable	**Special Provisions** Not Applicable	**Emergency Schedules (Ems)** Not Applicable	**Special Provisions** Not Applicable
SPECIAL PRECATIONS FOR USERS:	Multi-model shipping descriptions are provided for information purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (sea, air, etc.), does not indicate that the product is packaged suitably for the mode of transport. All				

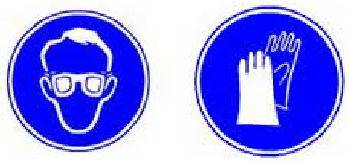
	packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport. People loading and unloading dangerous goods must be trained on all of the risks deriving from the substances and on all actions in case of emergency situations.
TRANSPORT IN BULK ACCORDING TO ANNEX II OF MARPOL II 73/78 AND THE IBC CODE	N.A
PROPER SHIPPING NAME	N.A
SHIP TYPE	N.A
POLLUTION CATEGORY	N.A

SECTION 15 – REGULATORY INFORMATION	
U.S. FEDERAL REGULATION	
OSHA	Not classified as hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)
CERCLA – SARA HAZARD CATEGORY	This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following category: None.
SARA SECTION 313	This product does not contain toxic chemical(s) at or above the de minimus concentrations subject to the reporting requirements of section 313 of Title III Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372.
TOXIC SUBSTANCES CONTROL ACT	TSCA Section 8(b) – Inventory Status: All components of this material are listed on or exempt from the TSCA inventory.
CALIFORNIA PROP. 65	Warning: This product may contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.
INTERNATIONAL REGULATIONS	
CANADIAN EPA	This product complies with Domestic Substance List of the Canadian Environmental Agency.
CANADIAN WHMIS CLASS	This material is not classified as a controlled product under the WHMIS. Canadian Inventory Status: All components of this material are listed on the Canadian Domestic Substances List (DSL).

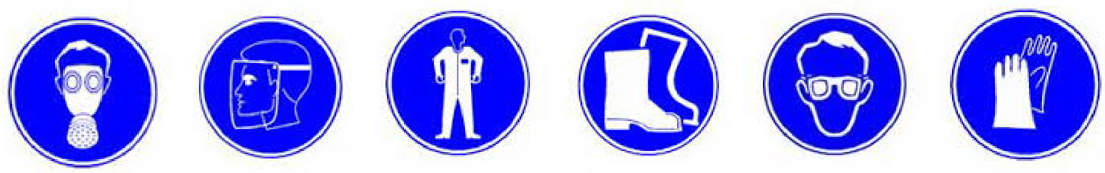
SECTION 16 – OTHER INFORMATION

HMIS RATINGS	HEALTH	FLAMMABILITY	REACTIVITY	PERSONAL PROTECTION
	1	1	0	B

EUROPEAN PRECAUTIONARY PICTOGRAMS
General:



If spraying or in poorly ventilated area:



PREVIOUS SDS REVISION DATE	9/15
REASON FOR REVISION	N/A
VOLATILE ORGANIC COMPOUNDS (VOC'S)	< 50 grams/liter
LEGEND	N.A. – Not Applicable, N.E. – Not Established, N.D. – Not Determined
ABBREVIATIONS USED	N/A – Information or data not available, NTP – National Toxicological Program, IARC – International Agency for Research on Cancer, NIOSH – National Institute of Occupational Safety and Health, PEL – Permissible Exposure Limit (8-hour TWA OSHA), TLV – Threshold Limit Value (8-Hour TWA ACGIH), STEL – Short Term Exposure Limit (15 min. TWA OSHA), C – Ceiling Value
NOTICE TO READER	It is recommended that each customer or recipient of this Safety Data Sheet (SDS) study it carefully and consult resources, as necessary or appropriate, to become aware of and understand the data contained in this SDS and any hazards associated with the product. This information is provided in good faith and believed to be accurate as of the effective date herein. However, no warranty, express or implied, is given, The information presented here applies only to the product as shipped. The addition of a material can change the composition, hazards and risks of the product. Regulatory requirements are subject to change and may differ between various locations and jurisdictions. The

	customer/buyer/user is responsible to ensure that their activities comply with all country, federal, state, provincial or local laws. The conditions for use of the product are not under the control of the manufacturer; the customer/buyer/user is responsible to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific SDS, the manufacturer cannot be responsible for the SDS's obtained from any other source. Note: This information must be included in all SDS that are copied and distributed for this material.

END OF SAFETY DATA SHEET

Ames'® Blue Max® Trowel-grade
Product Name (as used on Label and List)
Color: Blue
Revision Date: 2-15-18

GHS Safety **D**ata **S**heets (SDS)

SECTION 1 – IDENTIFICATION	
PRODUCT NAME	Ames'® Blue Max® Trowel-grade
OTHER MEANS OF IDENTIFICATION	BMXTG
END USE	Rubber based patch compound and filler, water borne dispersion
MANUFACTURER	Ames Research Laboratories, Inc. Salem, Oregon 97302 Corporate Office: 1891 16th Street SE Salem, Oregon 97302-1436 (503) 588-3330
EMERGENCY PHONE NUMBER	1-888-345-0809 or Chemtrec 1-800-424-9300

SECTION 2 – HAZARD IDENTIFICATION	
CLASSIFICATION	Acute Toxicity, Dermal – 5: Serious Eye Damage/Eye Irritation – 2B: Acute Toxicity, Inhalation – 5:
SIGNAL WORD	WARNING
HAZARD STATEMENT	May be harmful in contact with skin (H313) Causes eye irritation (H320) May be harmful if inhaled (H333)
HAZARD PICTOGRAMS	N.A. – No Symbol
PRECAUTIONARY STATEMENT(S)	Wear protective gloves/protective clothing/eye protection/face protection. Avoid breathing dust/fume/gas/mist/vapor/spray. Use in well-ventilated area. If hands or other body parts come in contact, wash thoroughly after handling. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. (P305+P351+P338) If eye irritation persists: Get medical attention from a physician. (P337+P313) IF ON SKIN OR INHALED: Call a POISION CENTER or doctor/physician if you feel unwell. (P304+P312)
HAZARDS NOT OTHERWISE CLASSIFIED	N.A.

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS		
SUBSTANCE / MIXTURE	Mixture	
OTHER MEANS OF IDENTIFICATION	N. A.	
CAS # / IDENTIFIERS		
INGREDIENT NAME	% BY WEIGHT	CAS NUMBER
Proprietary Polymer*	55 – 65 %	Proprietary
Limestone (Calcium Carbonate)	30 – 40 %	1317-65-3
Propylene Glycol	1 – 5%	57-55-6

Any concentrations shown in a range are to protect trade secret confidentiality or is due to batch variation. There are no additional ingredients present, which within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.
** A specialty formulated water-base man-made rubber technology.*

SECTION 4 – FIRST AID MEASURES	
DESCRIPTION OF NECESSARY FIRST AID MEASURES	
EYE CONTACT	Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do so while rinsing. If eye irritation persists: Get medical attention from a physician.
INHALATION	Remove affected individual(s) to fresh air. Get medical attention from a physician if breathing difficulty develops.
SKIN CONTACT	Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops. Wash contaminated clothes before reuse.
INGESTION	If swallowed, rinse mouth thoroughly. Do not induce vomiting. Never give anything by mouth to an unconscious person. Seek medical attention if irritation persists or if concerned.
MOST IMPORTANT SYMPTOMS / EFFECTS, ACUTE AND DELAYED	
EYE CONTACT	May cause eye irritation
INHALATION	With good ventilation, exposure to vapors not expected to cause adverse effects.
SKIN CONTACT	Prolonged skin exposure may cause skin irritation.
INGESTION	No hazards anticipated from swallowing small incidental amounts during use of this product.
INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDS, IF NECESSARY	
EYE CONTACT	N/A
INHALATION	N/A
SKIN CONTACT	N/A
INGESTION	N/A

SECTION 5 – FIRE FIGHTING MEASURES	
EXTINGUISHING MEDIA: SUITABLE MEDIA	To extinguish combustible residues of this product, use water fog, CO2, dry chemical or chemical foam or alcohol-resistant foam.
EXTINGUISHING MEDIA: UNSUITABLE MEDIA	N/A
SPECIFIC HAZARDS ARISING FROM THE CHEMICAL	Under fire conditions, some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to hydrocarbons, CO and dense smoke.
SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS	Keep people away. Isolate fire area and deny unnecessary entry. Containers of this material may build up pressure if exposed to heat (fire). Use water spray to cool fire-exposed containers.
SPECIAL EQUIPMENT FOR FIRE-FIGHTERS	Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective clothing. If protective equipment is not available or not used, fight fire from a protected location or safe distance.

SECTION 6 – ACCIDENTAL RELEASE MEASURES	
PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES	
FOR NON-EMGERGENCY PERSONNEL	Avoid unnecessary exposure or contact. Barricade the area to restrict access. Persons not wearing protective equipment (see Section 8) should be excluded from the area of the spill until cleanup has been completed.
FOR EMERGENCY PERSONNEL	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials.
ENVIRONMENTAL PRECAUTIONS	Stop leak at source when it is safe to do so. Dike and contain spill. Prevent spilled material from contaminating soil or entering drains, sewers, streams or other bodies of water.
METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP	
LARGE SPILLS	Avoid dilution with water to minimize the extent of the spill. Recover and recycle spilled product if possible, otherwise, collect with absorbent material and transfer to appropriate containers for disposal. Water may be used for final cleaning of the affected area.
SMALL SPILLS	Same procedures as listed above for large spills.

SECTION 7 – HANDLING AND STORAGE	
PRECAUTIONS FOR SAFE HANDLING	
PROTECTIVE MEASURES	Use in a well ventilated area. Keep out of reach of children. If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminants below the respective exposure limits. Use goggles and gloves. Similar to most latex paints.
GENERAL HYGIENE	Practice reasonable care to avoid repeated, prolonged skin contact. Wash thoroughly after handling. Do not eat, drink, smoke or use personal products when handling chemical substances.
CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATABILITIES	Store at temperatures between 40° F (4.4° C) and 110° F (43.3° C). Keep container closed when not in use. PROTECT FROM FREEZING.

SECTION 8 – EXPOSURE CONTROL/PERSONAL PROTECTION				
OCCUPATIONAL EXPOSURE LIMITS				
	OSHA PEL 8-HR TWA	OSHA PEL STEL/Ceiling	ACGIH TLV-TWA	ACGIH TLV-STEL
Proprietary Polymer	N.E.	N.E.	N.E.	N.E.
Limestone	15 mg/m^3	N.E.	10 mg/m^3	N.E.
Propylene Glycol	N.E.	N.E.	N.E.	N.E.
CONTROLS				
ENGINEERING CONTROLS	Good general ventilation should be sufficient for most conditions.			
PERSONAL PROTECTIVE EQUIPMENT	Wear safety glasses with side shields or safety goggles. Wear clean, long-sleeved, body-covering clothing. Nitrile, Neoprene®, or rubber gloves should provide protection against skin contact. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, or areas are poorly vented, wear an approved air-purifying respirator.			

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE	
PHYSICAL STATE	Thick liquid
COLOR	Blue
ODOR	Slight odor
ODOR THRESHOLD	N/A
pH	9.0 – 10
MELTING POINT	N/A
BOILING POINT	212° F (100° F)
FREEZING POINT	32° F (0° C)

FLASH POINT	N/A
EVAPORATION RATE	N/A
FLAMMABILITY (SOLID, GAS)	N/A
UPPER / LOWER FLAMMABILITY OR EXPLOSIVE LIMITS	N/A
VAPOR PRESSURE	N/A
VAPOR DENSITY	N/A
RELATIVE DENSITY	N/A
SOLUBILITY(IES)	Product is sold as dilutable. Polymer component is insoluble.
PARTITION COEFFICIENT: N-OCTANOL / WATER	N/A
AUTO-IGNITION TEMPERATURE	N.A.
DECOMPOSITION TEMPERATURE	> 350.6° F (177° C)
VISOCITY	N/A
SPECIFIC GRAVITY	1.2 – 1.25

SECTION 10 – STABILITY AND REACTIVITY	
REACTIVITY	This product is not reactive under normal conditions.
CHEMICAL STABILITY	This product is stable under normal storage conditions and during its intended use.
POSSIBILITY OF HAZARDOUS REACTION	Will not occur under normal conditions.
CONDITIONS TO AVOID	Avoid freezing temperatures (less than 32° F or 0° C). Products decompose at elevated temperatures.
INCOMPATIBLE MATERIALS	Addition of chemicals, such as acids or multivalent metal salts, may cause coagulation.
HAZARDOUS DECOMPOSITION PRODUCTS	Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Thermal decomposition may produce various hydrocarbons and irritating, acrid vapors.

SECTION 11 – TOXICOLOGICAL INFORMATION	
INFORMATION ON TOXICOLOGICAL EFFECTS	
ACUTE TOXICITY	May cause slight transient (temporary) eye irritation. Corneal injury unlikely. Short single exposure not likely to cause significant skin irritation. Prolonged and repeated exposure may cause slight skin irritation. Material may stick to skin causing irritation upon removal. A single, prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. With good ventilation, a single exposure to vapors is not expected to cause adverse effects. Single dose oral toxicity is considered to be extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.
IRRITATION / CORROSION	May cause slight irritation to skin and eyes.
SENSITIZATION	N.A.
MUTAGENICITY	N.A.
CARCINOGENICITY	N.A.
REPRODUCTIVE TOXICITY	N.A.
TETRAOGENICITY	N.A.
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)	N.A.
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE)	N.A.
ASPIRATION HAZARD	N.A.
INFORMATION ON LIKELY ROUTES OF EXPOSURE	Dermal is likely route of exposure.
POTENTIAL ACUTE HEALTH EFFECTS	
EYE CONTACT	May cause slight transient (temporary) eye irritation.
INHALATION	With good ventilation, a single exposure to vapors is not expected to cause adverse effects.
SKIN CONTACT	Short single exposure not likely to cause significant skin irritation. Prolonged and repeated exposure may cause slight skin irritation. Material may stick to skin causing irritation upon removal. A single, prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts.

INGESTION	Single dose oral toxicity is considered to be extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.		
SYMPTOMS RELATED TO THE PHYSICAL, CHEMCIAL AND TOXICOLOGICAL CHARACTERISTICS			
EYE CONTACT	N/A		
INHALATION	N/A		
SKIN CONTACT	N/A		
INGESTION	N/A		
DELAYED AND IMMEDIATE EFFECTS AND ALSO CHRONIC EFFECTS FROM SHORT AND LONG TERM EXPOSURE			
SHORT TERM EXPOSURE – POTENTIAL IMMEDIATE EFFECTS	N/A		
SHORT TERM EXPOSURE – POTENTIAL DELAYED EFFECTS	N/A		
LONG TERM EXPOSURE – POTENTIAL IMMEDIATE EFFECTS	N/A		
LONG TERM EXPOSURE – POTENTIAL DELAYED EFFECTS	N/A		
POTENTIAL CHRONIC HEALTH EFFECTS			
GENERAL	N.A.		
CARCINOGENICITY	N.A.		
MUTAGENICITY	N.A.		
TERATOGENCITY	N.A.		
DEVELOPMENTAL EFFECTS	N.A.		
FERTILITY EFFECTS	N.A.		
NUMERICAL MEASURES OF TOXICITY (ACUTE TOXICITY ESTIMATE)	N.A.		
TOXICOLOGICAL DATA:			
INGREDIENT	ORAL RAT (LD50)	SKIN RABBIT (LD50)	INHALATION RAT (LC50)
Proprietary Polymer	N/A	N/A	N/A
Propylene Glycol	>20000 mg/kg	>10000 mg/kg	6.15 mg/l
Limestone	>5000 mg/kg	N/A	N/A

SECTION 12 – ECOLOGICAL INFORMATION	
TOXICITY	Based largely or completely on information for similar material(s): Material is practically non-toxic to aquatic organisms on an acute basis (LC50 or EC50 > 100 mg/L in the most sensitive species tested).
PERSISTENCE AND DEGARDABILITY	The polymeric component is not expected to biodegrade.
BIOACCUMULATIVE POTENTIAL	N/A
MOBILITY IN SOIL	Not expected due to the product's high molecular weight.
OTHER ADVERSE EFFECTS	N/A

SECTION 13 – DISPOSAL CONSIDERATIONS	
DISPOSAL CONSIDERATIONS	Do not dump into any sewers, on the ground, or into any body of water. All disposal methods must be in compliance with all Federal/State/Provincial and local laws and regulations. Waste characterizations and compliance with applicable laws are solely the responsibility of the waste generator.

SECTION 14 – TRANSPORTATION INFORMATION	
Department of Transportation (DOT) - US	This product is not regulated by the DOT.
Transportation of Dangerous Goods (TDG) - Canada	This product is not regulated by the TDG.

	DOT Classification	TDG Classification	Mexico Classification	IMDG	IATA
UN NUMBER	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN PROPER NAME	-	-	-	-	-
PACKING GROUP	-	-	-	-	-
TRANSPORT HAZARD CLASS(ES)	-	-	-	-	-
ENVIRONMENTAL HAZARDS	No.	No.	No.	No.	No.
ADDITIONAL INFORMATION	**Special Provisions** Not Applicable	**Special Provisions** Not Applicable	**Special Provisions** Not Applicable	**Emergency Schedules (Ems)** Not Applicable	**Special Provisions** Not Applicable

SPECIAL PRECATIONS FOR USERS:	Multi-model shipping descriptions are provided for information purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (sea, air, etc.), does not indicate that the product is packaged suitably for the mode of transport. All packaging

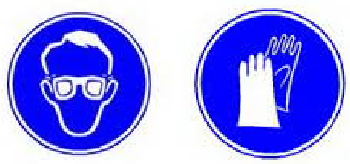
	must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport. People loading and unloading dangerous goods must be trained on all of the risks deriving from the substances and on all actions in case of emergency situations.
TRANSPORT IN BULK ACCORDING TO ANNEX II OF MARPOL II 73/78 AND THE IBC CODE	N.A
PROPER SHIPPING NAME	N.A
SHIP TYPE	N.A
POLLUTION CATEGORY	N.A

SECTION 15 – REGULATORY INFORMATION	
U.S. FEDERAL REGULATION	
OSHA	Not classified as hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)
CERCLA – SARA HAZARD CATEGORY	This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following category: None.
SARA SECTION 313	This product does not contain toxic chemical(s) at or above the de minimus concentrations subject to the reporting requirements of section 313 of Title III Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372.
TOXIC SUBSTANCES CONTROL ACT	TSCA Section 8(b) – Inventory Status: All components of this material are listed on or exempt from the TSCA inventory.
CALIFORNIA PROP. 65	This product may contain chemical(s) known to the state of California to cause cancer and/or birth defects or other reproductive harm
INTERNATIONAL REGULATIONS	
CANADIAN EPA	This product complies with Domestic Substance List of the Canadian Environmental Agency.
CANADIAN WHMIS CLASS	This material is not classified as a controlled product under the WHMIS. Canadian Inventory Status: All components of this material are listed on the Canadian Domestic Substances List (DSL). Additional Canadian Regulatory Information: This product does not contain a substance present on the WHMIS Ingredient Disclosure List (IDL) at or above the specified concentration limit.

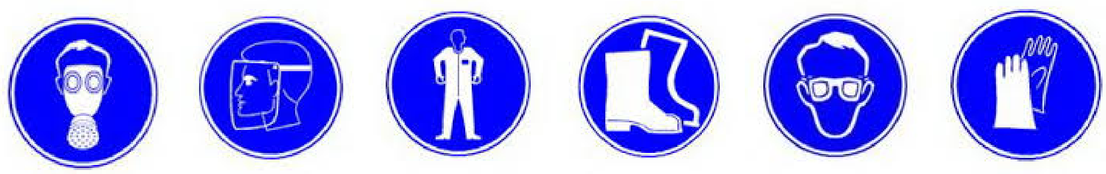
SECTION 16 – OTHER INFORMATION

HMIS RATINGS	HEALTH 1	FLAMMABILITY 0	REACTIVITY 0	PERSONAL PROTECTION B

EUROPEAN PRECAUTIONARY PICTOGRAMS
General:



If spraying or in poorly ventilated area:



PREVIOUS SDS REVISION DATE	N/A
REASON FOR REVISION	N/A
VOLATILE ORGANIC COMPOUNDS (VOC’S)	<50g/Liter
LEGEND	N.A. – Not Applicable, N.E. – Not Established, N.D. – Not Determined
ABBREVIATIONS USED	N/A – Information or data not available, NTP – National Toxicological Program, IARC – International Agency for Research on Cancer, NIOSH – National Institute of Occupational Safety and Health, PEL – Permissible Exposure Limit (8-hour TWA OSHA), TLV – Threshold Limit Value (8-Hour TWA ACGIH), STEL – Short Term Exposure Limit (15 min. TWA OSHA), C – Ceiling Value
NOTICE TO READER	It is recommended that each customer or recipient of this Safety Data Sheet (SDS) study it carefully and consult resources, as necessary or appropriate, to become aware of and understand the data contained in this SDS and any hazards associated with the product. This information is provided in good faith and believed to be accurate as of the effective date herein. However, no warranty, express or implied, is given, The information presented here applies only to the product as shipped. The addition of a material can change the composition, hazards and risks of the product. Regulatory requirements are subject to change and may differ between various locations and jurisdictions. The

	customer/buyer/user is responsible to ensure that their activities comply with all country, federal, state, provincial or local laws. The conditions for use of the product are not under the control of the manufacturer; the customer/buyer/user is responsible to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific SDS, the manufacturer cannot be responsible for the SDS's obtained from any other source. Note: This information must be included in all SDS that are copied and distributed for this material.

END OF SAFETY DATA SHEET

MATERIAL SAFETY DATA SHEET

1) PRODUCT AND COMPANY IDENTIFICATION

THE DOW CHEMICAL COMPANY
Midland Michigan 48674
USA

24-Hour Emergency Phone Number: 989-636-4400
Customer Service: 800-366-4740

PRODUCT NAME : GREAT STUFF* Gaps and Cracks
MATERIAL TYPE : One component system
ISSUE DATE : 04/26/2007
REVISION DATE : 01/25/2007

2) COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS Number	%
Prepolymer of MDI and Polyether polyol	mixture	40-70, 60-100%
Polymethylene polyphenyl Isocyanate containing approx. 40-50% MDI (4,4'methylene bisphenyl isocyanate) CAS# 101-68-8	9016-87-9	5-10,10-30%
Liquified Petroleum Mixture containing Isobutane (CAS#75-28-5), propane (CAS# 74-98-6) and dimethyl ether (CAS# 115-10-6)	mixture	10-30%

3) HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Sprayed or heated material harmful if inhaled. May cause allergic skin reaction. May cause allergic respiratory reaction and lung injury. Avoid temperatures above 105F (41C). Toxic flammable gases and heat are released under decomposition conditions. Toxic fumes may be released in fire situations. Reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this process.

EYE

May cause moderate eye irritation. May cause very slight transient (temporary) corneal injury.

SKIN

Prolonged or repeated exposure may cause slight skin irritation. May cause allergic skin reaction in susceptible individuals. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization. May stain skin. A single prolonged exposure is not likely to result in the material being absorbed in harmful amounts.

INGESTION

Single dose oral toxicity is considered to be low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.

INHALATION

At room temperature, vapors are minimal due to low vapor pressure. However, certain operations may generate vapor or aerosol concentrations sufficient to cause irritation or other adverse effects. Such operations include those in which the material is heated, sprayed or otherwise mechanically dispersed such as drumming, venting or

pumping. Excessive exposure may cause irritation to upper respiratory tract and lungs, and pulmonary edema (fluid in the lungs). May cause respiratory sensitization in susceptible individuals. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Effects may be delayed. Decreased lung function has been associated with overexposure to isocyanates.

SYSTEMIC EFFECTS

Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

TERATOLOGY

In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother.

CANCER INFORMATION

Lung tumors have been observed in laboratory animals exposed to aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

4) FIRST-AID MEASURES

EYE

Irrigate with flowing water immediately and continuously for 15 minutes. Remove contacts after first five minutes and continue washing. Consult medical personnel.

SKIN

Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. An MDI skin decontamination study demonstrated that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water.

INGESTION

If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

INHALATION

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN

No specific antidote. Provide supportive care. Treatment based on judgment of the physician in response to reactions of the patient. May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants, and antitussives may be of help. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed for 24-48 hours for signs of respiratory distress.

5) FIRE-FIGHTING MEASURES

FLAMMABLE PROPERTIES

Flash point: -156F, -104C

Method: Estimated

HAZARDOUS COMBUSTION PRODUCTS

During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include but are not limited to: nitrogen oxides, isocyanates, hydrogen cyanide, carbon monoxide, and carbon dioxide.

MATERIAL SAFETY DATA SHEET

OTHER FLAMMABILITY INFORMATION

Product reacts with water. Reaction may produce heat and/or gases. Reaction may be violent. Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is produced when product burns. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the atoignition temperatures possibly resulting in spontaneous combustion.

EXTINGUISHING MEDIA

Use carbon dioxide, dry chemical, foam, water fog or fine spray. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effective. Do not use direct water stream which can spread fire.

FIRE FIGHTING INSTRUCTIONS

Keep people away. Isolate fire area and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water is not recommended but may be applied in very large quantities as a fine spray when other extinguishing agents are not available. Contain fire water run-off if possible. Do not use direct water stream. May spread fire. Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Use water spray to cool fire exposed containers and fire affected zone until fire is out. Immediately withdraw all personnel from area in case of rising sound from venting safety devices or discoloration of the containers. Move containers from fire area if this is possible without hazard.

PROTECTIVE EQUIPMENT - FIRE FIGHTERS

Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant clothing with SCBA. If his will not provide sufficient fire protection; consider fighting fire from a remote location.

6) ACCIDENTAL RELEASE MEASURES

PROTECT PEOPLE

Avoid any contact. Barricade area. Clear non-emergency personnel from area. Keep upwind of spill. Ventilate area of leak or spill. The area must be evacuated and reentered by persons equipped for decontamination. Use appropriate safety equipment. If available, use foam to suppress vapors.

PROTECT THE ENVIRONMENT

Contain liquid to prevent contamination of soil, surface water or ground water. Keep out of ditches, sewers, and water supplies. Should the product enter sewers or drains, it should be pumped into a covered, vented container; the cover should be placed loosely on the container but not made pressure tight. Move to a well-ventilated area. Emergency services may need to be called to assist in the cleanup operation.

CLEAN-UP

Supplies of suitable decontaminant should always be kept available. Absorb with material such as: sawdust, vermiculite, dirt, sand, clay, cob grit, Milsorb. Avoid materials such as cement powder. Collect material in suitable and properly labeled OPEN containers. Do not place in sealed container. Prolonged contact with water results in a chemical reaction which may result in rupture of the container. Place in: polylined fiber pacs, plastic drums, or properly labeled metal containers. Remove to a well ventilated area. Clean up floor areas. Attempt to neutralize by suitable decontaminant solution: Formulation 1: sodium carbonate 5-10%; liquid detergent 0.2-2%; water to make up to 100%. OR Formulation 2: Concentrated ammonia solution 3-8%; liquid detergent 0.2-2%; water to make up to 100%. If ammonia is used, use good ventilation to prevent vapor exposure. If you have any questions on how to neutralize call The Dow Chemical

Company.

7) HANDLING AND STORAGE

HANDLING

Avoid contact of this product with water at all times during handling and storage. Use only with adequate ventilation. Keep equipment clean. Use disposable containers and tools where possible. Do not eat, drink, or smoke in working area.

STORAGE

Store in a dry place. The recommended storage temperature is between 32 - 90F (0-32C). Keep containers tightly closed when not in use. Protect containers from physical abuse. Avoid direct sunlight. DO NOT incinerate aerosol can.

8) EXPOSURE CONTROL/PERSONAL PROTECTION

ENGINEERING CONTROLS

Use only with adequate ventilation. Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and the people working at this point. Odor is inadequate warning of excessive exposure.

EYE/FACE PROTECTION

Use chemical goggles.

SKIN PROTECTION

Use protective clothing impervious to this material. Selection of specific items such as faceshield, gloves, boots, apron, or full-body suit will depend on operation. Consideration of all chemicals involved, time and the dexterity needed to safely complete the job must be considered. Solvents can significantly change the permeation of a chemical through a barrier. Work with your safety equipment supplier to obtain the best Personal Protective Equipment for the job. Nitrile gloves are often found to be appropriate for work with MDI. Butyl rubber, PVC and neoprene are also often chosen.

Remove contaminated clothing immediately, wash skin area with soap and water (warm water if available) and launder clothing before reuse. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and destroyed.

RESPIRATORY PROTECTION

Atmospheric levels should be maintained below the exposure guideline. When atmospheric levels may exceed the exposure guideline, use an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive-pressure air-supplying respirator (airline or self-contained breathing apparatus). For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus.

EXPOSURE GUIDELINES(S)

Methylene bisphenyl isocyanate (MDI): ACGIH TLV is 0.005 ppm TWA and OSHA PEL is 0.02 ppm Ceiling. PELs are in accord with those recommended by OSHA, as in the 1989 revision of PELs.

Isobutane: ACGIH TLV and OSHA PEL are 800 ppm.

Propane: ACGIH TLV is 2500 ppm TWA and OSHA PEL is 1000 ppm.

Dimethyl ether: ACGIH TLV is 1000 ppm TWA.

9) PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE

liquid

VAPOR PRESSURE
4210 mm Hg at 21C/70F

SPECIFIC GRAVITY
1.1

10) STABILITY AND REACTIVITY

CHEMICAL STABILITY
Stable under recommended storage conditions.

CONDITIONS TO AVOID
Avoid temperatures above 120F, 49C. Avoid temperatures below 32F, 0C. Can react with itself at temperatures above 320F, 160C. Product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Pressure build-up can be rapid. Avoid moisture. Material reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this reaction.

INCOMPATIBILITY WITH OTHER MATERIALS
Avoid contact with acids, water, alcohols, amines, ammonia, bases, moist air, and strong oxidizers. Avoid contact with metals such as aluminum, brass, copper, galvanized metals, tin, zinc. Avoid contact with moist organic absorbents. Reaction with water will generate carbon dioxide and heat. Generation of gas can cause pressure buildup in closed systems. Avoid unintended contact with polyols. The reaction of polyols and isocyanates generate heat. Diisocyanates react with many materials and the rate of reaction increases with temperature as well as increased contact; these reactions can become violent. Contact is increased by stirring or if the other material mixes with the diisocyanate. Diisocyanates are not soluble in water and are denser than water and sink to the bottom, but react slowly at the interface. The reaction forms carbon dioxide gas and a layer of solid polyurea.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Gases are released during decomposition.

HAZARDOUS POLYMERIZATION
Can occur. Polymerization can be catalyzed by: strong bases and water. Can react with itself at temperatures above 320F (160C).

11) TOXICOLOGICAL INFORMATION

SKIN
MDI: The LD50 for skin absorption in rabbits is > 2000 mg/kg.

INGESTION
MDI: The oral LD50 for rats is > 10,000 mg/kg.

MUTAGENICITY
MDI: Mutagenicity data on MDI are inconclusive. MDI was weakly positive in some in-vitro (test tube) studies;

other in-vitro studies were negative. A mutagenicity study in animals was negative.

Dimethyl ether: In vitro mutagenicity studies were positive. Animal mutagenicity studies were negative in some cases and positive in others.

12) ECOLOGICAL INFORMATION

MOVEMENT & PARTITIONING
Based on information for MDI and polymeric MDI. In the aquatic or terrestrial

environment, movement is expected to be limited by its reactivity with water forming predominantly insoluble polyureas.

DEGRADATION & PERSISTENCE
Based on information for MDI and polymeric MDI. In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.

ECOTOXICITY
Based on information for MDI and polymerc MDI. The measured ecotoxicity is that of the hydrolzed product, generally under conditions maximizing production of soluble species. Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 > 100 mg/L in most sensitive species). The LC50 in earthworm Eisenia foetida is > 1000 mg/kg.

13) DISPOSAL CONSIDERATIONS

DISPOSAL CONSIDERATIONS
FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

As a service to its customers, Dow can provide names of information resource to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 989-832-1556 for further details.

DISPOSAL
DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

14) TRANSPORT INFORMATION

US D.O.T.
Consumer Commodity ORM-D

15) REGULATORY INFORMATION

NOTICE
The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, expressed or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

REGULATORY INFORMATION
U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following subject to the reporting

MATERIAL SAFETY DATA SHEET

requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME CAS NUMBER

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Polymeric Diphenylmethane diisocyanate, CAS#9016-87-9

4,4'' Methylene bisphenol isocyanate, CAS# 101-68-8

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

PMDI/MDI: immediate and delayed health hazard

Isobutane/propane: fire hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

OSHA HAZARD COMMUNICATION STANDARD:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA,or SUPERFUND):

This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

Category:

Chemical Name	CAS#	RQ
Methylene bisphenyl isocyanate	101-68-8	5000 lbs
Isobutane	75-28-5	100 lbs
Propane	74-98-6	100 lbs
Dimethyl ether	115-10-6	100 lbs

CALIFORNIA PROPOSITION 65

This product contains no listed substances known to the state of California to cause cancer, birth defects or other reproductive harm.

PENNSYLVANIA STATE RIGHT TO KNOW HAZARDOUS SUBSTANCE:

Methylene bisphenyl isocyanate	101-68-8
Isobutane	75-28-5
Propane	74-98-6
Dimethyl ether	115-10-6

CANADIAN REGULATIONS

MATERIAL SAFETY DATA SHEET

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

D2A - respiratory tract sensitizer

D2B - eye or skin irritant, skin sensitizer

B3 - combustible liquid

Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer''s workplace education program.

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CPR STATEMENT: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

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HAZARDOUS PRODUCTS ACT INFORMATION: This product contains the following ingredients which are Controlled Products and/or on the Ingredient Disclosure List (Canadian HPA section 13 and 14):

COMPONENTS: CAS #

4,4'' Methylene bisphenol isocyanate   CAS# 101-68-8   2-15 wt %

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):

All substances in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16) OTHER INFORMATION

OTHER INFORMATION

VOC content: 158.1 grams/liter

No other information.

(TM), *, or (R) Indicates a trademark of The Dow Chemical Company.

Ames'® Block & Wall® Liquid Rubber

Product Name (as used on Label and List)
Color: White
Revision Date: 2-15-18

GHS **S**afety **D**ata **S**heets (SDS)

SECTION 1 – IDENTIFICATION	
PRODUCT NAME	Ames'® Block & Wall® Liquid Rubber
OTHER MEANS OF IDENTIFICATION	BWRF
END USE	Rubber paints and coatings, water borne dispersion
MANUFACTURER	Ames Research Laboratories, Inc. Salem, Oregon 97302 Corporate Office: 1891 16th Street SE Salem, Oregon 97302-1436 (503) 588-3330
EMERGENCY PHONE NUMBER	1-888-345-0809 or Chemtrec 1-800-424-9300

SECTION 2 – HAZARD IDENTIFICATION	
CLASSIFICATION	Acute Toxicity, Dermal – 5: Serious Eye Damage/Eye Irritation – 2B:
SIGNAL WORD	WARNING
HAZARD STATEMENT	May be harmful in contact with skin (H313) Causes eye irritation (H320)
HAZARD PICTOGRAMS	N.A. – No Symbol
PRECAUTIONARY STATEMENT(S)	Wear protective gloves/protective clothing/eye protection/face protection. Avoid breathing dust/fume/gas/mist/vapor/spray. Use in well-ventilated area. If hands or other body parts come in contact, wash thoroughly after handling. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. (P305+P351+P338) If eye irritation persists: Get medical attention from a physician. (P337+P313) IF ON SKIN: Call a POISION CENTER or doctor/physician if you feel unwell. (P312)
HAZARDS NOT OTHERWISE CLASSIFIED	N.A.

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS		
SUBSTANCE / MIXTURE	Mixture	
OTHER MEANS OF IDENTIFICATION	N.A.	
CAS # / IDENTIFIERS		
INGREDIENT NAME	% BY WEIGHT	CAS NUMBER
Carboxylated Styrene Butadiene Rubber	55 – 70 %	Proprietary
Water	15 – 25 %	7732-18-5
Titanium Dioxide	5 – 15 %	13463-67-7

Any concentrations shown in a range are to protect trade secret confidentiality or is due to batch variation. There are no additional ingredients present, which within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

SECTION 4 – FIRST AID MEASURES	
DESCRIPTION OF NECESSARY FIRST AID MEASURES	
EYE CONTACT	Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do so while rinsing. If eye irritation persists: Get medical attention from a physician.
INHALATION	Remove affected individual(s) to fresh air. Get medical attention from a physician if breathing difficulty develops.
SKIN CONTACT	Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops. Wash contaminated clothes before reuse.
INGESTION	If swallowed, rinse mouth thoroughly. Do not induce vomiting. Never give anything by mouth to an unconscious person. Seek medical attention if irritation persists or if concerned.
MOST IMPORTANT SYMPTOMS / EFFECTS, ACUTE AND DELAYED	
EYE CONTACT	May cause eye irritation
INHALATION	With good ventilation, exposure to vapors not expected to cause adverse effects.
SKIN CONTACT	Prolonged skin exposure may cause skin irritation.
INGESTION	No hazards anticipated from swallowing small incidental amounts during use of this product.
INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDS, IF NECESSARY	
EYE CONTACT	N/A
INHALATION	N/A
SKIN CONTACT	N/A
INGESTION	N/A

SECTION 5 – FIRE FIGHTING MEASURES	
EXTINGUISHING MEDIA: SUITABLE MEDIA	To extinguish combustible residues of this product, use water fog, CO2, dry chemical, chemical foam or alcohol-resistant foam
EXTINGUISHING MEDIA: UNSUITABLE MEDIA	N/A
SPECIFIC HAZARDS ARISING FROM THE CHEMICAL	Under fire conditions, some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to hydrocarbons, CO and dense smoke.
SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS	Keep people away. Isolate fire area and deny unnecessary entry. Containers of this material may build up pressure if exposed to heat (fire). Use water spray to cool fire-exposed containers.
SPECIAL EQUIPMENT FOR FIRE-FIGHTERS	Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective clothing. If protective equipment is not available or not used, fight fire from a protected location or safe distance.

SECTION 6 – ACCIDENTAL RELEASE MEASURES	
PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES	
FOR NON-EMGERGENCY PERSONNEL	Avoid unnecessary exposure or contact. Barricade the area to restrict access. Personnel not wearing protective equipment (see Section 8) should be excluded from the area of the spill until cleanup has been completed.
FOR EMERGENCY PERSONNEL	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials.
ENVIRONMENTAL PRECAUTIONS	Stop leak at source when it is safe to do so. Dike and contain spill. Prevent spilled material from contaminating soil or entering drains, sewers, streams or other bodies of water.
METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP	
LARGE SPILLS	Avoid dilution with water to minimize the extent of the spill. Recover and recycle spilled product if possible, otherwise, collect with absorbent material and transfer to appropriate containers for disposal. Water may be used for final cleaning of the affected area.
SMALL SPILLS	Same procedures as listed above for large spills.

SECTION 7 – HANDLING AND STORAGE	
PRECAUTIONS FOR SAFE HANDLING	
PROTECTIVE MEASURES	Use in a well ventilated area. Keep out of reach of children. If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminants below the respective exposure limits. Use goggles and gloves. Similar to most latex paints.
GENERAL HYGIENE	Practice reasonable care to avoid repeated, prolonged skin contact. Wash thoroughly after handling. Do not eat, drink, smoke or use personal products when handling chemical substances.
CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATABILITIES	Store at temperatures between 40° F (4.4° C) and 110° F (43.3° C). Keep container closed when not in use. PROTECT FROM FREEZING.

SECTION 8 – EXPOSURE CONTROL/PERSONAL PROTECTION				
OCCUPATIONAL EXPOSURE LIMITS				
	OSHA PEL 8-HR TWA	OSHA PEL STEL/Ceiling	ACGIH TLV-TWA	ACGIH TLV-STEL
Carboxylated Styrene Butadiene Rubber	N.E.	N.E.	N.E.	N.E.
Titanium Dioxide	15 mg/m^3	N.E.	10 mg/m^3	N.E.

CONTROLS	
ENGINEERING CONTROLS	Local exhaust ventilation may be necessary to control any air contaminants to within their respective exposure limits during the use of this product, However, good general ventilation should be sufficient for most conditions.
PERSONAL PROTECTIVE EQUIPMENT	Wear safety glasses with side shields or safety goggles. Wear clean, long-sleeved, body-covering clothing. Nitrile, Neoprene®, or rubber gloves should provide protection against skin contact. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, or areas are poorly vented, wear an approved air-purifying respirator.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE	
PHYSICAL STATE	Thick liquid
COLOR	White
ODOR	Slight odor
ODOR THRESHOLD	N/A
pH	9.0 – 10
MELTING POINT	N/A

BOILING POINT	212° F (100° F)
FREEZING POINT	32° F (0° C)
FLASH POINT	N.A.
EVAPORATION RATE	N/A
FLAMMABILITY (SOLID, GAS)	N/A
UPPER / LOWER FLAMMABILITY OR EXPLOSIVE LIMITS	N.A.
VAPOR PRESSURE	N/A
VAPOR DENSITY	N/A
RELATIVE DENSITY	N/A
SOLUBILITY(IES)	Product is sold as dilutable. Polymer component is insoluble.
PARTITION COEFFICIENT: N-OCTANOL / WATER	N/A
AUTO-IGNITION TEMPERATURE	N.A.
DECOMPOSITION TEMPERATURE	> 177˚C
VISOCITY	N/A
SPECIFIC GRAVITY	1.07 – 1.12

SECTION 10 – STABILITY AND REACTIVITY	
REACTIVITY	This product is not reactive under normal conditions.
CHEMICAL STABILITY	This product is stable under normal storage conditions and during its intended use.
POSSIBILITY OF HAZARDOUS REACTION	Will not occur under normal conditions.
CONDITIONS TO AVOID	Avoid freezing temperatures (less than 32° F or 0° C). Long term exposure to elevated temperatures.
INCOMPATIBLE MATERIALS	Addition of chemicals, such as acids or multivalent metal salts, may cause coagulation.
HAZARDOUS DECOMPOSITION PRODUCTS	Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Thermal decomposition may produce various hydrocarbons and irritating, acrid vapors.

SECTION 11 – TOXICOLOGICAL INFORMATION	
INFORMATION ON TOXICOLOGICAL EFFECTS	
ACUTE TOXICITY	May cause slight transient (temporary) eye irritation. Corneal injury unlikely. Short single exposure not likely to cause significant skin irritation. Prolonged and repeated exposure may cause slight skin irritation. Material may stick to skin causing irritation upon removal. A single, prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. With good ventilation, a single exposure to vapors is not expected to cause adverse effects. Single dose oral toxicity is considered to be extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.
IRRITATION / CORROSION	May cause slight irritation to skin and eyes.
SENSITIZATION	N.A.
MUTAGENICITY	N.A.
CARCINOGENICITY	N.A.
REPRODUCTIVE TOXICITY	N.A.
TETRAOGENICITY	N.A.
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)	N.A.
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE)	N.A.
ASPIRATION HAZARD	N.A.
INFORMATION ON LIKELY ROUTES OF EXPOSURE	Dermal is likely route of exposure.
POTENTIAL ACUTE HEALTH EFFECTS	
EYE CONTACT	May cause slight transient (temporary) eye irritation.
INHALATION	With good ventilation, a single exposure to vapors is not expected to cause adverse effects.
SKIN CONTACT	Short single exposure not likely to cause significant skin irritation. Prolonged and repeated exposure may cause slight skin irritation. Material may stick to skin causing irritation upon removal. A single, prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts.

INGESTION	Single dose oral toxicity is considered to be extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.
SYMPTOMS RELATED TO THE PHYSICAL, CHEMCIAL AND TOXICOLOGICAL CHARACTERISTICS	
EYE CONTACT	N/A
INHALATION	N/A
SKIN CONTACT	N/A
INGESTION	N/A
DELAYED AND IMMEDIATE EFFECTS AND ALSO CHRONIC EFFECTS FROM SHORT AND LONG TERM EXPOSURE	
SHORT TERM EXPOSURE – POTENTIAL IMMEDIATE EFFECTS	N/A
SHORT TERM EXPOSURE – POTENTIAL DELAYED EFFECTS	N/A
LONG TERM EXPOSURE – POTENTIAL IMMEDIATE EFFECTS	N/A
LONG TERM EXPOSURE – POTENTIAL DELAYED EFFECTS	N/A
POTENTIAL CHRONIC HEALTH EFFECTS	
GENERAL	N.A.
CARCINOGENICITY	N.A.
MUTAGENICITY	N.A.
TERATOGENCITY	N.A.
DEVELOPMENTAL EFFECTS	N.A.
FERTILITY EFFECTS	N.A.
NUMERICAL MEASURES OF TOXICITY (ACUTE TOXICITY ESTIMATE)	N.A.

TOXICOLOGICAL DATA:

INGREDIENT	ORAL RAT (LD50)	SKIN RABBIT (LD50)	INHALATION RAT (LC50)
Carboxylated Styrene Butadiene Rubber	N/A	N/A	N/A
Titanium Dioxide	10000 mg/kg	N/A	N/A

SECTION 12 – ECOLOGICAL INFORMATION	
TOXICITY	Based largely or completely on information for similar material(s): Material is practically non-toxic to aquatic organisms on an acute basis (LC50 or EC50 > 100 mg/L in the most sensitive species tested).
PERSISTENCE AND DEGARDABILITY	The polymeric component is not expected to biodegrade.
BIOACCUMULATIVE POTENTIAL	N/A
MOBILITY IN SOIL	Not expected due to the product's high molecular weight.
OTHER ADVERSE EFFECTS	N/A

SECTION 13 – DISPOSAL CONSIDERATIONS	
DISPOSAL CONSIDERATIONS	Do not dump into any sewers, on the ground, or into any body of water. All disposal methods must be in compliance with all Federal/State/Provincial and local laws and regulations. Waste characterizations and compliance with applicable laws are solely the responsibility of the waste generator.

SECTION 14 – TRANSPORTATION INFORMATION	
Department of Transportation (DOT) - US	This product is not regulated by the DOT.
Transportation of Dangerous Goods (TDG) - Canada	This product is not regulated by the TDG.

	DOT Classification	TDG Classification	Mexico Classification	IMDG	IATA
UN NUMBER	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN PROPER NAME	-	-	-	-	-
PACKING GROUP	-	-	-	-	-
TRANSPORT HAZARD CLASS(ES)	-	-	-	-	-
ENVIRONMENTAL HAZARDS	No.	No.	No.	No.	No.
ADDITIONAL INFORMATION	**Special Provisions** Not Applicable	**Special Provisions** Not Applicable	**Special Provisions** Not Applicable	**Emergency Schedules (Ems)** Not Applicable	**Special Provisions** Not Applicable

SPECIAL PRECATIONS FOR USERS:	Multi-model shipping descriptions are provided for information purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (sea, air, etc.), does not indicate that the

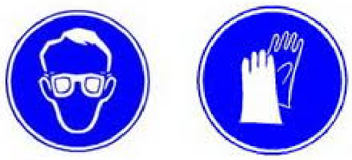
	product is packaged suitably for the mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport. People loading and unloading dangerous goods must be trained on all of the risks deriving from the substances and on all actions in case of emergency situations.
TRANSPORT IN BULK ACCORDING TO ANNEX II OF MARPOL II 73/78 AND THE IBC CODE	N.A
PROPER SHIPPING NAME	N.A
SHIP TYPE	N.A
POLLUTION CATEGORY	N.A

SECTION 15 – REGULATORY INFORMATION	
U.S. FEDERAL REGULATION	
OSHA	Not classified as hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)
CERCLA – SARA HAZARD CATEGORY	This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following category: None.
SARA SECTION 313	This product does not contain toxic chemical(s) at or above the de minimus concentrations subject to the reporting requirements of section 313 of Title III Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372.
TOXIC SUBSTANCES CONTROL ACT	TSCA Section 8(b) – Inventory Status: All components of this material are listed on or exempt from the TSCA inventory.
CALIFORNIA PROP. 65	This product may contain chemical(s) known to the state of California to cause cancer and/or birth defects or other reproductive harm.
INTERNATIONAL REGULATIONS	
CANADIAN EPA	This product complies with Domestic Substance List of the Canadian Environmental Agency.
CANADIAN WHMIS CLASS	This material is not classified as a controlled product under the WHMIS. Canadian Inventory Status: All components of this material are listed on the Canadian Domestic Substances List (DSL).

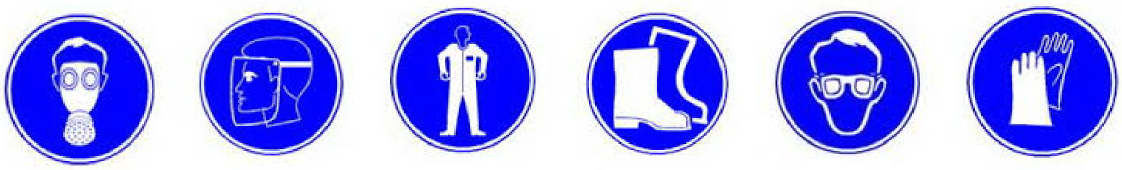
SECTION 16 – OTHER INFORMATION

HMIS RATINGS	HEALTH	FLAMMABILITY	REACTIVITY	PERSONAL PROTECTION
	1	0	0	B

EUROPEAN PRECAUTIONARY PICTOGRAMS
General:



If spraying or in poorly ventilated area:



PREVIOUS SDS REVISION DATE	9/15
REASON FOR REVISION	N/A
VOLATILE ORGANIC COMPOUNDS (VOC'S)	N/A
LEGEND	N.A. – Not Applicable, N.E. – Not Established, N.D. – Not Determined
ABBREVIATIONS USED	N/A – Information or data not available, NTP – National Toxicological Program, IARC – International Agency for Research on Cancer, NIOSH – National Institute of Occupational Safety and Health, PEL – Permissible Exposure Limit (8-hour TWA OSHA), TLV – Threshold Limit Value (8-Hour TWA ACGIH), STEL – Short Term Exposure Limit (15 min. TWA OSHA), C – Ceiling Value
NOTICE TO READER	It is recommended that each customer or recipient of this Safety Data Sheet (SDS) study it carefully and consult resources, as necessary or appropriate, to become aware of and understand the data contained in this SDS and any hazards associated with the product. This information is provided in good faith and believed to be accurate as of the effective date herein. However, no warranty, express or implied, is given, The information presented here applies only to the product as shipped. The addition of a material can change the composition, hazards and risks of the product. Regulatory requirements are subject to change and may differ between various locations and jurisdictions. The customer/buyer/user is responsible to

	ensure that their activities comply with all country, federal, state, provincial or local laws. The conditions for use of the product are not under the control of the manufacturer; the customer/buyer/user is responsible to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific SDS, the manufacturer cannot be responsible for the SDS's obtained from any other source. Note: This information must be included in all SDS that are copied and distributed for this material.

END OF SAFETY DATA SHEET

MATERIAL SAFETY DATA SHEET

GC68101
12 00

DATE OF PREPARATION
Sep 9, 2016

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
GC68101
PRODUCT NAME
Geocel® 3300® Professional Grade Polyurethane Sealant, White
MANUFACTURER'S NAME
Geocel Products Group
A Business Unit of The Sherwin-Williams Company
101 W. Prospect Avenue
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	(800) 348-7615 www.geocelusa.com
Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units		Vapor Pressure
2	**1305-78-8**	**Calcium Oxide**			
		ACGIH TLV		Not Available	
		OSHA PEL		Not Available	
44	**1317-65-3**	**Calcium Carbonate**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	
2	**13463-67-7**	**Titanium Dioxide**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

HMIS Codes

Health	3*
Flammability	0
Reactivity	1

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.
EFFECTS OF OVEREXPOSURE
EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Redness and itching or burning sensation may indicate eye or excessive skin exposure.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.
CANCER INFORMATION
For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
Not Applicable	Not Applicable	Not Applicable	Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY
Not Applicable
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).
Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.
PROTECTIVE GLOVES
Required for long or repeated contact.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	12.55 lb/gal	1503 g/l
SPECIFIC GRAVITY	1.51	
BOILING POINT	Not Applicable	
MELTING POINT	Not Available	
VOLATILE VOLUME	0%	
EVAPORATION RATE	Not Available	
VAPOR DENSITY	Not Available	
SOLUBILITY IN WATER	Not Available	
pH	> 2.0, < 11.5	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

0.03 lb/gal	3 g/l	Less Water and Federally Exempt Solvents
0.03 lb/gal	3 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable
CONDITIONS TO AVOID
None known.
INCOMPATIBILITY
None known.
HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide
HAZARDOUS POLYMERIZATION
Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS
IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name				
1305-78-8	**Calcium Oxide**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
1317-65-3	**Calcium Carbonate**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
13463-67-7	**Titanium Dioxide**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION
No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD
Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)
Not Regulated for Transportation.
Canada (TDG)
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IATA/ICAO
Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.
CALIFORNIA PROPOSITION 65
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
TSCA CERTIFICATION
All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Oatey®

Lo-VOC SCAQMD 1168/316A Compliant

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

*** Section 1 - Product and Company Identification ***

MSDS #1402E

Part Numbers: Purple – 30755(TV), 30756(TV), 30757(TV), 30758, 30759, 30927 Clear - 30749, 30750, 30751, 30752, 30753, 30754, 31652, 31653

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

*** Section 2 - Hazards Identification ***

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames and hot surfaces. - No smoking.
Keep container tightly closed.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/eye protection/face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/gas/mist/vapors.
Use only outdoors or in a well-ventilated area.

Response

If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.
If swallowed: Call a poison center or doctor/physician if you feel unwell. Rinse mouth. Do not induce vomiting.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
If exposed or concerned: Get medical advice/attention.
In case of fire: Use dry chemical, CO2, or foam to extinguish fire.

Storage

Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
78-93-3	Methyl ethyl ketone	25-40
67-64-1	Acetone	25-40
108-94-1	Cyclohexanone	15-30
109-99-9	Tetrahydrofuran	15-30

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

If material gets into eyes or if fumes cause irritation, immediately flush eyes with plenty of water until chemical is removed. If irritation persists, get medical attention immediately.

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

irst Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.
Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

*** Section 6 - Accidental Release Measures ***

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other noncombusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Purple or clear	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.84 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	99.96%
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics (potassium, calcium and sodium hypochlorite) and hydrogen peroxides. May attack plastic, resins and rubber.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

J: Component Carcinogenicity

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Acetone (67-64-1)

Test & Species		Conditions
96 Hr LC50 Oncorhynchus mykiss	4.74 - 6.33 mL/L	
96 Hr LC50 Pimephales promelas	6210 - 8120 mg/L [static]	
96 Hr LC50 Lepomis macrochirus	8300 mg/L	
48 Hr EC50 Daphnia magna	10294 - 17704 mg/L [Static]	
48 Hr EC50 Daphnia magna	12600 - 12700 mg/L	

Methyl ethyl ketone (78-93-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	3130-3320 mg/L [flow-through]	
48 Hr EC50 Daphnia magna	>520 mg/L	
48 Hr EC50 Daphnia magna	5091 mg/L	
48 Hr EC50 Daphnia magna	4025 - 6440 mg/L [Static]	

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Required Label(s): None (Limited Quantities are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Acetone (67-64-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Methyl ethyl ketone (78-93-3)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Cyclohexanone (108-94-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Tetrahydrofuran (109-99-9)

CERCLA: 1000 lb final RQ; 454 kg final RQ

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Acetone	67-64-1	Yes	Yes	Yes	Yes	Yes	No
Methyl ethyl ketone	78-93-3	Yes	Yes	Yes	Yes	Yes	No
Cyclohexanone	108-94-1	Yes	Yes	Yes	Yes	Yes	No
Tetrahydrofuran	109-99-9	Yes	Yes	Yes	Yes	Yes	No

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Acetone	67-64-1	1 %
Methyl ethyl ketone	78-93-3	1 %
Cyclohexanone	108-94-1	0.1 %
Tetrahydrofuran	109-99-9	1 %

Additional Regulatory Information

A: General Product Information

This product contains trace amounts of chemicals known to the State of California to cause cancer. Under normal use conditions, exposure to these chemicals at levels above the State of California "No Significant Risk Level" (NSRL) are unlikely. The use of proper personal protective equipment (PPE) and ventilation guidelines noted in Section 8 will minimize exposure to these chemicals.

Oatey®

Lo-VOC SCAQMD 1168/316A Compliant

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

* * * Section 1 - Product and Company Identification * * *

MSDS #1102E

Part Numbers: Clear 30850, 30863, 30876(TV), 30882, 31008(TV), 31011, 31950, 31951, 31952, 31953
Gray 30349, 31093, 31094, 31095, 31105, 31118, 31978, 31979, 31980, 31981, 32050, 32051, 32052, 32210, 32211

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other non-combusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear or Gray	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.94 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	80-84% Maximum 510 g/L per SCAQMD Test Method 316A.
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Carcinogenicity

A: General Product Information

In 2012 USEPA Integrated Risk Information System (IRIS) reviewed a two species inhalation lifetime study on THF conducted by NTP (1998). Male rats developed renal tumors and female mice developed liver tumors while neither the female rats nor the male mice showed similar results. Because the carcinogenic mechanisms could not be identified clearly in either species for either tumor, the EPA determined that the male rat and female mouse findings are relevant to the assessment of carcinogenic potential in humans. Therefore, the IRIS review concludes that these data in aggregate indicate that there is "suggestive evidence of carcinogenic potential" following exposure to THF by all routes of exposure.

B: Component Carcinogenicity

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

PVC (Chloroethylene, polymer) (9002-86-2)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Supplement 7 [1987]; Monograph 19 [1979] (Group 3 (not classifiable))

Silica, amorphous, fumed, crystalline-free (112945-52-5)

IARC: Monograph 68 [1997] (listed under Amorphous silica) (Group 3 (not classifiable))

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Tetrahydrofuran (109-99-9)

Test & Species	Conditions

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Component Waste Numbers

Tetrahydrofuran (109-99-9)
RCRA: waste number U213 (Ignitable waste)

Cyclohexanone (108-94-1)
RCRA: waste number U057 (Ignitable waste)

Acetone (67-64-1)
RCRA: waste number U002 (Ignitable waste)

Methyl ethyl ketone (78-93-3)
RCRA: waste number U159 (Ignitable waste, Toxic waste)
200.0 mg/L regulatory level

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Consumer Commodity, ORM-D

IMDG Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): None (Limited Quantites are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Material Safety Data Sheet
[OSHA 29 CFR 1910.1200]

The QUIKRETE® Companies One Securities Centre 3490 Piedmont Road, Suite 1300 Atlanta, GA 30329	Emergency Telephone Number (770) 216-9580	Information Telephone Number (770) 216-9580

Revision: February 2006 MSDS E

SECTION I: PRODUCT IDENTIFICATION

Product Types: QUIKRETE® DRY PACKAGED PORTLAND CEMENT BASED PRODUCTS (SERIES 4)

QUIKRETE® Product Name	Code #	QUIKRETE® Product Name	Code #
MORTAR MIX	1102	MASON MIX	1136
BASE COAT STUCCO	1139	EXTERIOR STUCCO	1209
FINISH COAT STUCCO	1201	FOAM COATING	1219
MASONRY COATING	2400	MARBLE STUCCO	1802
QUIKWALL® SURFACE BONDING CEMENT	1230	HEAVY DUTY MASONRY COATING	1300
POOL PLASTER	1319	GLASS BLOCK MORTAR	1610
ROOF TILE MORTAR	1140	POOL FINISH	1800
POLYMER MODIFIED SANDED TILE GROUT	1489	SANDED TILE GROUT	1156
THIN-SET FLOOR MIX	1548	THIN-SET WALL MIX	1554
OMNI GROUT SANDED	1490	THIN-SET MULTI-PURPOSE	1550
PEBBLE FINISH	1806	THIN-SET SANDED	1547
BULK MASONRY MORTARS	1162	INCA 1000 MINE SEALANT	1225-50
VENEER STONE MORTAR	1137		
PRO FINISH QUIKRETE ® BLENDED MORTAR MIX			1136-58
QUIKRETE® ONE COAT FIBERGLASS REINFORCED STUCCO SANDED			1200
(FORMERLY KNOWN AS QUIKWALL® FIBERGLASS REINFORCED STUCCO			
QUIKRETE® ONE COAT FIBERGLASS REINFORCED STUCCO CONCENTRATED			1216
(FORMERLY KNOWN AS QUIKWALL FIBERGLASS REINFORCED STUCCO CONCENTRATED)			

(ALSO APPLIES TO SPECIALTY AND/OR CUSTOM DESIGNED MORTARS & STUCCOS)

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components	CAS No.	PEL (OSHA) mg/M^3	TLV (ACGIH) mg/M^3
Silica Sand, crystalline	14808-60-7	$\frac{10}{\%SiO_2+2}$	0.05 (respirable)
Portland Cement	65997-15-1	5	5
May Contain one or more of the following ingredients:			
Pulverized Limestone	01317-65-3	5	5
Iron Oxide Pigments	01309-37-1	5	5
Lime	01305-62-0 or 39445-23-3	5	5
Clay	01332-58-7	5	5

Other Limits: National Institute for Occupational Safety and Health (NIOSH). Recommended standard maximum permissible concentration=0.05 mg/M^3 (respirable free silica) as determined by a full-shift sample up to 10-hour working day, 40-hour work week. See NIOSH Criteria for a Recommended Standard Occupational Exposure to Crystalline Silica.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Appearance: Gray to gray-brown colored powder. Some products contain coarse aggregate. (Quikrete Vinyl Concrete Patcher available in white)

Specific Gravity:	2.6 to 3.15	**Melting Point**	2700 ^{o}F	**Boiling Point:**	2700 ^{o}F
Vapor Pressure:	None	**Vapor Density:**	None	**Evaporation Rate:**	None
Solubility in Water:	Slight	**Odor:**	None		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability: Noncombustible and not explosive.

SECTION V - REACTIVITY DATA

Stability: Stable.
Incompatibility (Materials to Avoid): Contact of silica with powerful oxidizing agents such as fluorine, chlorine trifluoride, manganese trioxide, oxygen difluoride, may cause fires.
Hazardous Decomposition or By-products: Silica will dissolve in Hydrofluoric Acid and produce a corrosive gas - silicon tetrafluoride.
Hazardous Polymerization: Will Not Occur.
Condition to Avoid: Keep dry until used to preserve product utility.

SECTION VI - HEALTH HAZARD DATA

Route(s) of Entry: Inhalation, Skin, Ingestion
Acute Exposure: Product becomes alkaline when exposed to moisture. Exposure can dry the skin, cause alkali burns and effect the mucous membranes. Dust can irritate the eyes and upper respiratory system. Toxic effects noted in animals include, for acute exposures, alveolar damage with pulmonary edema.
Chronic Exposure: Dust can cause inflammation of the lining tissue of the interior of the nose and inflammation of the cornea. Hypersensitive individuals may develop an allergic dermatitis. Respirable crystalline silica (quartz) can cause silicosis, a fibrosis (scarring) of the lungs and possibly cancer. There is evidence that exposure to respirable silica or the disease silicosis is associated with an increased incidence of Scleroderma, tuberculosis and kidney disorders.

Carcinogenicity Listings:	NTP:	Known carcinogen
	OSHA:	Not listed as a carcinogen
	IARC Monographs:	Group 1 Carcinogen
	California Proposition 65:	Known carcinogen

NTP: The National Toxicology Program, in its “Ninth Report on Carcinogens” (released May 15, 2000) concluded that “Respirable crystalline silica (RCS), primarily quartz dusts occurring in industrial and occupational settings, is *known to be a human carcinogen*, based on sufficient evidence of carcinogenicity from studies in humans indicating a causal relationship between exposure to RCS and increased lung cancer rates in workers exposed to crystalline silica dust (reviewed in IAC, 1997; Brown *et al*., 1997; Hind *et al*., 1997)
IARC: The International Agency for Research on Cancer (“IARC”) concluded that there was “*sufficient evidence* in humans for the carcinogenicity of crystalline silica in the forms of quartz or cristobalite from occupational sources”, and that there is “*sufficient evidence* in experimental animals for the carcinogenicity of quartz or cristobalite.” The overall

IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is *carcinogenic to humans (*Group 1)." The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances or studies. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." For further information on the IARC evaluation, see IARC Monographs on the Evaluation of carcinogenic Risks to Humans, Volume 68, "Silica, Some Silicates..." (1997)

Signs and Symptoms of Exposure: Symptoms of excessive exposure to the dust include shortness of breath and reduced pulmonary function. Excessive exposure to skin and eyes especially when mixed with water can cause caustic burns as severe as third degree.

Medical Conditions Generally Aggravated by Exposure: Individuals with sensitive skin and with pulmonary and/or respiratory disease, including, but not limited to, asthma and bronchitis, or subject to eye irritation, should be precluded from exposure. Exposure to crystalline silica or the disease silicosis is associated with increased incidence of scleroderma, Tuberculosis and possibly increased incidence of kidney lesions.

Emergency First Aid Procedures:

Eyes: Immediately flush eye thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.

Skin: Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment if irritation or inflammation develops or persists. Seek immediate medical treatment in the event of burns.

Inhalation: Remove person to fresh air. If breathing is difficult, administer oxygen. If not breathing, give artificial respiration. Seek medical help if coughing and other symptoms do not subside. Inhalation of large amounts of portland cement require immediate medical attention.

Ingestion: Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

Spills: If spilled, use dustless methods (vacuum) and place into covered container for disposal or use if not contaminated or wet. Use adequate ventilation.

Waste Disposal Method: The packaging and material may be land filled; however, material should be covered to minimize generation of airborne dust. This product is not classified as a hazardous waste under RCRA or CERCLA.

SECTION VIII - CONTROL MEASURES/PERSONAL PROTECTION

Inhalation: DO NOT BREATE DUST. In dusty environments, the use of an OSHA, MSHA or NIOSH approved respirator is recommended. Local exhaust can be used, if necessary, to control airborne dust levels.

Eyes: Wear tight fitting goggles.

Skin: The use of barrier creams or impervious gloves, boots and clothing to protect the skin from contact is recommended. Following work, workers should shower with soap and water. Precautions must be observed because burns occur with little warning -- little heat is sensed.

WARN EMPLOYEES AND/OR CUSTOMERS OF THE HAZARDS AND REQUIRED OSHA PRECAUTIONS ASSOCIATED WITH THE USE OF THIS PRODUCT.

NOTE: The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to silica contained in our products.

TABLE OF CONTENTS

Prepared for: **Bradley E. Gentry**
IWM Consulting Group, LLC

Site: **Priority Residence #14**
Franklin, IN 46131 (Site)

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INSTALLATION REPORT

January 18, 2019

Vapor Mitigation System
Priority Residence #14
Franklin, IN 46131 (Site)

Mr. Bradley Gentry
IWM Consulting Group
Indianapolis, IN, 46214
317-347-1111

Vapor Mitigation System Installation Report
Dates of SSDS Installation Activities: December 10th– December 12th, 2018

Dear Mr. Gentry,

Vapor Intrusion Specialists, LLC (VIS) is pleased to provide a Vapor Mitigation System Installation Report that summarizes the scope of services performed at Priority Residence #14 located in Franklin, IN (Site). The Scope of services performed at the Site and specific field activities are described below.

Scope of Service:

- VIS installed a sub-slab depressurization system (SSDS) using a RadonAway™ RP265 fan to create a negative pressure with sufficient radius of influence (ROI) to mitigate beneath the entire portion of the basement slab. This was accomplished by using one (1) extraction point which was located centrally in the basement.
- The SSDS was comprised of the following major components: 4-inch schedule 40 poly vinyl chloride PVC piping for the SSDS extraction point (centrally located in the basement) and the horizontal run totaling approximately 40 feet of pipe. The basement SSDS extraction point was installed using a hammer drill and a 5-inch core bit. There was

approximately 5 to 7 gallons of sand and medium gravel removed from beneath the slab and containerized. One (1) U-tube manometer was installed to measure the vacuum of the extraction point. One (1) ball valve was installed to regulate the vacuum being applied to the extraction point. One (1) RadonAway™ RP265 fan was installed with a service switch in a weather tight enclosure located on the eastern exterior of the residence.

- The RadonAway™ RP265 fan was hardwired by a licensed electrician to a panel located in the basement and labeled (Fan Circuit).
- VIS conducted post Pressure Field Extension (PFE) testing utilizing one (1) vapor pin previously installed by IWM Consulting and four (4) previously drilled ½-inch holes utilized for initial diagnostic testing. The data collected in the field confirmed that the newly installed SSDS in the basement portion of the building and the SMDS in the crawl space is creating a sufficient negative pressure to prevent vapor intrusion into the structure.
- The SSDS was activated on December 12th, 2018.

Please Note:

- A figure depicting the SSDS layout is included as **Figure 1.**
- Photos taken during the installation have been included as **Attachment 1.**
- VIS's radon mitigation certification is included as **Attachment 2.**
- The VI Mitigation Installation Checklist is included as **Attachment 3.**
- An O&M manual for the mitigation fan is included as **Attachment 4.**
- An estimate of Annual Operating Costs is included as **Attachment 5.**
- The manufacture warranty is included as **Attachment 6.**
- Safety Data Sheets are included as **Attachment 7.**

Conclusion:

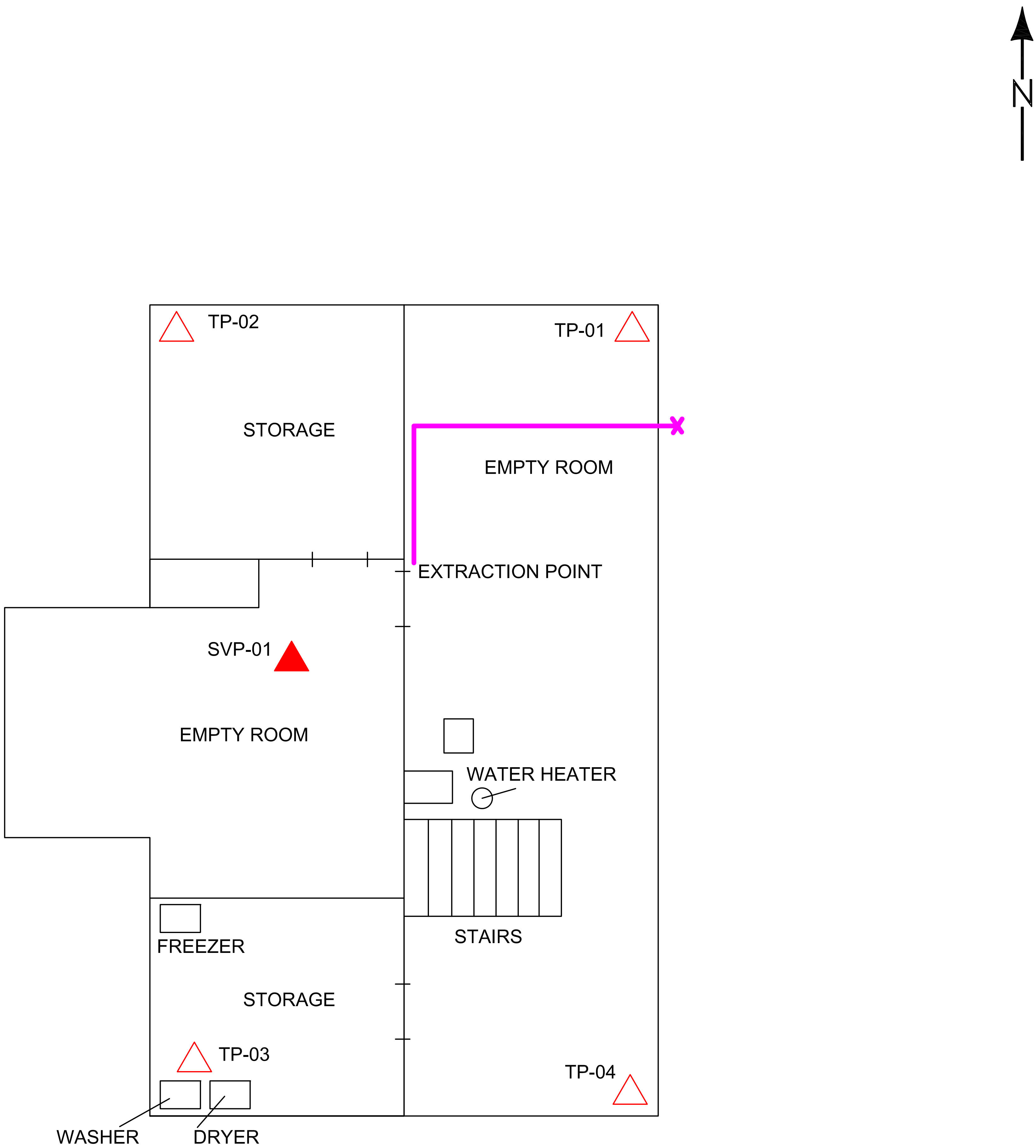
After the installation of this vapor mitigation system, a final walk through and post PFE readings were collected and analyzed. As per the system design, the vapor mitigation system is operating as specified and is generating sufficient negative pressures beneath the basement to prevent vapor intrusion. Please do not hesitate to contact me via email (awatt@vaporintrusion.us) or telephone (812-929-9070) with any questions you might have regarding this report.

Respectfully Submitted,

Alex Watt
Associate Project Manager
Vapor Intrusion Specialists, LLC
7428 Rockville Road
Indianapolis, IN 46214
NRPP Certification: 108383 RMT
Indiana Mitigator License: RTM00783

VAPOR INTRUSION SPECIALISTS

Figure 1
System Layout



LEGEND
FAN
TEST POINT
SUB-SLAB TEST POINT
SSDS SYSTEM
*SSDS = 4'1" BELOW GRADE

0' 5'
SCALE IN FEET

DRAWN BY: LL
DATE: 01/17/2019
REVISED:
HWPA #111291-01
DWG. NO. 111291S1

FIGURE 1
PRIORITY RESIDENCE #14

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

VAPOR INTRUSION SPECIALISTS

Attachment 1
Installation Photographs

Vapor Mitigation Installation Photographs – Priority Residence #14, Franklin, IN

Photo #1: Approximately 3' x 4' void in concrete behind staircase in basement.

Photo #2: Excavated 45 gallons of dirt/rock from void.

Photo #3: After excavation, before concrete pour.

Photo #4: Mixed and poured 300 pounds of high strength concrete filling entire void.

Vapor Mitigation Installation Photographs – Priority Residence #14, Franklin, IN

Photo #5: Additional holes in foundation slab.

Photo #6: Foundation slab holes filled with hydraulic cement.

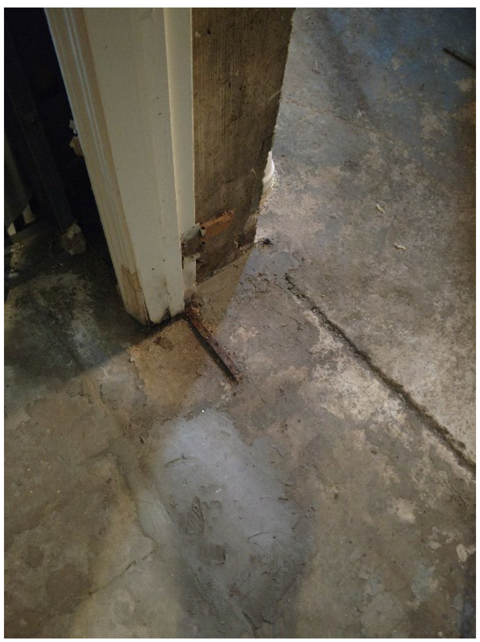


Photo #7: Either side of door jamb and in front of entry way filled with hydraulic cement.

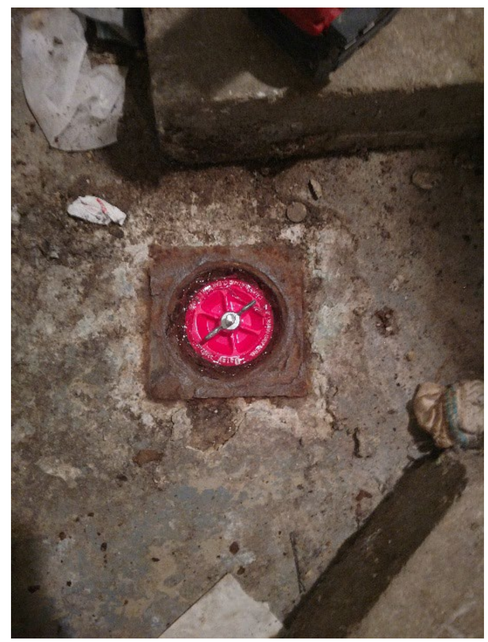


Photo #8: 4” drain line under dryer was cleaned and installed with a new “J” plug and sealed with a high grade silicone.

Vapor Mitigation Installation Photographs – Priority Residence #14, Franklin, IN

Photo #9: Sealed 4” extraction point penetration.

Photo #10: Extraction point vertical, installed with: a ball valve, U-tube manometer, system labels and a vacuum alarm.

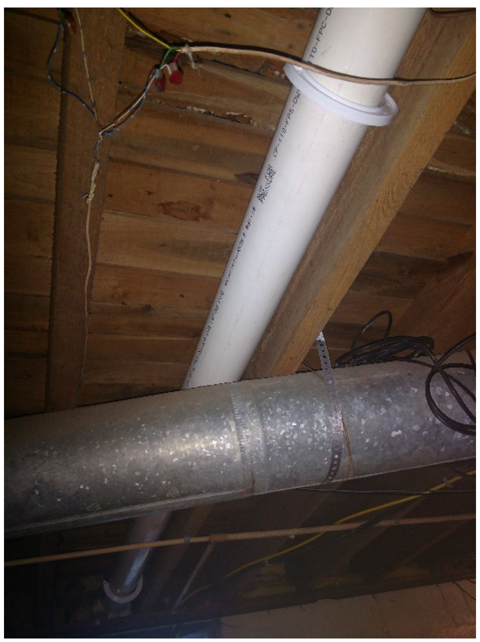


Photo #11: Extraction point vertical to main horizontal run. Horizontal run penetrates and exits the eastern side of residence.

Photo #12: All system piping was labeled.

Vapor Mitigation Installation Photographs – Priority Residence #14, Franklin, IN

Photo #13: An RP265 fan was mounted and installed with a condensate by-pass and a service switch in a weather tight enclosure.

Photo #14: Fan placard information.

Photo redacted.

Photo #15: Overview of fan.

Photo #16: The mitigation fan was wired to a dedicated circuit in the main electrical panel and labeled.

Attachment 2
Mitigation Certifications

NRPP™
NATIONAL RADON PROFICIENCY PROGRAM

Alex Hoskins Watt

Has satisfactorily fulfilled the requirements set forth by the National Radon Proficiency Program and is therefore certified as a:

Residential Mitigation Provider

NRPP ID 108383 RMT
Expires 12/31/2019

Valid for specific activities or measurement devices, which can be verified with NRPP. State and local agencies may have additional requirements.

NATIONAL RADON AARST PROFICIENCY PROGRAM

In witness Whereof,
I have subscribed my name as a
Representative of NRPP

Janna Sinclair

Janna Sinclair
NRPP Credentialing Coordinator

Indiana State Department of Health
Lead and Healthy Homes
2 N. Meridian Street, 5J
Indianapolis, Indiana 46204 (317) 234-4423

Radon Mitigator License

Certificate Number	Status	Expire Date
RTM00783	Active	12/31/2020

Alex H. Watt

Kristina Box, MD, FACOG
Kristina Box, MD, FACOG
State Health Commissioner
Indiana State Department of Health

STATE FORM 49122 (9-98)

Attachment 3
Checklist

Post Installation Checklist

Client: Amphenol

Site Address: PR#14

Site Contact: Chris Parks

Date: 12/12/18

System Install Date: 12/10-12/12/18

Fan Model: RadonAway^{TM} RP265

Piping	Yes	No	N/A
Are all system pipes Schedule 40 solid core PVC?	X		
Are all extraction point locations permanently sealed?	X		
Does any system piping obstruct windows, doors or service access points?		X	
Are all horizontal pipe runs supported at least every 6 feet?	X		
Are all vertical pipes supported at least every 8 feet?	X		
Do horizontal runs slope towards extraction pits for drainage?	X		
Were permanent test ports installed on the exhaust stack(s)?		X	
Was a varmint guard installed on the exhaust stack(s)? **(A ran cap was installed).**	X		
If the exhaust stack penetrates the roof, was it sealed by a licensed roofer? If so, who?			X

Fans	Yes	No	N/A
Was the fan mounted/ installed level?	X		
Was the fan installed with a condensate by-pass?	X		
Was the fan installed with flexible Fernco fittings for vibration reduction?	X		
Is the exhaust stack at least 10 feet above grade, 10 feet from any doors, windows, or air intakes and at least 2 feet above the top of any openings to a conditioned space?	X		
Was the fan mounted in the attic space of a building?		X	
Was the fan mounted on the exterior of a building? If so, where? **(Eastern side of house).**	X		

Make/ Model of Fan(s): RadonAway^{TM} RP265

Post Installation Checklist

Vapor Barrier	Yes	No	N/A
Are the crawl space(s) free of debris?			X
Has a Sub-membrane depressurization system been installed?			X
Was a minimum of 6 mil or thicker membrane used in system installation?			X
Were heavy traffic areas reinforced with extra material/ membrane?			X
Were all membrane seams overlapped a minimum of 12 inches and sealed properly?			X
Was the vapor barrier secured/ anchored to the wall using double sided tape and polyurethane caulk?			X
Was the vapor barrier secured/ anchored to the wall using termination bars/ wooden furring strips and polyurethane caulk?			X
Has a 3" or 4" perforated pipe been installed underneath the vapor barrier?			X
Are all utility entry or exit points, foundation or other penetrations sealed properly?			X

Electrical	Yes	No	N/A
Has the electrical work been performed by a licensed electrician? If so, who? **(Midwest Electric)**	X		
Is the fans outside service switch mounted in a weather tight enclosure?	X		
In the panel, is the mitigation system clearly marked/ labeled and visible from at least three feet away?	X		
Has a run-time meter been installed, and been installed in a weather tight enclosure?		X	
Has a KW meter been installed?		X	
Was the fan installed with a power cord no longer than 6 feet next to a non- GFCI receptacle?			X

Post Installation Checklist

Labels and System Monitors	Yes	No	N/A
Were the extraction point(s) installed with a U-tube/ Magnehelic gauge? If so, which? ***(U-tube)***	X		
Was there a Vacuum/ Audible alarm installed in case of system failure? **(Located in basement next to extraction point vertical).**	X		
Are system pipes, membranes and sump pump lids clearly labeled and easily identifiable?	X		
Was there a system label installed with company contact information in case of emergency?	X		

Sump Pit	Yes	No	N/A
Is there a sump pit(s) located in the building? If so, where?			X
Does the sump have an adequate cover installed, and is it properly anchored and sealed?			X
Are all penetrations in sump lid properly sealed?			X
Has the sump pit been used as an extraction point?			X
Does the sump lid have a view port for observation and maintenance purposes?			X

Testing	Yes	No	N/A
Was Diagnostic testing performed before system install?	X		
Was Post Diagnostic testing performed to confirm system performance?	X		

Reporting	Yes	No	N/A
Has an as built drawing been completed showing system layout?	X		
Have all test point(s) and extraction point(s) locations and data been inserted in to system drawing?	X		
Has the system install been documented with photographs?	X		

Post Installation Checklist

Field Notes

Basement slab thickness was 4-inches in thickness.

Technician's signature:

VAPOR INTRUSION SPECIALISTS
7428 Rockville Road, Indianapolis, Indiana 46214 | cell 812-929-9070

PFE Field Data Sheet

Property Name: Residential house

Property Address: Priority Residence #14

PFE Testing Date: 12/12/18

Professional: Alex Watt

Notes: Initial start up pressure on U-tube was 2.3 Inwc. Round #1 was recorded at 10:30 am, Round #2 was recorded at 1:00 pm and Round #3 was recorded at 1:15 pm. These pressure readings were adjusted utilizing a ball valve on the extraction point vertical.

Test Point	(Vacuum Inches of Water)	(Distance from EP-1)	Round #2 Pressure Reading [U-tube reading]	Round #3 Pressure Reading [U-tube reading]
TP-01	-0.234	~10'	-0.196 [2.0 Inwc]	-0.150 [1.5 Inwc]
TP-02	-0.138	~15'	-0.110	-0.091
TP-03	-0.052	~15'	-0.041	-0.025
TP-04	-0.042	~15'	-0.034	-0.023
VP-01	-0.151	~5'	-0.120	-0.089

Attachment 4
Vapor Mitigation System Operation and Maintenance

We advise consultants, maintenance personnel or property owners to conduct routine visual inspections of all SSDS/SMDS to verify that system components are operating properly. The inspection should include but not limited to the following:

- Observe the U-tube or magnehelic gauges for pressure indication; a pressure of 'O' indicates that there is a problem with system piping or fan operations.
- Observe the mitigation fan(s) and note any abnormal sounds or noises coming from the fan including buzzing, scraping, rattling, or etc. If any abnormal noises or sounds are audible, contact VIS.
- Most mitigation fans are factory sealed and designed to be maintenance free for the life of the fan.
- Should the fans' casing be opened or the factory seal broken, any service warranty may be voided.
- Factory maintenance documentation has been provided to consultant with recommended schedule for maintenance of fans if required.
- Inspect the PVC piping of the system for damage or cracks. If any damage occurs to the PVC piping, contact VIS piping supports and hangers should also be inspected for wear and integrity.
- Roof penetrations for system exhaust piping should be inspected to assure no moisture or other intrusion is apparent.
- Any significant changes to building or structure can and may affect system performance. VIS should be advised of planned changes beforehand to avoid any possible performance issues or system failure.

Contact VIS for additional service & Maintenance should any occasion arise that may cause concern that the SSDS or SMDS is not functioning properly as vapor intrusion may no longer be mitigated to meet performance criteria to which VIS completed mitigation.

Attachment 5
Annual Operating Costs

Radonaway Fans	Average KWH	Average Cost Per Year
RP140	*$0.0894*	$13.31
RP145	*$0.0894*	$42.29
RP260	*$0.0894*	$48.55
RP265	*$0.0894*	$88.50
RP380	*$0.0894*	$101.03
SF180	*$0.0894*	$42.29
GP201	*$0.0894*	$39.16
GP301	*$0.0894*	$56.39
GP401	*$0.0894*	$66.57
GP500	*$0.0894*	$78.31
GP501	*$0.0894*	$82.23
XP151	*$0.0894*	$40.72
XP201	*$0.0894*	$43.07
XP261	*$0.0894*	$66.57
HS2000	*$0.0894*	$164.46
HS3000	*$0.0894*	$117.47
HS5000	*$0.0894*	$250.61
Fantech Fans	**Average KWH**	**Average Cost Per Year**
HP2133	*$0.0894*	$13.31
Rn4	***$0.11***	**$170.00**

Attachment 6
Fan Warranty

RadonAway®

The world's leading radon fan manufacturer

RP, GP, XP Pro Series Installation Instructions

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** For General Ventilating Use Only. Do Not Use to Exhaust Hazardous, Corrosive or Explosive Materials, Gases or Vapors. See Vapor Intrusion Application Note #AN001 for important information on VI Applications. RadonAway.com/vapor-intrusion

2. **NOTE:** Fan is suitable for use with solid state speed controls; however, use of speed controls is not generally recommended.

2. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.

3. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.

4. **NOTICE!** There are no user serviceable parts located inside the fan unit.
Do NOT attempt to open. Return unit to the factory. (See Warranty, p. 8, for details.)

5. **WARNING!** Do not leave fan unit installed on system piping without electrical power for more than 48 hours. Fan failure could result from this non-operational storage.

6. **WARNING!** TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

   a) Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer. (See p. 8.)

   b) Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.

   c) Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire rated construction.

   d) Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent backdrafting. Follow the heating equipment manufacturers' guidelines and safety standards such as those published by any National Fire Protection Association, and the American Society for Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), and the local code authorities.

   e) When cutting or drilling into a wall or ceiling, do not damage electrical wiring and other hidden utilities.

   f) Ducted fans must always be vented to outdoors.

   g) If this unit is to be installed over a tub or shower, it must be marked as appropriate for the application and be connected to a GFCI (Ground Fault Circuit Interrupter) protected branch circuit.

RadonAway

RP Series	GP Series	XP Series
RP140 | P/N 28460	GP201 | P/N 28465	XP151 | P/N 28469
RP145 | P/N 28461	GP301 | P/N 28466	XP201 | P/N 28470
RP260 | P/N 28462	GP401 | P/N 28467	
RP265 | P/N 28463	GP501 | P/N 28468	
RP380 | P/N 28464		

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The RP, GP and XP Series Radon Fans are intended for use by trained, professional, certified/licensed radon mitigators. The purpose of these instructions is to provide additional guidance for the most effective use of RP, GP and XP Series Fans. These instructions should be considered supplemental to EPA/radon industry standard practices, state and local building codes and regulations. In the event of a conflict, those codes, practices and regulations take precedence over these instructions.

1.2 FAN SEALING

The RP, GP and XP Series Fans are factory sealed; no additional caulk or other materials are required to inhibit air leakage.

1.3 ENVIRONMENTALS

The RP, GP and XP Series Fans are designed to perform year-round in all but the harshest climates without additional concern for temperature or weather. For installations in an area of severe cold weather, please contact RadonAway for assistance. When not in operation, the fan should be stored in an area where the temperature is never less than 32 degrees F or more than 100 degrees F.

1.4 ACOUSTICS

The RP, GP and XP Series Fans, when installed properly, operate with little or no noticeable noise to the building occupants. The velocity of the outgoing air should be considered in the overall system design. In some cases the “rushing” sound of the outlet air may be disturbing. In these instances, the use of a RadonAway Exhaust Muffler is recommended.

(To ensure quiet operation of inline and remote fans, each fan shall be installed using sound attenuation techniques appropriate for the installation. For bathroom and general ventilation applications, at least 8 feet of insulated flexible duct shall be installed between the exhaust or supply grille(s) and the fan(s). RP, GP and XP Series Fans are not suitable for kitchen range hood remote ventilation applications.)

1.5 GROUND WATER

In the event that a temporary high water table results in water at or above slab level, water may be drawn into the riser pipes, thus blocking air flow to the RP, GP and XP Series Fan. The lack of cooling air may result in the fan cycling on and off as the internal temperature rises above the thermal cutoff. Should this condition arise, it is recommended that the fan be turned off until the water recedes, allowing for return to normal operation.

1.6 SLAB COVERAGE

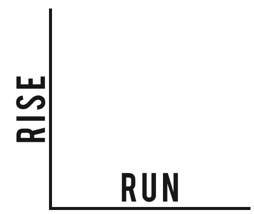
The RP, GP and XP Series Fans can provide coverage up to 2000+ sq. ft. per slab penetration. This will primarily depend on the sub-slab material in any particular installation. In general, the tighter the material, the smaller the area covered per penetration. Appropriate selection of the RP, GP and XP Series Fan best suited for the sub-slab material can improve the slab coverage. The RP, GP and XP Series have a wide range of models to choose from to cover a wide range of sub-slab materials. The RP140 and 145 are best suited for general purpose use. The RP 260 can be used where additional airflow is required, and the RP265 and RP 380 are best suited for large slab, high airflow applications. Additional suction points can be added as required. It is recommended that a small pit (5 to 10 gallons in size) be created below the slab at each suction hole.

1.7 CONDENSATION & DRAINAGE

Condensation is formed in the piping of a mitigation system when the air in the piping is chilled below its dew point. This can occur at points where the system piping goes through unheated space such as an attic, garage or outside. The system design must provide a means for water to drain back to a slab hole to remove the condensation. The RP, GP and XP Series Fan MUST be mounted vertically plumb and level, with the outlet pointing up for proper drainage through the fan. Avoid mounting the fan in any orientation that will allow water to accumulate inside the fan housing. The RP, GP and XP Series Fans are NOT suitable for underground burial.

For RP, GP and XP Series Fan piping, the following table provides the minimum recommended pipe diameter and pitch under several system conditions.

Pipe Diameter	Minimum Rise per Ft of Run*		
	@25 CFM	@50 CFM	@100 CFM
4”	1/8”	1/4”	3/8”
3”	1/4”	3/8”	1 1/2”



See p. 7 for detailed specifications.

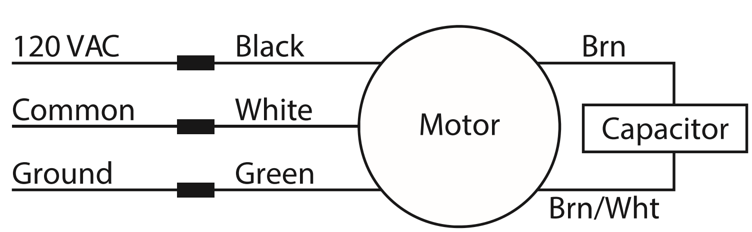
1.8 SYSTEM MONITOR & LABEL

A System Monitor, such as a manometer (P/N 50017) or audible alarm (P/N 28001-2, 28001-4 or 28421), is required to notify the occupants of a fan system malfunction. A System Label (provided with Manometer P/N 50017) with instructions for contacting the installing contractor for service and identifying the necessity for regular radon tests to be conducted by the building occupants must be conspicuously placed in a location where the occupants frequent and can see the label.

1.9 ELECTRICAL WIRING

The RP, GP and XP Series Fans operate on standard 120V, 60Hz AC. All wiring must be performed in accordance with National Fire Protection (NFPA) National Electrical Code, Standard #70, current edition, for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a UL Listed watertight conduit. Ensure that all exterior electrical boxes are outdoor rated and properly sealed to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.

RP, GP, XP Series Fan Wiring Diagram

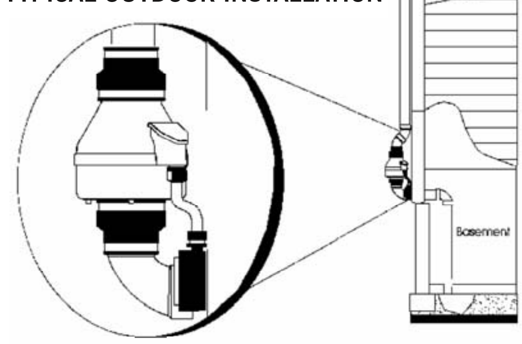


1.10 SPEED CONTROLS

The RP, GP and XP Series Fans are rated for use with electronic speed controls; however, speed controls are generally not recommended. If used, the recommended speed control is Pass & Seymour Solid State Speed Control (Cat. No. 94601-1).

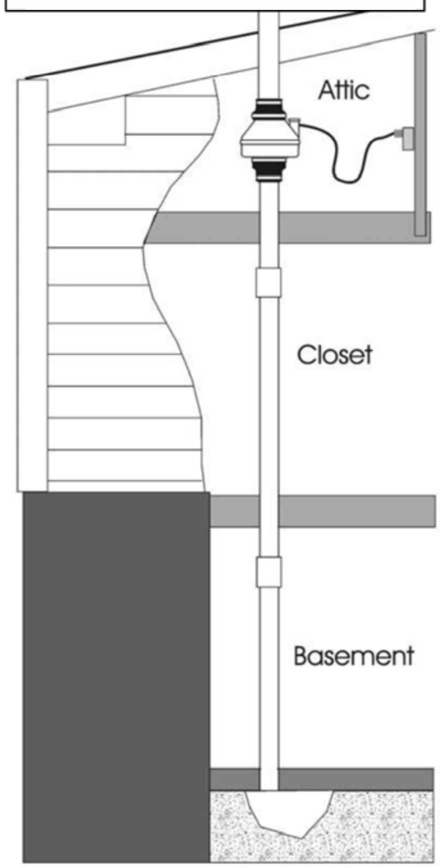
2.0 INSTALLATION

TYPICAL OUTDOOR INSTALLATION



The RP, GP and XP Series Fans can be mounted indoors or outdoors. (It is suggested that EPA and radon mitigation standards recommendations be followed in choosing the fan location.) The GP fans have an integrated mounting bracket; RP and XP Series Fans may be mounted directly on the system piping or fastened to a supporting structure by means of an optional mounting bracket.
The ducting from the fan to the outside of the building has a strong effect on noise and fan energy use. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated airflow.

TYPICAL INDOOR INSTALLATION



2.1 MOUNTING
Mount the RP, GP and XP Series Fan vertically with outlet up. Insure the unit is plumb and level. When mounting directly on the system piping assure that the fan does not contact any building surface to avoid vibration noise.

2.2 MOUNTING BRACKET (optional)
The RP and XP Series Fans may be optionally secured with the RadonAway P/N 25007 mounting bracket. Foam or rubber grommets may also be used between the bracket and mounting surface for vibration isolation.

2.3 SYSTEM PIPING
Complete piping run, using flexible couplings as a means of disconnect for servicing the unit and for vibration isolation. As the fan is typically outside of the building thermal boundary and is venting to the outside, installation of insulation around the fan is not required.

2.4 ELECTRICAL CONNECTION
Connect wiring with wire nuts provided, observing proper connections (See Section 1.9). Note that the fan is not intended for connection to rigid metal conduit.

2.5 VENT MUFFLER (optional)
Install the muffler assembly in the selected location in the outlet ducting. Solvent weld all connections. The muffler is normally installed at the end of the vent pipe.

2.6 OPERATION CHECKS & ANNUAL SYSTEM MAINTENANCE

______ **Verify** all connections are tight and **leak-free**.

______ **Ensure** the RP, GP and XP Series Fan and all ducting are **secure and vibration-free**.

______ **Verify system vacuum pressure** with manometer. **Insure** vacuum pressure is within normal operating range and **less than** the maximum recommended operating pressure.
(Based on sea-level operation, at higher altitudes reduce by about 4% per 1000 feet)
(Further reduce Maximum Operating Pressure by 10% for High Temperature environments.)
See Product Specifications. If this is exceeded, increase the number of suction points.

______ **Verify Radon levels** by testing to EPA Protocol and applicable testing standards.

THE FOLLOWING CHARTS SHOW THE PERFORMANCE OF THE RP, GP and XP SERIES FANS

RP Series Product Specifications

Typical CFM Vs. Static Pressure "WC									
Model	0"	.25"	.5"	.75"	1.0"	1.25"	1.5"	1.75"	2.0"
RP140	135	103	70	14	-	-	-	-	
RP145	166	146	126	104	82	61	41	21	3
RP260	251	209	157	117	70	26	-	-	-
RP265	375	330	282	238	204	170	140	108	70
RP380	531	490	415	340	268	200	139	84	41

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
RP140	15 - 21 watts	0.7" WC
RP145	41 - 72 watts	1.7" WC
RP260	47-65 watts	1.3" WC
RP265	95 - 139 watts	2.3" WC
RP380	96 - 138 watts	2.0" WC

**Reduce by 10% for High Temperature Operation **Reduce by 4% per 1000 ft. of altitude.*

Model	Size	Weight	Inlet/Outlet	L.2
RP140	8.5"H x 9.7" Dia.	5.5 lbs	4.5"OD (4.0" PVC Sched 40 size compatible)	25
RP145	8.5"H x 9.7" Dia.	5.5 lbs	4,5" OD	15
RP260	8.6"H x 11.75" Dia.	5.5 lbs	6.0" OD	48
RP265	8.6"H x 11.75" Dia.	6.5 lbs	6.0" OD	30
RP380	10.53"H x 13.41" Dia.	11.5 lbs	8.0" OD	57

L.2 = Estimated Equivalent Length of Rigid Metal Ducting resulting in .2" WC pressure loss for Duct Size listed. Longer Equivalent Lengths can be accommodated at Flows Lower than that at .2" WC pressure loss (see CFM Vs Static Pressure "WC Table).

XP Series Product Specifications

Typical CFM Vs. Static Pressure "WC						
	0"	.5"	1.0"	1.5"	1.75"	2.0"
XP151	150	115	69	-	-	-
XP201	112	95	70	40	-	-

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
XP151	45 - 60 watts	1.3" WC
XP201	45 - 66 watts	1.7" WC

**Reduce by 10% for High Temperature Operation **Reduce by 4% per 1000 ft. of altitude.*

Model	Size	Weight	Inlet/Outlet
XP151	9.5"H x 8.5" Dia.	6 lbs	4.5"OD (4.0" PVC Sched 40 size compatible)
XP201	9.5"H x 8.5" Dia.	6 lbs	4.5" OD

GP Series Product Specifications

Typical CFM Vs. Static Pressure “WC							
	1.0”	1.5”	2.0”	2.5”	3.0”	3.5”	4.0”
GP201	54	42	11	-	-	-	-
GP301	64	54	41	4	-	-	-
GP401	-	61	52	44	22	-	-
GP501	-	-	66	58	50	27	4

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
GP201	31-65 watts	1.8” WC
GP301	56-100 watts	2.3” WC
GP401	62-128 watts	3.0” WC
GP501	68 - 146 watts	3.8” WC

**Reduce by 10% for High Temperature Operation **Reduce by 4% per 1000 ft. of altitude.*

Model	Size	Weight	Inlet/Outlet
GP201	13”H x 12.5” Dia.	12 lbs	3.5”OD (3.0” PVC Sched 40 size compatible)
GP301	13”H x 12.5” Dia.	12 lbs	3.5” OD
GP401	13”H x 12.5” Dia.	12 lbs	3.5” OD
GP501	13”H x 12.5” Dia.	12 lbs	3.5” OD

RP, XP and GP Series Additional Specifications

Model	Recommended Duct	PVC Pipe Mounting	Thermal Cutout	Insulation Class
RP140	3” or 4” Schedule 20/40 PVC	Mount on the duct pipe or with optional mounting bracket. For Ventilation: 4”, 6” or 8” Rigid or Flexible Ducting.	130ºC/266ºF	Class B Insulation
RP145			130ºC/266ºF	Class F Insulation
RP260			150ºC/302ºF	
RP265			150ºC/302ºF	
RP380	6” Schedule 20/40 PVC Pipe		150ºC/302ºF	
XP151	3” or 4” Schedule 20/40 PVC	Fan may be mounted on the duct pipe or with integral flanges.	120ºC/248ºF	Class B Insulation
XP201				
GP201	3” or 4” Schedule 20/40 PVC	Fan may be mounted on the duct pipe or with integral flanges.	120ºC/248ºF	Class B Insulation
GP301				
GP401				
GP501				

Continuous Duty
3000 RPM
Thermally Protected
RP, GP Residential and Commercial
XP Residential Only
Rated for Indoor or Outdoor Use

LISTED
Electric Fan

Intertek
77728

Conforms to
UL STD. 507
Certified to
CAN/CSA STD.
C22.2 No.113

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the RadonAway® RP, GP and XP Series Fan for shipping damage within 15 days of receipt. **Notify RadonAway of any damages immediately.** RadonAway is not responsible for damages incurred during shipping. However, for your benefit, RadonAway does insure shipments.

There are no user serviceable parts inside the fan. **Do not attempt to open the housing.** Return unit to factory. (See Warranty below).

Install the RP, GP and XP Series Fan in accordance with all EPA, ANSI/AARST standard practices, and state and local building codes and regulations.

Provide a copy of this instruction or comparable radon system and testing information to the building occupants after completing system installation.

Warranty

RadonAway® warrants that the RP, GP (excluding GP500) and XP Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of 12 months from the date of purchase or 18 months from the date of manufacture, whichever is sooner (the "Warranty Term").

RadonAway® will replace any fan which fails due to defects in materials or workmanship during the Warranty Term. This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not cover damage in shipment unless the damage is due to the negligence of RadonAway®.

The Fan must be returned (at Owner's cost) to the RadonAway® factory. Any Fan returned to the factory will be discarded unless the Owner provides specific instructions along with the Fan when it is returned regardless of whether or not the Fan is actually replaced under this warranty. Proof of purchase must be supplied upon request for service under this Warranty.

5-YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway® will extend the Warranty Term of the fan to 60 months (5 years) from date of purchase or 66 months from date of manufacture, whichever is sooner, provided that the fan is installed by a professional radon mitigation contractor. Proof of purchase and/or proof of professional installation may be required for service under this warranty. No extended warranty is offered outside the Continental United States and Canada beyond the standard 12 months from the date of purchase or18 months from the date of manufacture, whichever is sooner.

RadonAway® is not responsible for installation, removal or delivery costs associated with this Warranty.

LIMITATION OF WARRANTY

EXCEPT AS STATED ABOVE, THE RP, GP (excluding GP500) and XP SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULARPURPOSE.

IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping costs, including insurance, to and from factory.

RadonAway® 3 Saber Way
Ward Hill, MA 01835 USA TEL (978) 521-3703
FAX (978) 521-3964
Email to: Returns@RadonAway.com

Record the following information for your records:

Serial Number: ____________________ Purchase Date: ____________

VAPOR INTRUSION SPECIALISTS

Attachment 7
SDS Sheets

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

* * * Section 1 - Product and Company Identification * * *

MSDS #1102E

Part Numbers: Clear 30850, 30863, 30876(TV), 30882, 31008(TV), 31011, 31950, 31951, 31952, 31953
Gray 30349, 31093, 31094, 31095, 31105, 31118, 31978, 31979, 31980, 31981, 32050, 32051, 32052, 32210, 32211

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other non-combusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear or Gray	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.94 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	80-84% Maximum 510 g/L per SCAQMD Test Method 316A.
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Carcinogenicity

A: General Product Information

In 2012 USEPA Integrated Risk Information System (IRIS) reviewed a two species inhalation lifetime study on THF conducted by NTP (1998). Male rats developed renal tumors and female mice developed liver tumors while neither the female rats nor the male mice showed similar results. Because the carcinogenic mechanisms could not be identified clearly in either species for either tumor, the EPA determined that the male rat and female mouse findings are relevant to the assessment of carcinogenic potential in humans. Therefore, the IRIS review concludes that these data in aggregate indicate that there is "suggestive evidence of carcinogenic potential" following exposure to THF by all routes of exposure.

B: Component Carcinogenicity

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

PVC (Chloroethylene, polymer) (9002-86-2)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Supplement 7 [1987]; Monograph 19 [1979] (Group 3 (not classifiable))

Silica, amorphous, fumed, crystalline-free (112945-52-5)

IARC: Monograph 68 [1997] (listed under Amorphous silica) (Group 3 (not classifiable))

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Tetrahydrofuran (109-99-9)

Test & Species	Conditions

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Component Waste Numbers

Tetrahydrofuran (109-99-9)
RCRA: waste number U213 (Ignitable waste)

Cyclohexanone (108-94-1)
RCRA: waste number U057 (Ignitable waste)

Acetone (67-64-1)
RCRA: waste number U002 (Ignitable waste)

Methyl ethyl ketone (78-93-3)
RCRA: waste number U159 (Ignitable waste, Toxic waste)
200.0 mg/L regulatory level

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Consumer Commodity, ORM-D

IMDG Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): None (Limited Quantites are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Oatey®

Lo-VOC SCAQMD 1168/316A Compliant

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

* * * Section 1 - Product and Company Identification * * *

MSDS #1402E

Part Numbers: Purple – 30755(TV), 30756(TV), 30757(TV), 30758, 30759, 30927 Clear - 30749, 30750, 30751, 30752, 30753, 30754, 31652, 31653

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Precautionary Statements

Prevention

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Keep away from heat/sparks/open flames and hot surfaces. - No smoking.
Keep container tightly closed.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/eye protection/face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/gas/mist/vapors.
Use only outdoors or in a well-ventilated area.

Response

If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.
If swallowed: Call a poison center or doctor/physician if you feel unwell. Rinse mouth. Do not induce vomiting.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
If exposed or concerned: Get medical advice/attention.
In case of fire: Use dry chemical, CO2, or foam to extinguish fire.

Storage

Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
78-93-3	Methyl ethyl ketone	25-40
67-64-1	Acetone	25-40
108-94-1	Cyclohexanone	15-30
109-99-9	Tetrahydrofuran	15-30

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

If material gets into eyes or if fumes cause irritation, immediately flush eyes with plenty of water until chemical is removed. If irritation persists, get medical attention immediately.

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

irst Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other noncombusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Purple or clear	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.84 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	99.96%
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics (potassium, calcium and sodium hypochlorite) and hydrogen peroxides. May attack plastic, resins and rubber.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

J: Component Carcinogenicity

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Acetone (67-64-1)

Test & Species		Conditions
96 Hr LC50 Oncorhynchus mykiss	4.74 - 6.33 mL/L	
96 Hr LC50 Pimephales promelas	6210 - 8120 mg/L [static]	
96 Hr LC50 Lepomis macrochirus	8300 mg/L	
48 Hr EC50 Daphnia magna	10294 - 17704 mg/L [Static]	
48 Hr EC50 Daphnia magna	12600 - 12700 mg/L	

Methyl ethyl ketone (78-93-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	3130-3320 mg/L [flow-through]	
48 Hr EC50 Daphnia magna	>520 mg/L	
48 Hr EC50 Daphnia magna	5091 mg/L	
48 Hr EC50 Daphnia magna	4025 - 6440 mg/L [Static]	

Required Label(s): None (Limited Quantities are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Acetone (67-64-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Methyl ethyl ketone (78-93-3)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Cyclohexanone (108-94-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Tetrahydrofuran (109-99-9)

CERCLA: 1000 lb final RQ; 454 kg final RQ

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Acetone	67-64-1	Yes	Yes	Yes	Yes	Yes	No
Methyl ethyl ketone	78-93-3	Yes	Yes	Yes	Yes	Yes	No
Cyclohexanone	108-94-1	Yes	Yes	Yes	Yes	Yes	No
Tetrahydrofuran	109-99-9	Yes	Yes	Yes	Yes	Yes	No

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Acetone	67-64-1	1 %
Methyl ethyl ketone	78-93-3	1 %
Cyclohexanone	108-94-1	0.1 %
Tetrahydrofuran	109-99-9	1 %

Additional Regulatory Information

A: General Product Information

This product contains trace amounts of chemicals known to the State of California to cause cancer. Under normal use conditions, exposure to these chemicals at levels above the State of California "No Significant Risk Level" (NSRL) are unlikely. The use of proper personal protective equipment (PPE) and ventilation guidelines noted in Section 8 will minimize exposure to these chemicals.

MATERIAL SAFETY DATA SHEET

GC68101
12 00

DATE OF PREPARATION
Sep 9, 2016

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
GC68101
PRODUCT NAME
Geocel® 3300® Professional Grade Polyurethane Sealant, White
MANUFACTURER'S NAME
Geocel Products Group
A Business Unit of The Sherwin-Williams Company
101 W. Prospect Avenue
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	(800) 348-7615 www.geocelusa.com
Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units		Vapor Pressure
2	**1305-78-8**	**Calcium Oxide**			
		ACGIH TLV		Not Available	
		OSHA PEL		Not Available	
44	**1317-65-3**	**Calcium Carbonate**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	
2	**13463-67-7**	**Titanium Dioxide**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

HMIS Codes

Health	3*
Flammability	0
Reactivity	1

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.
EFFECTS OF OVEREXPOSURE
EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Redness and itching or burning sensation may indicate eye or excessive skin exposure.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.
CANCER INFORMATION
For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
Not Applicable	Not Applicable	Not Applicable	Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY
Not Applicable
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).
Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.
PROTECTIVE GLOVES
Required for long or repeated contact.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	12.55 lb/gal	1503 g/l
SPECIFIC GRAVITY	1.51	
BOILING POINT	Not Applicable	
MELTING POINT	Not Available	
VOLATILE VOLUME	0%	
EVAPORATION RATE	Not Available	
VAPOR DENSITY	Not Available	
SOLUBILITY IN WATER	Not Available	
pH	> 2.0, < 11.5	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

0.03 lb/gal	3 g/l	Less Water and Federally Exempt Solvents
0.03 lb/gal	3 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name				
1305-78-8	**Calcium Oxide**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
1317-65-3	**Calcium Carbonate**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
13463-67-7	**Titanium Dioxide**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)
Not Regulated for Transportation.
Canada (TDG)
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IATA/ICAO
Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.
CALIFORNIA PROPOSITION 65
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
TSCA CERTIFICATION
All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

MATERIAL SAFETY DATA SHEET

1) PRODUCT AND COMPANY IDENTIFICATION

THE DOW CHEMICAL COMPANY
Midland Michigan 48674
USA

24-Hour Emergency Phone Number: 989-636-4400
Customer Service: 800-366-4740

PRODUCT NAME : GREAT STUFF* Gaps and Cracks
MATERIAL TYPE : One component system
ISSUE DATE : 04/26/2007
REVISION DATE : 01/25/2007

2) COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS Number	%
Prepolymer of MDI and Polyether polyol	mixture	40-70, 60-100%
Polymethylene polyphenyl Isocyanate containing approx. 40-50% MDI (4,4'methylene bisphenyl isocyanate) CAS# 101-68-8	9016-87-9	5-10,10-30%
Liquified Petroleum Mixture containing Isobutane (CAS#75-28-5), propane (CAS# 74-98-6) and dimethyl ether (CAS# 115-10-6)	mixture	10-30%

3) HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Sprayed or heated material harmful if inhaled. May cause allergic skin reaction. May cause allergic respiratory reaction and lung injury. Avoid temperatures above 105F (41C). Toxic flammable gases and heat are released under decomposition conditions. Toxic fumes may be released in fire situations. Reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this process.

EYE
May cause moderate eye irritation. May cause very slight transient (temporary) corneal injury.

SKIN
Prolonged or repeated exposure may cause slight skin irritation. May cause allergic skin reaction in susceptible individuals. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization. May stain skin. A single prolonged exposure is not likely to result in the material being absorbed in harmful amounts.

INGESTION
Single dose oral toxicity is considered to be low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.

INHALATION
At room temperature, vapors are minimal due to low vapor pressure. However, certain operations may generate vapor or aerosol concentrations sufficient to cause irritation or other adverse effects. Such operations include those in which the material is heated, sprayed or otherwise mechanically dispersed such as drumming, venting or

MATERIAL SAFETY DATA SHEET

pumping. Excessive exposure may cause irritation to upper respiratory tract and lungs, and pulmonary edema (fluid in the lungs). May cause respiratory sensitization in susceptible individuals. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Effects may be delayed. Decreased lung function has been associated with overexposure to isocyanates.

SYSTEMIC EFFECTS

Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

TERATOLOGY

In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother.

CANCER INFORMATION

Lung tumors have been observed in laboratory animals exposed to aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

4) FIRST-AID MEASURES

EYE

Irrigate with flowing water immediately and continuously for 15 minutes. Remove contacts after first five minutes and continue washing. Consult medical personnel.

SKIN

Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. An MDI skin decontamination study demonstrated that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water.

INGESTION

If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

INHALATION

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN

No specific antidote. Provide supportive care. Treatment based on judgment of the physician in response to reactions of the patient. May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants, and antitussives may be of help. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed for 24-48 hours for signs of respiratory distress.

5) FIRE-FIGHTING MEASURES

FLAMMABLE PROPERTIES

Flash point: -156F, -104C

Method: Estimated

HAZARDOUS COMBUSTION PRODUCTS

During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include but are not limited to: nitrogen oxides, isocyanates, hydrogen cyanide, carbon monoxide, and carbon dioxide.

MATERIAL SAFETY DATA SHEET

OTHER FLAMMABILITY INFORMATION
Product reacts with water. Reaction may produce heat and/or gases. Reaction may be violent. Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is produced when product burns. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the atoignition temperatures possibly resulting in spontaneous combustion.

EXTINGUISHING MEDIA
Use carbon dioxide, dry chemical, foam, water fog or fine spray. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effective. Do not use direct water stream which can spread fire.

FIRE FIGHTING INSTRUCTIONS
Keep people away. Isolate fire area and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water is not recommended but may be applied in very large quantities as a fine spray when other extinguishing agents are not available. Contain fire water run-off if possible. Do not use direct water stream. May spread fire. Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Use water spray to cool fire exposed containers and fire affected zone until fire is out. Immediately withdraw all personnel from area in case of rising sound from venting safety devices or discoloration of the containers. Move containers from fire area if this is possible without hazard.

PROTECTIVE EQUIPMENT - FIRE FIGHTERS
Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant clothing with SCBA. If his will not provide sufficient fire protection; consider fighting fire from a remote location.

6) ACCIDENTAL RELEASE MEASURES

PROTECT PEOPLE
Avoid any contact. Barricade area. Clear non-emergency personnel from area. Keep upwind of spill. Ventilate area of leak or spill. The area must be evacuated and reentered by persons equipped for decontamination. Use appropriate safety equipment. If available, use foam to suppress vapors.

PROTECT THE ENVIRONMENT
Contain liquid to prevent contamination of soil, surface water or ground water. Keep out of ditches, sewers, and water supplies. Should the product enter sewers or drains, it should be pumped into a covered, vented container; the cover should be placed loosely on the container but not made pressure tight. Move to a well-ventilated area. Emergency services may need to be called to assist in the cleanup operation.

CLEAN-UP
Supplies of suitable decontaminant should always be kept available. Absorb with material such as: sawdust, vermiculite, dirt, sand, clay, cob grit, Milsorb. Avoid materials such as cement powder. Collect material in suitable and properly labeled OPEN containers. Do not place in sealed container. Prolonged contact with water results in a chemical reaction which may result in rupture of the container. Place in: polylined fiber pacs, plastic drums, or properly labeled metal containers. Remove to a well ventilated area. Clean up floor areas. Attempt to neutralize by suitable decontaminant solution: Formulation 1: sodium carbonate 5-10%; liquid detergent 0.2-2%; water to make up to 100%. OR Formulation 2: Concentrated ammonia solution 3-8%; liquid detergent 0.2-2%; water to make up to 100%. If ammonia is used, use good ventilation to prevent vapor exposure. If you have any questions on how to neutralize call The Dow Chemical

Company.

7) HANDLING AND STORAGE

HANDLING

Avoid contact of this product with water at all times during handling and storage. Use only with adequate ventilation. Keep equipment clean. Use disposable containers and tools where possible. Do not eat, drink, or smoke in working area.

STORAGE

Store in a dry place. The recommended storage temperature is between 32 - 90F (0-32C). Keep containers tightly closed when not in use. Protect containers from physical abuse. Avoid direct sunlight. DO NOT incinerate aerosol can.

8) EXPOSURE CONTROL/PERSONAL PROTECTION

ENGINEERING CONTROLS

Use only with adequate ventilation. Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and the people working at this point. Odor is inadequate warning of excessive exposure.

EYE/FACE PROTECTION

Use chemical goggles.

SKIN PROTECTION

Use protective clothing impervious to this material. Selection of specific items such as faceshield, gloves, boots, apron, or full-body suit will depend on operation. Consideration of all chemicals involved, time and the dexterity needed to safely complete the job must be considered. Solvents can significantly change the permeation of a chemical through a barrier. Work with your safety equipment supplier to obtain the best Personal Protective Equipment for the job. Nitrile gloves are often found to be appropriate for work with MDI. Butyl rubber, PVC and neoprene are also often chosen.

Remove contaminated clothing immediately, wash skin area with soap and water (warm water if available) and launder clothing before reuse. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and destroyed.

RESPIRATORY PROTECTION

Atmospheric levels should be maintained below the exposure guideline. When atmospheric levels may exceed the exposure guideline, use an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive-pressure air-supplying respirator (airline or self-contained breathing apparatus). For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus.

EXPOSURE GUIDELINES(S)

Methylene bisphenyl isocyanate (MDI): ACGIH TLV is 0.005 ppm TWA and OSHA PEL is 0.02 ppm Ceiling. PELs are in accord with those recommended by OSHA, as in the 1989 revision of PELs.

Isobutane: ACGIH TLV and OSHA PEL are 800 ppm.

Propane: ACGIH TLV is 2500 ppm TWA and OSHA PEL is 1000 ppm.

Dimethyl ether: ACGIH TLV is 1000 ppm TWA.

9) PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE

MATERIAL SAFETY DATA SHEET

liquid

VAPOR PRESSURE
4210 mm Hg at 21C/70F

SPECIFIC GRAVITY
1.1

10) STABILITY AND REACTIVITY

CHEMICAL STABILITY
Stable under recommended storage conditions.

CONDITIONS TO AVOID
Avoid temperatures above 120F, 49C. Avoid temperatures below 32F, 0C. Can react with itself at temperatures above 320F, 160C. Product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Pressure build-up can be rapid. Avoid moisture. Material reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this reaction.

INCOMPATIBILITY WITH OTHER MATERIALS
Avoid contact with acids, water, alcohols, amines, ammonia, bases, moist air, and strong oxidizers. Avoid contact with metals such as aluminum, brass, copper, galvanized metals, tin, zinc. Avoid contact with moist organic absorbents. Reaction with water will generate carbon dioxide and heat. Generation of gas can cause pressure buildup in closed systems. Avoid unintended contact with polyols. The reaction of polyols and isocyanates generate heat. Diisocyanates react with many materials and the rate of reaction increases with temperature as well as increased contact; these reactions can become violent. Contact is increased by stirring or if the other material mixes with the diisocyanate. Diisocyanates are not soluble in water and are denser than water and sink to the bottom, but react slowly at the interface. The reaction forms carbon dioxide gas and a layer of solid polyurea.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Gases are released during decomposition.

HAZARDOUS POLYMERIZATION
Can occur. Polymerization can be catalyzed by: strong bases and water. Can react with itself at temperatures above 320F (160C).

11) TOXICOLOGICAL INFORMATION

SKIN
MDI: The LD50 for skin absorption in rabbits is > 2000 mg/kg.

INGESTION
MDI: The oral LD50 for rats is > 10,000 mg/kg.

MUTAGENICITY
MDI: Mutagenicity data on MDI are inconclusive. MDI was weakly positive in some in-vitro (test tube) studies;

other in-vitro studies were negative. A mutagenicity study in animals was negative.

Dimethyl ether: In vitro mutagenicity studies were positive. Animal mutagenicity studies were negative in some cases and positive in others.

12) ECOLOGICAL INFORMATION

MOVEMENT & PARTITIONING
Based on information for MDI and polymeric MDI. In the aquatic or terrestrial

environment, movement is expected to be limited by its reactivity with water forming predominantly insoluble polyureas.

DEGRADATION & PERSISTENCE
Based on information for MDI and polymeric MDI. In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.

ECOTOXICITY
Based on information for MDI and polymerc MDI. The measured ecotoxicity is that of the hydrolzed product, generally under conditions maximizing production of soluble species. Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 > 100 mg/L in most sensitive species). The LC50 in earthworm Eisenia foetida is > 1000 mg/kg.

13) DISPOSAL CONSIDERATIONS

DISPOSAL CONSIDERATIONS
FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

As a service to its customers, Dow can provide names of information resource to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 989-832-1556 for further details.

DISPOSAL
DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

14) TRANSPORT INFORMATION

US D.O.T.
Consumer Commodity ORM-D

15) REGULATORY INFORMATION

NOTICE
The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, expressed or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

REGULATORY INFORMATION
U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following subject to the reporting

MATERIAL SAFETY DATA SHEET

requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME CAS NUMBER

-------------------------------------- -----------

Polymeric Diphenylmethane diisocyanate, CAS#9016-87-9

4,4'' Methylene bisphenol isocyanate, CAS# 101-68-8

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

PMDI/MDI: immediate and delayed health hazard

Isobutane/propane: fire hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

OSHA HAZARD COMMUNICATION STANDARD:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA,or SUPERFUND):

This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

Category:

Chemical Name CAS# RQ

------------------------------- ----------- --

Methylene bisphenyl isocyanate	101-68-8	5000 lbs
Isobutane	75-28-5	100 lbs
Propane	74-98-6	100 lbs
Dimethyl ether	115-10-6	100 lbs

CALIFORNIA PROPOSITION 65

This product contains no listed substances known to the state of California to cause cancer, birth defects or other reproductive harm.

PENNSYLVANIA STATE RIGHT TO KNOW HAZARDOUS SUBSTANCE:

Methylene bisphenyl isocyanate	101-68-8
Isobutane	75-28-5
Propane	74-98-6
Dimethyl ether	115-10-6

CANADIAN REGULATIONS

MATERIAL SAFETY DATA SHEET

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

D2A - respiratory tract sensitizer

D2B - eye or skin irritant, skin sensitizer

B3 - combustible liquid

Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer''s workplace education program.

- - - - -

CPR STATEMENT: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

- - - - -

HAZARDOUS PRODUCTS ACT INFORMATION: This product contains the following ingredients which are Controlled Products and/or on the Ingredient Disclosure List (Canadian HPA section 13 and 14):

COMPONENTS: CAS #

4,4'' Methylene bisphenol isocyanate   CAS# 101-68-8   2-15 wt %

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):

All substances in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16) OTHER INFORMATION

OTHER INFORMATION

VOC content: 158.1 grams/liter

No other information.

(TM), *, or (R) Indicates a trademark of The Dow Chemical Company.

TABLE OF CONTENTS

Prepared for: **Bradley E. Gentry**
IWM Consulting Group, LLC

Site: **Priority Residence #22**
Franklin, IN 46131 (Site)

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INSTALLATION REPORT

January 18, 2019

Vapor Mitigation System
Priority Residence #22
Franklin, IN 46131 (Site)

Mr. Bradley Gentry
IWM Consulting Group
Indianapolis, IN, 46214
317-347-1111

Vapor Mitigation System Installation Report
Dates of SSDS/SMDS Installation Activities: November 29th – December 5th, 2018

Dear Mr. Gentry,

Vapor Intrusion Specialists, LLC (VIS) is pleased to provide a Vapor Mitigation System Installation Report that summarizes the scope of services performed at Priority Residence #22 located in Franklin, IN (Site). The Scope of services performed at the Site and specific field activities are described below.

Scope of Service:

- VIS installed a sub-slab depressurization system (SSDS) using a Fantech™ Rn4 fan to create a negative pressure with sufficient radius of influence (ROI) to mitigate beneath the entire portion of the basement slab. This was accomplished by using one (1) extraction point which was located centrally in the basement.
- The crawl space (located south of the basement) was also cleaned of debris and leveled so that the membrane would lay flat and not be punctured during the installation and operation of the sub-membrane depressurization system (SMDS). VIS

installed a 30-foot section of 4-inch perforated corrugated pipe underneath the VaporBlock™ 20 membrane and attached the corrugated pipe to the SSDS for constant negative pressure being distributed throughout the entire crawl space. The VaporBlock™ 20 membrane was attached to the wall using 2” ridged foam board mechanically fastened around the entire perimeter. All membrane seams overlapped a minimum of 12 inches and were sealed using a 4” VaporSeal™ tape.

- The SSDS/SMDS was comprised of the following major components: 4-inch schedule 40 PVC piping for the SSDS extraction point (centrally located in the basement) and the horizontal run totaling approximately 50 feet of pipe; additionally, a SMDS extraction point was connected to approximately 30 feet of 4-inch perforated corrugated pipe located underneath the VaporBlock™ 20 membrane in the crawlspace. The basement SSDS extraction point was installed using a hammer drill and a 5” core bit. There was approximately 5 to 7 gallons of sand and medium gravel removed from beneath the slab and containerized. Two (2) U-tube manometers were installed to measure the vacuum of each extraction point and one (1) ball valve was installed to regulate the vacuum being applied to the crawlspace finger system extraction point. One (1) Fantech™ Rn4 fan was installed with a service switch in a weather tight enclosure located on the eastern exterior of the house.
- A Fantech™ Rn4 fan was mounted and installed along the central portion of the eastern side of the residence and was hardwired by a licensed electrician to a panel located in the basement and labeled (Fan Circuit).
- VIS conducted post PFE testing utilizing one (1) vapor pin previously installed by IWM Consulting and four (4) previously drilled ½” holes utilized for initial diagnostic testing. The data collected in the field confirmed that the newly installed SSDS in the basement portion of the building and the SMDS in the crawl space is creating a sufficient negative pressure to prevent vapor intrusion into the structure.
- The SSDS was activated on December 4th, 2018 and the SMDS was activated on December 5th, 2018.

Please Note:

- A figure depicting the SSDS layout is included as **Figure 1.**
- Photos taken during the installation have been included as **Attachment 1.**
- VIS's radon mitigation certification is included as **Attachment 2.**
- The VI Mitigation Installation Checklist is included as **Attachment 3.**
- An O&M manual for the mitigation fan is included as **Attachment 4.**
- An estimate of Annual Operating Costs is included as **Attachment 5.**
- The manufacture warranty is included as **Attachment 6.**
- Safety Data Sheets are included as **Attachment 7.**

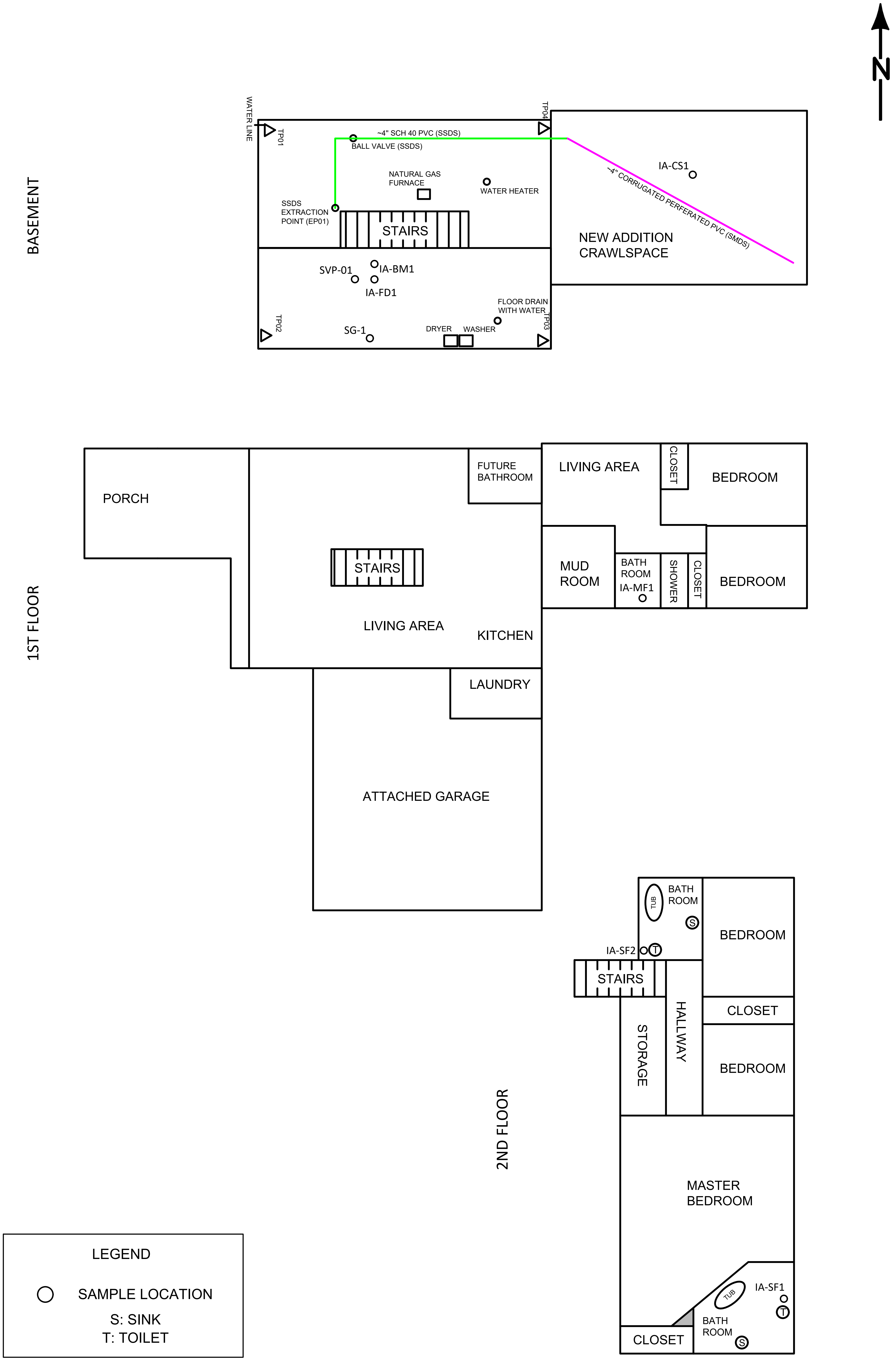
Conclusion:

After the installation of this multi-faceted vapor mitigation system, a final walk through and post PFE readings were collected and analyzed. As per the system design, the vapor mitigation system is operating as specified and is generating sufficient negative pressures beneath the basement and within the crawlspace to prevent vapor intrusion. Please do not hesitate to contact me via email (awatt@vaporintrusion.us) or telephone (812-929-9070) with any questions you might have regarding this report.

Respectfully Submitted,

Alex Watt
Associate Project Manager
Vapor Intrusion Specialists, LLC
7428 Rockville Road
Indianapolis, IN 46214
NRPP Certification: 108383 RMT
Indiana Mitigator License: RTM00783

Figure 1
System Layout



0' 10'
SCALE IN FEET

DRAWN BY: C.NEWELL
DATE: 05/07/2020
REVISED: 05/13/2020
HWPA #111291-01
PR MAPS.DWG

PRIORITY RESIDENCE #22
LAYOUT MAP

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP

Attachment 1
Installation Photographs

Vapor Mitigation Installation Photographs – Priority Residence #22, Franklin, IN

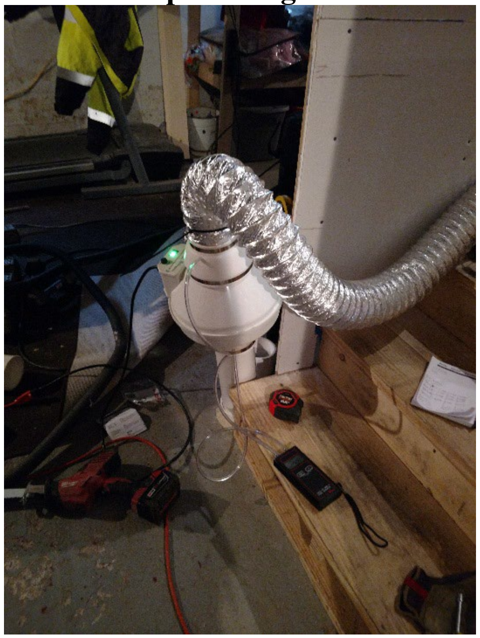


Photo #1: Conducted PFE testing.

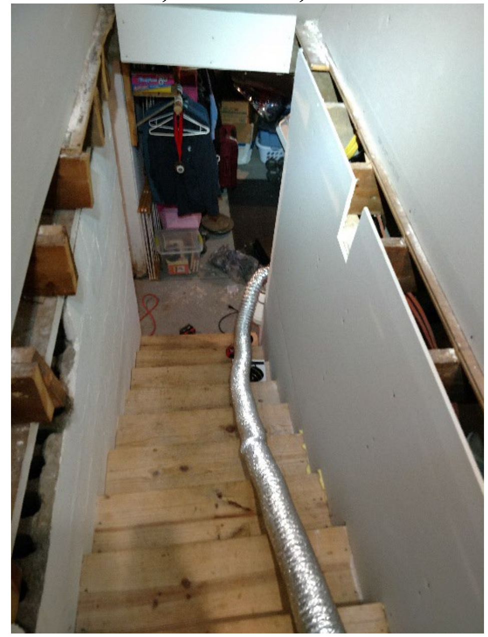


Photo #2: 4” exhaust line was run outside, where it discharged.

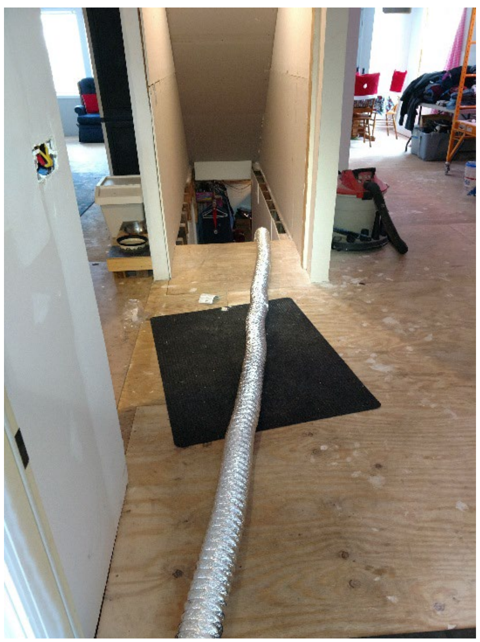


Photo #3: Exhaust line (continued).

Photo #4: Exhaust line discharging outside.

Vapor Mitigation Installation Photographs – Priority Residence #22, Franklin, IN

Photo #5: Upstairs tub drain was plugged.

Photo #6: A three stage air scrubber was running during system installation activities.

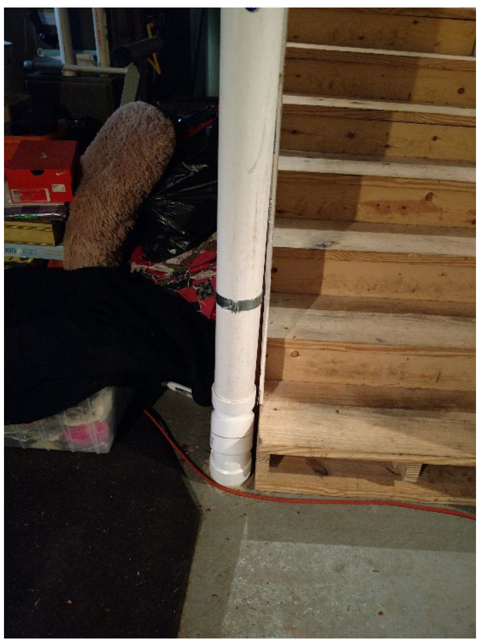


Photo #7: Extraction point vertical sealed with polyurethane sealant.

Photo #8: A U-tube manometer (reading 2.1 in of w.c.) and system labels installed on extraction point vertical.

Vapor Mitigation Installation Photographs – Priority Residence #22, Franklin, IN

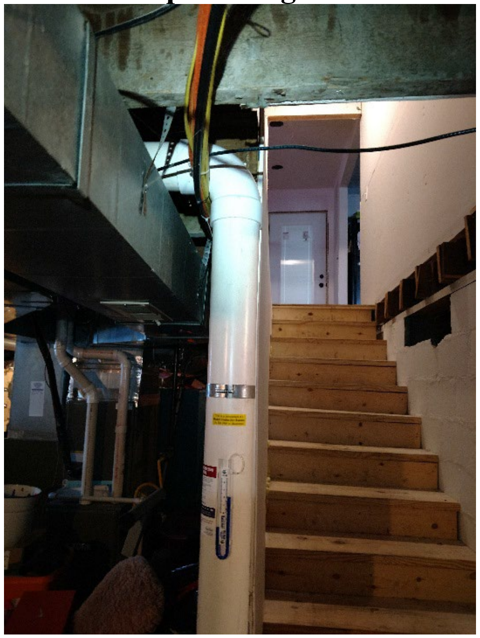


Photo #9: Extraction point vertical to main horizontal run.

Photo #10: Main horizontal run "T" and runs south towards crawlspace, the line running east penetrates exterior wall for exhaust stack.

Photo #11: Horizontal run going south for crawlspace finger system. Installed with a ball valve, vacuum alarm and system labels.

Photo #12: Crawlspace finger system was also installed with a U-tube manometer.

Vapor Mitigation Installation Photographs – Priority Residence #22, Franklin, IN

Photo #13: SMDS was installed with a 4” perforated pipe which was installed under a VaporBlock® 20 membrane.

Photo #14: SMDS continued.

Photo #15: Open foundation wall block tops were sealed with spray foam.

Photo #16: Mounted Fantech® Rn4 mitigation fan with a service switch in a weather tight enclosure.

Vapor Mitigation Installation Photographs – Priority Residence #22, Franklin, IN

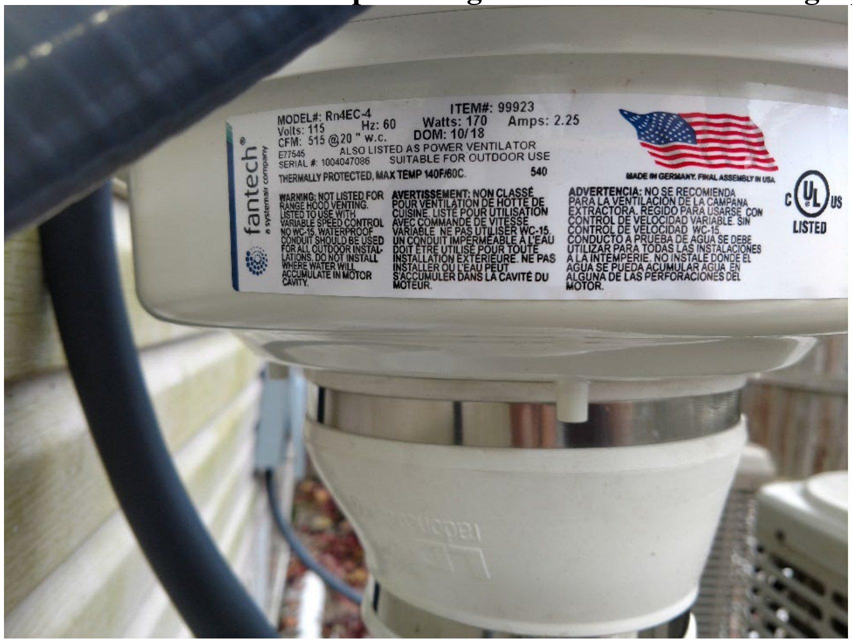


Photo #17: Fan identification badge.

Photo #18: Over-view of mounted fan, 4” exhaust stack extended 12” above the roof with a rain cap.

Attachment 2
Mitigation Certifications

NRPP™
NATIONAL RADON PROFICIENCY PROGRAM

Alex Hoskins Watt

Has satisfactorily fulfilled the requirements set forth by the
National Radon Proficiency Program and is therefore certified as a:

Residential Mitigation Provider

NRPP ID 108383 RMT
Expires 12/31/2019

Valid for specific activities or measurement devices, which can be verified with NRPP. State and local agencies may have additional requirements.

NATIONAL RADON PROFICIENCY PROGRAM
AARST

In witness Whereof,
I have subscribed my name as a
Representative of NRPP

Janna Sinclair

Janna Sinclair
NRPP Credentialing Coordinator

Indiana State Department of Health
Lead and Healthy Homes
2 N. Meridian Street, 5J
Indianapolis, Indiana 46204 (317) 234-4423

Radon Mitigator License

Certificate Number	Status	Expire Date
RTM00783	Active	12/31/2020

Alex H. Watt

Kristina Box, MD, FACOG
Kristina Box, MD, FACOG
State Health Commissioner
Indiana State Department of Health

Attachment 3

Checklist

Post Installation Checklist

Client: IWM Consulting Group

Date: 12/5/18

Site Address: Priority Residence #22

System Install Date: 11/29 to 12/15

Site Contact: Brad Gentry

Fan Model: Fantech© Rn4

Piping	Yes	No	N/A
Are all system pipes Schedule 40 solid core PVC?	X		
Are all extraction point locations permanently sealed?	X		
Does any system piping obstruct windows, doors or service access points?		X	
Are all horizontal pipe runs supported at least every 6 feet?	X		
Are all vertical pipes supported at least every 8 feet?	X		
Do horizontal runs slope towards extraction pits for drainage?	X		
Were permanent test ports installed on the exhaust stack(s)?		X	
Was a varmint guard installed on the exhaust stack(s)?		X	
If the exhaust stack penetrates the roof, was it sealed by a licensed roofer? If so, who?			X

Fans	Yes	No	N/A
Was the fan mounted/ installed level?	X		
Was the fan installed with a condensate by-pass?	X		
Was the fan installed with flexible Fernco fittings for vibration reduction?	X		
Is the exhaust stack at least 10 feet above grade, 10 feet from any doors, windows, or air intakes and at least 2 feet above the top of any openings to a conditioned space?	X		
Was the fan mounted in the attic space of a building?		X	
Was the fan mounted on the exterior of a building? If so, where? **(Eastern Wall)**	X		

Make/ Model of Fan(s) **Fantech© Rn4**

Post Installation Checklist

Vapor Barrier	Yes	No	N/A
Are the crawl space(s) free of debris?	X		
Has a Sub-membrane depressurization system been installed?	X		
Was a minimum of 6 mil or thicker membrane used in system installation? **VaporBlock© 20**	X		
Were heavy traffic areas reinforced with extra material/ membrane?	X		
Were all membrane seams overlapped a minimum of 12 inches and sealed properly?	X		
Was the vapor barrier secured/ anchored to the wall using double sided tape and polyurethane caulk?		X	
Was the vapor barrier secured/ anchored to the wall using termination bars/ wooden furring strips and polyurethane caulk?	X		
Has a 3” or 4” perforated pipe been installed underneath the vapor barrier? **4”**	X		
Are all utility entry or exit points, foundation or other penetrations sealed properly?	X		

Electrical	Yes	No	N/A
Has the electrical work been performed by a licensed electrician? If so, who? **Midwestern Electric**	X		
Is the fans outside service switch mounted in a weather tight enclosure?	X		
In the panel, is the mitigation system clearly marked/ labeled and visible from at least three feet away?	X		
Has a run-time meter been installed, and been installed in a weather tight enclosure?		X	
Has a KW meter been installed?		X	
Was the fan installed with a power cord no longer than 6 feet next to a non- GFCI receptacle?			X

Post Installation Checklist

Labels and System Monitors	Yes	No	N/A
Were the extraction point(s) installed with a U-tube/ Magnehelic gauge? If so, which? **U-tube**	X		
Was there a Vacuum/ Audible alarm installed in case of system failure? **Located near ball valve**	X		
Are system pipes, membranes and sump pump lids clearly labeled and easily identifiable?	X		
Was there a system label installed with company contact information in case of emergency?	X		

Sump Pit	Yes	No	N/A
Is there a sump pit(s) located in the building? If so, where? *Southwest corner*		X	
Does the sump have an adequate cover installed, and is it properly anchored and sealed?			X
Are all penetrations in sump lid properly sealed?			X
Has the sump pit been used as an extraction point?			X
Does the sump lid have a view port for observation and maintenance purposes?			X

Testing	Yes	No	N/A
Was Diagnostic testing performed before system install?	X		
Was Post Diagnostic testing performed to confirm system performance?	X		

Reporting	Yes	No	N/A
Has an as built drawing been completed showing system layout?	X		
Have all test point(s) and extraction point(s) locations and data been inserted in to system drawing?	X		
Has the system install been documented with photographs?	X		

Post Installation Checklist

Field Notes

Floor to wall joint looked tight with minimal cracks. Only found one floor drain in basement and it was retaining water, so no need for a Drainjer™ valve in the floor drain.

Technician's signature:

VAPOR INTRUSION SPECIALISTS
7428 Rockville Road, Indianapolis, Indiana 46214 | cell 812-929-9070

PFE Field Data Sheet

Property Name: PR #22

Property Address: N/A

PFE Testing Date: 12/5/18

Professional: Alex Watt

Notes: Fantech® Rn4 fan Revolutions Per Minute (RPM) ratio was reduced to 8 (out of 10) on the potentiometer.

Test Point	Observed Negative Pressure (in w.c.)	Distance from EP-1 (feet)
TP01	-0.119	~15
TP02	-0.070	~20
TP03	-0.023	~20
TP04	-0.018	~20
VP	-0.073	~10

Attachment 4

Vapor Mitigation System Operation and Maintenance

We advise consultants, maintenance personnel or property owners to conduct routine visual inspections of all SSDS/SMDS to verify that system components are operating properly. The inspection should include but not limited to the following:

- Observe the U-tube or magnehelic gauges for pressure indication; a pressure of 'O' indicates that there is a problem with system piping or fan operations.
- Observe the mitigation fan(s) and note any abnormal sounds or noises coming from the fan including buzzing, scraping, rattling, or etc. If any abnormal noises or sounds are audible, contact VIS.
- Most mitigation fans are factory sealed and designed to be maintenance free for the life of the fan.
- Should the fans' casing be opened or the factory seal broken, any service warranty may be voided.
- Factory maintenance documentation has been provided to consultant with recommended schedule for maintenance of fans if required.
- Inspect the PVC piping of the system for damage or cracks. If any damage occurs to the PVC piping, contact VIS piping supports and hangers should also be inspected for wear and integrity.
- Roof penetrations for system exhaust piping should be inspected to assure no moisture or other intrusion is apparent.
- Any significant changes to building or structure can and may affect system performance. VIS should be advised of planned changes beforehand to avoid any possible performance issues or system failure.

Contact VIS for additional service & Maintenance should any occasion arise that may cause concern that the SSDS or SMDS is not functioning properly as vapor intrusion may no longer be mitigated to meet performance criteria to which VIS completed mitigation.

Attachment 5
Annual Operating Costs

Radonaway Fans	Average KWH	Average Cost Per Year
RP140	*$0.0894*	$13.31
RP145	*$0.0894*	$42.29
RP260	*$0.0894*	$48.55
RP265	*$0.0894*	$88.50
RP380	*$0.0894*	$101.03
SF180	*$0.0894*	$42.29
GP201	*$0.0894*	$39.16
GP301	*$0.0894*	$56.39
GP401	*$0.0894*	$66.57
GP500	*$0.0894*	$78.31
GP501	*$0.0894*	$82.23
XP151	*$0.0894*	$40.72
XP201	*$0.0894*	$43.07
XP261	*$0.0894*	$66.57
HS2000	*$0.0894*	$164.46
HS3000	*$0.0894*	$117.47
HS5000	*$0.0894*	$250.61
Fantech Fans	**Average KWH**	**Average Cost Per Year**
HP2133	*$0.0894*	$13.31
Rn4	**$0.11**	**$170.00**

Attachment 6
Fan Warranty

Item #: 142001
Rev Date: 2017-11-03

Installation and Operation Manual
Manuel d'installation et d'opération

Rn4

Inline Radon Fan

Ventilateur pour radon en ligne

Techical / Customer Support:
Support technique et service à la clientèle
United States / États-Unis Tel.: 800.747.1762 **Canada** Tel.: 800.565.3548

fantech®
a systemair company

Note	Warning / Important note Avertissement / Note importante	Information	Technical information Information technique	Practical tip Conseil pratique

DO NOT CONNECT POWER SUPPLY until fan is completely installed.
Make sure electrical service to the fan is in the locked "OFF" position.

1. This fan has rotating parts and safety precaution should be exercised during installation, operation and maintenance.

2. WARNING! TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS - OBSERVE THE FOLLOWING:
   a. Use this unit in the manner intended by the manufacturer. If you have any questions, contact your manufacturer's representative or contact us directly.

   b. CAUTION: Before installation, servicing or cleaning unit, switch power off at service panel and lock the service disconnection means to prevent power from being switched on accidentally. When the service disconnection means cannot be locked, securely fasten a prominent warning device, such as tag, to the panel.

   c. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.

   d. The combustion airflow needed for safe operation of fuel burning equipment may be affected by this unit's operation. Follow the heating equipment manufacturer's guidelines and safety standards such as those published by the National Fire Protection Association (NFPA), the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) and the local code authorities.

   e. When cutting or drilling into wall and ceiling, do not damage electrical wiring and other hidden utilities.

   f. Ducted fans must always be vented to the outdoors.

3. WARNING! Check voltage at the fan to see if it corresponds to the motor name plate.

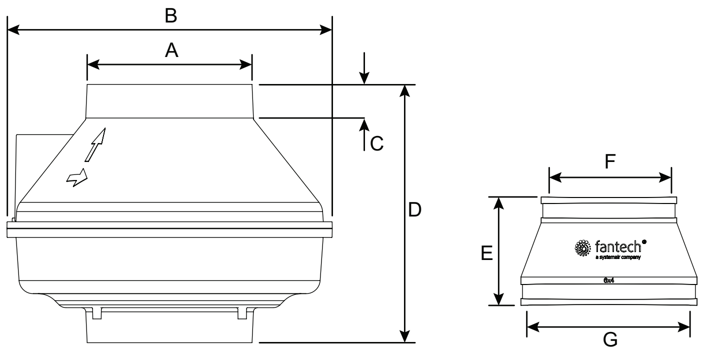
4. For radon mitigation use only. DO NOT use to exhaust hazardous or explosive materials and vapors.

5. Do not use this fan with any solid state speed control device.

GUARDS MUST BE INSTALLED WHEN FAN IS WITHIN REACH OF PERSONNEL OR WITHIN SEVEN (7) FEET OF WORKING LEVEL OR WHEN DEEMED ADVISABLE FOR SAFETY.

The ducting from this fan to the outside of the building has a strong effect on the air flow, noise and energy use of the fan. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated air flow.

DIMENSIONS



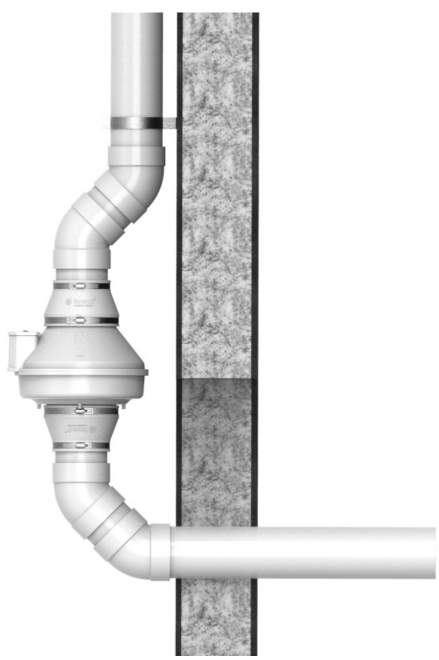
Model/ Modèle	A	B	C	D	E	F	G
Rn4-3	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)	4 (102)	3 1/2 (89)	6 (152)
Rn4-4	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)	4 (102)	4 1/2 (114)	6 (152)

Dimensions in inches (mm).
Dimensions en pouces (mm)

INSTALLATION

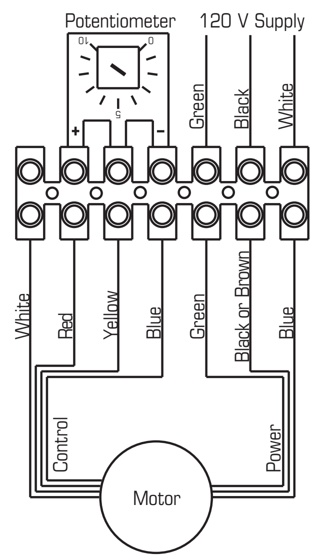
The Rn4-3 is designed for use with 3" schedule 40 PVC pipe.
The Rn4-4 is designed for use with 4" schedule 40 PVC pipe

Prior to installation, the suction pipe should be terminated at the exterior wall. The suction pipe should be installed with slight incline to drain water from the fan.



DO NOT connect fan directly to building structure

WIRING DIAGRAM



To reduce fan speed use a small screwdriver and turn potentiometer knob counter clockwise

WARRANTY

Five (5) Year Warranty

This warranty supersedes all prior warranties

DURING ENTIRE WARRANTY PERIOD:
Fantech will repair or replace any part which has a factory defect in workmanship or material. Product may need to be returned to the Fantech factory, together with a copy of the bill of sale and identified with RMA number.

FOR FACTORY RETURN YOU MUST:
- Have a Return Materials Authorization (RMA) number. This may be obtained by calling Fantech either in the USA at 1.800.747.1762 or in CANADA at 1.800.565.3548. Please have bill of sale available.
- The RMA number must be clearly written on the outside of the carton, or the carton will be refused.
- All parts and/or product will be repaired/replaced and shipped back to buyer; no credit will be issued.

OR
The Distributor may place an order for the warranty part and/or product and is invoiced. The Distributor will receive a credit equal to the invoice only after product is returned prepaid and verified to be defective.

FANTECH WARRANTY TERMS DO NOT PROVIDE FOR REPLACEMENT WITHOUT CHARGE PRIOR TO INSPECTION FOR A DEFECT. REPLACEMENTS ISSUED IN ADVANCE OF DEFECT INSPECTION ARE INVOICED, AND CREDIT IS PENDING INSPECTION OF RETURNED MATERIAL. DEFECTIVE MATERIAL RETURNED BY END USERS SHOULD NOT BE REPLACED BY THE DISTRIBUTOR WITHOUT CHARGE TO THE END USER, AS CREDIT TO DISTRIBUTOR'S ACCOUNT WILL BE PENDING INSPECTION AND VERIFICATION OF ACTUAL DEFECT BY FANTECH.

THE FOLLOWING WARRANTIES DO NOT APPLY:
- Damages from shipping, either concealed or visible. Claim must be filed with freight company.
- Damages resulting from improper wiring or installation.
- Damages or failure caused by acts of God, or resulting from improper consumer procedures, such as:
    1. Improper maintenance
    2. Misuse, abuse, abnormal use, or accident, and
    3. Incorrect electrical voltage or current.
- Removal or any alteration made on the Fantech label control number or date of manufacture.
- Any other warranty, expressed, implied or written, and to any consequential or incidental damages, loss or property, revenues, or profit, or costs of removal, installation or reinstallation, for any breach of warranty.

WARRANTY VALIDATION
- The user must keep a copy of the bill of sale to verify purchase date.
- These warranties give you specific legal rights, and are subject to an applicable consumer protection legislation. You may have additional rights which vary from state to state.

Limitation of Warranty and Liability

This warranty does not apply to any Fantech product or part which has failed as a result of faulty installation or abuse, incorrect electrical connections or alterations made by others, or use under abnormal operating conditions or misapplication of the product or parts. We will not approve for payment any repair not made by us or our authorized agent without prior written consent. The foregoing shall constitute our sole and exclusive warranty and our sole exclusive liability, and is in lieu of any other warranties, whether written, oral, implied or statutory. There are no warranties which extend beyond the description on the page hereof. In no event, whether as a result of breach of contract, or warranty or alleged negligence, defect incorrect advice or other causes, shall Fantech be liable for special or consequential damages, including, but not limited to, loss of profits or revenue, loss of use of equipment or any other associated equipment, cost of capital, cost of substitute equipment, facilities or services, downtime costs, or claims of customers of purchase for such damages. Fantech neither assumes or authorizes any person to assume for it any other liability in connection with the sale of product(s) or part(s). Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages so the above limitations and exclusions may not apply to you.

Warning

Fantech products are designed and manufactured to provide reliable performance, but they are not guaranteed to be 100% free from defects. Even reliable products will experience occasional failures and this possibility should be recognized by the user. If these products are used in a life support ventilation system where failure could result in loss or injury, the user should provide adequate backup ventilation, supplementary natural ventilation, failure alarm system, or acknowledge willingness to accept the risk of such loss or injury.

Attachment 7

SDS Sheets

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

* * * Section 1 - Product and Company Identification * * *

MSDS #1102E

Part Numbers: Clear 30850, 30863, 30876(TV), 30882, 31008(TV), 31011, 31950, 31951, 31952, 31953 Gray 30349, 31093, 31094, 31095, 31105, 31118, 31978, 31979, 31980, 31981, 32050, 32051, 32052, 32210, 32211

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other non-combusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear or Gray	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.94 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	80-84% Maximum 510 g/L per SCAQMD Test Method 316A.
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Carcinogenicity

A: General Product Information

In 2012 USEPA Integrated Risk Information System (IRIS) reviewed a two species inhalation lifetime study on THF conducted by NTP (1998). Male rats developed renal tumors and female mice developed liver tumors while neither the female rats nor the male mice showed similar results. Because the carcinogenic mechanisms could not be identified clearly in either species for either tumor, the EPA determined that the male rat and female mouse findings are relevant to the assessment of carcinogenic potential in humans. Therefore, the IRIS review concludes that these data in aggregate indicate that there is "suggestive evidence of carcinogenic potential" following exposure to THF by all routes of exposure.

B: Component Carcinogenicity

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

PVC (Chloroethylene, polymer) (9002-86-2)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Supplement 7 [1987]; Monograph 19 [1979] (Group 3 (not classifiable))

Silica, amorphous, fumed, crystalline-free (112945-52-5)

IARC: Monograph 68 [1997] (listed under Amorphous silica) (Group 3 (not classifiable))

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

*** Section 12 - Ecological Information ***

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Tetrahydrofuran (109-99-9)

Test & Species	Conditions

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Component Waste Numbers

Tetrahydrofuran (109-99-9)
RCRA: waste number U213 (Ignitable waste)

Cyclohexanone (108-94-1)
RCRA: waste number U057 (Ignitable waste)

Acetone (67-64-1)
RCRA: waste number U002 (Ignitable waste)

Methyl ethyl ketone (78-93-3)
RCRA: waste number U159 (Ignitable waste, Toxic waste)
200.0 mg/L regulatory level

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Consumer Commodity, ORM-D

IMDG Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): None (Limited Quantites are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

* * * Section 1 - Product and Company Identification * * *

MSDS #1402E

Part Numbers: Purple – 30755(TV), 30756(TV), 30757(TV), 30758, 30759, 30927 Clear - 30749, 30750, 30751, 30752, 30753, 30754, 31652, 31653

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

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Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Precautionary Statements

Prevention

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Keep away from heat/sparks/open flames and hot surfaces. - No smoking.
Keep container tightly closed.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/eye protection/face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/gas/mist/vapors.
Use only outdoors or in a well-ventilated area.

Response

If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.
If swallowed: Call a poison center or doctor/physician if you feel unwell. Rinse mouth. Do not induce vomiting.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
If exposed or concerned: Get medical advice/attention.
In case of fire: Use dry chemical, CO_2, or foam to extinguish fire.

Storage

Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
78-93-3	Methyl ethyl ketone	25-40
67-64-1	Acetone	25-40
108-94-1	Cyclohexanone	15-30
109-99-9	Tetrahydrofuran	15-30

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

If material gets into eyes or if fumes cause irritation, immediately flush eyes with plenty of water until chemical is removed. If irritation persists, get medical attention immediately.

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

*** Section 6 - Accidental Release Measures ***

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other noncombusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

:ngineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Purple or clear	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.84 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	99.96%
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics (potassium, calcium and sodium hypochlorite) and hydrogen peroxides. May attack plastic, resins and rubber.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

J: Component Carcinogenicity

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Acetone (67-64-1)

Test & Species		Conditions
96 Hr LC50 Oncorhynchus mykiss	4.74 - 6.33 mL/L	
96 Hr LC50 Pimephales promelas	6210 - 8120 mg/L [static]	
96 Hr LC50 Lepomis macrochirus	8300 mg/L	
48 Hr EC50 Daphnia magna	10294 - 17704 mg/L [Static]	
48 Hr EC50 Daphnia magna	12600 - 12700 mg/L	

Methyl ethyl ketone (78-93-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	3130-3320 mg/L [flow-through]	
48 Hr EC50 Daphnia magna	>520 mg/L	
48 Hr EC50 Daphnia magna	5091 mg/L	
48 Hr EC50 Daphnia magna	4025 - 6440 mg/L [Static]	

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Required Label(s): None (Limited Quantities are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Acetone (67-64-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Methyl ethyl ketone (78-93-3)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Cyclohexanone (108-94-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Tetrahydrofuran (109-99-9)

CERCLA: 1000 lb final RQ; 454 kg final RQ

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Acetone	67-64-1	Yes	Yes	Yes	Yes	Yes	No
Methyl ethyl ketone	78-93-3	Yes	Yes	Yes	Yes	Yes	No
Cyclohexanone	108-94-1	Yes	Yes	Yes	Yes	Yes	No
Tetrahydrofuran	109-99-9	Yes	Yes	Yes	Yes	Yes	No

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Acetone	67-64-1	1 %
Methyl ethyl ketone	78-93-3	1 %
Cyclohexanone	108-94-1	0.1 %
Tetrahydrofuran	109-99-9	1 %

Additional Regulatory Information

A: General Product Information

This product contains trace amounts of chemicals known to the State of California to cause cancer. Under normal use conditions, exposure to these chemicals at levels above the State of California "No Significant Risk Level" (NSRL) are unlikely. The use of proper personal protective equipment (PPE) and ventilation guidelines noted in Section 8 will minimize exposure to these chemicals.

MATERIAL SAFETY DATA SHEET

GC68101
12 00

DATE OF PREPARATION
Sep 9, 2016

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
GC68101
PRODUCT NAME
Geocel® 3300® Professional Grade Polyurethane Sealant, White
MANUFACTURER'S NAME
Geocel Products Group
A Business Unit of The Sherwin-Williams Company
101 W. Prospect Avenue
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	(800) 348-7615 www.geocelusa.com
Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units		Vapor Pressure
2	**1305-78-8**	**Calcium Oxide**			
		ACGIH TLV		Not Available	
		OSHA PEL		Not Available	
44	**1317-65-3**	**Calcium Carbonate**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	
2	**13463-67-7**	**Titanium Dioxide**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

HMIS Codes

Health	3*
Flammability	0
Reactivity	1

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.
EFFECTS OF OVEREXPOSURE
EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Redness and itching or burning sensation may indicate eye or excessive skin exposure.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.
CANCER INFORMATION
For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
Not Applicable	Not Applicable	Not Applicable	Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY
Not Applicable
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).
Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.
PROTECTIVE GLOVES
Required for long or repeated contact.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	12.55 lb/gal	1503 g/l
SPECIFIC GRAVITY	1.51	
BOILING POINT	Not Applicable	
MELTING POINT	Not Available	
VOLATILE VOLUME	0%	
EVAPORATION RATE	Not Available	
VAPOR DENSITY	Not Available	
SOLUBILITY IN WATER	Not Available	
pH	> 2.0, < 11.5	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

0.03 lb/gal	3 g/l	Less Water and Federally Exempt Solvents
0.03 lb/gal	3 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable
CONDITIONS TO AVOID
None known.
INCOMPATIBILITY
None known.
HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide
HAZARDOUS POLYMERIZATION
Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS
IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name				
1305-78-8	**Calcium Oxide**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
1317-65-3	**Calcium Carbonate**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
13463-67-7	**Titanium Dioxide**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION
No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD
Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)
Not Regulated for Transportation.
Canada (TDG)
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IATA/ICAO
Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.
CALIFORNIA PROPOSITION 65
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
TSCA CERTIFICATION
All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

MATERIAL SAFETY DATA SHEET

1) PRODUCT AND COMPANY IDENTIFICATION

THE DOW CHEMICAL COMPANY
Midland Michigan 48674
USA

24-Hour Emergency Phone Number: 989-636-4400
Customer Service: 800-366-4740

PRODUCT NAME : GREAT STUFF* Gaps and Cracks
MATERIAL TYPE : One component system
ISSUE DATE : 04/26/2007
REVISION DATE : 01/25/2007

2) COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS Number	%
Prepolymer of MDI and Polyether polyol	mixture	40-70, 60-100%
Polymethylene polyphenyl Isocyanate containing approx. 40-50% MDI (4,4'methylene bisphenyl isocyanate) CAS# 101-68-8	9016-87-9	5-10,10-30%
Liquified Petroleum Mixture containing Isobutane (CAS#75-28-5), propane (CAS# 74-98-6) and dimethyl ether (CAS# 115-10-6)	mixture	10-30%

3) HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Sprayed or heated material harmful if inhaled. May cause allergic skin reaction. May cause allergic respiratory reaction and lung injury. Avoid temperatures above 105F (41C). Toxic flammable gases and heat are released under decomposition conditions. Toxic fumes may be released in fire situations. Reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this process.

EYE

May cause moderate eye irritation. May cause very slight transient (temporary) corneal injury.

SKIN

Prolonged or repeated exposure may cause slight skin irritation. May cause allergic skin reaction in susceptible individuals. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization. May stain skin. A single prolonged exposure is not likely to result in the material being absorbed in harmful amounts.

INGESTION

Single dose oral toxicity is considered to be low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.

INHALATION

At room temperature, vapors are minimal due to low vapor pressure. However, certain operations may generate vapor or aerosol concentrations sufficient to cause irritation or other adverse effects. Such operations include those in which the material is heated, sprayed or otherwise mechanically dispersed such as drumming, venting or

MATERIAL SAFETY DATA SHEET

pumping. Excessive exposure may cause irritation to upper respiratory tract and lungs, and pulmonary edema (fluid in the lungs). May cause respiratory sensitization in susceptible individuals. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Effects may be delayed. Decreased lung function has been associated with overexposure to isocyanates.

SYSTEMIC EFFECTS
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

TERATOLOGY
In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother.

CANCER INFORMATION
Lung tumors have been observed in laboratory animals exposed to aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

4) FIRST-AID MEASURES

EYE
Irrigate with flowing water immediately and continuously for 15 minutes. Remove contacts after first five minutes and continue washing. Consult medical personnel.

SKIN
Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. An MDI skin decontamination study demonstrated that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water.

INGESTION
If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

INHALATION
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN
No specific antidote. Provide supportive care. Treatment based on judgment of the physician in response to reactions of the patient. May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants, and antitussives may be of help. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed for 24-48 hours for signs of respiratory distress.

5) FIRE-FIGHTING MEASURES

FLAMMABLE PROPERTIES
Flash point: -156F, -104C

Method: Estimated

HAZARDOUS COMBUSTION PRODUCTS
During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include but are not limited to: nitrogen oxides, isocyanates, hydrogen cyanide, carbon monoxide, and carbon dioxide.

MATERIAL SAFETY DATA SHEET

OTHER FLAMMABILITY INFORMATION
Product reacts with water. Reaction may produce heat and/or gases. Reaction may be violent. Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is produced when product burns. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the atoignition temperatures possibly resulting in spontaneous combustion.

EXTINGUISHING MEDIA
Use carbon dioxide, dry chemical, foam, water fog or fine spray. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effective. Do not use direct water stream which can spread fire.

FIRE FIGHTING INSTRUCTIONS
Keep people away. Isolate fire area and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water is not recommended but may be applied in very large quantities as a fine spray when other extinguishing agents are not available. Contain fire water run-off if possible. Do not use direct water stream. May spread fire. Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Use water spray to cool fire exposed containers and fire affected zone until fire is out. Immediately withdraw all personnel from area in case of rising sound from venting safety devices or discoloration of the containers. Move containers from fire area if this is possible without hazard.

PROTECTIVE EQUIPMENT - FIRE FIGHTERS
Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant clothing with SCBA. If his will not provide sufficient fire protection; consider fighting fire from a remote location.

6) ACCIDENTAL RELEASE MEASURES

PROTECT PEOPLE
Avoid any contact. Barricade area. Clear non-emergency personnel from area. Keep upwind of spill. Ventilate area of leak or spill. The area must be evacuated and reentered by persons equipped for decontamination. Use appropriate safety equipment. If available, use foam to suppress vapors.

PROTECT THE ENVIRONMENT
Contain liquid to prevent contamination of soil, surface water or ground water. Keep out of ditches, sewers, and water supplies. Should the product enter sewers or drains, it should be pumped into a covered, vented container; the cover should be placed loosely on the container but not made pressure tight. Move to a well-ventilated area. Emergency services may need to be called to assist in the cleanup operation.

CLEAN-UP
Supplies of suitable decontaminant should always be kept available. Absorb with material such as: sawdust, vermiculite, dirt, sand, clay, cob grit, Milsorb. Avoid materials such as cement powder. Collect material in suitable and properly labeled OPEN containers. Do not place in sealed container. Prolonged contact with water results in a chemical reaction which may result in rupture of the container. Place in: polylined fiber pacs, plastic drums, or properly labeled metal containers. Remove to a well ventilated area. Clean up floor areas. Attempt to neutralize by suitable decontaminant solution: Formulation 1: sodium carbonate 5-10%; liquid detergent 0.2-2%; water to make up to 100%. OR Formulation 2: Concentrated ammonia solution 3-8%; liquid detergent 0.2-2%; water to make up to 100%. If ammonia is used, use good ventilation to prevent vapor exposure. If you have any questions on how to neutralize call The Dow Chemical

Company.

7) HANDLING AND STORAGE

HANDLING

Avoid contact of this product with water at all times during handling and storage. Use only with adequate ventilation. Keep equipment clean. Use disposable containers and tools where possible. Do not eat, drink, or smoke in working area.

STORAGE

Store in a dry place. The recommended storage temperature is between 32 - 90F (0-32C). Keep containers tightly closed when not in use. Protect containers from physical abuse. Avoid direct sunlight. DO NOT incinerate aerosol can.

8) EXPOSURE CONTROL/PERSONAL PROTECTION

ENGINEERING CONTROLS

Use only with adequate ventilation. Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and the people working at this point. Odor is inadequate warning of excessive exposure.

EYE/FACE PROTECTION

Use chemical goggles.

SKIN PROTECTION

Use protective clothing impervious to this material. Selection of specific items such as faceshield, gloves, boots, apron, or full-body suit will depend on operation. Consideration of all chemicals involved, time and the dexterity needed to safely complete the job must be considered. Solvents can significantly change the permeation of a chemical through a barrier. Work with your safety equipment supplier to obtain the best Personal Protective Equipment for the job. Nitrile gloves are often found to be appropriate for work with MDI. Butyl rubber, PVC and neoprene are also often chosen.

Remove contaminated clothing immediately, wash skin area with soap and water (warm water if available) and launder clothing before reuse. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and destroyed.

RESPIRATORY PROTECTION

Atmospheric levels should be maintained below the exposure guideline. When atmospheric levels may exceed the exposure guideline, use an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive-pressure air-supplying respirator (airline or self-contained breathing apparatus). For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus.

EXPOSURE GUIDELINES(S)

Methylene bisphenyl isocyanate (MDI): ACGIH TLV is 0.005 ppm TWA and OSHA PEL is 0.02 ppm Ceiling. PELs are in accord with those recommended by OSHA, as in the 1989 revision of PELs.

Isobutane: ACGIH TLV and OSHA PEL are 800 ppm.

Propane: ACGIH TLV is 2500 ppm TWA and OSHA PEL is 1000 ppm.

Dimethyl ether: ACGIH TLV is 1000 ppm TWA.

9) PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE

MATERIAL SAFETY DATA SHEET

liquid

VAPOR PRESSURE
4210 mm Hg at 21C/70F

SPECIFIC GRAVITY
1.1

10) STABILITY AND REACTIVITY

CHEMICAL STABILITY
Stable under recommended storage conditions.

CONDITIONS TO AVOID
Avoid temperatures above 120F, 49C. Avoid temperatures below 32F, 0C. Can react with itself at temperatures above 320F, 160C. Product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Pressure build-up can be rapid. Avoid moisture. Material reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this reaction.

INCOMPATIBILITY WITH OTHER MATERIALS
Avoid contact with acids, water, alcohols, amines, ammonia, bases, moist air, and strong oxidizers. Avoid contact with metals such as aluminum, brass, copper, galvanized metals, tin, zinc. Avoid contact with moist organic absorbents. Reaction with water will generate carbon dioxide and heat. Generation of gas can cause pressure buildup in closed systems. Avoid unintended contact with polyols. The reaction of polyols and isocyanates generate heat. Diisocyanates react with many materials and the rate of reaction increases with temperature as well as increased contact; these reactions can become violent. Contact is increased by stirring or if the other material mixes with the diisocyanate. Diisocyanates are not soluble in water and are denser than water and sink to the bottom, but react slowly at the interface. The reaction forms carbon dioxide gas and a layer of solid polyurea.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Gases are released during decomposition.

HAZARDOUS POLYMERIZATION
Can occur. Polymerization can be catalyzed by: strong bases and water. Can react with itself at temperatures above 320F (160C).

11) TOXICOLOGICAL INFORMATION

SKIN
MDI: The LD50 for skin absorption in rabbits is > 2000 mg/kg.

INGESTION
MDI: The oral LD50 for rats is > 10,000 mg/kg.

MUTAGENICITY
MDI: Mutagenicity data on MDI are inconclusive. MDI was weakly positive in some in-vitro (test tube) studies;

other in-vitro studies were negative. A mutagenicity study in animals was negative.

Dimethyl ether: In vitro mutagenicity studies were positive. Animal mutagenicity studies were negative in some cases and positive in others.

12) ECOLOGICAL INFORMATION

MOVEMENT & PARTITIONING
Based on information for MDI and polymeric MDI. In the aquatic or terrestrial

MATERIAL SAFETY DATA SHEET

environment, movement is expected to be limited by its reactivity with water forming predominantly insoluble polyureas.

DEGRADATION & PERSISTENCE
Based on information for MDI and polymeric MDI. In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.

ECOTOXICITY
Based on information for MDI and polymerc MDI. The measured ecotoxicity is that of the hydrolzed product, generally under conditions maximizing production of soluble species. Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 > 100 mg/L in most sensitive species). The LC50 in earthworm Eisenia foetida is > 1000 mg/kg.

13) DISPOSAL CONSIDERATIONS

DISPOSAL CONSIDERATIONS
FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

As a service to its customers, Dow can provide names of information resource to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 989-832-1556 for further details.

DISPOSAL
DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

14) TRANSPORT INFORMATION

US D.O.T.
Consumer Commodity ORM-D

15) REGULATORY INFORMATION

NOTICE
The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, expressed or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

REGULATORY INFORMATION
U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following subject to the reporting

MATERIAL SAFETY DATA SHEET

requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME CAS NUMBER

-- -----------

Polymeric Diphenylmethane diisocyanate, CAS#9016-87-9

4,4'' Methylene bisphenol isocyanate, CAS# 101-68-8

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

PMDI/MDI: immediate and delayed health hazard

Isobutane/propane: fire hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

OSHA HAZARD COMMUNICATION STANDARD:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA,or SUPERFUND):

This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

Category:

Chemical Name CAS# RQ

-------------------------------- ----------- --

Methylene bisphenyl isocyanate	101-68-8	5000 lbs
Isobutane	75-28-5	100 lbs
Propane	74-98-6	100 lbs
Dimethyl ether	115-10-6	100 lbs

CALIFORNIA PROPOSITION 65

This product contains no listed substances known to the state of California to cause cancer, birth defects or other reproductive harm.

PENNSYLVANIA STATE RIGHT TO KNOW HAZARDOUS SUBSTANCE:

Methylene bisphenyl isocyanate	101-68-8
Isobutane	75-28-5
Propane	74-98-6
Dimethyl ether	115-10-6

CANADIAN REGULATIONS

MATERIAL SAFETY DATA SHEET

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

D2A - respiratory tract sensitizer

D2B - eye or skin irritant, skin sensitizer

B3 - combustible liquid

Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer''s workplace education program.

\- - - - -

CPR STATEMENT: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

\- - - - -

HAZARDOUS PRODUCTS ACT INFORMATION: This product contains the following ingredients which are Controlled Products and/or on the Ingredient Disclosure List (Canadian HPA section 13 and 14):

COMPONENTS: CAS #

4,4'' Methylene bisphenol isocyanate   CAS# 101-68-8   2-15 wt %

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):

All substances in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16) OTHER INFORMATION

OTHER INFORMATION

VOC content: 158.1 grams/liter

No other information.

(TM), *, or (R) Indicates a trademark of The Dow Chemical Company.

TABLE OF CONTENTS

Prepared for: **Mr. Bradley Gentry**
IWM Consulting Group, LLC

Site: **Priority Residence #29**
Franklin, IN 46131 (Site)

Table of Contents

INSTALLATION REPORT

August 2, 2019

Vapor Mitigation System
Priority Residence #29
Franklin, IN 46131 (Site)

Mr. Bradley Gentry
IWM Consulting Group
Indianapolis, IN, 46214
317-347-1111

Vapor Mitigation System Installation Report
Dates of SSDS Installation Activities: July 23rd – July 26th, 2019

Dear Mr. Gentry,

Vapor Intrusion Specialists, LLC (VIS) is pleased to provide a Vapor Mitigation System Installation Report that summarizes the scope of services performed at Priority Residence #29 located in Franklin, IN (Site). The Scope of services performed at the Site and specific field activities are described below.

Scope of Service:

- VIS installed a sub-slab depressurization system (SSDS) using a Fantech™ Rn4 fan to create a negative pressure with sufficient radius of influence (ROI) to mitigate beneath the entire portion of the basement slab. This was accomplished by using one (1) extraction point which was located centrally in the basement.
- The SSDS was comprised of the following major components: 4-inch schedule 40 poly vinyl chloride (PVC) piping for the SSDS extraction point (centrally located in the basement) and a horizontal run totaling approximately forty (50) feet of pipe. The

basement SSDS extraction point was installed using a hammer drill and a 5-inch core bit. There was approximately five (5) to seven (7) gallons of sand removed from beneath the slab and containerized. One (1) vacuum audible alarm was installed to alert the homeowner if the extraction point loses vacuum. One (1) U-tube manometer was installed to measure the vacuum of the extraction point. One (1) Fantech™ Rn4 fan was installed with a service switch in a weather tight enclosure located on the northwest corner exterior of the residence.

- The Fantech™ Rn4 fan was hardwired by a licensed electrician (Midwest Electric) to a dedicated circuit in the existing panel located in the basement (centrally on the northern wall) and labeled (Fan Circuit).
- VIS conducted post Pressure Field Extension (PFE) testing utilizing one (1) vapor pin and four (4) previously drilled ½-inch holes utilized for initial diagnostic testing. The data collected in the field confirmed that the newly installed SSDS in the basement of the building is creating a sufficient negative pressure to prevent vapor intrusion into the structure.
- The SSDS was activated on July 26th, 2019.
- The final round of Post PFE Testing was conducted on July 30th, 2019.

Please Note:

- A figure depicting the SSDS layout is included as **Figure 1.**
- Photos taken during the installation have been included as **Attachment 1.**
- VIS's radon mitigation certification is included as **Attachment 2.**
- The VI Mitigation Installation Checklist is included as **Attachment 3.**
- An O&M manual for the mitigation fan is included as **Attachment 4.**
- An estimate of Annual Operating Costs is included as **Attachment 5.**
- The manufacture warranty is included as **Attachment 6.**
- Safety Data Sheets are included as **Attachment 7.**
- Post PFE Results are included as **Attachment 8.**

Conclusion:

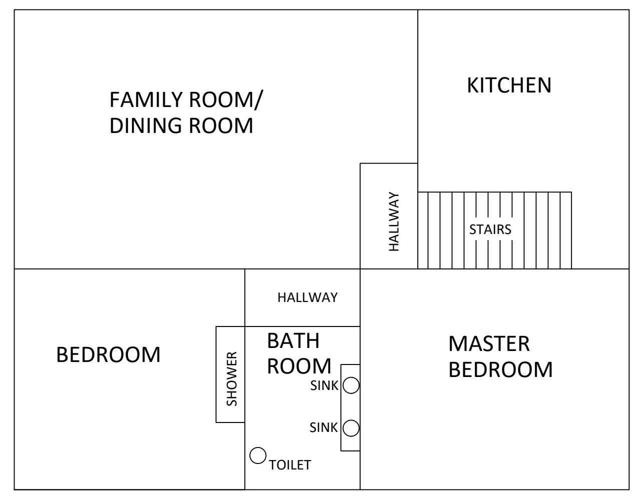
After the installation of this vapor mitigation system, a final walk through and post PFE readings were collected and analyzed. As per the system design, the vapor mitigation system is operating as specified and is generating sufficient negative pressures beneath the basement to prevent vapor intrusion. Please do not hesitate to contact me via email (awatt@vaporintrusion.us) or telephone (812-929-9070) with any questions you might have regarding this report.

Respectfully Submitted,

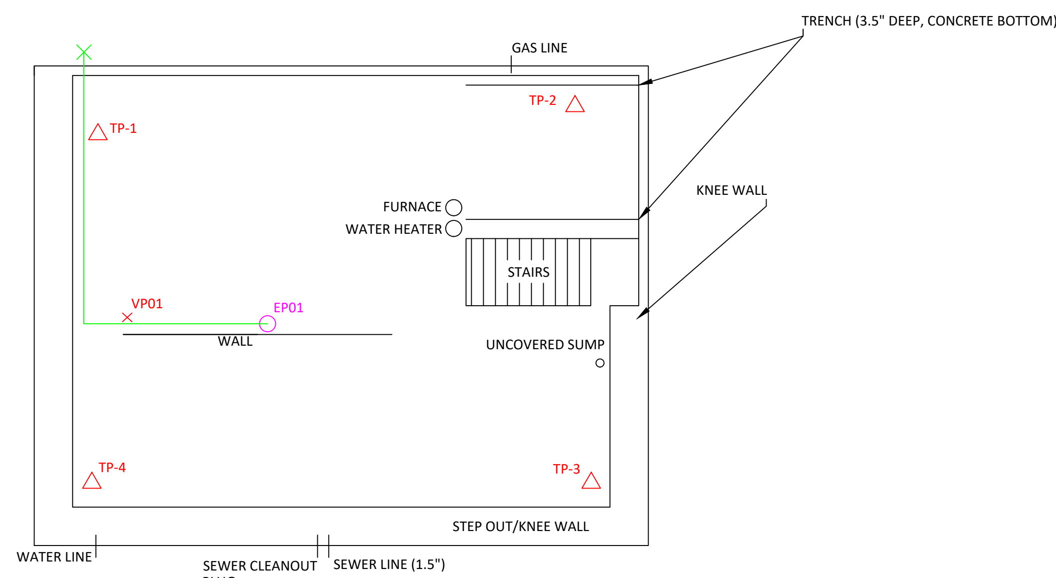
Alex Watt
Associate Project Manager
Vapor Intrusion Specialists, LLC
7428 Rockville Road
Indianapolis, IN 46214
NRPP Certification: 108383 RMT
Indiana Mitigator License: RTM00783

Figure 1
System Layout

1ST FLOOR



BASEMENT



LEGEND

- TEST POINT
- VAPOR PIN
- EXTRACTION POINT
- MOUNTED FAN

0' 10'
SCALE IN FEET

DRAWN BY: LAC	FIGURE 1 PRIORITY RESIDENCE #29 SYSTEM LAYOUT	FORMER AMPHENOL RFI/CMS 980 HURRICANE ROAD FRANKLIN, INDIANA
DATE: 1/30/19		
REVISED: LAC 1/30/19		
HWPA #111291-01		
DWG. NO. 111291S1		

VAPOR INTRUSION SPECIALISTS

Attachment 1
Installation Photographs

Vapor Mitigation Installation Photographs – Priority Residence #29, Franklin, IN

Photo #1: Initial extraction point sealed with hydraulic cement & moved closer to the center dividing wall. New extraction point sealed with polyurethane caulking.

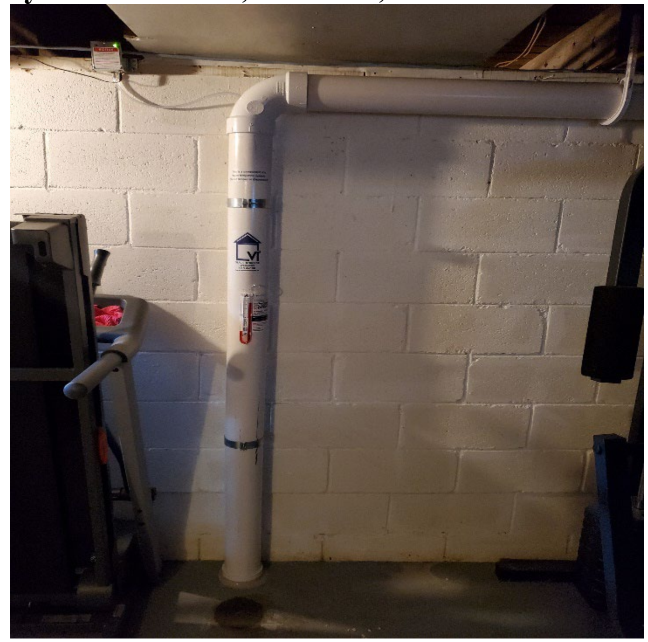


Photo #2: Extraction point (EP-01) vertical (installed with system labels, contact information, a system indicator and vacuum alarm).

Photo #3: The vapor mitigation system was installed with an audible vacuum alarm.

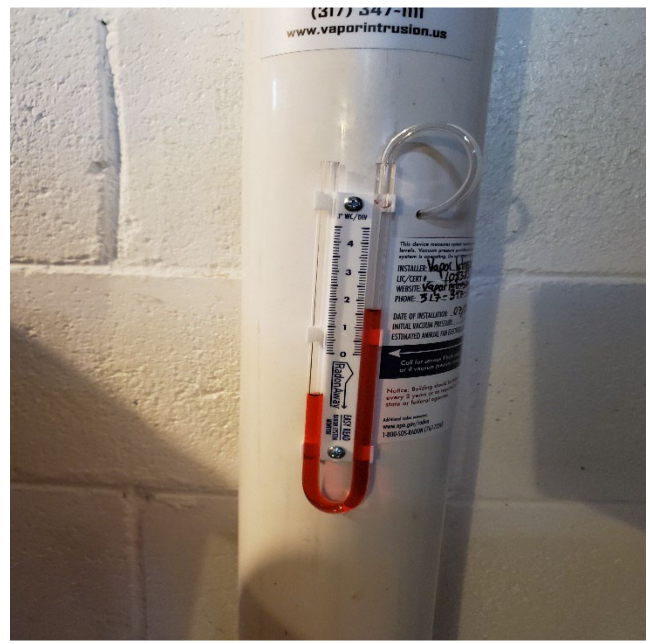


Photo #4: After the system calibration was completed, the final U-tube manometer reading was 1.8” wc.

Vapor Mitigation Installation Photographs – Priority Residence #29, Franklin, IN

Photo #5: EP-01 vertical transitioning to main horizontal run routing west.

Photo #6: Main horizontal run transitioning from west to north.

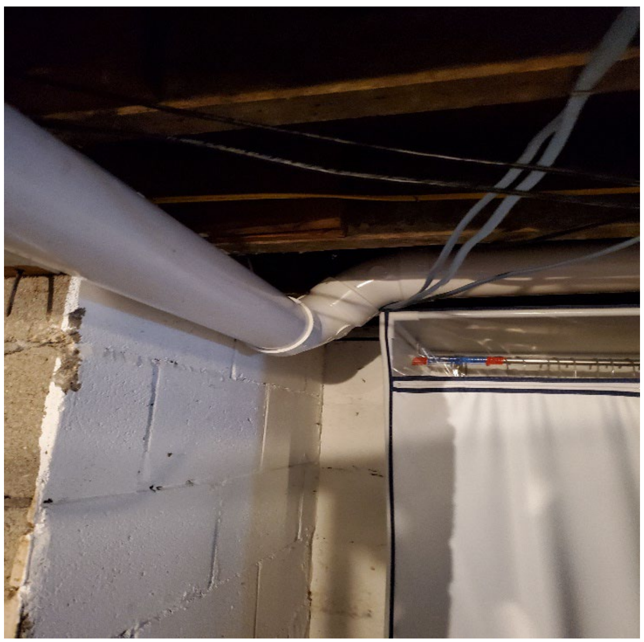


Photo #7: All system piping was adequately labeled.

Photo #8: Main horizontal routing north.

Vapor Mitigation Installation Photographs – Priority Residence #29, Franklin, IN

Photo #9: Main horizontal run penetrating the northwest corner on the residence.

Photo #10: Exterior wall penetration sealed with spray foam and polyurethane caulking.

Photo #11: Fan information.

Photo #12: Overview shot of exterior vapor mitigation system components.

Vapor Mitigation Installation Photographs – Priority Residence #29, Franklin, IN

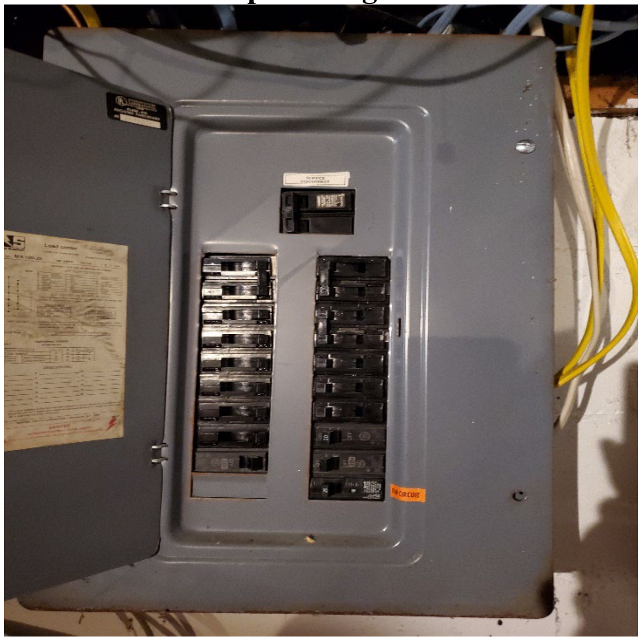


Photo #13: Vapor mitigation system was wired to a dedicated circuit in the panel and was labeled “Fan Circuit”.

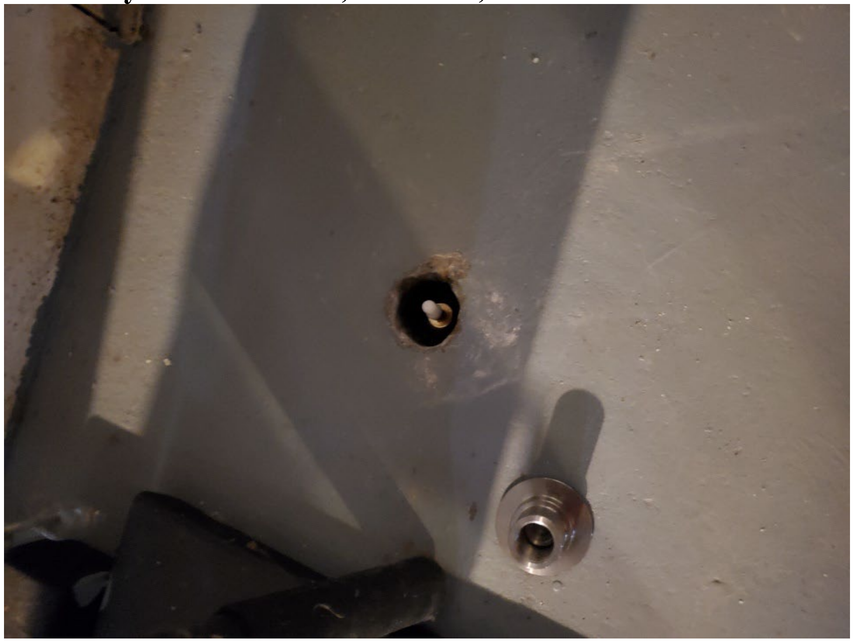


Photo #14: A Vapor Pin™ was installed centrally 6-foot east of the west wall.

Photo #15: Test point (TP) 01 Post PFE reading (-0.069” wc).

Photo #16: TP-02 Post PFE reading (-0.040” wc).

Vapor Mitigation Installation Photographs – Priority Residence #29, Franklin, IN

Photo #17: TP-03 Post PFE reading (-0.027” wc).

Photo #18: TP-04 Post PFE reading (-0.049” wc).

Photo #19: Soil gas probe reading (-0.028” wc), located on the Northwest corner of the residence.

Attachment 2
Mitigation Certifications

Alex Hoskins Watt

Has satisfactorily fulfilled the requirements set forth by the
National Radon Proficiency Program and is therefore certified as a:

Residential Mitigation Provider

NRPP ID 108383 RMT
Expires 12/31/2019

Valid for specific activities or measurement devices, which can be verified with NRPP. State and local agencies may have additional requirements.

In witness Whereof,
I have subscribed my name as a
Representative of NRPP

Janna Sinclair

Janna Sinclair
NRPP Credentialing Coordinator

Attachment 3
Checklist

Post Installation Checklist

Client: Brad Gentry

Date: 08/02/19

Site Address: Priority Residence #29

System Install Date: 07/23-07/26/19

Site Contact: Chris Parks

Fan Model: Fantech™ Rn4

Piping	Yes	No	N/A
Are all system pipes Schedule 40 solid core PVC?	X		
Are all extraction point locations permanently sealed?	X		
Does any system piping obstruct windows, doors or service access points?		X	
Are all horizontal pipe runs supported at least every 6 feet?	X		
Are all vertical pipes supported at least every 8 feet?	X		
Do horizontal runs slope towards extraction pits for drainage?	X		
Were permanent test ports installed on the exhaust stack(s)?	X		
Was a varmint guard installed on the exhaust stack(s)?		X	
If the exhaust stack penetrates the roof, was it sealed by a licensed roofer? If so, who?			X

Fans	Yes	No	N/A
Was the fan mounted/ installed level?	X		
Was the fan installed with a condensate by-pass?	X		
Was the fan installed with flexible Fernco fittings for vibration reduction?	X		
Is the exhaust stack at least 10 feet above grade, 10 feet from any doors, windows, or air intakes and at least 2 feet above the top of any openings to a conditioned space?	X		
Was the fan mounted in the attic space of a building?		X	
Was the fan mounted on the exterior of a building? If so, where? **(NW corner)**	X		

Make/ Model of Fan(s) **Fantech™ Rn4**

Post Installation Checklist

Vapor Barrier	Yes	No	N/A
Are the crawl space(s) free of debris?			X
Has a Sub-membrane depressurization system been installed?			X
Was a minimum of 6 mil or thicker membrane used in system installation?			X
Were heavy traffic areas reinforced with extra material/ membrane?			X
Were all membrane seams overlapped a minimum of 12 inches and sealed properly?			X
Was the vapor barrier secured/ anchored to the wall using double sided tape and polyurethane caulk?			X
Was the vapor barrier secured/ anchored to the wall using termination bars/ wooden furring strips and polyurethane caulk?			X
Has a 3” or 4” perforated pipe been installed underneath the vapor barrier?			X
Are all utility entry or exit points, foundation or other penetrations sealed properly?			X

Electrical	Yes	No	N/A
Has the electrical work been performed by a licensed electrician? If so, who? **Midwest Electric.**	X		
Is the fans outside service switch mounted in a weather tight enclosure?	X		
In the panel, is the mitigation system clearly marked/ labeled and visible from at least three feet away?	X		
Has a run-time meter been installed, and been installed in a weather tight enclosure?		X	
Has a KW meter been installed?		X	
Was the fan installed with a power cord no longer than 6 feet next to a non- GFCI receptacle?			X

Post Installation Checklist

Labels and System Monitors	Yes	No	N/A
Were the extraction point(s) installed with a U-tube/ Magnehelic gauge? If so, which? **U-tube manometer.**	X		
Was there a Vacuum/ Audible alarm installed in case of system failure? **Located near extraction point vertical.**	X		
Are system pipes, membranes and sump pump lids clearly labeled and easily identifiable?	X		
Was there a system label installed with company contact information in case of emergency?	X		

Sump Pit	Yes	No	N/A
Is there a sump pit(s) located in the building? If so, where? *Southwest corner*	X		
Does the sump have an adequate cover installed, and is it properly anchored and sealed?	X		
Are all penetrations in sump lid properly sealed?	X		
Has the sump pit been used as an extraction point?		X	
Does the sump lid have a view port for observation and maintenance purposes? **It has a removable maintenance hatch located on the side of the raised sump lid.**	X		

Testing	Yes	No	N/A
Was Diagnostic testing performed before system install?	X		
Was Post Diagnostic testing performed to confirm system performance?	X		

Reporting	Yes	No	N/A
Has an as built drawing been completed showing system layout?	X		
Have all test point(s) and extraction point(s) locations and data been inserted in to system drawing?	X		
Has the system install been documented with photographs?	X		

Post Installation Checklist

Field Notes

Basement slab thickness was 4.5-inches in thickness.

Technician's signature:

Attachment 4

Vapor Mitigation System Operation and Maintenance

We advise consultants, maintenance personnel or property owners to conduct routine visual inspections of all SSDS/SMDS to verify that system components are operating properly. The inspection should include but not limited to the following:

- Observe the U-tube or magnehelic gauges for pressure indication; a pressure of 'O' indicates that there is a problem with system piping or fan operations.
- Observe the mitigation fan(s) and note any abnormal sounds or noises coming from the fan including buzzing, scraping, rattling, or etc. If any abnormal noises or sounds are audible, contact VIS.
- Most mitigation fans are factory sealed and designed to be maintenance free for the life of the fan.
- Should the fans' casing be opened or the factory seal broken, any service warranty may be voided.
- Factory maintenance documentation has been provided to consultant with recommended schedule for maintenance of fans if required.
- Inspect the PVC piping of the system for damage or cracks. If any damage occurs to the PVC piping, contact VIS piping supports and hangers should also be inspected for wear and integrity.
- Roof penetrations for system exhaust piping should be inspected to assure no moisture or other intrusion is apparent.
- Any significant changes to building or structure can and may affect system performance. VIS should be advised of planned changes beforehand to avoid any possible performance issues or system failure.

Contact VIS for additional service & Maintenance should any occasion arise that may cause concern that the SSDS or SMDS is not functioning properly as vapor intrusion may no longer be mitigated to meet performance criteria to which VIS completed mitigation.

Attachment 5
Annual Operating Costs

Fantech Fans	Average KWH	Average Cost Per Year
Rn4	$0.12	$170.00 @ max capacity.

Fan is currently operating at a 6 out of 10. Based on electric use costs and operating efficiency, the total cost should be approximately $100 per year based on 12 cents a kilowatt hour.

Attachment 6
Fan Warranty

Meet the New Rn4 Radon Fan

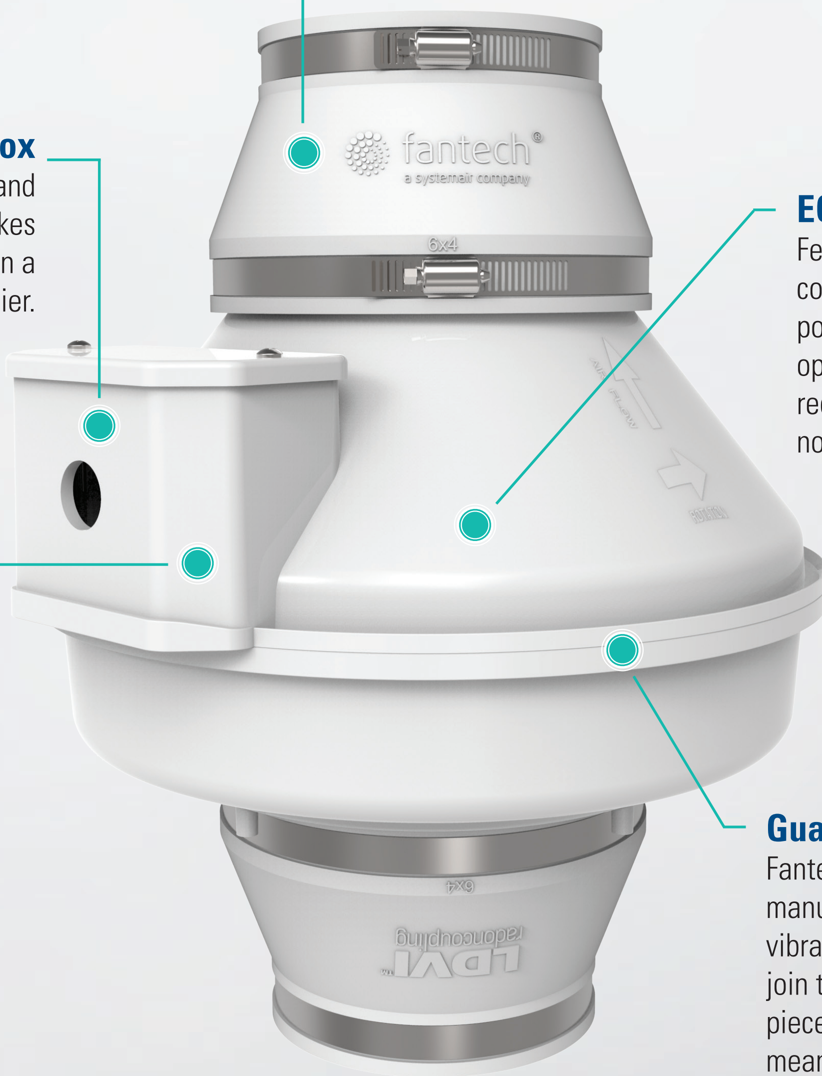
Fantech's most powerful Radon fan ever
and only available through Professional Discount Supply

Radon Specific LDVI™ Couplings

Fantech's new LDVI™ (Low Durometer Vibration Isolators) couplings are specifically designed for radon mitigation applications.
LDVI couplings are molded with a more flexible, low durometer material, making installation easier and providing superior vibration isolation.

Unbelievable Power & Efficiency

Fantech's most powerful Radon Mitigation fan, capable of 4.3" of suction while moving 20 cfm and 490 cfm when operating at only 0.5" of suction.



Large Electrical Box

More internal space and a terminal block makes wiring and installation a whole lot easier.

EC Motor

Features an electronically commutated (EC) motor that is powerful, ultra-efficient and operationally stable at full and reduced speeds. Less heat and noise equals longer life.

Speed Control

Integral speed control can be used to "dial in" the fan speed necessary to achieve either the required sub-slab depressurization or required system air flow rate.

Guaranteed Airtight

Fantech is the only radon fan manufacturer that uses a vibration weld to permanently join the housing into a single piece. No caulk or sealant means no leaks.

Certifications

HVI CERTIFIED 2100 · c UL us

Order Now:
719-444-0646 (p)
orders@radonpds.com
www.radonpds.com

RADON PDS
PROFESSIONAL DISCOUNT SUPPLY

Fantech's Rn4 Radon Fan

Application

Our new Rn4 radon fan is specifically designed for mitigation systems requiring high suction air performance, with the built-in flexibility to provide greater air flow rates at lower suction pressures as well.

Design

As the most powerful model in Fantech's family of Radon Mitigation fans, the Rn4 can create 4.3" of suction while moving 20 cfm, as well as, move 490 cfm when operating at only 0.5" of suction.

The Rn4 features an electronically commutated (EC) motor. Inherently efficient and operationally stable at full and reduced speeds, the EC motor arms the radon professional with installation methods not previously practical. Located in the wiring box, an integral speed control potentiometer can be used to "dial in" the fan speed necessary to achieve either the required sub-slab depressurization or required system air flow rate.

The Rn4 series fans are constructed with UL certified, UV protected Polycarbonate material that are vibration welded for 100% leak-proof housing construction. Totally enclosed motors are designed with extra moisture protection for radon application.

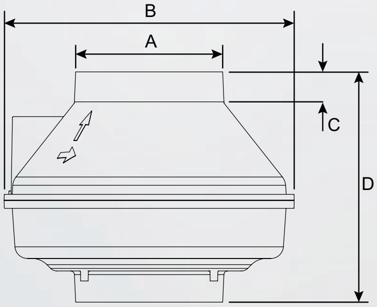
Included with every Rn4 is a pair of Fantech's new LDVI™ (Low Durometer Vibration Isolators) 6" x 4" couplings. Designed specifically for radon mitigation applications, LDVI couplings are molded with a more flexible, low durometer material as compared to standard plumbing couplings. The more flexible LDVI couplings make installation easier and provide superior vibration isolation.

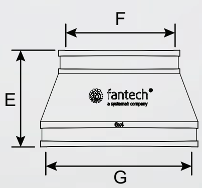
- Unbelievable Power & Efficiency
- Equipped with EC Digital Motor
- Speed Controllable
- Radon Specific LDVI™ Couplings
- Guaranteed Airtight
- Large Electrical Box

Specification Data & Dimensions

Model	Duct size	Rated power	Voltage / phase	Max. amps	2.0" P_s	2.5" P_s	3.0" P_s	3.5" P_s	4.0" P_s	4.3" P_s	Max P_s	Cross Reference / Replacement Guide[1]		
	inch	W	V / ~	A							in.wg	Fantech	RadonAway	AMG/Festa
Rn4	6	172	120 / 1	2.64	295	237	185	130	75	20	4.417	FR 200 FR 225 FR250	GP401 GP501	Eagle Fury

1 Fan substitution/replacement based on pressure capability; pipe/connection sizes vary, and may require size transition couplings.





Model	A	B	C	D	E	F	G
Rn4	5 7/8	11 1/2	1 1/4	9 1/4	4	4 1/2	6

Systemair Inc. • July, 2017

Attachment 7
SDS Sheets

Lo-VOC
SCAQMD 1168/316A
Compliant

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

* * * Section 1 - Product and Company Identification * * *

MSDS #1102E

Part Numbers: Clear 30850, 30863, 30876(TV), 30882, 31008(TV), 31011, 31950, 31951, 31952, 31953
Gray 30349, 31093, 31094, 31095, 31105, 31118, 31978, 31979, 31980, 31981, 32050, 32051, 32052, 32210, 32211

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other non-combusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear or Gray	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.94 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	80-84% Maximum 510 g/L per SCAQMD Test Method 316A.
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Carcinogenicity

A: General Product Information

In 2012 USEPA Integrated Risk Information System (IRIS) reviewed a two species inhalation lifetime study on THF conducted by NTP (1998). Male rats developed renal tumors and female mice developed liver tumors while neither the female rats nor the male mice showed similar results. Because the carcinogenic mechanisms could not be identified clearly in either species for either tumor, the EPA determined that the male rat and female mouse findings are relevant to the assessment of carcinogenic potential in humans. Therefore, the IRIS review concludes that these data in aggregate indicate that there is "suggestive evidence of carcinogenic potential" following exposure to THF by all routes of exposure.

B: Component Carcinogenicity

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

PVC (Chloroethylene, polymer) (9002-86-2)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Supplement 7 [1987]; Monograph 19 [1979] (Group 3 (not classifiable))

Silica, amorphous, fumed, crystalline-free (112945-52-5)

IARC: Monograph 68 [1997] (listed under Amorphous silica) (Group 3 (not classifiable))

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Tetrahydrofuran (109-99-9)

Test & Species	Conditions

Component Waste Numbers

Tetrahydrofuran (109-99-9)
RCRA: waste number U213 (Ignitable waste)

Cyclohexanone (108-94-1)
RCRA: waste number U057 (Ignitable waste)

Acetone (67-64-1)
RCRA: waste number U002 (Ignitable waste)

Methyl ethyl ketone (78-93-3)
RCRA: waste number U159 (Ignitable waste, Toxic waste)
200.0 mg/L regulatory level

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Consumer Commodity, ORM-D

IMDG Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): None (Limited Quantites are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Oatey®

Lo-VOC
SCAQMD 1168/316A
Compliant

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

*** Section 1 - Product and Company Identification ***

MSDS #1402E

Part Numbers: Purple – 30755(TV), 30756(TV), 30757(TV), 30758, 30759, 30927 Clear - 30749, 30750, 30751, 30752, 30753, 30754, 31652, 31653

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

*** Section 2 - Hazards Identification ***

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames and hot surfaces. - No smoking.
Keep container tightly closed.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/eye protection/face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/gas/mist/vapors.
Use only outdoors or in a well-ventilated area.

Response

If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.
If swallowed: Call a poison center or doctor/physician if you feel unwell. Rinse mouth. Do not induce vomiting.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
If exposed or concerned: Get medical advice/attention.
In case of fire: Use dry chemical, CO2, or foam to extinguish fire.

Storage

Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
78-93-3	Methyl ethyl ketone	25-40
67-64-1	Acetone	25-40
108-94-1	Cyclohexanone	15-30
109-99-9	Tetrahydrofuran	15-30

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

If material gets into eyes or if fumes cause irritation, immediately flush eyes with plenty of water until chemical is removed. If irritation persists, get medical attention immediately.

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

irst Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

*** Section 6 - Accidental Release Measures ***

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other noncombusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Purple or clear	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.84 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	99.96%
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics (potassium, calcium and sodium hypochlorite) and hydrogen peroxides. May attack plastic, resins and rubber.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

J: Component Carcinogenicity

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Acetone (67-64-1)

Test & Species		Conditions
96 Hr LC50 Oncorhynchus mykiss	4.74 - 6.33 mL/L	
96 Hr LC50 Pimephales promelas	6210 - 8120 mg/L [static]	
96 Hr LC50 Lepomis macrochirus	8300 mg/L	
48 Hr EC50 Daphnia magna	10294 - 17704 mg/L [Static]	
48 Hr EC50 Daphnia magna	12600 - 12700 mg/L	

Methyl ethyl ketone (78-93-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	3130-3320 mg/L [flow-through]	
48 Hr EC50 Daphnia magna	>520 mg/L	
48 Hr EC50 Daphnia magna	5091 mg/L	
48 Hr EC50 Daphnia magna	4025 - 6440 mg/L [Static]	

Required Label(s): None (Limited Quantities are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Acetone (67-64-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Methyl ethyl ketone (78-93-3)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Cyclohexanone (108-94-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Tetrahydrofuran (109-99-9)

CERCLA: 1000 lb final RQ; 454 kg final RQ

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Acetone	67-64-1	Yes	Yes	Yes	Yes	Yes	No
Methyl ethyl ketone	78-93-3	Yes	Yes	Yes	Yes	Yes	No
Cyclohexanone	108-94-1	Yes	Yes	Yes	Yes	Yes	No
Tetrahydrofuran	109-99-9	Yes	Yes	Yes	Yes	Yes	No

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Acetone	67-64-1	1 %
Methyl ethyl ketone	78-93-3	1 %
Cyclohexanone	108-94-1	0.1 %
Tetrahydrofuran	109-99-9	1 %

Additional Regulatory Information

A: General Product Information

This product contains trace amounts of chemicals known to the State of California to cause cancer. Under normal use conditions, exposure to these chemicals at levels above the State of California "No Significant Risk Level" (NSRL) are unlikely. The use of proper personal protective equipment (PPE) and ventilation guidelines noted in Section 8 will minimize exposure to these chemicals.

MATERIAL SAFETY DATA SHEET

GC68101
12 00

DATE OF PREPARATION
Sep 9, 2016

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
GC68101
PRODUCT NAME
Geocel® 3300® Professional Grade Polyurethane Sealant, White
MANUFACTURER'S NAME
Geocel Products Group
A Business Unit of The Sherwin-Williams Company
101 W. Prospect Avenue
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	(800) 348-7615 www.geocelusa.com
Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units		Vapor Pressure
2	**1305-78-8**	**Calcium Oxide**			
		ACGIH TLV		Not Available	
		OSHA PEL		Not Available	
44	**1317-65-3**	**Calcium Carbonate**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	
2	**13463-67-7**	**Titanium Dioxide**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

HMIS Codes

Health	3*
Flammability	0
Reactivity	1

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.
EFFECTS OF OVEREXPOSURE
EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Redness and itching or burning sensation may indicate eye or excessive skin exposure.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.
CANCER INFORMATION
For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
Not Applicable	Not Applicable	Not Applicable	Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY
Not Applicable
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).
Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.
PROTECTIVE GLOVES
Required for long or repeated contact.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	12.55 lb/gal	1503 g/l
SPECIFIC GRAVITY	1.51	
BOILING POINT	Not Applicable	
MELTING POINT	Not Available	
VOLATILE VOLUME	0%	
EVAPORATION RATE	Not Available	
VAPOR DENSITY	Not Available	
SOLUBILITY IN WATER	Not Available	
pH	> 2.0, < 11.5	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

0.03 lb/gal	3 g/l	Less Water and Federally Exempt Solvents
0.03 lb/gal	3 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable
CONDITIONS TO AVOID
None known.
INCOMPATIBILITY
None known.
HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide
HAZARDOUS POLYMERIZATION
Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS
IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name				
1305-78-8	**Calcium Oxide**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
1317-65-3	**Calcium Carbonate**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
13463-67-7	**Titanium Dioxide**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION
No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD
Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)
Not Regulated for Transportation.
Canada (TDG)
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IATA/ICAO
Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.
CALIFORNIA PROPOSITION 65
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
TSCA CERTIFICATION
All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

MATERIAL SAFETY DATA SHEET

1) PRODUCT AND COMPANY IDENTIFICATION

THE DOW CHEMICAL COMPANY
Midland Michigan 48674
USA

24-Hour Emergency Phone Number: 989-636-4400
Customer Service: 800-366-4740

PRODUCT NAME : GREAT STUFF* Gaps and Cracks
MATERIAL TYPE : One component system
ISSUE DATE : 04/26/2007
REVISION DATE : 01/25/2007

2) COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS Number	%
Prepolymer of MDI and Polyether polyol	mixture	40-70, 60-100%
Polymethylene polyphenyl Isocyanate containing approx. 40-50% MDI (4,4'methylene bisphenyl isocyanate) CAS# 101-68-8	9016-87-9	5-10,10-30%
Liquified Petroleum Mixture containing Isobutane (CAS#75-28-5), propane (CAS# 74-98-6) and dimethyl ether (CAS# 115-10-6)	mixture	10-30%

3) HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Sprayed or heated material harmful if inhaled. May cause allergic skin reaction. May cause allergic respiratory reaction and lung injury. Avoid temperatures above 105F (41C). Toxic flammable gases and heat are released under decomposition conditions. Toxic fumes may be released in fire situations. Reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this process.

EYE

May cause moderate eye irritation. May cause very slight transient (temporary) corneal injury.

SKIN

Prolonged or repeated exposure may cause slight skin irritation. May cause allergic skin reaction in susceptible individuals. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization. May stain skin. A single prolonged exposure is not likely to result in the material being absorbed in harmful amounts.

INGESTION

Single dose oral toxicity is considered to be low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.

INHALATION

At room temperature, vapors are minimal due to low vapor pressure. However, certain operations may generate vapor or aerosol concentrations sufficient to cause irritation or other adverse effects. Such operations include those in which the material is heated, sprayed or otherwise mechanically dispersed such as drumming, venting or

MATERIAL SAFETY DATA SHEET

pumping. Excessive exposure may cause irritation to upper respiratory tract and lungs, and pulmonary edema (fluid in the lungs). May cause respiratory sensitization in susceptible individuals. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Effects may be delayed. Decreased lung function has been associated with overexposure to isocyanates.

SYSTEMIC EFFECTS

Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

TERATOLOGY

In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother.

CANCER INFORMATION

Lung tumors have been observed in laboratory animals exposed to aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

4) FIRST-AID MEASURES

EYE

Irrigate with flowing water immediately and continuously for 15 minutes. Remove contacts after first five minutes and continue washing. Consult medical personnel.

SKIN

Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. An MDI skin decontamination study demonstrated that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water.

INGESTION

If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

INHALATION

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN

No specific antidote. Provide supportive care. Treatment based on judgment of the physician in response to reactions of the patient. May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants, and antitussives may be of help. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed for 24-48 hours for signs of respiratory distress.

5) FIRE-FIGHTING MEASURES

FLAMMABLE PROPERTIES

Flash point: -156F, -104C

Method: Estimated

HAZARDOUS COMBUSTION PRODUCTS

During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include but are not limited to: nitrogen oxides, isocyanates, hydrogen cyanide, carbon monoxide, and carbon dioxide.

MATERIAL SAFETY DATA SHEET

OTHER FLAMMABILITY INFORMATION

Product reacts with water. Reaction may produce heat and/or gases. Reaction may be violent. Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is produced when product burns. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the atoignition temperatures possibly resulting in spontaneous combustion.

EXTINGUISHING MEDIA

Use carbon dioxide, dry chemical, foam, water fog or fine spray. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effective. Do not use direct water stream which can spread fire.

FIRE FIGHTING INSTRUCTIONS

Keep people away. Isolate fire area and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water is not recommended but may be applied in very large quantities as a fine spray when other extinguishing agents are not available. Contain fire water run-off if possible. Do not use direct water stream. May spread fire. Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Use water spray to cool fire exposed containers and fire affected zone until fire is out. Immediately withdraw all personnel from area in case of rising sound from venting safety devices or discoloration of the containers. Move containers from fire area if this is possible without hazard.

PROTECTIVE EQUIPMENT - FIRE FIGHTERS

Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant clothing with SCBA. If his will not provide sufficient fire protection; consider fighting fire from a remote location.

6) ACCIDENTAL RELEASE MEASURES

PROTECT PEOPLE

Avoid any contact. Barricade area. Clear non-emergency personnel from area. Keep upwind of spill. Ventilate area of leak or spill. The area must be evacuated and reentered by persons equipped for decontamination. Use appropriate safety equipment. If available, use foam to suppress vapors.

PROTECT THE ENVIRONMENT

Contain liquid to prevent contamination of soil, surface water or ground water. Keep out of ditches, sewers, and water supplies. Should the product enter sewers or drains, it should be pumped into a covered, vented container; the cover should be placed loosely on the container but not made pressure tight. Move to a well-ventilated area. Emergency services may need to be called to assist in the cleanup operation.

CLEAN-UP

Supplies of suitable decontaminant should always be kept available. Absorb with material such as: sawdust, vermiculite, dirt, sand, clay, cob grit, Milsorb. Avoid materials such as cement powder. Collect material in suitable and properly labeled OPEN containers. Do not place in sealed container. Prolonged contact with water results in a chemical reaction which may result in rupture of the container. Place in: polylined fiber pacs, plastic drums, or properly labeled metal containers. Remove to a well ventilated area. Clean up floor areas. Attempt to neutralize by suitable decontaminant solution: Formulation 1: sodium carbonate 5-10%; liquid detergent 0.2-2%; water to make up to 100%. OR Formulation 2: Concentrated ammonia solution 3-8%; liquid detergent 0.2-2%; water to make up to 100%. If ammonia is used, use good ventilation to prevent vapor exposure. If you have any questions on how to neutralize call The Dow Chemical

Company.

7) HANDLING AND STORAGE

HANDLING

Avoid contact of this product with water at all times during handling and storage. Use only with adequate ventilation. Keep equipment clean. Use disposable containers and tools where possible. Do not eat, drink, or smoke in working area.

STORAGE

Store in a dry place. The recommended storage temperature is between 32 - 90F (0-32C). Keep containers tightly closed when not in use. Protect containers from physical abuse. Avoid direct sunlight. DO NOT incinerate aerosol can.

8) EXPOSURE CONTROL/PERSONAL PROTECTION

ENGINEERING CONTROLS

Use only with adequate ventilation. Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and the people working at this point. Odor is inadequate warning of excessive exposure.

EYE/FACE PROTECTION

Use chemical goggles.

SKIN PROTECTION

Use protective clothing impervious to this material. Selection of specific items such as faceshield, gloves, boots, apron, or full-body suit will depend on operation. Consideration of all chemicals involved, time and the dexterity needed to safely complete the job must be considered. Solvents can significantly change the permeation of a chemical through a barrier. Work with your safety equipment supplier to obtain the best Personal Protective Equipment for the job. Nitrile gloves are often found to be appropriate for work with MDI. Butyl rubber, PVC and neoprene are also often chosen.

Remove contaminated clothing immediately, wash skin area with soap and water (warm water if available) and launder clothing before reuse. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and destroyed.

RESPIRATORY PROTECTION

Atmospheric levels should be maintained below the exposure guideline. When atmospheric levels may exceed the exposure guideline, use an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive-pressure air-supplying respirator (airline or self-contained breathing apparatus). For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus.

EXPOSURE GUIDELINES(S)

Methylene bisphenyl isocyanate (MDI): ACGIH TLV is 0.005 ppm TWA and OSHA PEL is 0.02 ppm Ceiling. PELs are in accord with those recommended by OSHA, as in the 1989 revision of PELs.

Isobutane: ACGIH TLV and OSHA PEL are 800 ppm.

Propane: ACGIH TLV is 2500 ppm TWA and OSHA PEL is 1000 ppm.

Dimethyl ether: ACGIH TLV is 1000 ppm TWA.

9) PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE

MATERIAL SAFETY DATA SHEET

liquid

VAPOR PRESSURE
4210 mm Hg at 21C/70F

SPECIFIC GRAVITY
1.1

10) STABILITY AND REACTIVITY

CHEMICAL STABILITY
Stable under recommended storage conditions.

CONDITIONS TO AVOID
Avoid temperatures above 120F, 49C. Avoid temperatures below 32F, 0C. Can react with itself at temperatures above 320F, 160C. Product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Pressure build-up can be rapid. Avoid moisture. Material reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this reaction.

INCOMPATIBILITY WITH OTHER MATERIALS
Avoid contact with acids, water, alcohols, amines, ammonia, bases, moist air, and strong oxidizers. Avoid contact with metals such as aluminum, brass, copper, galvanized metals, tin, zinc. Avoid contact with moist organic absorbents. Reaction with water will generate carbon dioxide and heat. Generation of gas can cause pressure buildup in closed systems. Avoid unintended contact with polyols. The reaction of polyols and isocyanates generate heat. Diisocyanates react with many materials and the rate of reaction increases with temperature as well as increased contact; these reactions can become violent. Contact is increased by stirring or if the other material mixes with the diisocyanate. Diisocyanates are not soluble in water and are denser than water and sink to the bottom, but react slowly at the interface. The reaction forms carbon dioxide gas and a layer of solid polyurea.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Gases are released during decomposition.

HAZARDOUS POLYMERIZATION
Can occur. Polymerization can be catalyzed by: strong bases and water. Can react with itself at temperatures above 320F (160C).

11) TOXICOLOGICAL INFORMATION

SKIN
MDI: The LD50 for skin absorption in rabbits is > 2000 mg/kg.

INGESTION
MDI: The oral LD50 for rats is > 10,000 mg/kg.

MUTAGENICITY
MDI: Mutagenicity data on MDI are inconclusive. MDI was weakly positive in some in-vitro (test tube) studies;

other in-vitro studies were negative. A mutagenicity study in animals was negative.

Dimethyl ether: In vitro mutagenicity studies were positive. Animal mutagenicity studies were negative in some cases and positive in others.

12) ECOLOGICAL INFORMATION

MOVEMENT & PARTITIONING
Based on information for MDI and polymeric MDI. In the aquatic or terrestrial

environment, movement is expected to be limited by its reactivity with water forming predominantly insoluble polyureas.

DEGRADATION & PERSISTENCE
Based on information for MDI and polymeric MDI. In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.

ECOTOXICITY
Based on information for MDI and polymerc MDI. The measured ecotoxicity is that of the hydrolzed product, generally under conditions maximizing production of soluble species. Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 > 100 mg/L in most sensitive species). The LC50 in earthworm Eisenia foetida is > 1000 mg/kg.

13) DISPOSAL CONSIDERATIONS

DISPOSAL CONSIDERATIONS
FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

As a service to its customers, Dow can provide names of information resource to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 989-832-1556 for further details.

DISPOSAL
DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

14) TRANSPORT INFORMATION

US D.O.T.
Consumer Commodity ORM-D

15) REGULATORY INFORMATION

NOTICE
The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, expressed or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

REGULATORY INFORMATION
U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following subject to the reporting

MATERIAL SAFETY DATA SHEET

requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME CAS NUMBER

-- -----------

Polymeric Diphenylmethane diisocyanate, CAS#9016-87-9

4,4'' Methylene bisphenol isocyanate, CAS# 101-68-8

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

PMDI/MDI: immediate and delayed health hazard

Isobutane/propane: fire hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

OSHA HAZARD COMMUNICATION STANDARD:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA,or SUPERFUND):

This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

Category:

Chemical Name CAS# RQ

-------------------------------- ----------- --

Methylene bisphenyl isocyanate	101-68-8	5000 lbs
Isobutane	75-28-5	100 lbs
Propane	74-98-6	100 lbs
Dimethyl ether	115-10-6	100 lbs

CALIFORNIA PROPOSITION 65

This product contains no listed substances known to the state of California to cause cancer, birth defects or other reproductive harm.

PENNSYLVANIA STATE RIGHT TO KNOW HAZARDOUS SUBSTANCE:

Methylene bisphenyl isocyanate	101-68-8
Isobutane	75-28-5
Propane	74-98-6
Dimethyl ether	115-10-6

CANADIAN REGULATIONS

MATERIAL SAFETY DATA SHEET

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

D2A - respiratory tract sensitizer

D2B - eye or skin irritant, skin sensitizer

B3 - combustible liquid

Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer''s workplace education program.

\- - - - -

CPR STATEMENT: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

\- - - - -

HAZARDOUS PRODUCTS ACT INFORMATION: This product contains the following ingredients which are Controlled Products and/or on the Ingredient Disclosure List (Canadian HPA section 13 and 14):

COMPONENTS: CAS #

4,4'' Methylene bisphenol isocyanate   CAS# 101-68-8   2-15 wt %

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):

All substances in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16) OTHER INFORMATION

OTHER INFORMATION

VOC content: 158.1 grams/liter

No other information.

(TM), *, or (R) Indicates a trademark of The Dow Chemical Company.

Attachment 8
Post PFE Results

VAPOR INTRUSION SPECIALISTS

7428 Rockville Road, Indianapolis, Indiana 46214 | cell 812-929-9070

PFE Field Data Sheet

Property Name: PR #29

Property Address: Franklin, IN

PFE Testing Date: 7/30/19

Professional: A. Watt

Notes: Exterior soil gas probe located on the northwest corner was evaluated using a digital micro manometer. Approximately 0.028" wc. negative pressure was observed at exterior soil gas probe SGe-01.

Test Point	(Vacuum Inches of Water)	(Distance from EP-1)
TP-01	-0.069"	~15'
TP-02	-0.040"	~18'
TP-03	-0.027"	~18'
TP-04	-0.049"	~15'
VP-01	-0.253"	~6'
SGe-01	-0.028"	~20'

Notes:
in wc = inches of water column
distance measured in feet

TABLE OF CONTENTS

Prepared for: **Bradley E. Gentry**
IWM Consulting Group, LLC

Site: **Priority Residence #31**
Franklin, IN 46131 (Site)

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INSTALLATION REPORT

August 6, 2020

Mr. Bradley Gentry
IWM Consulting Group
VP/Brownfield Coordinator
7428 Rockville Rd.
Indianapolis, IN, 46214

RE: Vapor Mitigation System Installation Report
Sub-Slab Depressurization System Installation
Priority Residence #31
Franklin, IN 46131
July 10th through July 16th 2020

Dear Mr. Gentry,

Vapor Intrusion Specialists, LLC (VIS) is pleased to provide a Vapor Mitigation System Installation Report that summarizes the scope of work performed for Priority Residence #31 located in Franklin, IN (Site). The Scope of work performed at the Site and specific field activities completed are described below.

Scope of Work:

- VIS installed a sub-slab depressurization system (SSDS) using a Fantech™ Rn4 fan to create an even distribution of negative pressure beneath the building slab. This was accomplished utilizing a single extraction point located centrally near the furnace in the basement.
- The SSDS is comprised of the following: 4-inch schedule 40 polyvinyl chloride (PVC) piping for the extraction point vertical, horizontal system piping, and vertical exhaust, totaling approximately 60 feet of PVC pipe; the 5-inch cored extraction point was created by removing approximately 15 gallons of substrate material and placed in to a labeled steel 55-gallon which is located on the Former Amphenol Facility Property located at 980

Hurricane Road, Franklin, IN; one (1) U-tube manometer, one (1) audible vacuum alarm, one (1) ball valve and one (1) Fantech™ Rn4 fan.

- A Fantech™ Rn4 fan was mounted and installed with a service switch on the northwestern corner of the house and was hardwired by Bash Electric (licensed electrician) to the main electrical panel located on the southern wall in the basement.
- The old pedestal sump pump (located in the southeast corner) had to be removed in order to completely seal the sump basin. A new 1/3 HP Zoeller sump pump and check valve was installed. A new sump lid was installed with a 4-inch view port for future servicing purposes. The sump lid was secured to the concrete using 1.75-inch Tapcon® screws and sealed with mold resistant silicone.
- VIS conducted post installation Pressure Field Extension (PFE) testing utilizing one (1) vapor pin previously installed by IWM Consulting and four (4) previously drilled 0.5-inch holes utilized for initial diagnostic testing conducted by VIS. During the final round of post PFE testing, the mitigation system was fully calibrated utilizing the built-in potentiometer on the Fantech™ Rn4 fan, in order to distribute the negative pressure across the entire slab. The potentiometer on the fan was dialed to 7 out of 10.
- The SSDS was fully operational on July 14, 2020 and the post PFE testing was conducted that same day. The post PFE testing confirmed that the SSDS was successfully creating a negative pressure beneath the slab of the building.

Please Note:

- A figure depicting the SSDS layout is included as **Figure 1.**
- Photos taken post installation have been included as **Attachment 1.**
- Post PFE results are included as **Attachment 2.**
- VIS's radon mitigation certification is included as **Attachment 3.**
- The VI Mitigation Installation Checklist is included as **Attachment 4.**
- An O&M manual for the mitigation fan is included as **Attachment 5.**
- An estimated annual Operating Costs is included as **Attachment 6.**
- fan warranty is included as **Attachment 7.**
- SDS sheets are included as **Attachment 8.**

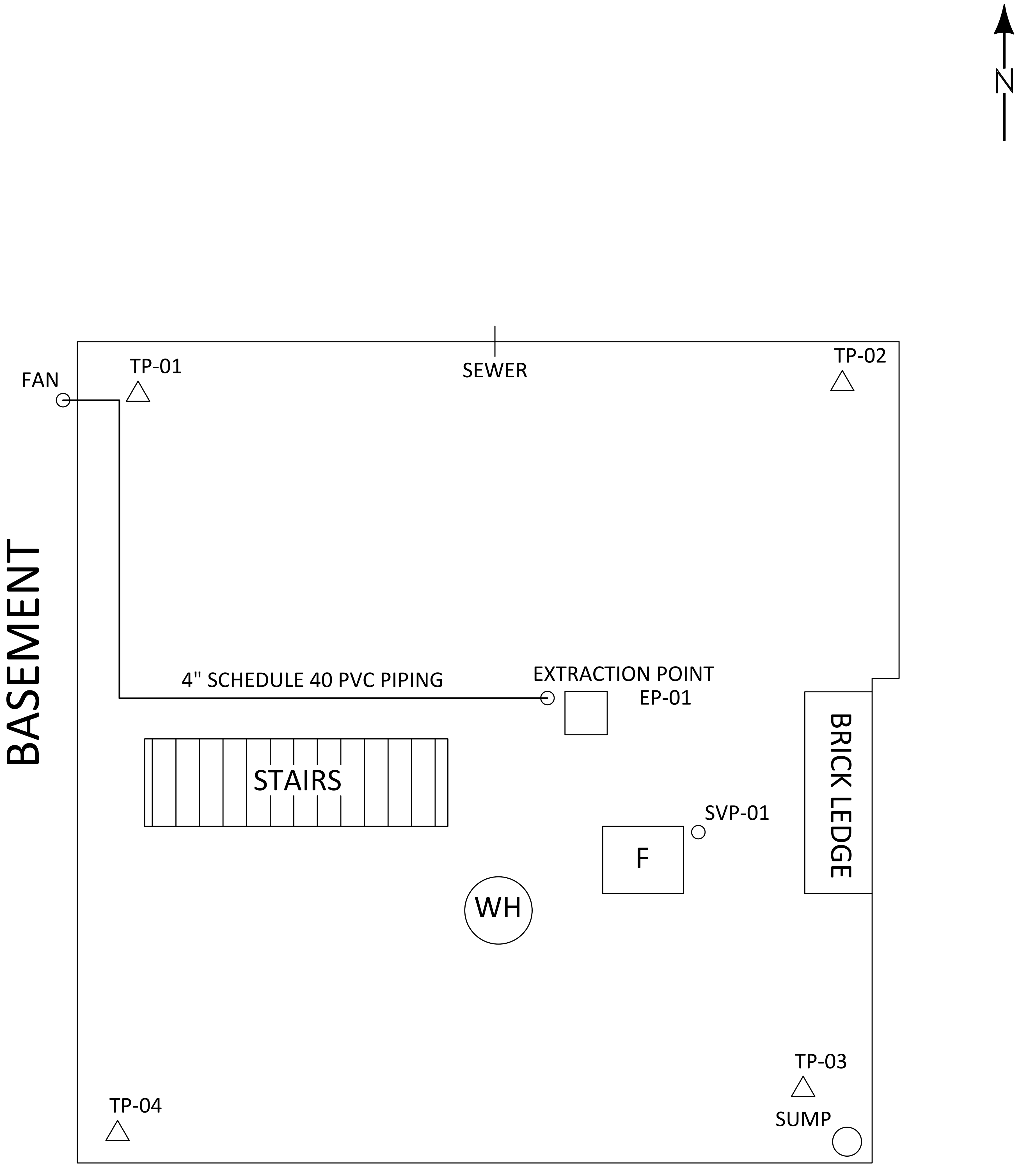
Conclusion:

VIS submits this report as written and visual documentation that the contracted scope of work for the vapor mitigation system was successfully completed to the approval of client. After performing our final round of PFE testing, we were able to analyze the data collected in the field and determine that the SSDS is providing sufficient Radius of Influence (ROI) to depressurize beneath the entire footprint of the structure's basement slab. Please do not hesitate to contact me via email (awatt@vaporintrusion.us) or telephone (812-929-9070) with any questions you might have regarding this report.

Respectfully Submitted,

Alex Watt
Associate Project Manager
Vapor Intrusion Specialists, LLC
7428 Rockville Road
Indianapolis, IN 46214
NRPP Certification: 108383 RMT
Indiana Mitigator License: RTM00783

Figure 1
System Layout



0' 4'
SCALE IN FEET

DRAWN BY: C. NEWELL
DATE: 08/07/2020
REVISED:
HWPA #111291-01
DWG. NO. 111291S1

FIGURE 1
VAPOR MITIGATION SYSTEM
LAYOUT MAP
(PRIORITY RESIDENCE #31)

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

VAPOR INTRUSION SPECIALISTS

Attachment 1
Installation Photographs

Vapor Mitigation Installation Photographs – Priority Residence #31, Franklin, IN

Photo #1: Old pedestal sump pump.

Photo #2: A new submersible sump pump, check valve and mechanically sealed sump lid was installed.

Photo #3: A commercial grade air scrubber was running during the PFE testing and all system installation activities.

Photo #4: Extraction point EP-01 is located centrally near the furnace.

Vapor Mitigation Installation Photographs – Priority Residence #31, Franklin, IN

Photo #5: Extraction point EP-01 was installed with a U-tube manometer and is currently pulling 3 inches of water column (inwc).

Photo #6: Extraction point EP-01 vertical was installed with contractor contact information.

Photo #7: Overview shot of Extraction point EP-01 vertical.

Photo #8: Extraction point EP-01 vertical transitions to main horizontal run and routes west.

Vapor Mitigation Installation Photographs – Priority Residence #31, Franklin, IN

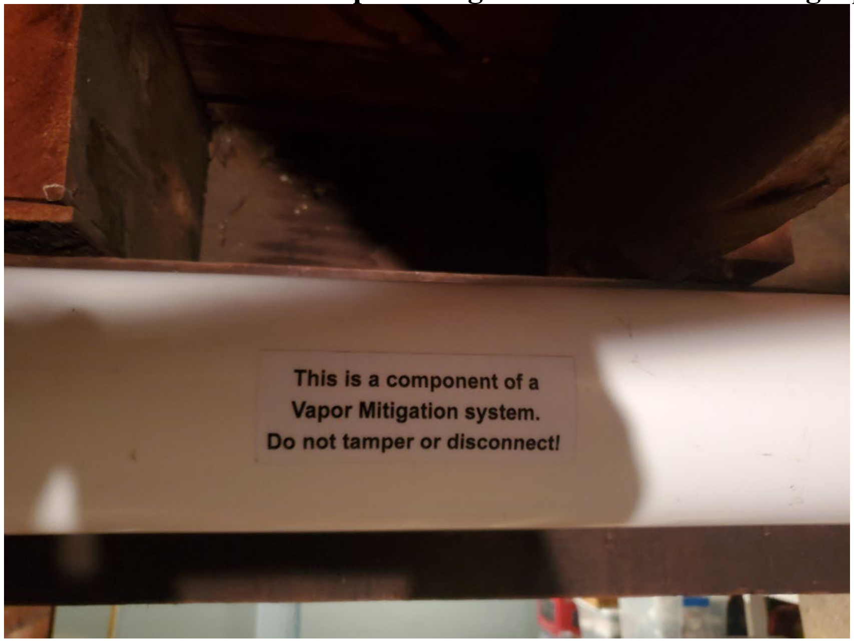


Photo #9: All vertical and horizontal piping was installed with placarding.


Photo #10: Main horizontal run transitions from running west routing to the north.


Photo #11: Main horizontal run routing north.


Photo #12: Main horizontal run penetrates the band board and exits out routing west.

Vapor Mitigation Installation Photographs – Priority Residence #31, Franklin, IN

Photo #13: A Rn4 Fantech™ fan was mounted and installed on the northwest corner of the home.

Photo #14: Rn4 Fantech™ information.

Photo #15: The fan was installed with an outside service switch in a weather tight enclosure for future services purposes.

Photo #16: The exhaust stack was installed with a rain cap.

Vapor Mitigation Installation Photographs – Priority Residence #31, Franklin, IN

Photo #17: The system was installed with an audible vacuum alarm located on the north wall near the pool table.

Photo #18: The mitigation fan was wired to dedicated circuit in the electrical panel and was labeled “Fan Circuit”.

Attachment 2
Post PFE Results

VAPOR INTRUSION SPECIALISTS
7428 Rockville Road, Indianapolis, Indiana 46214 | cell 812-929-9070

PFE Field Data Sheet

Client: IWM Consulting Group

Property Address: PR #31, Franklin, IN

PFE Testing Date: 7/16/20

Professional: Alex Watt & D. Danner

Notes: U-tube reads 3 inches of water column. The Rn4 fan is set to 7 out of 10 on the potentiometer.

Test Point	(Vacuum Inches of Water)	(Distance from EP-1)
TP-01	-0.045	~16
TP-02	-0.049	~16
TP-03	-0.041	~16
TP-04	-0.027	~16
VP-01	-0.088	~6

Attachment 3
Mitigation Certifications

Indiana State Department of Health
Lead and Healthy Homes
2 N. Meridian Street, 5J
Indianapolis, Indiana 46204 (317) 234-4423

Radon Mitigator License

Certificate Number	Status	Expire Date
RTM00783	Active	12/31/2020

Alex H. Watt

Kristina Box, MD, FACOG

Kristina Box, MD, FACOG
State Health Commissioner
Indiana State Department of Health

STATE FORM 49122 (9-98)

NRPP™
NATIONAL RADON PROFICIENCY PROGRAM

Alex Hoskins Watt

Has satisfactorily fulfilled the requirements set forth by the
National Radon Proficiency Program and is therefore certified as a:

Residential Mitigation Provider

NRPP ID 108383 RMT
Expires 12/31/2021

Valid for specific activities or measurement devices, which can be verified with NRPP. State and local agencies may have additional requirements.

NATIONAL RADON AARST PROFICIENCY PROGRAM

In witness Whereof,
I have subscribed my name as a
Representative of NRPP

Christina Johnson

Christina Johnson
NRPP Credentialing Coordinator

Attachment 4
Checklist

Post Installation Checklist

Client: IWM Consulting Group

Site Address: Priority Residence #31

Site Contact: Brad Gentry

Date: 08/06/20

System Install Date: 07/10 - 07/16/2020

Fan Model: Rn4 Fantech™

Piping	Yes	No	N/A
Are all system pipes Schedule 40 solid core PVC?	X		
Are all extraction point locations permanently sealed?	X		
Does any system piping obstruct windows, doors or service access points?		X	
Are all horizontal pipe runs supported at least every 6 feet?	X		
Are all vertical pipes supported at least every 8 feet?	X		
Do horizontal runs slope towards extraction pits for drainage?	X		
Were permanent test ports installed on the exhaust stack(s)?	X		
Was a varmint guard installed on the exhaust stack(s)?		X	
If the exhaust stack penetrates the roof, was it sealed by a licensed roofer? If so, who?			X

Fans	Yes	No	N/A
Was the fan mounted/ installed level?	X		
Was the fan installed with a condensate by-pass?	X		
Was the fan installed with flexible Fernco fittings for vibration reduction?	X		
Is the exhaust stack at least 10 feet above grade, 10 feet from any doors, windows, or air intakes and at least 2 feet above the top of any openings to a conditioned space?	X		
Was the fan mounted in the attic space of a building?		X	
Was the fan mounted on the exterior of a building? If so, where? (NE *corner*)	X		

Make/ Model of Fan(s) Rn4 Fantech™

Post Installation Checklist

Vapor Barrier	Yes	No	N/A
Are the crawl space(s) free of debris?			X
Has a Sub-membrane depressurization system been installed?			X
Was a minimum of 6 mil or thicker membrane used in system installation?			X
Were heavy traffic areas reinforced with extra material/ membrane?			X
Were all membrane seams overlapped a minimum of 12 inches and sealed properly?			X
Was the vapor barrier secured/ anchored to the wall using double sided tape and polyurethane caulk?			X
Was the vapor barrier secured/ anchored to the wall using termination bars/ wooden furring strips and polyurethane caulk?			X
Has a 3” or 4” perforated pipe been installed underneath the vapor barrier?			X
Are all utility entry or exit points, foundation or other penetrations sealed properly?			X

Electrical	Yes	No	N/A
Has the electrical work been performed by a licensed electrician? If so, who? **Bash Electric**	X		
Is the fans outside service switch mounted in a weather tight enclosure?	X		
In the panel, is the mitigation system clearly marked/ labeled and visible from at least three feet away?	X		
Has a run-time meter been installed, and been installed in a weather tight enclosure?		X	
Has a KW meter been installed?		X	
Was the fan installed with a power cord no longer than 6 feet next to a non- GFCI receptacle?			X

Post Installation Checklist

Labels and System Monitors	Yes	No	N/A
Were the extraction point(s) installed with a U-tube/ Magnehelic gauge? If so, which? **U-tube**	X		
Was there a Vacuum/ Audible alarm installed in case of system failure? **Centrally on the north wall near the pool table.**	X		
Are system pipes, membranes and sump pump lids clearly labeled and easily identifiable?	X		
Was there a system label installed with company contact information in case of emergency?	X		

Sump Pit	Yes	No	N/A
Is there a sump pit(s) located in the building? If so, where? **Southeast corner**	X		
Does the sump have an adequate cover installed, and is it properly anchored and sealed?	X		
Are all penetrations in sump lid properly sealed?	X		
Has the sump pit been used as an extraction point?		X	
Does the sump lid have a view port for observation and maintenance purposes?	X		

Testing	Yes	No	N/A
Was Diagnostic testing performed before system install?	X		
Was Post Diagnostic testing performed to confirm system performance?	X		

Reporting	Yes	No	N/A
Has an as built drawing been completed showing system layout?	X		
Have all test point(s) and extraction point(s) locations and data been inserted in to system drawing?	X		
Has the system install been documented with photographs?	X		

VAPOR INTRUSION SPECIALISTS

Post Installation Checklist

Field Notes

No drain tiles were located in the sump basin. No membrane was observed underneath the slab.

Technician's signature:

Attachment 5
Vapor Mitigation System Operation and Maintenance

We advise consultants, maintenance personnel or property owners to conduct routine visual inspections of all SSDS/SMDS to verify that system components are operating properly. The inspection should include but not limited to the following:

- Observe the U-tube or magnehelic gauges for pressure indication; a pressure of 'O' indicates that there is a problem with system piping or fan operations.
- Observe the mitigation fan(s) and note any abnormal sounds or noises coming from the fan including buzzing, scraping, rattling, or etc. If any abnormal noises or sounds are audible, contact VIS.
- Most mitigation fans are factory sealed and designed to be maintenance free for the life of the fan.
- Should the fans' casing be opened or the factory seal broken, any service warranty may be voided.
- Factory maintenance documentation has been provided to consultant with recommended schedule for maintenance of fans if required.
- Inspect the PVC piping of the system for damage or cracks. If any damage occurs to the PVC piping, contact VIS piping supports and hangers should also be inspected for wear and integrity.
- Roof penetrations for system exhaust piping should be inspected to assure no moisture or other intrusion is apparent.
- Any significant changes to building or structure can and may affect system performance. VIS should be advised of planned changes beforehand to avoid any possible performance issues or system failure.

Contact VIS for additional service & Maintenance should any occasion arise that may cause concern that the SSDS or SMDS is not functioning properly as vapor intrusion may no longer be mitigated to meet performance criteria to which VIS completed mitigation.

Attachment 6

Annual Operating Costs

Fantech	kWh	Estimated Cost Per Year
Rn4	$0.12	$120.00

Attachment 7
Fan Warranty

Item #: 142001
Rev Date: 2017-11-03

Installation and Operation Manual
Manuel d'installation et d'opération

Rn4

Inline Radon Fan

Ventilateur pour radon en ligne

Techical / Customer Support:
Support technique et service à la clientèle
United States / États-Unis Tel.: 800.747.1762 **Canada** Tel.: 800.565.3548

fantech®
a systemair company

Note	Warning / Important note Avertissement / Note importante	Information	Technical information Information technique	Practical tip Conseil pratique

DO NOT CONNECT POWER SUPPLY until fan is completely installed.
Make sure electrical service to the fan is in the locked "OFF" position.

1. This fan has rotating parts and safety precaution should be exercised during installation, operation and maintenance.

2. WARNING! TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS - OBSERVE THE FOLLOWING:
   a. Use this unit in the manner intended by the manufacturer. If you have any questions, contact your manufacturer's representative or contact us directly.

   b. CAUTION: Before installation, servicing or cleaning unit, switch power off at service panel and lock the service disconnection means to prevent power from being switched on accidentally. When the service disconnection means cannot be locked, securely fasten a prominent warning device, such as tag, to the panel.

   c. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.

   d. The combustion airflow needed for safe operation of fuel burning equipment may be affected by this unit's operation. Follow the heating equipment manufacturer's guidelines and safety standards such as those published by the National Fire Protection Association (NFPA), the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) and the local code authorities.

   e. When cutting or drilling into wall and ceiling, do not damage electrical wiring and other hidden utilities.

   f. Ducted fans must always be vented to the outdoors.

3. WARNING! Check voltage at the fan to see if it corresponds to the motor name plate.

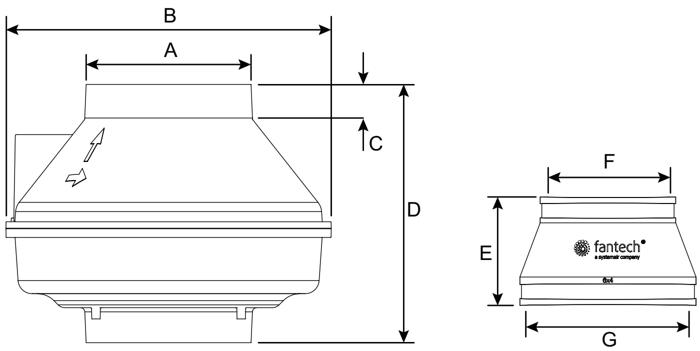
4. For radon mitigation use only. DO NOT use to exhaust hazardous or explosive materials and vapors.

5. Do not use this fan with any solid state speed control device.

GUARDS MUST BE INSTALLED WHEN FAN IS WITHIN REACH OF PERSONNEL OR WITHIN SEVEN (7) FEET OF WORKING LEVEL OR WHEN DEEMED ADVISABLE FOR SAFETY.

The ducting from this fan to the outside of the building has a strong effect on the air flow, noise and energy use of the fan. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated air flow.

DIMENSIONS



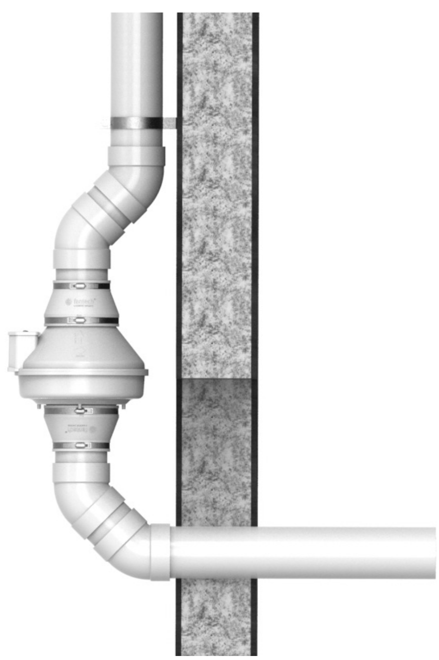
Model/ Modèle	A	B	C	D	E	F	G
Rn4-3	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)	4 (102)	3 1/2 (89)	6 (152)
Rn4-4	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)	4 (102)	4 1/2 (114)	6 (152)

Dimensions in inches (mm).
Dimensions en pouces (mm)

INSTALLATION

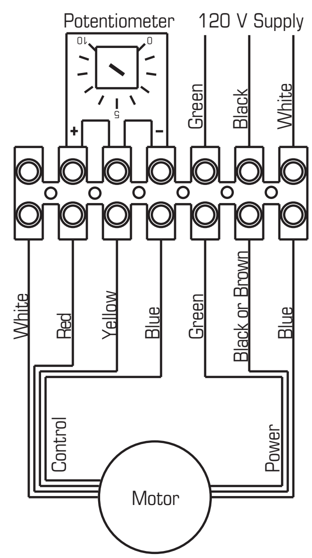
The Rn4-3 is designed for use with 3" schedule 40 PVC pipe.
The Rn4-4 is designed for use with 4" schedule 40 PVC pipe

Prior to installation, the suction pipe should be terminated at the exterior wall. The suction pipe should be installed with slight incline to drain water from the fan.



DO NOT connect fan directly to building structure

WIRING DIAGRAM



To reduce fan speed use a small screwdriver and turn potentiometer knob counter clockwise

WARRANTY

Five (5) Year Warranty

This warranty supersedes all prior warranties

DURING ENTIRE WARRANTY PERIOD:
Fantech will repair or replace any part which has a factory defect in workmanship or material. Product may need to be returned to the Fantech factory, together with a copy of the bill of sale and identified with RMA number.

FOR FACTORY RETURN YOU MUST:
- Have a Return Materials Authorization (RMA) number. This may be obtained by calling Fantech either in the USA at 1.800.747.1762 or in CANADA at 1.800.565.3548. Please have bill of sale available.
- The RMA number must be clearly written on the outside of the carton, or the carton will be refused.
- All parts and/or product will be repaired/replaced and shipped back to buyer; no credit will be issued.

OR
The Distributor may place an order for the warranty part and/or product and is invoiced. The Distributor will receive a credit equal to the invoice only after product is returned prepaid and verified to be defective.

FANTECH WARRANTY TERMS DO NOT PROVIDE FOR REPLACEMENT WITHOUT CHARGE PRIOR TO INSPECTION FOR A DEFECT. REPLACEMENTS ISSUED IN ADVANCE OF DEFECT INSPECTION ARE INVOICED, AND CREDIT IS PENDING INSPECTION OF RETURNED MATERIAL. DEFECTIVE MATERIAL RETURNED BY END USERS SHOULD NOT BE REPLACED BY THE DISTRIBUTOR WITHOUT CHARGE TO THE END USER, AS CREDIT TO DISTRIBUTOR'S ACCOUNT WILL BE PENDING INSPECTION AND VERIFICATION OF ACTUAL DEFECT BY FANTECH.

THE FOLLOWING WARRANTIES DO NOT APPLY:
- Damages from shipping, either concealed or visible. Claim must be filed with freight company.
- Damages resulting from improper wiring or installation.
- Damages or failure caused by acts of God, or resulting from improper consumer procedures, such as:
  1. Improper maintenance
  2. Misuse, abuse, abnormal use, or accident, and
  3. Incorrect electrical voltage or current.
- Removal or any alteration made on the Fantech label control number or date of manufacture.
- Any other warranty, expressed, implied or written, and to any consequential or incidental damages, loss or property, revenues, or profit, or costs of removal, installation or reinstallation, for any breach of warranty.

WARRANTY VALIDATION
- The user must keep a copy of the bill of sale to verify purchase date.
- These warranties give you specific legal rights, and are subject to an applicable consumer protection legislation. You may have additional rights which vary from state to state.

Limitation of Warranty and Liability

This warranty does not apply to any Fantech product or part which has failed as a result of faulty installation or abuse, incorrect electrical connections or alterations made by others, or use under abnormal operating conditions or misapplication of the product or parts. We will not approve for payment any repair not made by us or our authorized agent without prior written consent. The foregoing shall constitute our sole and exclusive warranty and our sole exclusive liability, and is in lieu of any other warranties, whether written, oral, implied or statutory. There are no warranties which extend beyond the description on the page hereof. In no event, whether as a result of breach of contract, or warranty or alleged negligence, defect incorrect advice or other causes, shall Fantech be liable for special or consequential damages, including, but not limited to, loss of profits or revenue, loss of use of equipment or any other associated equipment, cost of capital, cost of substitute equipment, facilities or services, downtime costs, or claims of customers of purchase for such damages. Fantech neither assumes or authorizes any person to assume for it any other liability in connection with the sale of product(s) or part(s). Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages so the above limitations and exclusions may not apply to you.

Warning

Fantech products are designed and manufactured to provide reliable performance, but they are not guaranteed to be 100% free from defects. Even reliable products will experience occasional failures and this possibility should be recognized by the user. If these products are used in a life support ventilation system where failure could result in loss or injury, the user should provide adequate backup ventilation, supplementary natural ventilation, failure alarm system, or acknowledge willingness to accept the risk of such loss or injury.

Attachment 8

SDS Sheets

MATERIAL SAFETY DATA SHEET

GC68101
12 00

DATE OF PREPARATION
Sep 9, 2016

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
GC68101
PRODUCT NAME
Geocel® 3300® Professional Grade Polyurethane Sealant, White
MANUFACTURER'S NAME
Geocel Products Group
A Business Unit of The Sherwin-Williams Company
101 W. Prospect Avenue
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	(800) 348-7615 www.geocelusa.com
Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units		Vapor Pressure
2	**1305-78-8**	**Calcium Oxide**			
		ACGIH TLV		Not Available	
		OSHA PEL		Not Available	
44	**1317-65-3**	**Calcium Carbonate**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	
2	**13463-67-7**	**Titanium Dioxide**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

HMIS Codes

Health	3*
Flammability	0
Reactivity	1

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.
EFFECTS OF OVEREXPOSURE
EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Redness and itching or burning sensation may indicate eye or excessive skin exposure.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.
CANCER INFORMATION
For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
Not Applicable	Not Applicable	Not Applicable	Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY
Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).
Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES
Required for long or repeated contact.

EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	12.55 lb/gal	1503 g/l
SPECIFIC GRAVITY	1.51	
BOILING POINT	Not Applicable	
MELTING POINT	Not Available	
VOLATILE VOLUME	0%	
EVAPORATION RATE	Not Available	
VAPOR DENSITY	Not Available	
SOLUBILITY IN WATER	Not Available	
pH	> 2.0, < 11.5	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

0.03 lb/gal	3 g/l	Less Water and Federally Exempt Solvents
0.03 lb/gal	3 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable
CONDITIONS TO AVOID
None known.
INCOMPATIBILITY
None known.
HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide
HAZARDOUS POLYMERIZATION
Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS
IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."
TOXICOLOGY DATA

CAS No.	Ingredient Name				
1305-78-8	**Calcium Oxide**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
1317-65-3	**Calcium Carbonate**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
13463-67-7	**Titanium Dioxide**				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION
No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD
Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)
Not Regulated for Transportation.
Canada (TDG)
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IATA/ICAO
Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.
CALIFORNIA PROPOSITION 65
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
TSCA CERTIFICATION
All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Oatey®

Lo-VOC
SCAQMD 1168/316A
Compliant

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

* * * Section 1 - Product and Company Identification * * *

MSDS #1402E

Part Numbers: Purple – 30755(TV), 30756(TV), 30757(TV), 30758, 30759, 30927 Clear - 30749, 30750, 30751, 30752, 30753, 30754, 31652, 31653

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Precautionary Statements

Prevention

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Keep away from heat/sparks/open flames and hot surfaces. - No smoking.
Keep container tightly closed.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/eye protection/face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/gas/mist/vapors.
Use only outdoors or in a well-ventilated area.

Response
If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.
If swallowed: Call a poison center or doctor/physician if you feel unwell. Rinse mouth. Do not induce vomiting.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
If exposed or concerned: Get medical advice/attention.
In case of fire: Use dry chemical, CO2, or foam to extinguish fire.

Storage
Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal
Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
78-93-3	Methyl ethyl ketone	25-40
67-64-1	Acetone	25-40
108-94-1	Cyclohexanone	15-30
109-99-9	Tetrahydrofuran	15-30

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes
If material gets into eyes or if fumes cause irritation, immediately flush eyes with plenty of water until chemical is removed. If irritation persists, get medical attention immediately.

First Aid: Skin
Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other noncombusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Purple or clear	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.84 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	99.96%
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics (potassium, calcium and sodium hypochlorite) and hydrogen peroxides. May attack plastic, resins and rubber.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

J: Component Carcinogenicity

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Acetone (67-64-1)

Test & Species		Conditions
96 Hr LC50 Oncorhynchus mykiss	4.74 - 6.33 mL/L	
96 Hr LC50 Pimephales promelas	6210 - 8120 mg/L [static]	
96 Hr LC50 Lepomis macrochirus	8300 mg/L	
48 Hr EC50 Daphnia magna	10294 - 17704 mg/L [Static]	
48 Hr EC50 Daphnia magna	12600 - 12700 mg/L	

Methyl ethyl ketone (78-93-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	3130-3320 mg/L [flow-through]	
48 Hr EC50 Daphnia magna	>520 mg/L	
48 Hr EC50 Daphnia magna	5091 mg/L	
48 Hr EC50 Daphnia magna	4025 - 6440 mg/L [Static]	

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Required Label(s): None (Limited Quantities are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Acetone (67-64-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Methyl ethyl ketone (78-93-3)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Cyclohexanone (108-94-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Tetrahydrofuran (109-99-9)

CERCLA: 1000 lb final RQ; 454 kg final RQ

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Acetone	67-64-1	Yes	Yes	Yes	Yes	Yes	No
Methyl ethyl ketone	78-93-3	Yes	Yes	Yes	Yes	Yes	No
Cyclohexanone	108-94-1	Yes	Yes	Yes	Yes	Yes	No
Tetrahydrofuran	109-99-9	Yes	Yes	Yes	Yes	Yes	No

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Acetone	67-64-1	1 %
Methyl ethyl ketone	78-93-3	1 %
Cyclohexanone	108-94-1	0.1 %
Tetrahydrofuran	109-99-9	1 %

Additional Regulatory Information

A: General Product Information

This product contains trace amounts of chemicals known to the State of California to cause cancer. Under normal use conditions, exposure to these chemicals at levels above the State of California "No Significant Risk Level" (NSRL) are unlikely. The use of proper personal protective equipment (PPE) and ventilation guidelines noted in Section 8 will minimize exposure to these chemicals.

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

* * * Section 1 - Product and Company Identification * * *

MSDS #1102E

Part Numbers: Clear 30850, 30863, 30876(TV), 30882, 31008(TV), 31011, 31950, 31951, 31952, 31953
Gray 30349, 31093, 31094, 31095, 31105, 31118, 31978, 31979, 31980, 31981, 32050, 32051, 32052, 32210, 32211

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other non-combusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear or Gray	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.94 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	80-84% Maximum 510 g/L per SCAQMD Test Method 316A.
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Carcinogenicity

A: General Product Information

In 2012 USEPA Integrated Risk Information System (IRIS) reviewed a two species inhalation lifetime study on THF conducted by NTP (1998). Male rats developed renal tumors and female mice developed liver tumors while neither the female rats nor the male mice showed similar results. Because the carcinogenic mechanisms could not be identified clearly in either species for either tumor, the EPA determined that the male rat and female mouse findings are relevant to the assessment of carcinogenic potential in humans. Therefore, the IRIS review concludes that these data in aggregate indicate that there is "suggestive evidence of carcinogenic potential" following exposure to THF by all routes of exposure.

B: Component Carcinogenicity

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

PVC (Chloroethylene, polymer) (9002-86-2)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Supplement 7 [1987]; Monograph 19 [1979] (Group 3 (not classifiable))

Silica, amorphous, fumed, crystalline-free (112945-52-5)

IARC: Monograph 68 [1997] (listed under Amorphous silica) (Group 3 (not classifiable))

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Tetrahydrofuran (109-99-9)

Test & Species	Conditions

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Component Waste Numbers

Tetrahydrofuran (109-99-9)
RCRA: waste number U213 (Ignitable waste)

Cyclohexanone (108-94-1)
RCRA: waste number U057 (Ignitable waste)

Acetone (67-64-1)
RCRA: waste number U002 (Ignitable waste)

Methyl ethyl ketone (78-93-3)
RCRA: waste number U159 (Ignitable waste, Toxic waste)
200.0 mg/L regulatory level

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Consumer Commodity, ORM-D

IMDG Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): None (Limited Quantites are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

TABLE OF CONTENTS

Prepared for: **Mr. Bradley Gentry**
IWM Consulting

Site: **Priority Residence #36**
Franklin, IN 46131 (Site)

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INSTALLATION REPORT

April 9, 2019

Vapor Mitigation System
Priority Residence #36
Franklin, IN 46131 (Site)

Mr. Bradley Gentry
IWM Consulting Group
Indianapolis, IN, 46214
317-347-1111

Vapor Mitigation System Installation Report
Dates of SSDS/SMDS Installation Activities: January 9th – January 14th, 2018

Dear Mr. Gentry,

Vapor Intrusion Specialists, LLC (VIS) is pleased to provide a Vapor Mitigation System Installation Report that summarizes the scope of services performed at Priority Residence #36 located in Franklin, IN (Site). The Scope of services performed at the Site and specific field activities are described below.

Scope of Service:

- VIS installed a sub-slab depressurization system (SSDS) using a Fantech™ Rn4 fan to create a negative pressure with sufficient radius of influence (ROI) to mitigate beneath the entire portion of the basement slab. This was accomplished by using one (1) extraction point which was located centrally in the basement.
- The SSDS was comprised of the following major components: 4-inch schedule 40 poly vinyl chloride (PVC) piping for the SSDS extraction point (centrally located in the basement) and a horizontal run totaling approximately forty (40) feet of pipe. The

basement SSDS extraction point was installed using a hammer drill and a 5-inch core bit. There was approximately five (5) to seven (7) gallons of sand removed from beneath the slab and containerized. One (1) vacuum audible alarm was installed to alert the homeowner if the extraction point loses vacuum. One (1) U-tube manometer was installed to measure the vacuum of the extraction point. One (1) Fantech™ Rn4 fan was installed with a service switch in a weather tight enclosure located on the eastern exterior of the residence.

- The Fantech™ Rn4 fan was temporally hardwired by a licensed electrician to the pre-existing panel located in the basement and labeled (Radon fan). The pre-existing 100-amp service is being replaced and upgraded to a 200-amp service panel. After the panel swap, the mitigation system will be wired to a dedicated circuit.
- Additionally, VIS replaced the cover to the basement sump with a new fully sealing polyethylene cover.
- On March 5th, 2019, the pre-existing 100-amp service was removed and then upgraded to a 200-amp service. During this time, the radon fan was temporarily disconnected. After the upgraded 200-amp service was installed, the radon fan was then hardwired to a dedicated circuit in the panel and labeled "fan circuit" by a licensed electrician (Midwest Electric).
- VIS conducted post Pressure Field Extension (PFE) testing utilizing one (1) vapor pin previously installed by IWM Consulting and four (4) previously drilled ½-inch holes utilized for initial diagnostic testing. The data collected in the field confirmed that the newly installed SSDS in the basement of the building is creating a sufficient negative pressure to prevent vapor intrusion into the structure.
- The SSDS was activated on January 14th, 2019.

Please Note:

- A figure depicting the SSDS layout is included as **Figure 1.**
- Photos taken during the installation have been included as **Attachment 1.**
- VIS's radon mitigation certification is included as **Attachment 2.**
- The VI Mitigation Installation Checklist is included as **Attachment 3.**
- An O&M manual for the mitigation fan is included as **Attachment 4.**
- An estimate of Annual Operating Costs is included as **Attachment 5.**
- The manufacture warranty is included as **Attachment 6.**

- Safety Data Sheets are included as **Attachment 7.**
- Post PFE Results are included as **Attachment 8.**

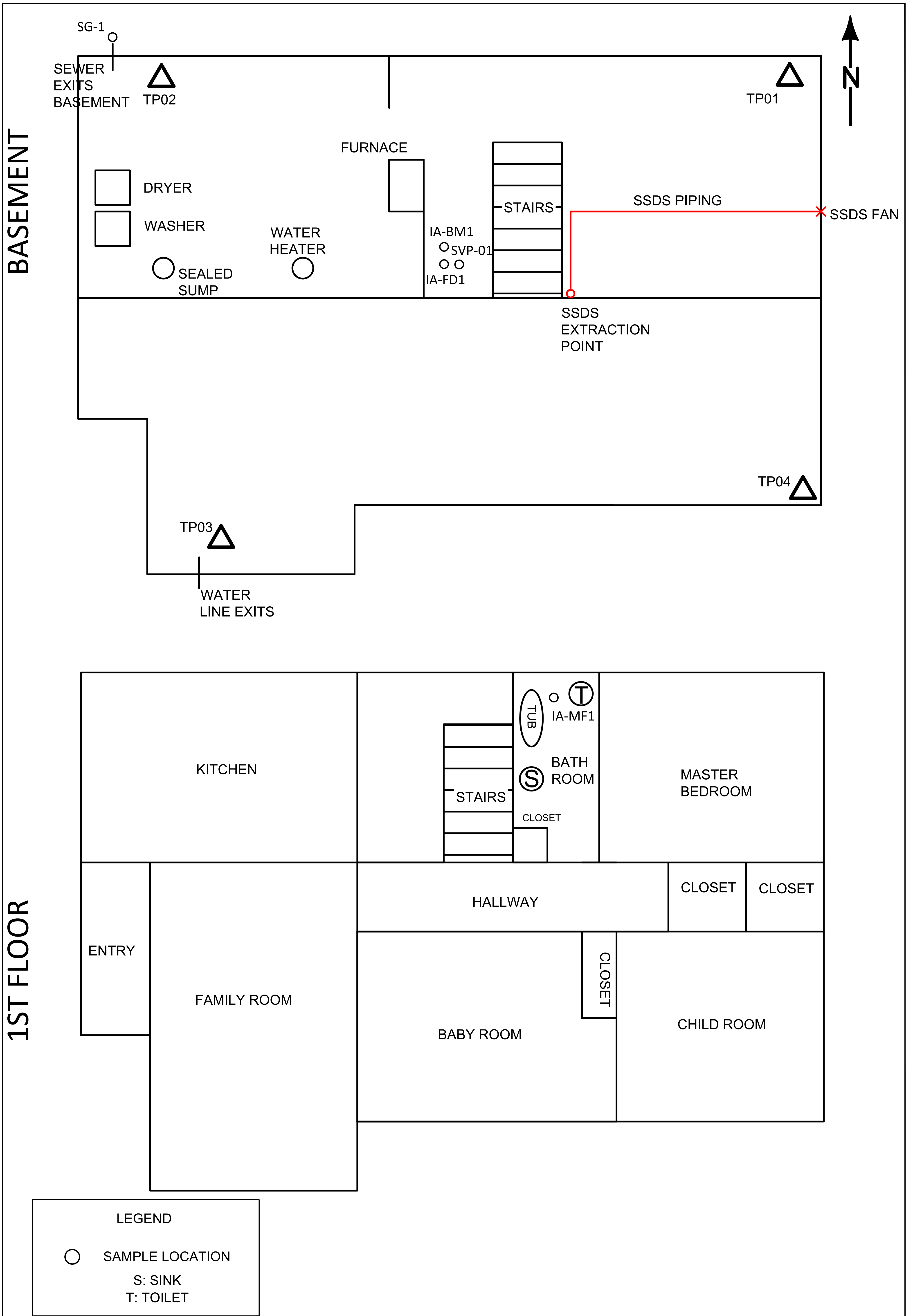
Conclusion:

After the installation of this vapor mitigation system, a final walk through and post PFE readings were collected and analyzed. As per the system design, the vapor mitigation system is operating as specified and is generating sufficient negative pressures beneath the basement to prevent vapor intrusion. Please do not hesitate to contact me via email (awatt@vaporintrusion.us) or telephone (812-929-9070) with any questions you might have regarding this report.

Respectfully Submitted,

Alex Watt
Associate Project Manager
Vapor Intrusion Specialists, LLC
7428 Rockville Road
Indianapolis, IN 46214
NRPP Certification: 108383 RMT
Indiana Mitigator License: RTM00783

Figure 1
System Layout



DRAWN BY: C.NEWELL
DATE: 05/07/2020
REVISED: 05/13/2020
HWPA #111291-01
PR MAPS.DWG

PRIORITY RESIDENCE #36
LAYOUT MAP

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP

Attachment 1
Installation Photographs

Vapor Mitigation Installation Photographs – Priority Residence #36, Franklin, IN

Photo #1: PFE testing was performed before system installation activities.

Photo #2: Old wooden sump lid was removed; New poly lid was installed fully sealing sump.

Photo #3: Extraction point installed centrally in basement.

Photo #4: Extraction point installed with a U-tube manometer to show system vacuum (2.6 Inwc, final pressure after fan adjustment), and with system labels.

Vapor Mitigation Installation Photographs – Priority Residence #36, Franklin, IN

Photo #5: Extraction point vertical to main horizontal run going north.

Photo #6: Main Horizontal run transitioning from the south and running east.

Photo #7: Main horizontal run to wall penetration.

Photo #8: All interior system piping was labeled.

Vapor Mitigation Installation Photographs – Priority Residence #36, Franklin, IN

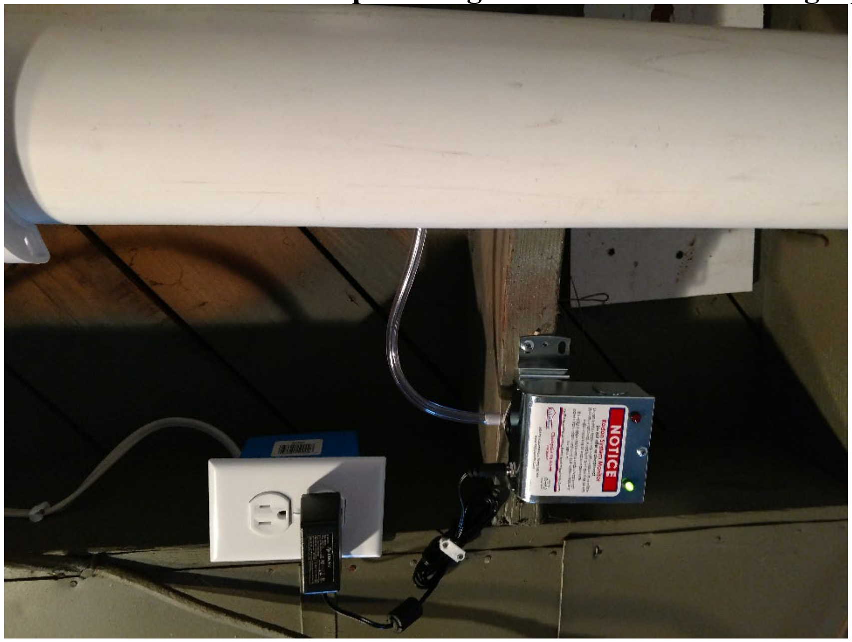


Photo #9: An audible vacuum alarm was installed on the main horizontal run.

Photo #10: System was temporally wired to existing panel.

Photo #11: Rn4 was mounted on the eastern side of the residence. It was installed with a service switch in a weather tight enclosure.

Photo #12: Fan placard information.

Vapor Mitigation Installation Photographs – Priority Residence #36, Franklin, IN

Photo Redacted.

Photo #13: Over view shoot of mounted fan and system exhaust piping.

Photo #14: New 200-amp service and hardwired radon fan to a dedicated circuit.

Attachment 2
Mitigation Certifications

NRPP™
NATIONAL RADON PROFICIENCY PROGRAM

Alex Hoskins Watt

Has satisfactorily fulfilled the requirements set forth by the
National Radon Proficiency Program and is therefore certified as a:

Residential Mitigation Provider

NRPP ID 108383 RMT
Expires 12/31/2019

Valid for specific activities or measurement devices, which can be verified with NRPP. State and local agencies may have additional requirements.

NATIONAL RADON PROFICIENCY PROGRAM AARST

In witness Whereof,
I have subscribed my name as a
Representative of NRPP

Janna Sinclair

Janna Sinclair
NRPP Credentialing Coordinator

Indiana State Department of Health
Lead and Healthy Homes
2 N. Meridian Street, 5J
Indianapolis, Indiana 46204 (317) 234-4423

Radon Mitigator License

Certificate Number	Status	Expire Date
RTM00783	Active	12/31/2020

Alex H. Watt

Kristina Box, MD, FACOG

Kristina Box, MD, FACOG
State Health Commissioner
Indiana State Department of Health

Attachment 3
Checklist

Post Installation Checklist

Client: Brad Gentry

Date: 4/9/19

Site Address: Priority Residence #36, Franklin, IN

System Install Date: 01/09-01/14/18

Site Contact: Chris Parks

Fan Model: Fantech™ Rn4

Piping	Yes	No	N/A
Are all system pipes Schedule 40 solid core PVC?	X		
Are all extraction point locations permanently sealed?	X		
Does any system piping obstruct windows, doors or service access points?		X	
Are all horizontal pipe runs supported at least every 6 feet?	X		
Are all vertical pipes supported at least every 8 feet?	X		
Do horizontal runs slope towards extraction pits for drainage?	X		
Were permanent test ports installed on the exhaust stack(s)?		X	
Was a varmint guard installed on the exhaust stack(s)?		X	
If the exhaust stack penetrates the roof, was it sealed by a licensed roofer? If so, who?			X

Fans	Yes	No	N/A
Was the fan mounted/ installed level?	X		
Was the fan installed with a condensate by-pass?	X		
Was the fan installed with flexible Fernco fittings for vibration reduction?	X		
Is the exhaust stack at least 10 feet above grade, 10 feet from any doors, windows, or air intakes and at least 2 feet above the top of any openings to a conditioned space?	X		
Was the fan mounted in the attic space of a building?		X	
Was the fan mounted on the exterior of a building? If so, where? **(East side of residence.)**	X		

Make/ Model of Fan(s) Fantech™ Rn4

Post Installation Checklist

Vapor Barrier	Yes	No	N/A
Are the crawl space(s) free of debris?			X
Has a Sub-membrane depressurization system been installed?			X
Was a minimum of 6 mil or thicker membrane used in system installation?			X
Were heavy traffic areas reinforced with extra material/ membrane?			X
Were all membrane seams overlapped a minimum of 12 inches and sealed properly?			X
Was the vapor barrier secured/ anchored to the wall using double sided tape and polyurethane caulk?			X
Was the vapor barrier secured/ anchored to the wall using termination bars/ wooden furring strips and polyurethane caulk?			X
Has a 3” or 4” perforated pipe been installed underneath the vapor barrier?			X
Are all utility entry or exit points, foundation or other penetrations sealed properly?			X

Electrical	Yes	No	N/A
Has the electrical work been performed by a licensed electrician? If so, who? **Midwest Electric Company, Inc.**	X		
Is the fans outside service switch mounted in a weather tight enclosure?	X		
In the panel, is the mitigation system clearly marked/ labeled and visible from at least three feet away?	X		
Has a run-time meter been installed, and been installed in a weather tight enclosure?		X	
Has a KW meter been installed?		X	
Was the fan installed with a power cord no longer than 6 feet next to a non- GFCI receptacle?			X

Post Installation Checklist

Labels and System Monitors	Yes	No	N/A
Were the extraction point(s) installed with a U-tube/ Magnehelic gauge? If so, which? **U-tube**	X		
Was there a Vacuum/ Audible alarm installed in case of system failure?	X		
Are system pipes, membranes and sump pump lids clearly labeled and easily identifiable?	X		
Was there a system label installed with company contact information in case of emergency?	X		

Sump Pit	Yes	No	N/A
Is there a sump pit(s) located in the building? If so, where? **(West side of house in laundry room.)**	X		
Does the sump have an adequate cover installed, and is it properly anchored and sealed?	X		
Are all penetrations in sump lid properly sealed?	X		
Has the sump pit been used as an extraction point?		X	
Does the sump lid have a view port for observation and maintenance purposes?	X		

Testing	Yes	No	N/A
Was Diagnostic testing performed before system install?	X		
Was Post Diagnostic testing performed to confirm system performance?	X		

Reporting	Yes	No	N/A
Has an as built drawing been completed showing system layout?	X		
Have all test point(s) and extraction point(s) locations and data been inserted in to system drawing?	X		
Has the system install been documented with photographs?	X		

Post Installation Checklist

Field Notes

Basement slab thickness ranged between 4 and 5-inches.

Technician's signature:

Attachment 4

Vapor Mitigation System Operation and Maintenance

We advise consultants, maintenance personnel or property owners to conduct routine visual inspections of all SSDS/SMDS to verify that system components are operating properly. The inspection should include but not limited to the following:

- Observe the U-tube or magnehelic gauges for pressure indication; a pressure of ‘O’ indicates that there is a problem with system piping or fan operations.
- Observe the mitigation fan(s) and note any abnormal sounds or noises coming from the fan including buzzing, scraping, rattling, or etc. If any abnormal noises or sounds are audible, contact VIS.
- Most mitigation fans are factory sealed and designed to be maintenance free for the life of the fan.
- Should the fans’ casing be opened or the factory seal broken, any service warranty may be voided.
- Factory maintenance documentation has been provided to consultant with recommended schedule for maintenance of fans if required.
- Inspect the PVC piping of the system for damage or cracks. If any damage occurs to the PVC piping, contact VIS piping supports and hangers should also be inspected for wear and integrity.
- Roof penetrations for system exhaust piping should be inspected to assure no moisture or other intrusion is apparent.
- Any significant changes to building or structure can and may affect system performance. VIS should be advised of planned changes beforehand to avoid any possible performance issues or system failure.

Contact VIS for additional service & Maintenance should any occasion arise that may cause concern that the SSDS or SMDS is not functioning properly as vapor intrusion may no longer be mitigated to meet performance criteria to which VIS completed mitigation.

Attachment 5

Annual Operating Costs

Radonaway Fans	Average KWH	Average Cost Per Year
RP140	*$0.0894*	$13.31
RP145	*$0.0894*	$42.29
RP260	*$0.0894*	$48.55
RP265	*$0.0894*	$88.50
RP380	*$0.0894*	$101.03
SF180	*$0.0894*	$42.29
GP201	*$0.0894*	$39.16
GP301	*$0.0894*	$56.39
GP401	*$0.0894*	$66.57
GP500	*$0.0894*	$78.31
GP501	*$0.0894*	$82.23
XP151	*$0.0894*	$40.72
XP201	*$0.0894*	$43.07
XP261	*$0.0894*	$66.57
HS2000	*$0.0894*	$164.46
HS3000	*$0.0894*	$117.47
HS5000	*$0.0894*	$250.61
Fantech Fans	**Average KWH**	**Average Cost Per Year**
HP2133	$0.0894	$13.31
Rn4	**$0.11**	**$170.00**

Attachment 6
Fan Warranty

Installation and Operation Manual
Manuel d'installation et d'opération

Item #: 142001
Rev Date: 2017-11-03

Rn4

Inline Radon Fan

Ventilateur pour radon en ligne

Techical / Customer Support:
Support technique et service à la clientèle
United States / États-Unis Tel.: 800.747.1762 **Canada** Tel.: 800.565.3548

fantech®
a systemair company

Note	Warning / Important note Avertissement / Note importante	Information	Technical information Information technique	Practical tip Conseil pratique

DO NOT CONNECT POWER SUPPLY until fan is completely installed.
Make sure electrical service to the fan is in the locked "OFF" position.

1. This fan has rotating parts and safety precaution should be exercised during installation, operation and maintenance.

2. WARNING! TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS - OBSERVE THE FOLLOWING:
   a. Use this unit in the manner intended by the manufacturer. If you have any questions, contact your manufacturer's representative or contact us directly.

   b. CAUTION: Before installation, servicing or cleaning unit, switch power off at service panel and lock the service disconnection means to prevent power from being switched on accidentally. When the service disconnection means cannot be locked, securely fasten a prominent warning device, such as tag, to the panel.

   c. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.

   d. The combustion airflow needed for safe operation of fuel burning equipment may be affected by this unit's operation. Follow the heating equipment manufacturer's guidelines and safety standards such as those published by the National Fire Protection Association (NFPA), the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) and the local code authorities.

   e. When cutting or drilling into wall and ceiling, do not damage electrical wiring and other hidden utilities.

   f. Ducted fans must always be vented to the outdoors.

3. WARNING! Check voltage at the fan to see if it corresponds to the motor name plate.

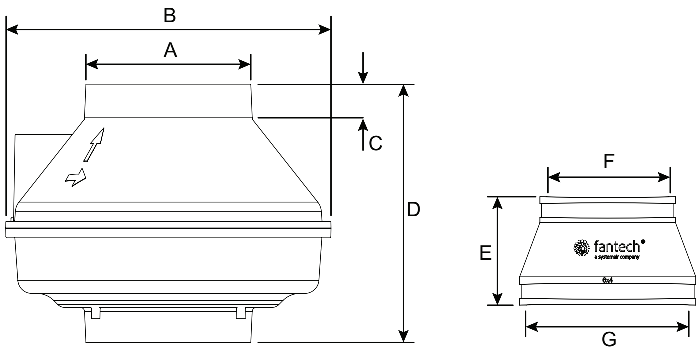
4. For radon mitigation use only. DO NOT use to exhaust hazardous or explosive materials and vapors.

5. Do not use this fan with any solid state speed control device.

GUARDS MUST BE INSTALLED WHEN FAN IS WITHIN REACH OF PERSONNEL OR WITHIN SEVEN (7) FEET OF WORKING LEVEL OR WHEN DEEMED ADVISABLE FOR SAFETY.

The ducting from this fan to the outside of the building has a strong effect on the air flow, noise and energy use of the fan. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated air flow.

DIMENSIONS



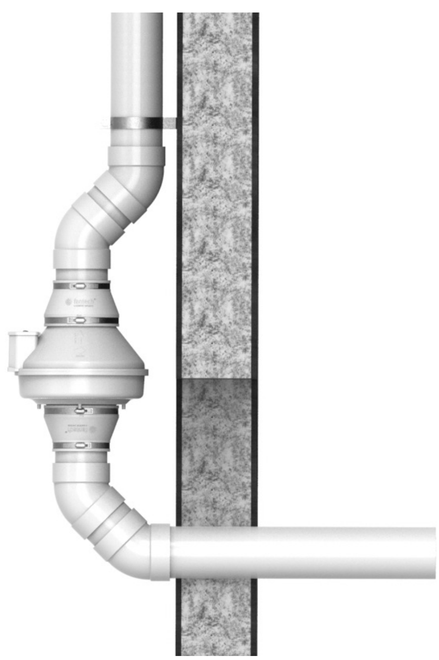
Model/ Modèle	A	B	C	D	E	F	G
Rn4-3	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)	4 (102)	3 1/2 (89)	6 (152)
Rn4-4	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)	4 (102)	4 1/2 (114)	6 (152)

Dimensions in inches (mm).
Dimensions en pouces (mm)

INSTALLATION

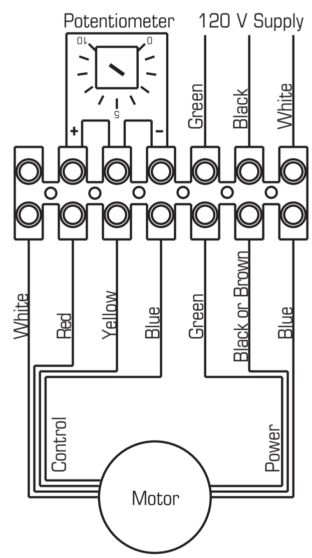
The Rn4-3 is designed for use with 3" schedule 40 PVC pipe.
The Rn4-4 is designed for use with 4" schedule 40 PVC pipe

Prior to installation, the suction pipe should be terminated at the exterior wall. The suction pipe should be installed with slight incline to drain water from the fan.



DO NOT connect fan directly to building structure

WIRING DIAGRAM



To reduce fan speed use a small screwdriver and turn potentiometer knob counter clockwise

WARRANTY

Five (5) Year Warranty

This warranty supersedes all prior warranties

DURING ENTIRE WARRANTY PERIOD:
Fantech will repair or replace any part which has a factory defect in workmanship or material. Product may need to be returned to the Fantech factory, together with a copy of the bill of sale and identified with RMA number.

FOR FACTORY RETURN YOU MUST:
- Have a Return Materials Authorization (RMA) number. This may be obtained by calling Fantech either in the USA at 1.800.747.1762 or in CANADA at 1.800.565.3548. Please have bill of sale available.
- The RMA number must be clearly written on the outside of the carton, or the carton will be refused.
- All parts and/or product will be repaired/replaced and shipped back to buyer; no credit will be issued.

OR
The Distributor may place an order for the warranty part and/or product and is invoiced. The Distributor will receive a credit equal to the invoice only after product is returned prepaid and verified to be defective.

FANTECH WARRANTY TERMS DO NOT PROVIDE FOR REPLACEMENT WITHOUT CHARGE PRIOR TO INSPECTION FOR A DEFECT. REPLACEMENTS ISSUED IN ADVANCE OF DEFECT INSPECTION ARE INVOICED, AND CREDIT IS PENDING INSPECTION OF RETURNED MATERIAL. DEFECTIVE MATERIAL RETURNED BY END USERS SHOULD NOT BE REPLACED BY THE DISTRIBUTOR WITHOUT CHARGE TO THE END USER, AS CREDIT TO DISTRIBUTOR'S ACCOUNT WILL BE PENDING INSPECTION AND VERIFICATION OF ACTUAL DEFECT BY FANTECH.

THE FOLLOWING WARRANTIES DO NOT APPLY:
- Damages from shipping, either concealed or visible. Claim must be filed with freight company.
- Damages resulting from improper wiring or installation.
- Damages or failure caused by acts of God, or resulting from improper consumer procedures, such as:
  1. Improper maintenance
  2. Misuse, abuse, abnormal use, or accident, and
  3. Incorrect electrical voltage or current.
- Removal or any alteration made on the Fantech label control number or date of manufacture.
- Any other warranty, expressed, implied or written, and to any consequential or incidental damages, loss or property, revenues, or profit, or costs of removal, installation or reinstallation, for any breach of warranty.

WARRANTY VALIDATION
- The user must keep a copy of the bill of sale to verify purchase date.
- These warranties give you specific legal rights, and are subject to an applicable consumer protection legislation. You may have additional rights which vary from state to state.

Limitation of Warranty and Liability

This warranty does not apply to any Fantech product or part which has failed as a result of faulty installation or abuse, incorrect electrical connections or alterations made by others, or use under abnormal operating conditions or misapplication of the product or parts. We will not approve for payment any repair not made by us or our authorized agent without prior written consent. The foregoing shall constitute our sole and exclusive warranty and our sole exclusive liability, and is in lieu of any other warranties, whether written, oral, implied or statutory. There are no warranties which extend beyond the description on the page hereof. In no event, whether as a result of breach of contract, or warranty or alleged negligence, defect incorrect advice or other causes, shall Fantech be liable for special or consequential damages, including, but not limited to, loss of profits or revenue, loss of use of equipment or any other associated equipment, cost of capital, cost of substitute equipment, facilities or services, downtime costs, or claims of customers of purchase for such damages. Fantech neither assumes or authorizes any person to assume for it any other liability in connection with the sale of product(s) or part(s). Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages so the above limitations and exclusions may not apply to you.

Warning

Fantech products are designed and manufactured to provide reliable performance, but they are not guaranteed to be 100% free from defects. Even reliable products will experience occasional failures and this possibility should be recognized by the user. If these products are used in a life support ventilation system where failure could result in loss or injury, the user should provide adequate backup ventilation, supplementary natural ventilation, failure alarm system, or acknowledge willingness to accept the risk of such loss or injury.

Attachment 7

SDS Sheets

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

* * * Section 1 - Product and Company Identification * * *

MSDS #1102E

Part Numbers: Clear 30850, 30863, 30876(TV), 30882, 31008(TV), 31011, 31950, 31951, 31952, 31953
Gray 30349, 31093, 31094, 31095, 31105, 31118, 31978, 31979, 31980, 31981, 32050, 32051, 32052, 32210, 32211

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other non-combusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear or Gray	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.94 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	80-84% Maximum 510 g/L per SCAQMD Test Method 316A.
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Carcinogenicity

A: General Product Information

In 2012 USEPA Integrated Risk Information System (IRIS) reviewed a two species inhalation lifetime study on THF conducted by NTP (1998). Male rats developed renal tumors and female mice developed liver tumors while neither the female rats nor the male mice showed similar results. Because the carcinogenic mechanisms could not be identified clearly in either species for either tumor, the EPA determined that the male rat and female mouse findings are relevant to the assessment of carcinogenic potential in humans. Therefore, the IRIS review concludes that these data in aggregate indicate that there is "suggestive evidence of carcinogenic potential" following exposure to THF by all routes of exposure.

B: Component Carcinogenicity

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

PVC (Chloroethylene, polymer) (9002-86-2)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Supplement 7 [1987]; Monograph 19 [1979] (Group 3 (not classifiable))

Silica, amorphous, fumed, crystalline-free (112945-52-5)

IARC: Monograph 68 [1997] (listed under Amorphous silica) (Group 3 (not classifiable))

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Tetrahydrofuran (109-99-9)

Test & Species	Conditions

Material Name: OATEY PVC HEAVY DUTY CLEAR or GRAY CEMENT - LO-VOC FORMULA

Component Waste Numbers

Tetrahydrofuran (109-99-9)
RCRA: waste number U213 (Ignitable waste)

Cyclohexanone (108-94-1)
RCRA: waste number U057 (Ignitable waste)

Acetone (67-64-1)
RCRA: waste number U002 (Ignitable waste)

Methyl ethyl ketone (78-93-3)
RCRA: waste number U159 (Ignitable waste, Toxic waste)
200.0 mg/L regulatory level

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Consumer Commodity, ORM-D

IMDG Information

For Greater than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): Flammable Liquid

For Less than 1 liter (0.3 gal):
Shipping Name: Adhesives
UN #: 1133 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): None (Limited Quantites are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Lo-VOC
SCAQMD 1168/316A
Compliant

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

* * * Section 1 - Product and Company Identification * * *

MSDS #1402E

Part Numbers: Purple – 30755(TV), 30756(TV), 30757(TV), 30758, 30759, 30927 Clear - 30749, 30750, 30751, 30752, 30753, 30754, 31652, 31653

Manufacturer Information

Oatey Co.
4700 West 160th Street
Cleveland, OH 44135

Phone: 216-267-7100

For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1- 703-527-3887.

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 2
Acute Toxicity Oral - Category 4
Acute Toxicity Dermal - Category 4
Acute Toxicity Inhalation - Category 4
Eye Damage/Irritation - Category 2A
Carcinogenicity - Category 2
Specific Target Organ Toxicity Single Exposure - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Harmful if inhaled.
Causes serious eye irritation.
Contains a chemical classified by the US EPA as a suspected possible carcinogen.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Precautionary Statements

Prevention

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Keep away from heat/sparks/open flames and hot surfaces. - No smoking.
Keep container tightly closed.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/eye protection/face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/gas/mist/vapors.
Use only outdoors or in a well-ventilated area.

Response

If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.
If swallowed: Call a poison center or doctor/physician if you feel unwell. Rinse mouth. Do not induce vomiting.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
If exposed or concerned: Get medical advice/attention.
In case of fire: Use dry chemical, CO2, or foam to extinguish fire.

Storage

Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
78-93-3	Methyl ethyl ketone	25-40
67-64-1	Acetone	25-40
108-94-1	Cyclohexanone	15-30
109-99-9	Tetrahydrofuran	15-30

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

If material gets into eyes or if fumes cause irritation, immediately flush eyes with plenty of water until chemical is removed. If irritation persists, get medical attention immediately.

First Aid: Skin

Remove contaminated clothing immediately. Wash all exposed areas with soap and water. Get medical attention if irritation develops. Remove dried cement with hand cleaner or baby oil.

.irst Aid: Ingestion

DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to a person who is unconscious or drowsy. Get immediate medical attention by calling a Poison Control Center, or hospital emergency room. If medical advice cannot be obtained, then take the person and product to the nearest medical emergency treatment center or hospital.

First Aid: Inhalation

If symptoms of exposure develop, remove to fresh air. If breathing becomes difficult, administer oxygen. Administer artificial respiration if breathing has stopped. Seek immediate medical attention.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.
Highly flammable liquid and vapor. Keep away from heat and all sources of ignition including sparks, flames, lighted cigarettes and pilot lights. Containers may rupture or explode in the heat of a fire. Vapors are heavier than air and may travel to a remote ignition source and flash back. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

Hazardous Combustion Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Extinguishing Media

Use dry chemical, CO2, or foam to extinguish fire. Cool fire exposed container with water. Water may be ineffective as an extinguishing agent.

Unsuitable Extinguishing Media

None.

Fire Fighting Equipment/Instructions

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

*** Section 6 - Accidental Release Measures ***

Recovery and Neutralization

Stop leak if it can be done without risk.

Materials and Methods for Clean-Up

Remove all sources of ignition and ventilate area. Soak up spill with an inert absorbent such as sand, earth or other noncombusting material. Put absorbent material in covered, labeled metal containers.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high.

Environmental Precautions

Prevent liquid from entering watercourses, sewers and natural waterways.

Prevention of Secondary Hazards

None

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

Engineering Measures

Open doors & windows. Provide ventilation capable of maintaining emissions at the point of use below recommended exposure limits. If used in enclosed area, use exhaust fans. Exhaust fans should be explosion-proof or set up in a way that flammable concentrations of solvent vapors are not exposed to electrical fixtures or hot surfaces.

Personal Protective Equipment: Respiratory

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

Personal Protective Equipment: Hands

Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H(tm) or Silver Shield(tm) to avoid prolonged skin contact.

Personal Protective Equipment: Eyes

Safety glasses with side shields or safety goggles.

Personal Protective Equipment: Skin and Body

No additional protective equipment needed.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Purple or clear	**Odor:**	Ether-like
Physical State:	Liquid	**pH:**	NA
Vapor Pressure:	145 mmHg @ 20°C	**Vapor Density:**	2.5
Boiling Point:	151°F (66°C)	**Melting Point:**	NA
Solubility (H2O):	Negligible	**Specific Gravity:**	0.84 +/- 0.02 @ 20°C
Evaporation Rate:	(BUAC = 1) = 5.5 - 8.0	**VOC:**	99.96%
Octanol/H2O Coeff.:	ND	**Flash Point:**	14-23°F (-10 to -5°C)
Flash Point Method:	CCCFP	**Upper Flammability Limit (UFL):**	11.8
Lower Flammability Limit (LFL):	1.8	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid heat, sparks, flames and other sources of ignition.

Incompatible Products

Oxidizing agents, alkalis, amines, ammonia, acids, chlorine compounds, chlorinated inorganics (potassium, calcium and sodium hypochlorite) and hydrogen peroxides. May attack plastic, resins and rubber.

Hazardous Decomposition Products

Combustion will produce toxic and irritating vapors including carbon monoxide, carbon dioxide and hydrogen chloride.

Material Name: OATEY PURPLE OR CLEAR PRIMER NSF LISTED

J: Component Carcinogenicity

Acetone (67-64-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

Cyclohexanone (108-94-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Tetrahydrofuran (109-99-9)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Reproductive Toxicity

Methyl ethyl ketone and cyclohexanone have been shown to cause embryofetal toxicity and birth defects in laboratory animals. Acetone and tetrahydrofuran has been found to cause adverse developmental effects only when exposure levels cause other toxic effects to the mother.

Specified Target Organ General Toxicity: Single Exposure

May cause respiratory irritation. Inhalation of high concentrations may cause central nervous system depression, narcosis and unconsciousness. May cause kidney, liver and lung damage.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Aspiration during swallowing or vomiting can cause chemical pneumonia and lung damage. May cause kidney and liver damage.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is not expected to be toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Acetone (67-64-1)

Test & Species		Conditions
96 Hr LC50 Oncorhynchus mykiss	4.74 - 6.33 mL/L	
96 Hr LC50 Pimephales promelas	6210 - 8120 mg/L [static]	
96 Hr LC50 Lepomis macrochirus	8300 mg/L	
48 Hr EC50 Daphnia magna	10294 - 17704 mg/L [Static]	
48 Hr EC50 Daphnia magna	12600 - 12700 mg/L	

Methyl ethyl ketone (78-93-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	3130-3320 mg/L [flow-through]	
48 Hr EC50 Daphnia magna	>520 mg/L	
48 Hr EC50 Daphnia magna	5091 mg/L	
48 Hr EC50 Daphnia magna	4025 - 6440 mg/L [Static]	

Required Label(s): None (Limited Quantities are expected from labeling)

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Acetone (67-64-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Methyl ethyl ketone (78-93-3)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Cyclohexanone (108-94-1)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

Tetrahydrofuran (109-99-9)

CERCLA: 1000 lb final RQ; 454 kg final RQ

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Acetone	67-64-1	Yes	Yes	Yes	Yes	Yes	No
Methyl ethyl ketone	78-93-3	Yes	Yes	Yes	Yes	Yes	No
Cyclohexanone	108-94-1	Yes	Yes	Yes	Yes	Yes	No
Tetrahydrofuran	109-99-9	Yes	Yes	Yes	Yes	Yes	No

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Acetone	67-64-1	1 %
Methyl ethyl ketone	78-93-3	1 %
Cyclohexanone	108-94-1	0.1 %
Tetrahydrofuran	109-99-9	1 %

Additional Regulatory Information

A: General Product Information

This product contains trace amounts of chemicals known to the State of California to cause cancer. Under normal use conditions, exposure to these chemicals at levels above the State of California "No Significant Risk Level" (NSRL) are unlikely. The use of proper personal protective equipment (PPE) and ventilation guidelines noted in Section 8 will minimize exposure to these chemicals.

MATERIAL SAFETY DATA SHEET

GC68101
12 00

DATE OF PREPARATION
Sep 9, 2016

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
GC68101
PRODUCT NAME
Geocel® 3300® Professional Grade Polyurethane Sealant, White
MANUFACTURER'S NAME
Geocel Products Group
A Business Unit of The Sherwin-Williams Company
101 W. Prospect Avenue
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	(800) 348-7615 www.geocelusa.com
Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units		Vapor Pressure
2	**1305-78-8**	**Calcium Oxide**			
		ACGIH TLV		Not Available	
		OSHA PEL		Not Available	
44	**1317-65-3**	**Calcium Carbonate**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	
2	**13463-67-7**	**Titanium Dioxide**			
		ACGIH TLV	10	mg/m3 as Dust	
		OSHA PEL	10	mg/m3 Total Dust	
		OSHA PEL	5	mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

HMIS Codes

Health	3*
Flammability	0
Reactivity	1

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.
EFFECTS OF OVEREXPOSURE
EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Redness and itching or burning sensation may indicate eye or excessive skin exposure.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.
CANCER INFORMATION
For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
Not Applicable	Not Applicable	Not Applicable	Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY
Not Applicable
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).
Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.
PROTECTIVE GLOVES
Required for long or repeated contact.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	12.55 lb/gal	1503 g/l
SPECIFIC GRAVITY	1.51	
BOILING POINT	Not Applicable	
MELTING POINT	Not Available	
VOLATILE VOLUME	0%	
EVAPORATION RATE	Not Available	
VAPOR DENSITY	Not Available	
SOLUBILITY IN WATER	Not Available	
pH	> 2.0, < 11.5	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

0.03 lb/gal	3 g/l	Less Water and Federally Exempt Solvents
0.03 lb/gal	3 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable
CONDITIONS TO AVOID
None known.
INCOMPATIBILITY
None known.
HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide
HAZARDOUS POLYMERIZATION
Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS
IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."
TOXICOLOGY DATA

CAS No.	Ingredient Name			
1305-78-8	**Calcium Oxide**			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
1317-65-3	**Calcium Carbonate**			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
13463-67-7	**Titanium Dioxide**			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION
No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD
Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)
Not Regulated for Transportation.
Canada (TDG)
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IMO
Not Regulated for Transportation.
IATA/ICAO
Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.
CALIFORNIA PROPOSITION 65
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
TSCA CERTIFICATION
All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

MATERIAL SAFETY DATA SHEET

1) PRODUCT AND COMPANY IDENTIFICATION

THE DOW CHEMICAL COMPANY
Midland Michigan 48674
USA

24-Hour Emergency Phone Number: 989-636-4400
Customer Service: 800-366-4740

PRODUCT NAME : GREAT STUFF* Gaps and Cracks
MATERIAL TYPE : One component system
ISSUE DATE : 04/26/2007
REVISION DATE : 01/25/2007

2) COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS Number	%
Prepolymer of MDI and Polyether polyol	mixture	40-70, 60-100%
Polymethylene polyphenyl Isocyanate containing approx. 40-50% MDI (4,4'methylene bisphenyl isocyanate) CAS# 101-68-8	9016-87-9	5-10,10-30%
Liquified Petroleum Mixture containing Isobutane (CAS#75-28-5), propane (CAS# 74-98-6) and dimethyl ether (CAS# 115-10-6)	mixture	10-30%

3) HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Sprayed or heated material harmful if inhaled. May cause allergic skin reaction. May cause allergic respiratory reaction and lung injury. Avoid temperatures above 105F (41C). Toxic flammable gases and heat are released under decomposition conditions. Toxic fumes may be released in fire situations. Reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this process.

EYE

May cause moderate eye irritation. May cause very slight transient (temporary) corneal injury.

SKIN

Prolonged or repeated exposure may cause slight skin irritation. May cause allergic skin reaction in susceptible individuals. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization. May stain skin. A single prolonged exposure is not likely to result in the material being absorbed in harmful amounts.

INGESTION

Single dose oral toxicity is considered to be low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.

INHALATION

At room temperature, vapors are minimal due to low vapor pressure. However, certain operations may generate vapor or aerosol concentrations sufficient to cause irritation or other adverse effects. Such operations include those in which the material is heated, sprayed or otherwise mechanically dispersed such as drumming, venting or

MATERIAL SAFETY DATA SHEET

pumping. Excessive exposure may cause irritation to upper respiratory tract and lungs, and pulmonary edema (fluid in the lungs). May cause respiratory sensitization in susceptible individuals. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Effects may be delayed. Decreased lung function has been associated with overexposure to isocyanates.

SYSTEMIC EFFECTS
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

TERATOLOGY
In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother.

CANCER INFORMATION
Lung tumors have been observed in laboratory animals exposed to aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

4) FIRST-AID MEASURES

EYE
Irrigate with flowing water immediately and continuously for 15 minutes. Remove contacts after first five minutes and continue washing. Consult medical personnel.

SKIN
Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. An MDI skin decontamination study demonstrated that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water.

INGESTION
If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

INHALATION
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN
No specific antidote. Provide supportive care. Treatment based on judgment of the physician in response to reactions of the patient. May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants, and antitussives may be of help. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed for 24-48 hours for signs of respiratory distress.

5) FIRE-FIGHTING MEASURES

FLAMMABLE PROPERTIES
Flash point: -156F, -104C

Method: Estimated

HAZARDOUS COMBUSTION PRODUCTS
During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include but are not limited to: nitrogen oxides, isocyanates, hydrogen cyanide, carbon monoxide, and carbon dioxide.

MATERIAL SAFETY DATA SHEET

OTHER FLAMMABILITY INFORMATION

Product reacts with water. Reaction may produce heat and/or gases. Reaction may be violent. Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is produced when product burns. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the atoignition temperatures possibly resulting in spontaneous combustion.

EXTINGUISHING MEDIA

Use carbon dioxide, dry chemical, foam, water fog or fine spray. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effective. Do not use direct water stream which can spread fire.

FIRE FIGHTING INSTRUCTIONS

Keep people away. Isolate fire area and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water is not recommended but may be applied in very large quantities as a fine spray when other extinguishing agents are not available. Contain fire water run-off if possible. Do not use direct water stream. May spread fire. Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Use water spray to cool fire exposed containers and fire affected zone until fire is out. Immediately withdraw all personnel from area in case of rising sound from venting safety devices or discoloration of the containers. Move containers from fire area if this is possible without hazard.

PROTECTIVE EQUIPMENT - FIRE FIGHTERS

Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant clothing with SCBA. If his will not provide sufficient fire protection; consider fighting fire from a remote location.

6) ACCIDENTAL RELEASE MEASURES

PROTECT PEOPLE

Avoid any contact. Barricade area. Clear non-emergency personnel from area. Keep upwind of spill. Ventilate area of leak or spill. The area must be evacuated and reentered by persons equipped for decontamination. Use appropriate safety equipment. If available, use foam to suppress vapors.

PROTECT THE ENVIRONMENT

Contain liquid to prevent contamination of soil, surface water or ground water. Keep out of ditches, sewers, and water supplies. Should the product enter sewers or drains, it should be pumped into a covered, vented container; the cover should be placed loosely on the container but not made pressure tight. Move to a well-ventilated area. Emergency services may need to be called to assist in the cleanup operation.

CLEAN-UP

Supplies of suitable decontaminant should always be kept available. Absorb with material such as: sawdust, vermiculite, dirt, sand, clay, cob grit, Milsorb. Avoid materials such as cement powder. Collect material in suitable and properly labeled OPEN containers. Do not place in sealed container. Prolonged contact with water results in a chemical reaction which may result in rupture of the container. Place in: polylined fiber pacs, plastic drums, or properly labeled metal containers. Remove to a well ventilated area. Clean up floor areas. Attempt to neutralize by suitable decontaminant solution: Formulation 1: sodium carbonate 5-10%; liquid detergent 0.2-2%; water to make up to 100%. OR Formulation 2: Concentrated ammonia solution 3-8%; liquid detergent 0.2-2%; water to make up to 100%. If ammonia is used, use good ventilation to prevent vapor exposure. If you have any questions on how to neutralize call The Dow Chemical

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Company.

7) HANDLING AND STORAGE

HANDLING
Avoid contact of this product with water at all times during handling and storage. Use only with adequate ventilation. Keep equipment clean. Use disposable containers and tools where possible. Do not eat, drink, or smoke in working area.

STORAGE
Store in a dry place. The recommended storage temperature is between 32 - 90F (0-32C). Keep containers tightly closed when not in use. Protect containers from physical abuse. Avoid direct sunlight. DO NOT incinerate aerosol can.

8) EXPOSURE CONTROL/PERSONAL PROTECTION

ENGINEERING CONTROLS
Use only with adequate ventilation. Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and the people working at this point. Odor is inadequate warning of excessive exposure.

EYE/FACE PROTECTION
Use chemical goggles.

SKIN PROTECTION
Use protective clothing impervious to this material. Selection of specific items such as faceshield, gloves, boots, apron, or full-body suit will depend on operation. Consideration of all chemicals involved, time and the dexterity needed to safely complete the job must be considered. Solvents can significantly change the permeation of a chemical through a barrier. Work with your safety equipment supplier to obtain the best Personal Protective Equipment for the job. Nitrile gloves are often found to be appropriate for work with MDI. Butyl rubber, PVC and neoprene are also often chosen.

Remove contaminated clothing immediately, wash skin area with soap and water (warm water if available) and launder clothing before reuse. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and destroyed.

RESPIRATORY PROTECTION
Atmospheric levels should be maintained below the exposure guideline. When atmospheric levels may exceed the exposure guideline, use an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive-pressure air-supplying respirator (airline or self-contained breathing apparatus). For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus.

EXPOSURE GUIDELINES(S)
Methylene bisphenyl isocyanate (MDI): ACGIH TLV is 0.005 ppm TWA and OSHA PEL is 0.02 ppm Ceiling. PELs are in accord with those recommended by OSHA, as in the 1989 revision of PELs.

Isobutane: ACGIH TLV and OSHA PEL are 800 ppm.

Propane: ACGIH TLV is 2500 ppm TWA and OSHA PEL is 1000 ppm.

Dimethyl ether: ACGIH TLV is 1000 ppm TWA.

9) PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE

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liquid

VAPOR PRESSURE
4210 mm Hg at 21C/70F

SPECIFIC GRAVITY
1.1

10) STABILITY AND REACTIVITY

CHEMICAL STABILITY
Stable under recommended storage conditions.

CONDITIONS TO AVOID
Avoid temperatures above 120F, 49C. Avoid temperatures below 32F, 0C. Can react with itself at temperatures above 320F, 160C. Product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Pressure build-up can be rapid. Avoid moisture. Material reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this reaction.

INCOMPATIBILITY WITH OTHER MATERIALS
Avoid contact with acids, water, alcohols, amines, ammonia, bases, moist air, and strong oxidizers. Avoid contact with metals such as aluminum, brass, copper, galvanized metals, tin, zinc. Avoid contact with moist organic absorbents. Reaction with water will generate carbon dioxide and heat. Generation of gas can cause pressure buildup in closed systems. Avoid unintended contact with polyols. The reaction of polyols and isocyanates generate heat. Diisocyanates react with many materials and the rate of reaction increases with temperature as well as increased contact; these reactions can become violent. Contact is increased by stirring or if the other material mixes with the diisocyanate. Diisocyanates are not soluble in water and are denser than water and sink to the bottom, but react slowly at the interface. The reaction forms carbon dioxide gas and a layer of solid polyurea.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Gases are released during decomposition.

HAZARDOUS POLYMERIZATION
Can occur. Polymerization can be catalyzed by: strong bases and water. Can react with itself at temperatures above 320F (160C).

11) TOXICOLOGICAL INFORMATION

SKIN
MDI: The LD50 for skin absorption in rabbits is > 2000 mg/kg.

INGESTION
MDI: The oral LD50 for rats is > 10,000 mg/kg.

MUTAGENICITY
MDI: Mutagenicity data on MDI are inconclusive. MDI was weakly positive in some in-vitro (test tube) studies;

other in-vitro studies were negative. A mutagenicity study in animals was negative.

Dimethyl ether: In vitro mutagenicity studies were positive. Animal mutagenicity studies were negative in some cases and positive in others.

12) ECOLOGICAL INFORMATION

MOVEMENT & PARTITIONING
Based on information for MDI and polymeric MDI. In the aquatic or terrestrial

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environment, movement is expected to be limited by its reactivity with water forming predominantly insoluble polyureas.

DEGRADATION & PERSISTENCE

Based on information for MDI and polymeric MDI. In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.

ECOTOXICITY

Based on information for MDI and polymerc MDI. The measured ecotoxicity is that of the hydrolzed product, generally under conditions maximizing production of soluble species. Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 > 100 mg/L in most sensitive species). The LC50 in earthworm Eisenia foetida is > 1000 mg/kg.

13) DISPOSAL CONSIDERATIONS

DISPOSAL CONSIDERATIONS

FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

As a service to its customers, Dow can provide names of information resource to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 989-832-1556 for further details.

DISPOSAL

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

14) TRANSPORT INFORMATION

US D.O.T.

Consumer Commodity ORM-D

15) REGULATORY INFORMATION

NOTICE

The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, expressed or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

REGULATORY INFORMATION

U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following subject to the reporting

MATERIAL SAFETY DATA SHEET

requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME CAS NUMBER

--------------------------------------- -----------

Polymeric Diphenylmethane diisocyanate, CAS#9016-87-9

4,4'' Methylene bisphenol isocyanate, CAS# 101-68-8

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

PMDI/MDI: immediate and delayed health hazard

Isobutane/propane: fire hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

OSHA HAZARD COMMUNICATION STANDARD:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA,or SUPERFUND):

This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

Category:

Chemical Name	CAS#	RQ
Methylene bisphenyl isocyanate	101-68-8	5000 lbs
Isobutane	75-28-5	100 lbs
Propane	74-98-6	100 lbs
Dimethyl ether	115-10-6	100 lbs

CALIFORNIA PROPOSITION 65

This product contains no listed substances known to the state of California to cause cancer, birth defects or other reproductive harm.

PENNSYLVANIA STATE RIGHT TO KNOW HAZARDOUS SUBSTANCE:

Methylene bisphenyl isocyanate	101-68-8
Isobutane	75-28-5
Propane	74-98-6
Dimethyl ether	115-10-6

CANADIAN REGULATIONS

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WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

D2A - respiratory tract sensitizer

D2B - eye or skin irritant, skin sensitizer

B3 - combustible liquid

Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer''s workplace education program.

- - - - -

CPR STATEMENT: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

- - - - -

HAZARDOUS PRODUCTS ACT INFORMATION: This product contains the following ingredients which are Controlled Products and/or on the Ingredient Disclosure List (Canadian HPA section 13 and 14):

COMPONENTS: CAS #

4,4'' Methylene bisphenol isocyanate   CAS# 101-68-8   2-15 wt %

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):

All substances in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16) OTHER INFORMATION

OTHER INFORMATION

VOC content: 158.1 grams/liter

No other information.

(TM), *, or (R) Indicates a trademark of The Dow Chemical Company.

Attachment 8
Post PFE Results

VAPOR INTRUSION SPECIALISTS
7428 Rockville Road, Indianapolis, Indiana 46214 | cell 812-929-9070

PFE Field Data Sheet

Property Name: PR #36

Property Address: PR #36, Franklin, IN

PFE Testing Date: 1/14/2019 & 3/22/2019

Professional: Alex Watt

Notes: Slab was 4" in thickness, the sub-slab material consisted of damp sand.

Test Point	(Distance from EP-1)	Dialed to 5 on the potentiometer	Dialed to 7 on the potentiometer	2nd round Post PFE (Dialed to 7 on the potentiometer) (3/22/19)
TP01	12'	-0.026	-0.052	-0.056
TP02	16'	-0.007	-0.017	-0.043
TP03	20'	-0.010	-0.026	-0.034
TP04	20'	-0.008	-0.021	-0.030
VP01	5'	-0.112	-0.212	-0.207

Appendix B
SSDS/SMDS Component Monitoring Form & SSDS/SMDS Inspection Checklists

SSDS/SMDS Monitoring Checklist

Select Priority Residences

Franklin, IN

Inspector's Name (Company): ____________________

General Information

Contact Person(s): Dane Danner (VIS)
(317) 675-0150

Brad Gentry (IWM Consulting)
(317) 347-1111

Occupant Name(s):
PR #4 - [redacted]
PR #5 - [redacted]
PR #14 - [redacted]
PR #22 - [redacted]

Occupant Address:
[redacted]

Occupant Name(s):
PR #29 - [redacted]
PR #31 - [redacted]
PR #36 - [redacted]

Occupant Address:
[redacted] , Franklin, IN 46131

Visual Inspection

	SSDS #4		SSDS #5		SMDS #5		SSDS #14		SSDS #22		SMDS #22		SSDS #29		SSDS #31		SSDS #36	
Inspection Date:																		
Inspection Time:																		
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
Has remodeling activities recently occurred?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
When:																		
Has the occupant noticed any system shutdowns?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
When:																		
Is the HVAC system operational?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

System

	SSDS #4		SSDS #5		SMDS #5		SSDS #14		SSDS #22		SMDS #22		SSDS #29		SSDS #31		SSDS #36	
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
Is the fan intact and operational?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Is the fan making any unusual noises or vibrations?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Is the riser piping intact?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Does the system still appear to be sealed?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Do the suction points appear sealed?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Is the audible alarm operational?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Manometer Reading (inches of water)																		

Weather Conditions During Inspection:

Comments:

SMDS Component Monitoring Form - PR #5
Franklin, IN

Monitoring Date	Manometer Reading (inches of water)	Audible Alarm Test Results (Operational/Non-operational)

*This monitoring sheet shall remain onsite and filled out each visit

IWM CONSULTING GROUP

SMDS Component Monitoring Form - PR #22
Franklin, IN

Monitoring Date	Manometer Reading (inches of water)	Audible Alarm Test Results (Operational/Non-operational)

*This monitoring sheet shall remain onsite and filled out each visit

SSDS Component Monitoring Form - PR #4
Franklin, IN

Monitoring Date	Manometer Reading (inches of water)	Audible Alarm Test Results (Operational/Non-operational)

*This monitoring sheet shall remain onsite and filled out each visit

SSDS Component Monitoring Form - PR #5
Franklin, IN

Monitoring Date	Manometer Reading (inches of water)	Audible Alarm Test Results (Operational/Non-operational)

*This monitoring sheet shall remain onsite and filled out each visit

SSDS Component Monitoring Form - PR #14
Franklin, IN

Monitoring Date	Manometer Reading (inches of water)	Audible Alarm Test Results (Operational/Non-operational)

*This monitoring sheet shall remain onsite and filled out each visit

SSDS Component Monitoring Form - PR #22
Franklin, IN

Monitoring Date	Manometer Reading (inches of water)	Audible Alarm Test Results (Operational/Non-operational)

*This monitoring sheet shall remain onsite and filled out each visit

SSDS Component Monitoring Form - PR #29
Franklin, IN

Monitoring Date	Manometer Reading (inches of water)	Audible Alarm Test Results (Operational/Non-operational)

*This monitoring sheet shall remain onsite and filled out each visit

SSDS Component Monitoring Form - PR #31
Franklin, IN

Monitoring Date	Manometer Reading (inches of water)	Audible Alarm Test Results (Operational/Non-operational)

*This monitoring sheet shall remain onsite and filled out each visit

SSDS Component Monitoring Form - PR #36
Franklin, IN

Monitoring Date	Manometer Reading (inches of water)	Audible Alarm Test Results (Operational/Non-operational)

*This monitoring sheet shall remain onsite and filled out each visit

Appendix C
Mitigation System Trouble-shooting Form

Mitigation System Trouble Shooting

Site: Priority Residence

Primary Contact: Alex Watt: 812-929-9070 or awatt@vaporintrusion.us
Secondary Contact: Brad Gentry: 317-435-8877 or at bgentry@iwmconsult.com

Please follow these steps if your system indicator/s (U-tube manometer/ Magnehelic gauge) is showing 0 on the sight tube/gauge or if the audible vacuum alarm has been activated.

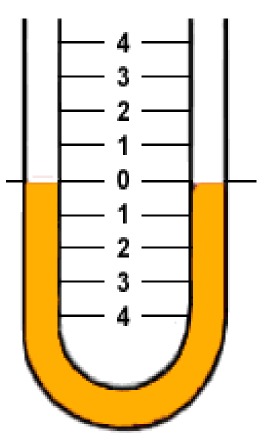
Step #1) Confirm that the clear tubing leading from the U-tube manometer, Magnehelic gauge, and/or audible vacuum alarm are still inserted into the SSDS exhaust stack and that the tubing is not plugged with debris. If the tubing is detached, insert the tubing back into the exhaust stack and recheck the U-tube or Magnehlic reading. If the tubing is plugged, remove the debris and reinsert the tubing back into the SSDS exhaust stack. If the reading is still O or the audible alarm is still activated, proceed to Step #2.

Step #2) Check to see if dedicated circuit breaker in panel has been tripped. If so, reset and turn back to the on position.

Step #3) Check service switch located next the fan to see if it has been turned off. If so, flip switch back to the on position (if applicable).

If the fan still does not operate, the audible alarm is still activated, and the pressure readings remain at 0, it means there is an electrical issue. Please immediately contact the above for further assistance in order to quickly resolve the issue.

U-tube Manometer at zero



Magnehelic Gauge at zero

Appendix C

Pre-Design Assessment Documents

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SITE LOGIC Report

QuantArray®-Chlor Study

Contact:	Brad Gentry	Phone:	317-435-8877
Address:	IWM Consulting Group 7428 Rockville Road Indianapolis, IN 46214	Email:	bgentry@IWMconsult.com

MI Identifier: **037SA**

Report Date: 02/02/2021

Project: Former Amphenol Facility, IN.AMP18.02

Comments:

The QuantArray®-Chlor Approach

Quantification of *Dehalococcoides*, the only known bacterial group capable of complete reductive dechlorination of PCE and TCE to ethene, has become an indispensable component of assessment, remedy selection, and performance monitoring at sites impacted by chlorinated solvents. While undeniably a key group of halorespiring bacteria, *Dehalococcoides* are not the only bacteria of interest in the subsurface because reductive dechlorination is not the only potential biodegradation pathway operative at contaminated sites, and chlorinated ethenes are not always the primary contaminants of concern. The QuantArray®-Chlor not only includes a variety of halorespiring bacteria (*Dehalococcoides*, *Dehalobacter*, *Dehalogenimonas*, etc.) to assess the potential for reductive dechlorination of chloroethenes, chloroethanes, chlorobenzenes, chlorophenols, and chloroform, but also provides quantification of functional genes involved in aerobic (co)metabolic pathways for biodegradation of chlorinated solvents and even competing biological processes. Thus, the QuantArray®-Chlor will give site managers the ability to simultaneously yet economically evaluate the potential for biodegradation of a spectrum of common chlorinated contaminants through a multitude of anaerobic and aerobic (co) metabolic pathways to give a much more clear and comprehensive view of contaminant biodegradation.

The QuantArray®-Chlor is used to quantify specific microorganisms and functional genes to evaluate the following:

Anaerobic Reductive Dechlorination	Quantification of important halorespiring bacteria (e.g. *Dehalococcoides*, *Dehalobacter*, *Dehalogenimonas*, *Desulfitobacterium* spp.) and key functional genes (e.g. vinyl chloride reductases, TCE reductase, chloroform reductase) responsible for reductive dechlorination of a broad spectrum of chlorinated solvents.
Aerobic Cometabolism	Several different types of bacteria including methanotrophs and some toluene/phenol utilizing bacteria can co-oxidize TCE, DCE, and vinyl chloride. The QuantArray®-Chlor quantifies functional genes like soluble methane monooxygenase encoding enzymes capable of co-oxidation of chlorinated ethenes.
Aerobic (Co)metabolism of Vinyl Chloride	Ethene oxidizing bacteria are capable of cometabolism of vinyl chloride. In some cases, ethenotrophs can also utilize vinyl chloride as a growth supporting substrate. The QuantArray®-Chlor targets key functional genes in ethene metabolism.

How do QuantArrays® work?

The QuantArray®-Chlor in many respects is a hybrid technology combining the highly parallel detection of microarrays with the accurate and precise quantification provided by qPCR into a single platform. The key to highly parallel qPCR reactions is the nanoliter fluidics platform for low volume, solution phase qPCR reactions.

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How are QuantArray® results reported?

One of the primary advantages of the QuantArray®-Chlor is the simultaneous quantification of a broad spectrum of different microorganisms and key functional genes involved in a variety of pathways for chlorinated hydrocarbon biodegradation. However, highly parallel quantification combined with the various metabolic and cometabolic capabilities of different target organisms can complicate data presentation. Therefore, in addition to Summary Tables, QuantArray® results will be presented as Microbial Population Summary and Comparison Figures to aid in data interpretation and subsequent evaluation of site management activities.

Types of Tables and Figures:

Microbial Population Summary	Figure presenting the concentrations of QuantArray®-Chlor target populations (e.g. *Dehalococcoides*) and functional genes (e.g. vinyl chloride reductase) relative to typically observed values.
Summary Tables	Tables of target population concentrations grouped by biodegradation pathway and contaminant type.
Comparison Figures	Depending on the project, sample results can be presented to compare changes over time or examine differences in microbial populations along a transect of the dissolved plume.

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Results

Table 1: Summary of the QuantArray®-Chlor results obtained for samples MW-22, MW-30, and MW-42.

Sample Name Sample Date	MW-22 01/19/2021	MW-30 01/19/2021	MW-42 01/19/2021
Reductive Dechlorination	cells/mL	cells/mL	cells/mL
Dehalococcoides (DHC)	**1.15E+01**	**4.00E-01 (J)**	**2.70E+00**
tceA Reductase (TCE)	<5.00E-01	<5.00E-01	<5.00E-01
BAV1 Vinyl Chloride Reductase (BVC)	<5.00E-01	<5.00E-01	<5.00E-01
Vinyl Chloride Reductase (VCR)	<5.00E-01	<5.00E-01	<5.00E-01
Dehalobacter spp. (DHBt)	**3.62E+02**	<4.50E+00	<4.50E+00
Dehalobacter DCM (DCM)	<4.70E+00	<4.50E+00	<4.50E+00
Dehalogenimonas spp. (DHG)	<4.70E+00	<4.50E+00	<4.50E+00
cerA Reductase (CER)	<4.70E+00	<4.50E+00	<4.50E+00
trans-1,2-DCE Reductase (TDR)	<4.70E+00	<4.50E+00	<4.50E+00
Desulfitobacterium spp. (DSB)	**8.79E+01**	**8.45E+01**	**1.59E+02**
Dehalobium chlorocoercia (DECO)	**7.87E+02**	<4.50E+00	**4.87E+02**
Desulfuromonas spp. (DSM)	<4.70E+00	**3.00E-01 (J)**	<4.50E+00
PCE Reductase (PCE-1)	<4.70E+00	<4.50E+00	<4.50E+00
PCE Reductase (PCE-2)	<4.70E+00	<4.50E+00	<4.50E+00
Chloroform Reductase (CFR)	<4.70E+00	<4.50E+00	<4.50E+00
1,1 DCA Reductase (DCA)	<4.70E+00	<4.50E+00	<4.50E+00
1,2 DCA Reductase (DCAR)	<4.70E+00	<4.50E+00	<4.50E+00
Aerobic (Co)Metabolic			
Soluble Methane Monooxygenase (SMMO)	<4.70E+00	<4.50E+00	<4.50E+00
Toluene Dioxygenase (TOD)	<4.70E+00	<4.50E+00	**8.10E+00**
Phenol Hydroxylase (PHE)	<4.70E+00	<4.50E+00	**1.50E+03**
Trichlorobenzene Dioxygenase (TCBO)	<4.70E+00	<4.50E+00	**8.70E+01**
Toluene Monooxygenase 2 (RDEG)	<4.70E+00	<4.50E+00	**8.87E+03**
Toluene Monooxygenase (RMO)	<4.70E+00	<4.50E+00	<4.50E+00
Ethene Monooxygenase (EtnC)	<4.70E+00	<4.50E+00	<4.50E+00
Epoxyalkane Transferase (EtnE)	<4.70E+00	<4.50E+00	<4.50E+00
Dichloromethane Dehalogenase (DCMA)	<4.70E+00	<4.50E+00	<4.50E+00
Other			
Total Eubacteria (EBAC)	**1.24E+05**	**1.35E+04**	**3.03E+05**
Sulfate Reducing Bacteria (APS)	**3.70E+03**	**9.10E+02**	**1.40E+03**
Methanogens (MGN)	<4.70E+00	<4.50E+00	<4.50E+00

Legend:

NA = Not Analyzed
NS = Not Sampled
J = Estimated Gene Copies Below PQL but Above LQL
I = Inhibited
< = Result Not Detected

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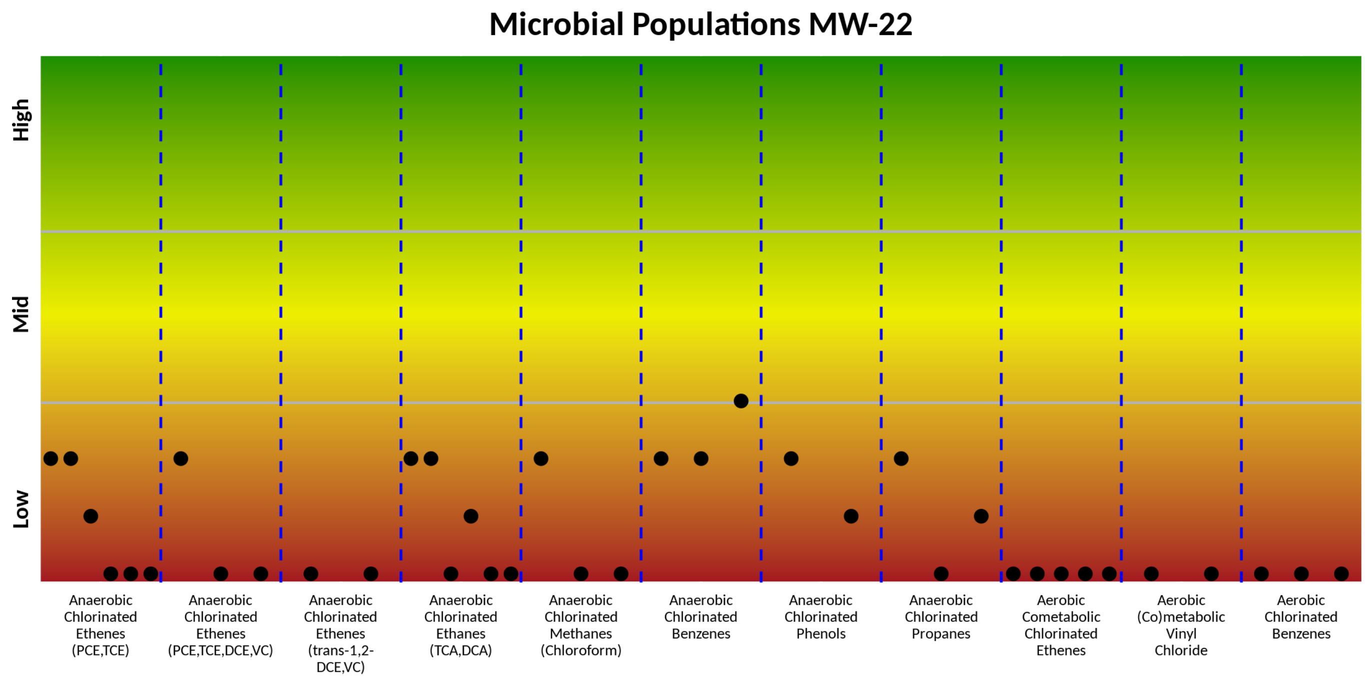

Figure 1: Microbial population summary to aid in evaluating potential pathways and biodegradation of specific contaminants.

Anaerobic - Reductive Dechlorination or Dichloroelimination		Aerobic - (Co)metabolism	
Chlorinated Ethenes (PCE, TCE)	DHC, DHBt, DSB, DSM, PCE-1, PCE-2	Chlorinated Ethenes (TCE,DCE,VC)	sMMO, TOD, PHE, RDEG, RMO
Chlorinated Ethenes (PCE, TCE, DCE, VC)	DHC, BVC, VCR	(Co)metabolic Vinyl Chloride	etnC, etnE
Chlorinated Ethenes (trans-1,2-DCE, VC)	TDR, CER	Chlorinated Benzenes	TOD, TCBO, PHE
Chlorinated Ethanes (TCA and 1,2-DCA)	DHC, DHBt, DHG, DSB[1], DCA, DCAR		
Chlorinated Methanes (Chloroform)	DHBt, DCM, CFR		
Chlorinated Benzenes	DHC, DHBt[2], DECO		
Chlorinated Phenols	DHC, DSB		
Chlorinated Propanes	DHC, DHG, DSB[1]		

[1]*Desulfitobacterium dichloroeliminans* DCA1. [2]Implicated in reductive dechlorination of dichlorobenzene and potentially chlorobenzene.

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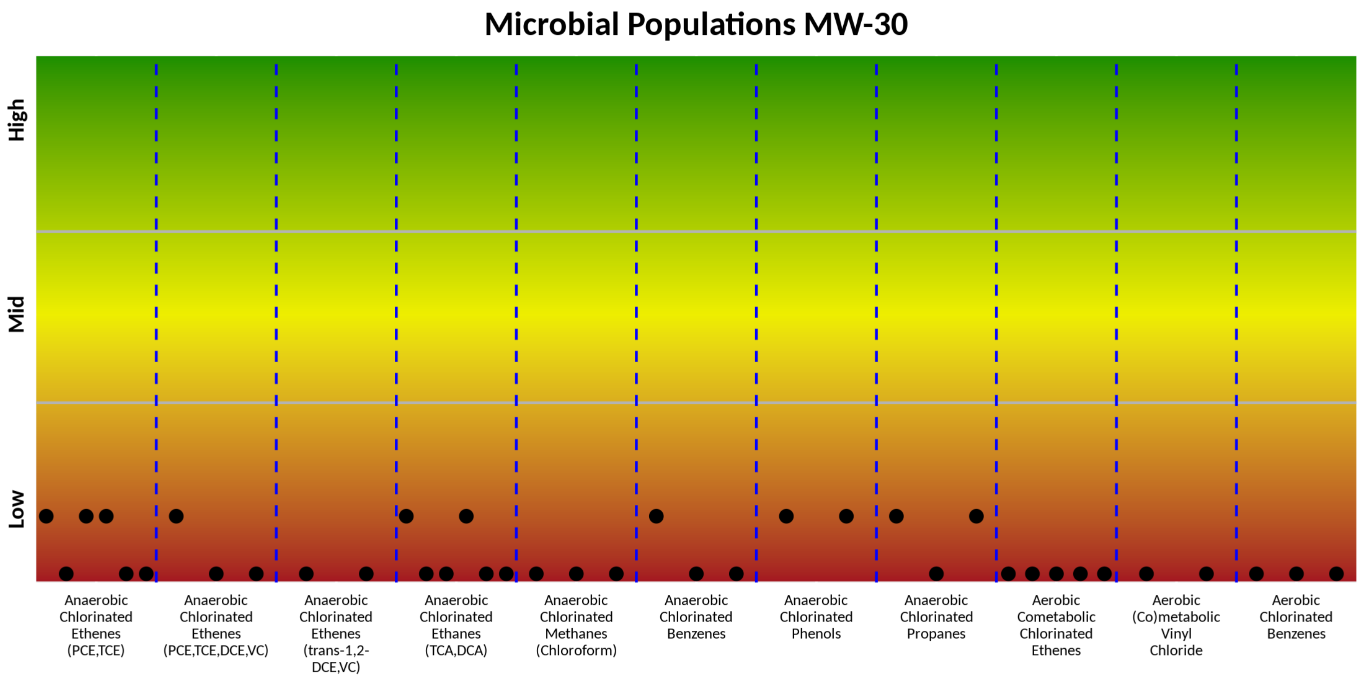

Figure 2: Microbial population summary to aid in evaluating potential pathways and biodegradation of specific contaminants.

Anaerobic - Reductive Dechlorination or Dichloroelimination		Aerobic - (Co)metabolism	
Chlorinated Ethenes (PCE, TCE)	DHC, DHBt, DSB, DSM, PCE-1, PCE-2	Chlorinated Ethenes (TCE,DCE,VC)	sMMO, TOD, PHE, RDEG, RMO
Chlorinated Ethenes (PCE, TCE, DCE, VC)	DHC, BVC, VCR	(Co)metabolic Vinyl Chloride	etnC, etnE
Chlorinated Ethenes (trans-1,2-DCE, VC)	TDR, CER	Chlorinated Benzenes	TOD, TCBO, PHE
Chlorinated Ethanes (TCA and 1,2-DCA)	DHC, DHBt, DHG, DSB[1], DCA, DCAR		
Chlorinated Methanes (Chloroform)	DHBt, DCM, CFR		
Chlorinated Benzenes	DHC, DHBt[2], DECO		
Chlorinated Phenols	DHC, DSB		
Chlorinated Propanes	DHC, DHG, DSB[1]		

[1]*Desulfitobacterium dichloroeliminans* DCA1. [2]Implicated in reductive dechlorination of dichlorobenzene and potentially chlorobenzene.

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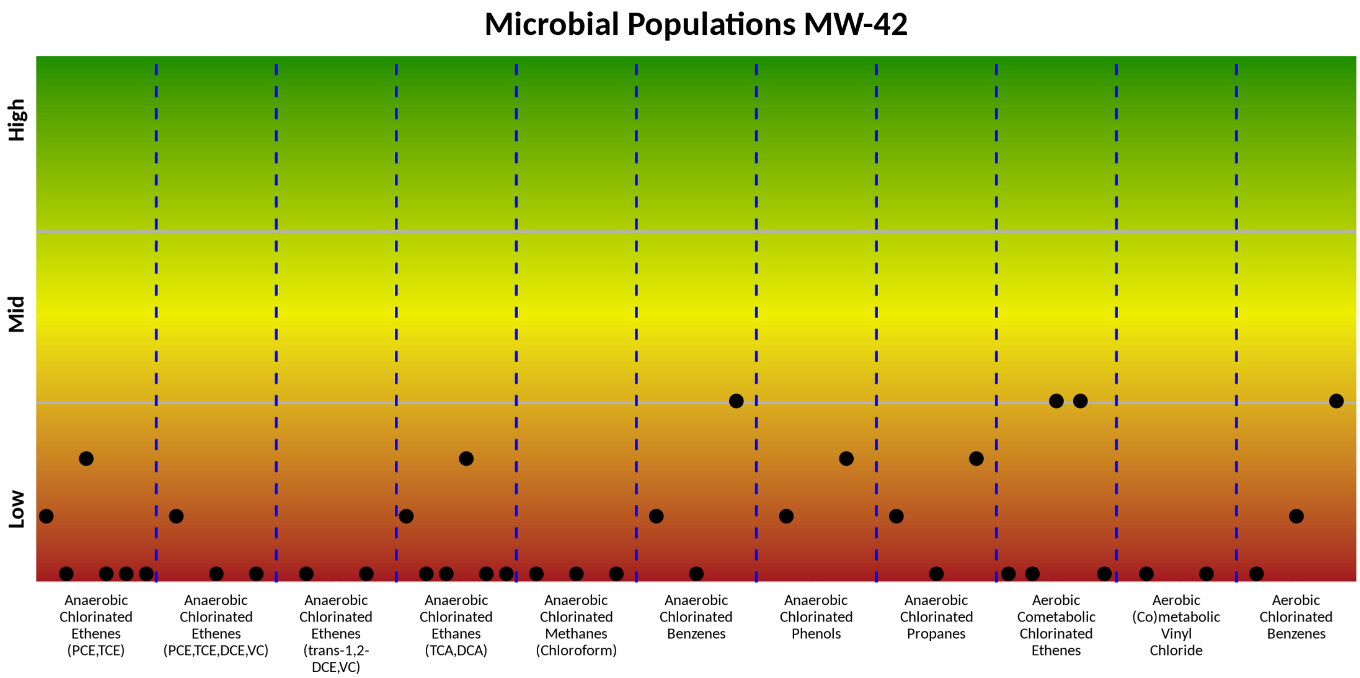

Figure 3: Microbial population summary to aid in evaluating potential pathways and biodegradation of specific contaminants.

Anaerobic - Reductive Dechlorination or Dichloroelimination		Aerobic - (Co)metabolism	
Chlorinated Ethenes (PCE, TCE)	DHC, DHBt, DSB, DSM, PCE-1, PCE-2	Chlorinated Ethenes (TCE,DCE,VC)	sMMO, TOD, PHE, RDEG, RMO
Chlorinated Ethenes (PCE, TCE, DCE, VC)	DHC, BVC, VCR	(Co)metabolic Vinyl Chloride	etnC, etnE
Chlorinated Ethenes (trans-1,2-DCE, VC)	TDR, CER	Chlorinated Benzenes	TOD, TCBO, PHE
Chlorinated Ethanes (TCA and 1,2-DCA)	DHC, DHBt, DHG, DSB[1], DCA, DCAR		
Chlorinated Methanes (Chloroform)	DHBt, DCM, CFR		
Chlorinated Benzenes	DHC, DHBt[2], DECO		
Chlorinated Phenols	DHC, DSB		
Chlorinated Propanes	DHC, DHG, DSB[1]		

[1]*Desulfitobacterium dichloroeliminans* DCA1. [2]Implicated in reductive dechlorination of dichlorobenzene and potentially chlorobenzene.

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Table 2: Summary of the QuantArray®-Chlor results for microorganisms responsible for reductive dechlorination for samples MW-22, MW-30, and MW-42.

Sample Name Sample Date	MW-22 01/19/2021	MW-30 01/19/2021	MW-42 01/19/2021
Reductive Dechlorination	cells/mL	cells/mL	cells/mL
Dehalococcoides (DHC)	**1.15E+01**	**4.00E-01 (J)**	**2.70E+00**
tceA Reductase (TCE)	<5.00E-01	<5.00E-01	<5.00E-01
BAV1 Vinyl Chloride Reductase (BVC)	<5.00E-01	<5.00E-01	<5.00E-01
Vinyl Chloride Reductase (VCR)	<5.00E-01	<5.00E-01	<5.00E-01
Dehalobacter spp. (DHBt)	**3.62E+02**	<4.50E+00	<4.50E+00
Dehalobacter DCM (DCM)	<4.70E+00	<4.50E+00	<4.50E+00
Dehalogenimonas spp. (DHG)	<4.70E+00	<4.50E+00	<4.50E+00
Desulfitobacterium spp. (DSB)	**8.79E+01**	**8.45E+01**	**1.59E+02**
Dehalobium chlorocoercia (DECO)	**7.87E+02**	<4.50E+00	**4.87E+02**
Desulfuromonas spp. (DSM)	<4.70E+00	**3.00E-01 (J)**	<4.50E+00

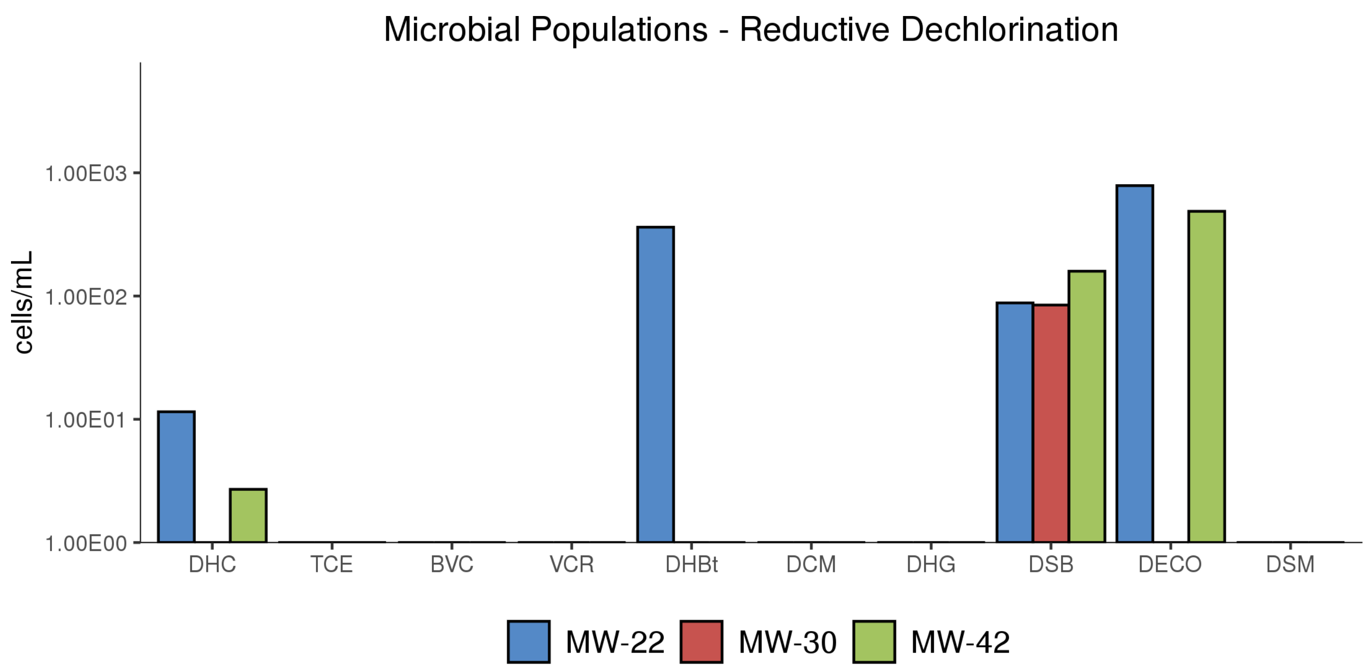

Figure 4: Comparison - microbial populations involved in reductive dechlorination.

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Table 3: Summary of the QuantArray®-Chlor results for microorganisms responsible for reductive dechlorination for samples MW-22, MW-30, and MW-42.

Sample Name **Sample Date**	**MW-22** **01/19/2021**	**MW-30** **01/19/2021**	**MW-42** **01/19/2021**
Reductive Dechlorination	cells/mL	cells/mL	cells/mL
Chloroform Reductase (CFR)	<4.70E+00	<4.50E+00	<4.50E+00
1,1 DCA Reductase (DCA)	<4.70E+00	<4.50E+00	<4.50E+00
1,2 DCA Reductase (DCAR)	<4.70E+00	<4.50E+00	<4.50E+00
PCE Reductase (PCE-1)	<4.70E+00	<4.50E+00	<4.50E+00
PCE Reductase (PCE-2)	<4.70E+00	<4.50E+00	<4.50E+00
Dehalogenimonas trans-1,2-DCE Reductase (TDR)	<4.70E+00	<4.50E+00	<4.50E+00
Dehalogenimonas cerA Reductase (CER)	<4.70E+00	<4.50E+00	<4.50E+00

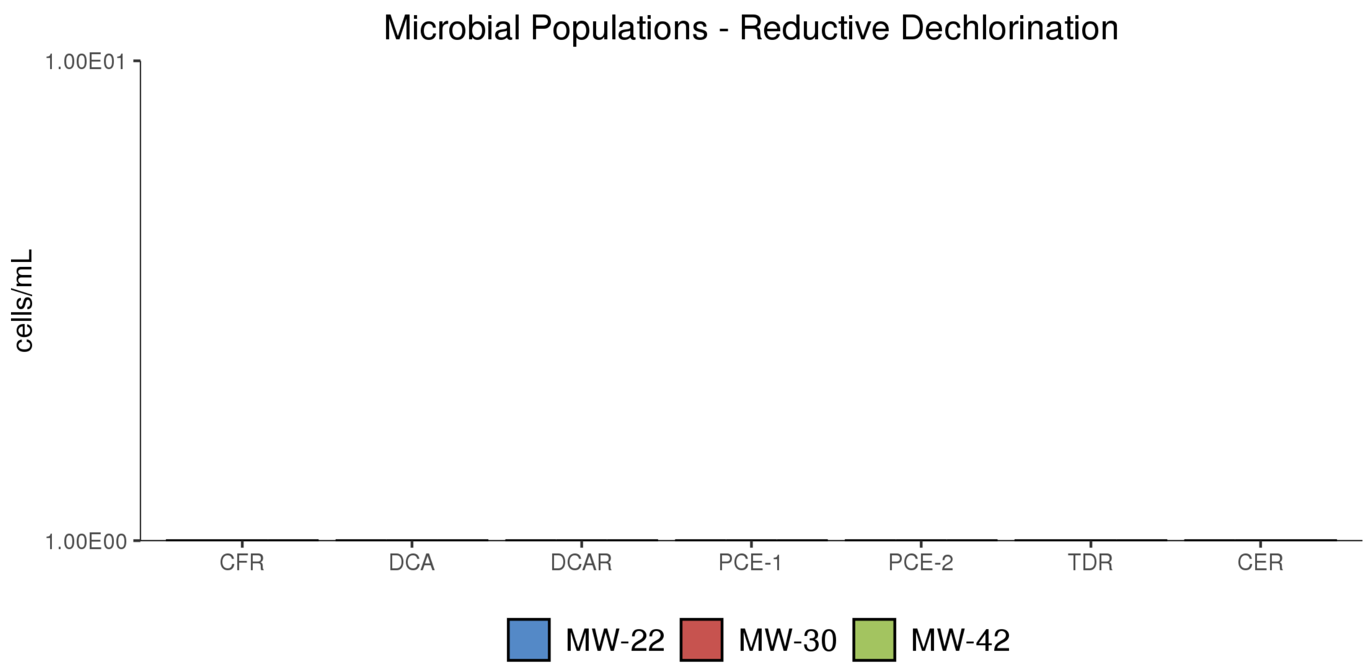

Figure 5: Comparison - microbial populations involved in reductive dechlorination.

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Table 4: Summary of the QuantArray®-Chlor results for microorganisms responsible for aerobic (co)metabolism for samples MW-22, MW-30, and MW-42.

Sample Name Sample Date	MW-22 01/19/2021	MW-30 01/19/2021	MW-42 01/19/2021
Aerobic (Co)Metabolic	cells/mL	cells/mL	cells/mL
Soluble Methane Monooxygenase (SMMO)	<4.70E+00	<4.50E+00	<4.50E+00
Toluene Dioxygenase (TOD)	<4.70E+00	<4.50E+00	**8.10E+00**
Phenol Hydroxylase (PHE)	<4.70E+00	<4.50E+00	**1.50E+03**
Trichlorobenzene Dioxygenase (TCBO)	<4.70E+00	<4.50E+00	**8.70E+01**
Toluene Monooxygenase 2 (RDEG)	<4.70E+00	<4.50E+00	**8.87E+03**
Toluene Monooxygenase (RMO)	<4.70E+00	<4.50E+00	<4.50E+00
Ethene Monooxygenase (EtnC)	<4.70E+00	<4.50E+00	<4.50E+00
Epoxyalkane Transferase (EtnE)	<4.70E+00	<4.50E+00	<4.50E+00
Dichloromethane Dehalogenase (DCMA)	<4.70E+00	<4.50E+00	<4.50E+00

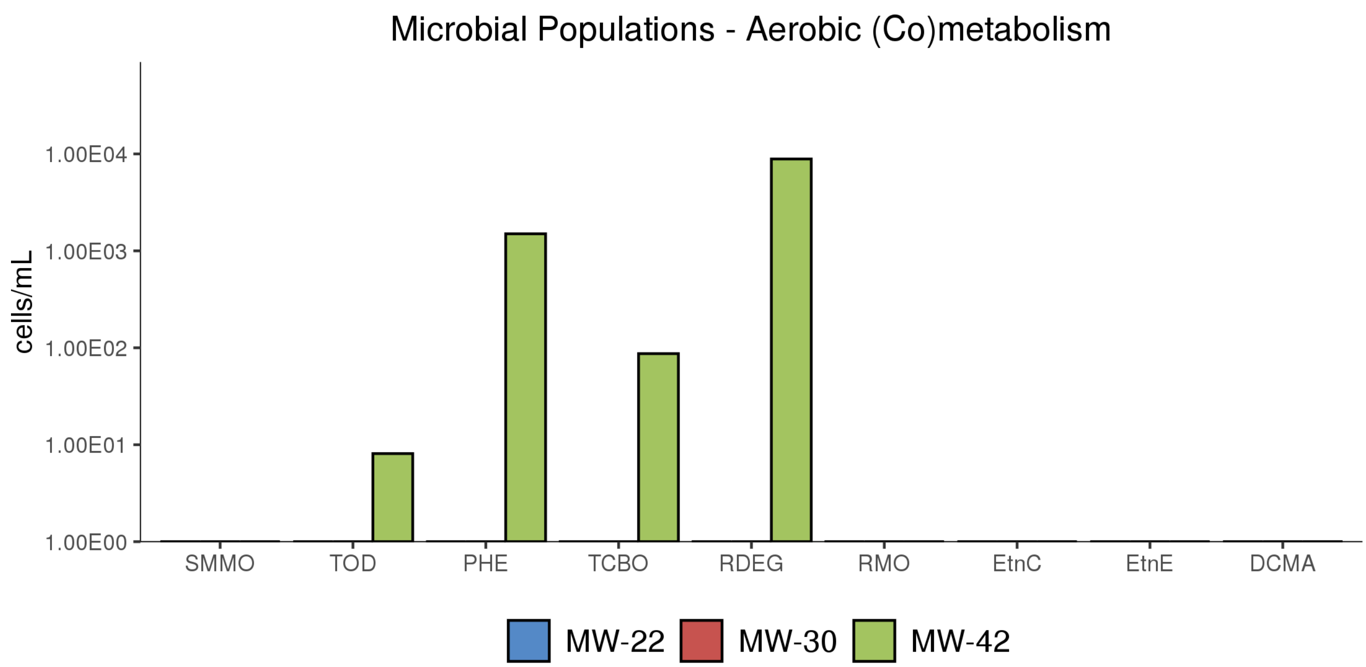

Figure 6: Comparison - microbial populations involved in aerobic (co)metabolism.

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Table 5: Summary of the QuantArray® results for total bacteria and other populations for samples MW-22, MW-30, and MW-42.

Sample Name Sample Date	MW-22 01/19/2021	MW-30 01/19/2021	MW-42 01/19/2021
Other	cells/mL	cells/mL	cells/mL
Total Eubacteria (EBAC)	**1.24E+05**	**1.35E+04**	**3.03E+05**
Sulfate Reducing Bacteria (APS)	**3.70E+03**	**9.10E+02**	**1.40E+03**
Methanogens (MGN)	<4.70E+00	<4.50E+00	<4.50E+00

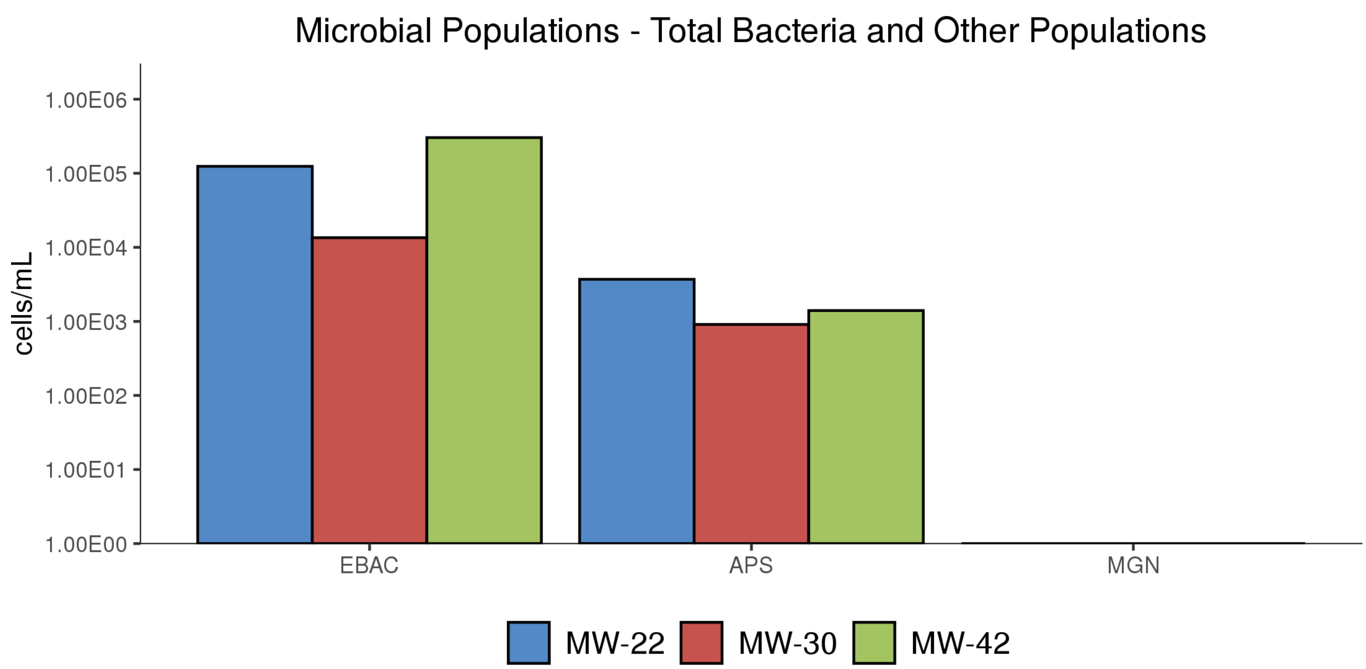

Figure 7: Comparison - microbial populations.

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Interpretation

The overall purpose of the QuantArray®-Chlor is to give site managers the ability to simultaneously yet economically evaluate the potential for biodegradation of a spectrum of common chlorinated contaminants through a multitude of anaerobic and aerobic (co)metabolic pathways in order to provide a clearer and more comprehensive view of contaminant biodegradation. The following discussion describes the interpretation of results in general terms and is meant to serve as a guide.

Reductive Dechlorination - Chlorinated Ethenes: While a number of bacterial cultures including *Dehalococcoides*, *Dehalobacter*, *Desulfitobacterium*, and *Desulfuromonas* spp. capable of utilizing PCE and TCE as growth-supporting electron acceptors have been isolated [1–5], *Dehalococcoides* may be the most important because they are the only bacterial group that has been isolated to date which is capable of complete reductive dechlorination of PCE to ethene [6]. In fact, the presence of *Dehalococcoides* has been associated with complete reductive dechlorination to ethene at sites across North America and Europe [7], and Lu et al. [8] have proposed using a *Dehalococcoides* concentration of 1 x 10^4 cells/mL as a screening criterion to identify sites where biological reductive dechlorination is predicted to proceed at "generally useful" rates.

At chlorinated ethene sites, any "stall" leading to the accumulation of daughter products, especially vinyl chloride, would be a substantial concern. While *Dehalococcoides* concentrations greater than 1 x 10^4 cells/mL correspond to ethene production and useful rates of dechlorination, the range of chlorinated ethenes degraded varies by strain within the *Dehalococcoides* genus [6, 9], and the presence of co-contaminants and competitors can have complex impacts on the halorespiring microbial community [10–15]. Therefore, QuantArray®-Chlor also provides quantification of a suite of reductive dehalogenase genes (PCE, TCE, BVC, VCR, CER, and TDR) to more definitively confirm the potential for reductive dechlorination of all chlorinated ethene compounds including vinyl chloride.

Perhaps most importantly, QuantArray®-Chlor quantifies TCE reductase (TCE) and both known vinyl chloride reductase genes (BVC, VCR) from *Dehalococcoides* to conclusively evaluate the potential for complete reductive dechlorination of chlorinated ethenes to nontoxic ethene [16–18]. In addition, the analysis also includes quantification of reductive dehalogenase genes from *Dehalogenimonas* spp. capable of reductive dechlorination of chlorinated ethenes. More specifically, these are the trans-1,2-DCE dehalogenase gene (TDR) from strain WBC-2 [19] and the vinyl chloride reductase gene (CER) from GP, the only known organisms other than *Dehalococcoides* capable of vinyl chloride reduction [20]. Finally, PCE reductase genes responsible for sequential reductive dechlorination of PCE to *cis*-DCE by *Sulfurospirillum* and *Geobacter* spp. are also quantified. In mixed cultures, evidence increasingly suggests that partial dechlorinators like *Sulfurospirillum* and *Geobacter* may be responsible for the majority of reductive dechlorination of PCE to TCE and *cis*-DCE while *Dehalococcoides* functions more as *cis*-DCE and vinyl chloride reducing specialists [10, 21].

Reductive Dechlorination - Chlorinated Ethanes: Under anaerobic conditions, chlorinated ethanes are susceptible to reductive dechlorination by several groups of halorespiring bacteria including *Dehalobacter*, *Dehalogenimonas*, and *Dehalococcoides*. While the reported range of chlorinated ethanes utilized varies by genus, species, and sometimes at the strain level, several general observations can be made regarding biodegradation pathways and daughter product formation. *Dehalobacter* spp. have been isolated that are capable of sequential reductive dechlorination of 1,1,1-TCA through 1,1-DCA to chloroethane [13]. Biodegradation of 1,1,2-TCA by several halorespiring bacteria including *Dehalobacter* and *Dehalogenimonas* spp. proceeds via dichloroelimination producing vinyl chloride [22–24]. Similarly, 1,2-DCA biodegradation by *Dehalobacter*, *Dehalogenimonas*, and *Dehalococcoides* occurs via dichloroelimination producing ethene. While not utilized by many *Desulfitobacterium* isolates, at least one strain, *Desulfitobacterium dichloroeliminans* strain DCA1, is also capable of dichloroelimination of 1,2-DCA [25]. The 1,2-dichloroethane reductive dehalogenase gene (DCAR) from members of *Desulfitobacterium* and *Dehalobacter* is known to dechlorinate 1,2-DCA to ethene, while the 1,1-dichloroethane reductive dehalogenase (DCA) targets the gene responsible for 1,1-DCA dechlorination in some strains of *Dehalobacter*. In addition to chloroform,chloroform reductase (CFR) has also been shown to be responsible for reductivedechlorination of 1,1,1-TCA [26].

Reductive Dechlorination - Chlorinated Methanes: Chloroform is a common co-contaminant at chlorinated solvent sites and can inhibit reductive dechlorination of chlorinated ethenes. Grostern et al. demonstrated that a *Dehalobacter* population was capable of reductive dechlorination of chloroform to produce dichloromethane [27]. The *cfrA* gene encodes the reductase which catalyzes this initial step in chloroform biodegradation [26]. Justicia-Leon et al. have since shown that dichloromethane can support growth of a distinct group of *Dehalobacter* strains via fermentation [28]. The *Dehalobacter* DCM assay targets the 16S rRNA gene of these strains.

Reductive Dechlorination - Chlorinated Benzenes: Chlorinated benzenes are an important class of industrial solvents and chemical intermediates in the production of drugs, dyes, herbicides, and insecticides. The physical-chemical properties of chlorinated benzenes as well as susceptibility to biodegradation are functions of their degree of chlorination and the positions of chlorine substituents. Under anaerobic conditions, reductive dechlorination of higher chlorinated benzenes including hexachlorobenzene (HCB),

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pentachlorobenzene (PeCB), tetrachlorobenzene (TeCB) isomers, and trichlorobenzene (TCB) isomers has been well documented [29], although biodegradation of individual compounds and isomers varies between isolates. For example, *Dehalococcoides* strain CBDB1 reductively dechlorinats HCB, PeCB, all three TeCB isomers, 1,2,3-TCB, and 1,2,4-TCB [9, 30]. *Dehalobium chlorocoercia* DF-1 has been shown to be capable of reductive dechlorination of HCB, PeCB, and 1,2,3,5-TeCB [31]. The dichlorobenzene (DCB) isomers and chlorobenzene (CB) were considered relatively recalcitrant under anaerobic conditions. However, new evidence has demonstrated reductive dechlorination of DCBs to CB and CB to benzene [32] with corresponding increases in concentrations of *Dehalobacter* spp. [33].

Reductive Dechlorination - Chlorinated Phenols: Pentachlorophenol (PCP) was one of the most widely used biocides in the U.S. and despite residential use restrictions, is still extensively used industrially as a wood preservative. Along with PCP, the tetrachlorophenol and trichlorophenol isomers were also used as fungicides in wood preserving formulations. 2,4-Dichlorophenol and 2,4,5-TCP were used as chemical intermediates in herbicide production (e.g. 2,4-D) and chlorophenols are known byproducts of chlorine bleaching in the pulp and paper industry. While the range of compounds utilized varies by strain, some *Dehalococcoides* isolates are capable of reductive dechlorination of PCP and other chlorinated phenols. For example, *Dehalococcoides* strain CBDB1 is capable of utilizing PCP, all three tetrachlorophenol (TeCP) congeners, all six trichlorophenol (TCP) congeners, and 2,3-dichlorophenol (2,3-DCP). PCP dechlorination by strain CBDB1 produces a mixture of 3,5-DCP, 3,4-DCP, 2,4-DCP, 3-CP, and 4-CP [34]. In the same study, however, *Dehalococcoides* strain 195 dechlorinated a more narrow spectrum of chlorophenols which included 2,3-DCP, 2,3,4-TCP, and 2,3,6-TCP, but no other TCPs or PCP. Similar to *Dehalococcoides*, some species and strains of *Desulfitobacterium* are capable of utilizing PCP and other chlorinated phenols. *Desulfitobacterium hafniense* PCP-1 is capable of reductive dechlorination of PCP to 3-CP [35]. However, the ability to biodegrade PCP is not universal among *Desulfitobacterium* isolates. *Desulfitobacterium* sp. strain PCE1 and *D. chlororespirans* strain Co23, for example, can utilize some TCP and DCP isomers, but not PCP for growth [2, 36].

Reductive Dechlorination - Chlorinated Propanes: *Dehalogenimonas* is a recently described bacterial genus of the phylum Chloroflexi which also includes the well-known chloroethene-respiring *Dehalococcoides* [23]. The *Dehalogenimonas* isolates characterized to date are also halorespiring bacteria, but utilize a rather unique range of chlorinated compounds as electron acceptors including chlorinated propanes (1,2,3-TCP and 1,2-DCP) and a variety of other vicinally chlorinated alkanes including 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, and 1,2-dichloroethane [23].

Aerobic - Chlorinated Ethene Cometabolism: Under aerobic conditions, several different types of bacteria including methane-oxidizing bacteria (methanotrophs), and many benzene, toluene, ethylbenzene, xylene, and (BTEX)-utilizing bacteria can cometabolize or co-oxidize TCE, DCE, and vinyl chloride [37]. In general, cometabolism of chlorinated ethenes is mediated by monooxygenase enzymes with "relaxed' specificity that oxidize a primary (growth supporting) substrate (*e.g.* methane) and co-oxidize the chlorinated compound (*e.g.*TCE). QuantArray®-Chlor provides quantification of a suite of genes encoding oxygenase enzymes capable of co-oxidation of chlorinated ethenes including soluble methane monooxygenase (sMMO). Soluble methane monooxygenases co-oxidize a broad range of chlorinated compounds [38–41] including TCE, *cis*-DCE, and vinyl chloride. Furthermore, soluble methane monooxygenases are generally believed to support greater rates of aerobic cometabolism [40]. QuantArray®-Chlor also quantifies aromatic oxygenase genes encoding ring hydroxylating toluene monooxygenase genes (RMO, RDEG), toluene dioxygenase (TOD) and phenol hydroxylases (PHE) capable of TCE co-oxidation [42–46]. TCE or a degradation product has been shown to induce expression of toluene monooxygenases in some laboratory studies [43, 47] raising the possibility of TCE cometabolism with an alternative (non-aromatic) growth substrate. Moreover, while a number of additional factors must be considered, recent research under ESTCP Project 201584 has shown positive correlations between concentrations of monooxygenase genes (soluble methane monooxygenase, ring hydroxylating monooxygenases, and phenol hydroxylase) and the rate of TCE degradation [48].

Aerobic - Chlorinated Ethane Cometabolism: While less widely studied than cometabolism of chlorinated ethenes, some chlorinated ethanes are also susceptible to co-oxidation. As mentioned previously, soluble methane monooxygenases (sMMO) exhibit very relaxed specificity. In laboratory studies, sMMO has been shown to co-oxidize a number of chlorinated ethanes including 1,1,1-TCA and 1,2-DCA [38, 40].

Aerobic - Vinyl Chloride Cometabolism: Beginning in the early 1990s, numerous microcosm studies demonstrated aerobic oxidation of vinyl chloride under MNA conditions without the addition of exogenous primary substrates. Since then, strains of

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Mycobacterium, *Nocardioides*, *Pseudomonas*, *Ochrobactrum*, and *Ralstonia* species have been isolated which are capable of aerobic growth on both ethene and vinyl chloride (see Mattes et al. [49] for a review). The initial steps in the pathway are the monooxygenase (*etn*ABCD) catalyzed conversion of ethene and vinyl chloride to their respective epoxyalkanes (epoxyethane and chlorooxirane), followed by epoxyalkane:CoM transferase (*etn*E) mediated conjugation and breaking of the epoxide [50].

Aerobic - Chlorinated Benzenes: In general, chlorobenzenes with four or less chlorine groups are susceptible to aerobic biodegradation and can serve as growth-supporting substrates. Toluene dioxygenase (TOD) has a relatively relaxed substrate specificity and mediates the incorporation of both atoms of oxygen into the aromatic ring of benzene and substituted benzenes (toluene and chlorobenzene). Comparison of TOD levels in background and source zone samples from a CB-impacted site suggested that CBs promoted growth of TOD-containing bacteria [51]. In addition, aerobic biodegradation of some trichlorobenzene and even tetrachlorobenzene isomers is initiated by a group of related trichlorobenzene dioxygenase genes (TCBO). Finally, phenol hydroxylases catalyze the continued oxidation and in some cases, the initial oxidation of a variety of monoaromatic compounds. In an independent study, significant increases in numbers of bacteria containing PHE genes corresponded to increases in biodegradation of DCB isomers [51].

Aerobic - Chlorinated Methanes: Many aerobic methylotrophic bacteria, belonging to diverse genera (*Hyphomicrobium*, *Methylobacterium*, *Methylophilus*, *Pseudomonas*, *Paracoccus*, and *Alibacter*) have been isolated which are capable of utilizing dichloromethane (DCM) as a growth substrate. The DCM metabolic pathway in methylotrophic bacteria is initiated by a dichloromethane dehalogenase (DCMA) gene. DCMA is responsible for aerobic biodegradation of dichloromethane by methylotrophs by first producing formaldehyde which is then further oxidized [52]. As discussed in previous sections, soluble methane monooxygenase (sMMO) exhibits relaxed specificity and co-oxidizes a broad spectrum of chlorinated hydrocarbons. In addition to chlorinated ethenes, sMMO has been shown to co-oxidize chloroform in laboratory studies [38, 41].

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References

1. Gerritse, J. *et al.* Influence of different electron donors and acceptors on dehalorespiration of tetrachloroethene by *Desulfitobacterium frappieri* TCE1. *Applied and Environmental Microbiology* **65,** 5212–5221 (1999).
2. Gerritse, J. *et al. Desulfitobacterium* sp. strain PCE1, an anaerobic bacterium that can grow by reductive dechlorination of tetrachloroethene or ortho-chlorinated phenols. *Archives of Microbiology* **165,** 132–140 (1996).
3. Holliger, C., Schraa, G., Stams, A. & Zehnder, A. A highly purified enrichment culture couples the reductive dechlorination of tetrachloroethene to growth. *Applied and Environmental Microbiology* **59,** 2991–2997 (1993).
4. Krumholz, L. R., Sharp, R. & Fishbain, S. S. A freshwater anaerobe coupling acetate oxidation to tetrachloroethylene dehalogenation. *Applied and Environmental Microbiology* **62,** 4108–4113 (1996).
5. Loffler, F. E., Sanford, R. A. & Tiedje, J. M. Initial Characterization of a Reductive Dehalogenase from *Desulfitobacterium chlororespirans* Co23. *Applied and Environmental Microbiology* **62,** 3809–3813 (1996).
6. Maymó-Gatell, X., Anguish, T. & Zinder, S. H. Reductive dechlorination of chlorinated ethenes and 1, 2-dichloroethane by *"Dehalococcoides ethenogenes"* 195. *Applied and Environmental Microbiology* **65,** 3108–3113 (1999).
7. Hendrickson, E. R. *et al.* Molecular analysis of *Dehalococcoides* 16S ribosomal DNA from chloroethene-contaminated sites throughout North America and Europe. *Applied and Environmental Microbiology* **68,** 485–495 (2002).
8. Lu, X., Wilson, J. T. & Kampbell, D. H. Relationship between *Dehalococcoides* DNA in ground water and rates of reductive dechlorination at field scale. *Water Research* **40,** 3131–3140 (2006).
9. Adrian, L., Szewzyk, U., Wecke, J. & Go¨risch, H. Bacterial dehalorespiration with chlorinated benzenes. *Nature* **408,** 580–583 (2000).
10. Amos, B. K., Suchomel, E. J., Pennell, K. D. & Lo¨ffler, F. E. Spatial and temporal distributions of Geobacter lov- leyi and Dehalococcoides spp. during bioenhanced PCE-NAPL dissolution. *Environmental Science & Technology* **43,** 1977–1985 (2009).
11. Duhamel, M. & Edwards, E. A. Growth and yields of dechlorinators, acetogens, and methanogens during reduc- tive dechlorination of chlorinated ethenes and dihaloelimination of 1, 2-dichloroethane. *Environmental Science & Technology* **41,** 2303–2310 (2007).
12. Duhamel, M. *et al.* Comparison of anaerobic dechlorinating enrichment cultures maintained on tetrachloroethene, trichloroethene, /textitcis-dichloroethene and vinyl chloride. *Water Research* **36,** 4193–4202 (2002).
13. Grostern, A. & Edwards, E. A. A 1, 1, 1-trichloroethane-degrading anaerobic mixed microbial culture enhances biotransformation of mixtures of chlorinated ethenes and ethanes. *Applied and Environmental Microbiology* **72,** 7849–7856 (2006).
14. Huang, D. & Becker, J. G. Determination of intrinsic monod kinetic parameters for two heterotrophic tetrachloroethene (PCE)-respiring strains and insight into their application. *Biotechnology and Bioengineering* **104,** 301– 311 (2009).
15. Mayer-Blackwell, K. *et al.* 1, 2-Dichloroethane exposure alters the population structure, metabolism, and kinetics of a trichloroethene-dechlorinating dehalococcoides mccartyi consortium. *Environmental Science & Technology* **50,** 12187–12196 (2016).
16. Krajmalnik-Brown, R. *et al.* Genetic identification of a putative vinyl chloride reductase in Dehalococcoides sp. strain BAV1. *Applied and Environmental Microbiology* **70,** 6347–6351 (2004).
17. Mu¨ller, J. A. *et al.* Molecular identification of the catabolic vinyl chloride reductase from *Dehalococcoides* sp. strain VS and its environmental distribution. *Applied and Environmental Microbiology* **70,** 4880–4888 (2004).
18. Ritalahti, K. M. *et al.* Quantitative PCR targeting 16S rRNA and reductive dehalogenase genes simultaneously monitors multiple *Dehalococcoides* strains. *Applied and Environmental Microbiology* **72,** 2765–2774 (2006).

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19. Molenda, O., Quaile, A. T. & Edwards, E. A. Dehalogenimonas sp. strain WBC-2 genome and identification of its trans-dichloroethene reductive dehalogenase, TdrA. *Applied and Environmental Microbiology* **82,** 40–50 (2016).

20. Yang, Y. *et al.* Grape pomace compost harbors organohalide-respiring Dehalogenimonas species with novel reductive dehalogenase genes. *The ISME Journal* **11,** 2767 (2017).

21. Maillard, J. *et al.* Reductive dechlorination of tetrachloroethene by a stepwise catalysis of different organohalide respiring bacteria and reductive dehalogenases. *Biodegradation* **22,** 949–960 (2011).

22. Grostern, A. & Edwards, E. A. Growth of Dehalobacter and Dehalococcoides spp. during degradation of chlorinated ethanes. *Applied and Environmental Microbiology* **72,** 428–436 (2006).

23. Moe, W. M., Yan, J., Nobre, M. F., da Costa, M. S. & Rainey, F. A. *Dehalogenimonas lykanthroporepellens* gen. nov., sp. nov., a reductively dehalogenating bacterium isolated from chlorinated solvent-contaminated groundwater. *International Journal of Systematic and Evolutionary Microbiology* **59,** 2692–2697 (2009).

24. Yan, J., Rash, B., Rainey, F. & Moe, W. Isolation of novel bacteria within the Chloroflexi capable of reductive dechlorination of 1, 2, 3-trichloropropane. *Environmental Microbiology* **11,** 833–843 (2009).

25. De Wildeman, S., Diekert, G., Van Langenhove, H. & Verstraete, W. Stereoselective microbial dehalorespiration with vicinal dichlorinated alkanes. *Applied and Environmental Microbiology* **69,** 5643–5647 (2003).

26. Tang, S. & Edwards, E. A. Identification of *Dehalobacter* reductive dehalogenases that catalyse dechlorination of chloroform, 1,1,1-trichloroethane and 1,1-dichloroethane. *Phil. Trans. R. Soc. B* **368,** 20120318 (2013).

27. Grostern, A., Duhamel, M., Dworatzek, S. & Edwards, E. A. Chloroform respiration to dichloromethane by a *Dehalobacter* population. *Environmental Microbiology* **12,** 1053–1060 (2010).

28. Justicia-Leon, S. D., Ritalahti, K. M., Mack, E. E. & Lo¨ ffler, F. E. Dichloromethane fermentation by a *Dehalobacter* sp. in an enrichment culture derived from pristine river sediment. *Applied and Environmental Microbiology* **78,** 1288–1291 (2012).

29. Field, J. A. & Sierra-Alvarez, R. Microbial degradation of chlorinated benzenes. *Biodegradation* **19,** 463–480 (2008).

30. Jayachandran, G., Go¨risch, H. & Adrian, L. Dehalorespiration with hexachlorobenzene and pentachlorobenzene by *Dehalococcoides* sp. strain CBDB1. *Archives of Microbiology* **180,** 411–416 (2003).

31. Wu, Q. *et al.* Dechlorination of chlorobenzenes by a culture containing bacterium DF-1, a PCB dechlorinating microorganism. *Environmental Science & Technology* **36,** 3290–3294 (2002).

32. Fung, J. M. *et al.* Reductive dehalogenation of dichlorobenzenes and monochlorobenzene to benzene in microcosms. *Environmental Science & Technology* **43,** 2302–2307 (2009).

33. Nelson, J. L., Fung, J. M., Cadillo-Quiroz, H., Cheng, X. & Zinder, S. H. A role for *Dehalobacter* spp. in the reductive dehalogenation of dichlorobenzenes and monochlorobenzene. *Environmental Science & Technology* **45,** 6806–6813 (2011).

34. Adrian, L., Hansen, S. K., Fung, J. M., Go¨ risch, H. & Zinder, S. H. Growth of *Dehalococcoides* strains with chlorophenols as electron acceptors. *Environmental Science & Technology* **41,** 2318–2323 (2007).

35. Bouchard, B. *et al.* Isolation and characterization of *Desulfitobacterium frappieri* sp. nov., an anaerobic bacterium which reductively dechlorinates pentachlorophenol to 3-chlorophenol. *International Journal of Systematic and Evolutionary Microbiology* **46,** 1010–1015 (1996).

36. Sanford, R. A., Cole, J. R., Lo¨ ffler, F. & Tiedje, J. M. Characterization of *Desulfitobacterium chlororespirans* sp. nov., which grows by coupling the oxidation of lactate to the reductive dechlorination of 3-chloro-4-hydroxybenzoate. *Applied and Environmental Microbiology* **62,** 3800–3808 (1996).

37. Field, J. & Sierra-Alvarez, R. Biodegradability of chlorinated solvents and related chlorinated aliphatic compounds. *Reviews in Environmental Science and Biotechnology* **3,** 185–254 (2004).

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38. Chang, H.-L. & Alvarez-Cohen, L. Biodegradation of individual and multiple chlorinated aliphatic hydrocarbons by methane-oxidizing cultures. *Applied and Environmental Microbiology* **62,** 3371–3377 (1996).

39. Colby, J., Stirling, D. I. & Dalton, H. The soluble methane mono-oxygenase of Methylococcus capsulatus (Bath). Its ability to oxygenate n-alkanes, n-alkenes, ethers, and alicyclic, aromatic and heterocyclic compounds. *Biochemical Journal* **165,** 395–402 (1977).

40. Oldenhuis, R., Oedzes, J. Y., Van der Waarde, J. & Janssen, D. B. Kinetics of chlorinated hydrocarbon degradation by Methylosinus trichosporium OB3b and toxicity of trichloroethylene. *Applied and Environmental Microbiology* **57,** 7–14 (1991).

41. Van Hylckama, V. J., De Koning, W. & Janssen, D. B. Transformation kinetics of chlorinated ethenes by Methylosinus trichosporium OB3b and detection of unstable epoxides by on-line gas chromatography. *Applied and Environmental Microbiology* **62,** 3304–3312 (1996).

42. Futamata, H., Harayama, S. & Watanabe, K. Group-specific monitoring of phenol hydroxylase genes for a functional assessment of phenol-stimulated trichloroethylene bioremediation. *Applied and Environmental Microbiology* **67,** 4671–4677 (2001).

43. McClay, K., Streger, S. H. & Steffan, R. J. Induction of toluene oxidation activity in Pseudomonas mendocina KR1 and Pseudomonas sp. strain ENVPC5 by chlorinated solvents and alkanes. *Applied and Environmental Microbiology* **61,** 3479–3481 (1995).

44. Newman, L. M. & Wackett, L. P. Trichloroethylene oxidation by purified toluene 2-monooxygenase: products, kinetics, and turnover-dependent inactivation. *Journal of Bacteriology* **179,** 90–96 (1997).

45. Byrne, A. M. & Olsen, R. H. Cascade regulation of the toluene-3-monooxygenase operon (tbuA1UBVA2C) of *Burkholderia pickettii* PKO1: role of the tbuA1 promoter (PtbuA1) in the expression of its cognate activator, TbuT. *Journal of Bacteriology* **178,** 6327–6337 (1996).

46. Wackett, L. P. & Gibson, D. T. Degradation of trichloroethylene by toluene dioxygenase in whole-cell studies with Pseudomonas putida F1. *Applied and Environmental Microbiology* **54,** 1703–1708 (1988).

47. Leahy, J. G., Byrne, A. M. & Olsen, R. H. Comparison of factors influencing trichloroethylene degradation by toluene-oxidizing bacteria. *Applied and Environmental Microbiology* **62,** 825–833 (1996).

48. Wiedemeier, T. H., Wilson, J. T., Freedman, D. L. & Lee, B. *Providing Additional Support for MNA by Including Quantitative Lines of Evidence for Abiotic Degradation and Co-metabolic Oxidation of Chlorinated Ethylenes* tech. rep. (TH Wiedemeier and Associates, Inc. Sedalia United States, 2017).

49. Mattes, T. E., Alexander, A. K. & Coleman, N. V. Aerobic biodegradation of the chloroethenes: pathways, enzymes, ecology, and evolution. *FEMS Microbiology Reviews* **34,** 445–475 (2010).

50. Coleman, N. V. & Spain, J. C. Epoxyalkane: coenzyme M transferase in the ethene and vinyl chloride biodegradation pathways of *Mycobacterium* strain JS60. *Journal of Bacteriology* **185,** 5536–5545 (2003).

51. Dominguez, R. F. *et al.* Aerobic bioremediation of chlorobenzene source-zone soil in flow-through columns: performance assessment using quantitative PCR. *Biodegradation* **19,** 545–553 (2008).

52. La Roche, S. D. & Leisinger, T. Sequence analysis and expression of the bacterial dichloromethane dehalogenase structural gene, a member of the glutathione S-transferase supergene family. *Journal of Bacteriology* **172,** 164–171 (1990).

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Sample Information						Analyses				CENSUS: Please select the target organism/gene																								
MI ID (Laboratory Use Only)	Sample Name	Date Sampled	Time Sampled	Matrix	Total Number of Containers	PLFA	NGS	QuantArray Chlor	QuantArray Petro	DHC (Dehalococcoides)	DHC Functional genes (bvc, tce, vcr)	DHBt (Dehalobacter)	DHG (Dehalogenimonas)	DSM (Desulfuromonas)	DSB (Desulfitobacterium)	EBAC (Total)	SRB (Sulfate Reducing Bacteria-APS)	MGN (Methanogens)	MOB (Methanotrophs)	SMMO	DNF (Dentrifiers-nirS and nirK)	AMO (ammonia oxidizing bacteria)	PM1 (MTBE aerobic)	RMO (Toluene Monooxygenase)	RDEG (Toluene Monooxygenase)	PHE (Phenol Hydroxylase)	NAH (Napthalene-aerobic)	BSSA (Toluene/Xylene-Anaerobic)	add. qPCR:	RNA (Expression Option)*	Other:	Other:	Other:
0375A 1	MW-22	1/19/21	12:12	GW	1			X																									
2	MW-30	1/19/21	10:28	GW	1			X																									
3	MW-42	1/19/21	13:50	GW	1			X																									

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Bench-Scale Testing to Support Remedial Implementation at the Former Bendix Facility, Franklin, Indiana (ACO No. R8H-5-99-002; EPA ID No. IND 044 587 848)

Prepared by

Daniel Cassidy, **Perivallon, Inc.**

for

Amphenol Corporation

April 17, 2023

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1.0 INTRODUCTION

The objective of these bench-scale studies was to investigate various technologies for their effectiveness in remediating the contaminated aquifer underlying the Former Bendix Facility (the Site) and protecting off-site receptors downgradient. The Site is contaminated with volatile organic compounds (CVOCs), primarily tetrachloroethene (PCE), with lesser amounts of trichlorethylene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1-DCA), *cis*-1,2-dichloroethene (*cis*-1,2-DCE), and trace amounts of *trans*-1,2-dichloroethene (*trans*-1,2-DCE), 1,1-dichloroethene (1,1-DCE), vinyl chloride (VC), 1,2-dichloroethane (1,2-DCA), and methylene chloride (MC). The best-performing technologies and chemistries in these bench studies will be implemented at the site using in-situ injections and permeable reactive barriers (PRBs). A PRB is created by injecting or emplacing reactive materials in an aquifer through which contaminated groundwater flows under the natural hydraulic gradient. Treated groundwater exits the reactive zone created by the PRB and moves downgradient. A suitable and effective reactive material in a PRB removes contaminants from groundwater by adsorption onto an immobile medium, breaks down contaminants to less-toxic products, or amends groundwater that promote contaminant degradation by native microorganisms downgradient from the PRB.

The following remediation technologies were tested in this study.

1) In Situ Chemical Oxidation (ISCO) was tested for its ability to destroy CVOCs via chemical oxidation at the “source” (i.e., the locations in the aquifer known to have the highest CVOC concentrations). Such mass reduction makes less contaminant available to be transported downgradient and off site by groundwater. The specific ISCO chemistries tested on aquifer material from the Site included:

    a. hydrogen peroxide (H_2O_2, or HP), also known as Modified Fenton Chemistry (MFC);
    b. sodium persulfate (NaS_2O_8, or SPS), activated with hydrogen peroxide, sodium hydroxide, and autoactivated (i.e., no activators added); and
    c. sodium permanganate ($NaMnO_4$, or SPM).

2) In Situ Chemical Reduction (ISCR) amendments were tested for their ability to destroy CVOCs through chemical reduction, and to sufficiently lower the oxidation-reduction potential (ORP) and provide electron donors to promote reductive dechlorination of CVOCs downgradient of the treatment zone. When the necessary microorganisms and the right conditions are present in an aquifer, reductive dechlorination has proven to be very effective at degrading CVOCs and “polishing” groundwater at long distances downgradient from a PRB. Microbial Insights (2021) did genetic testing on aquifer

materials from the Site and found abundant copies of key functional genes known to be responsible for reductive dechlorination of a wide variety of chlorinated solvents (e.g., vinyl chloride reductases, TCE reductase, chloroform reductase) and a healthy consortium of a variety of halorespiring bacteria (e.g., *Dehalococcoides*, *Dehalobacter*, *Dehalogenimonas*, *Desulfitobacterium* spp.). Based on the promising results from the Microbial Insights (2021) study, it was decided that a strategy be tested for a PRB that could both directly destroy CVOCs via chemical reduction in the treatment zone and support reductive dechlorination downgradient. The specific ISCR amendments tested on aquifer material from the Site included:

a. Zero-Valent Iron (ZVI), to destroy CVOCs via chemical reduction and reduce the ORP to levels necessary for the growth of the native halorespiring bacteria; and
b. Emulsified vegetable oil (EVO) to provide electron donors for reductive dechlorination of CVOCs by the native halorespiring bacteria.

3) In-Situ Stabilization (ISS) was tested for its ability to adsorb and remove CVOCs from Site groundwater. Granular activated carbon (GAC) was selected for ISS testing in these studies. It should be noted that GAC is often used as a stand-alone amendment in ISS-PRBs but can also be used in PRBs with the ISCO and ISCR amendments mentioned above to supplement treatment with stabilization/immobilization.

These remediation technologies were bench tested using a combination of batch reactors to evaluate the remedial chemistry, and column reactor studies to simulate in-situ conditions, as described in the following sections.

2.0 MATERIALS & METHODS

The following subsections describe the materials and methods utilized for the bench-scale testing. These methods include:

- Collection, Preparation & Baseline Characterization of the environmental media (i.e., impacted soil and groundwater);
- Summary of the remedial amendments and doses tested on Site soil and groundwater (i.e., ISCO, ISCR, ISS and SPS activations);
- Batch reactor setup and operation to test treatment of soils from Zone B and Zone C; and,
- Column reactor setup and operation to test treatment of Site groundwater.

These descriptions are then followed by a review and discussion of results and then conclusions.

2.1 Soil & Groundwater Samples

Soil and groundwater were sampled from the site on February 8, 2023, and were placed in 5-gallon (19-L) pails. Soil was sampled from the bottom of Zone B stratigraphic unit (comprised predominantly of more permeable sand deposits) and the top of Zone C stratigraphic unit (comprised of a dense sandy clay) near GP-10 and GP-11. Groundwater was sampled from MW-12R. The samples included two pails of groundwater from MW-12R, three pails of sandy soil from the bottom of Zone B taken near GP-10 and GP-11, and one pail of clay soil taken from the top of Zone C near GP-10 and GP-11 (see **Figure 1)**. All samples were received by Perivallon on the same day of sampling (February 8, 2023) from the IWM office in Indianapolis, returned to the testing laboratory, and kept refrigerated overnight. The next day the process of soil preparation, homogenization, and testing began. Note, because the groundwater was collected in large containers from a single well, homogenization was not necessary.

Figure 1. A picture of the six 5-gallon pails containing samples of soil and groundwater.

Figure 2 and **Figure 3** show opened pails the aquifer material sampled from Zone B and Zone C, respectively. Note the standing water on top of the Zone B soil (**Figure 2**), showing the saturated nature of the soil. In contrast, note the relatively low water content and highly cohesive nature of the Zone C soil (**Figure 3**). **Figure 4** shows a closeup picture of the soil from Zone B (left) and Zone C (right), more clearly showing the saturated and non-cohesive sand that comprises Zone B and the fine-grained cohesive soil at the top of Zone C. **Figure 5** shows a picture of an opened pail of site groundwater collected from MW-12R.

Figure 2. Picture of an opened pail of soil sampled from Zone B, showing how saturated the soil was with groundwater.

Figure 3. Picture of an opened pail of soil sampled from Zone C, showing the highly cohesive nature of the soil.

Figure 4. A closeup picture comparing the saturated, non-cohesive sandy soil collected from Zone B (left) and the cohesive, fine-grained soil collected from Zone C (right).

Figure 5. Picture of an opened pail of groundwater collected from MW-12R.

2.2 Characterization of the Site Soil & Groundwater

The soil samples from Zone B and Zone C were homogenized, independently, on February 9, 2023. For Zone B soil, this was done by dividing two pails of soil into two roughly equal sub-volumes and mixing for 2 minutes in a UTest 25-L Soil Mixer, fitted with a lid to minimize stripping of CVOCs. Approximately half of each of the two homogenized soil sub-volumes were then switched (i.e., added to the other initial, homogenized soil sub-volume) and both sub-volumes were homogenized for 1 minute. This was repeated three times, after which the homogenized soil was placed back into the two 5-gallon pails it was collected in. The pail of Zone C soil was only half full of soil, which allowed the entire contents to be homogenized in the UTest 25-L Soil Mixer. The two pails of homogenized soil from Zone B and the one pail of homogenized soil from Zone C served as the "baseline" or "untreated" soil for all the subsequent bench testing. The pails of groundwater and homogenized soil were refrigerated throughout the study period and were only removed temporarily to collect subsamples for the batch and column reactors and to sample for analyses and measurements.

EPA Method 8260D (GC/MS) was used to quantify the chlorinated volatile organic compounds (CVOCs) in soil and groundwater samples. Approximately 10 g of soil (dry weight) and 2 mL of groundwater were sampled to measure CVOCs. The analytes quantified in soil and groundwater with EPA Method 8260 were the same as those reported and discussed by IWM Consulting Group, LLC (March 22, 2022) and included PCE, TCE, 1,1,1-TCA, 1,1-DCA, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1-DCE, VC, 1,2-DCA, and MC.

Table 1 lists the mean and standard deviation for measurements of CVOC concentrations (in mg/kg) and water content in ten (10) samples of the baseline sandy soil from Zone B. **Table 2** lists the mean and standard deviation for measurements of CVOC concentrations (in mg/kg) and water content in ten (10) samples of the baseline clay soil from Zone C. The predominant CVOC in the baseline, homogenized soil from both Zone B and Zone C was PCE, with lower TCE and 1,1,1-TCA. Other CVOCs in the baseline soil were near the method detection limit (MDL) of approximately 2 mg/kg or below (ND). This is consistent with the findings of IWM Consulting Group, LLC (March 22, 2022). Zone B soil had higher concentrations of PCE than Zone C soil. The sum of the mean of the concentrations of all the CVOCs in baseline soils from Zone B and Zone C was 741 mg/kg and 305 mg/kg, respectively.

Table 3 lists the mean and standard deviation for measurements of CVOC concentrations (in µg/L) and pH in ten (10) samples of site groundwater from MW-12R. The most abundant CVOC in the site groundwater was PCE, with lesser concentrations of TCE, 1,1,1-TCA, 1,1-DCA, and *cis*-1,2-DCE. The other CVOCs were near or below the MDL of 0.3 µg/L. The sum of the mean of the concentrations of all the CVOCs in the groundwater sampled was 1300 µg/L.

Table 1. The mean and standard deviation for measurements of CVOC concentrations (in mg/kg) and water content in ten (10) samples of the baseline sandy soil from Zone B.

Sample	PCE	TCE	1,1,1-TCA	1,1-DCA	*cis*-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC	1,2-DCA	MC	% H_2O
1	720	22.4	3.1	2.3	BD*	BD	BD	BD	BD	BD	0.16
2	670	21.9	BD	BD	BD	BD	BD	BD	BD	BD	0.15
3	760	25.7	6.7	3.4	2.5	BD	BD	BD	BD	BD	0.18
4	710	24.3	6.3	BD	BD	BD	BD	BD	BD	BD	0.16
5	670	26.7	BD	BD	BD	BD	BD	BD	BD	BD	0.17
6	680	22.8	BD	BD	BD	BD	BD	BD	BD	BD	0.15
7	730	23.9	4.3	3.0	BD	BD	BD	BD	BD	BD	0.15
8	720	21.3	3.4	BD	BD	BD	BD	BD	BD	BD	0.16
9	670	23.5	BD	BD	BD	BD	BD	BD	BD	BD	0.15
10	740	25.0	4.4	2.8	2.5	BD	BD	BD	BD	BD	0.16
Mean	**707**	**23.8**	**4.7**	**2.9**	**2.5**	**BD**	**BD**	**BD**	**BD**	**BD**	**0.16**
Std. Dev.	**32.4**	**1.6**	**1.6**	**0.6**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0.01**

*BD (below detection); MDL = 2 mg/kg.

Table 2. The mean and standard deviation for measurements of CVOC concentrations (in mg/kg) and water content in ten (10) samples of the baseline clay soil from Zone C.

Sample	PCE	TCE	1,1,1-TCA	1,1-DCA	*cis*-1,2-DCE	*trans*-1,2-DCE	1,1-DCE	VC	1,2-DCA	MC	% H_2O
1	270	13.5	19.7	BD*	BD	BD	BD	BD	BD	BD	0.18
2	280	15.4	23.1	BD	2.4	BD	BD	BD	BD	BD	0.19
3	250	17.7	17.8	BD	BD	BD	BD	BD	BD	BD	0.17
4	260	15.8	20.2	BD	BD	BD	BD	BD	BD	BD	0.19
5	250	15.0	18.4	BD	BD	BD	BD	BD	BD	BD	0.18
6	270	14.8	22.6	2.3	BD	BD	BD	BD	BD	BD	0.20
7	240	13.6	19.8	BD	BD	BD	BD	BD	BD	BD	0.18
8	260	14.2	20.2	BD	BD	BD	BD	BD	BD	BD	0.19
9	290	16.7	26.9	3.7	2.6	BD	BD	BD	BD	BD	0.20
10	260	15.8	22.1	BD	BD	BD	BD	BD	BD	BD	0.20
Mean	**263**	**15.3**	**21.1**	**3.0**	**2.5**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0.19**
Std. Dev.	**14.2**	**1.3**	**2.5**	**0.7**	**0.1**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0.01**

*BD (below detection); MDL = 2 mg/kg.

Table 3. The mean and standard deviation for measurements of CVOC concentrations (in µg/L) and pH in ten (10) samples of site groundwater from MW-12R.

Sample	PCE	TCE	1,1,1-TCA	1,1-DCA	*cis*-1,2-DCE	*trans*-1,2-DCE	1,1-DCE	VC	1,2-DCA	MC	pH
1	784.1	147.2	24.4	19.2	325.7	BD	BD	BD	BD	BD	6.92
2	753.3	141.1	28.4	18.5	313.8	0.81	BD	BD	BD	BD	7.04
3	766.0	136.7	32.6	22.5	320.6	BD	0.39	BD	BD	0.55	6.87
4	804.4	151.3	29.8	24.1	327.9	BD	BD	0.56	BD	BD	6.93
5	759.9	146.4	30.2	16.7	322.5	0.97	BD	BD	0.46	BD	7.07
6	767.8	149.8	36.9	15.9	324.1	BD	BD	BD	ND	BD	6.88
7	783.6	143.7	32.1	23.5	329.9	0.72	0.49	BD	ND	0.70	7.12
8	772.5	144.6	30.2	20.5	315.3	BD	BD	0.63	0.61	BD	6.95
9	798.3	148.6	36.9	23.6	317.8	0.63	BD	BD	BD	BD	7.09
10	789.8	143.7	32.1	21.4	322.7	BD	BD	BD	BD	BD	6.96
Mean	**778.0**	**145.3**	**31.4**	**20.6**	**322.0**	**0.78**	**0.44**	**0.60**	**0.54**	**0.63**	**6.98**
Std. Dev.	**15.91**	**4.11**	**3.55**	**2.79**	**4.98**	**0.13**	**0.05**	**0.04**	**0.07**	**0.07**	**0.09**

*BD (below detection); MDL = 0.3 µg/L.

2.3 Remediation Amendments Tested for PRBs

All the amendments and chemicals used in these bench studies were procured by Perivallon, Inc. ("Perivallon").

2.3.1 In Situ Chemical Oxidation (ISCO)

The three chemical oxidants tested for potential use in ISCO remediation are listed below and are all pictured in **Figure 6**.

1. *Hydrogen peroxide, or HP*: A 50% solution of HP was obtained from Solvay Chemicals, Inc. (Houston, TX) and is shown in **Figure 6**.
2. *Sodium persulfate, or SPS ($Na_2S_2O_8$)*: Granular SPS was obtained from Peroxychem (Philadelphia, PA). The white granules and a 10% solution made therefrom are shown in **Figure 6**.
3. *Sodium permanganate, or SPM*: Powdered SPM was obtained from Carus Chemicals (Peru, IL). The dark purple SPM granules and a solution made therefrom are shown **Figure 6**. Note, the characteristic deep-purple color that the permanganate anion (MnO_4^-) imparts to solids and to solutions.

Figure 6. A picture of the HP, SPS $Na_2S_2O_8$, and SPM used in the ISCO batch reactors.

2.3.2 In Situ Chemical Reduction (ISCR)

The two amendments tested for potential use in ISCR PRBs or subsurface injection were ZVI and EVO. Perivallon procured both reagents, described below and pictured in **Figure 7**.

1) S-MicroZVI® from Regenesis (San Clemente, CA), which comes as a colloidal suspension 40% ZVI by weight with a particle size of less than 5 μm (**Figure 7**).
2) EOS-450 EVO (EOS Remediation LLC, Durham, NC) (**Figure 7**).

ZVI directly degrades CVOCs via chemical reduction and can also reduce the oxidation reduction potential (ORP) to values suitable, or nearly so, to support the growth of halorespiring bacteria that degrade CVOCs via reductive dechlorination. EVO serves as an electron donor, which is necessary to support reductive dechlorination by halorespiring bacteria. The rate of reductive biodechlorination of CVOCs is too low to achieve measurable biodegradation of CVOCs in the timeframe of these studies. However, EVO was included in these ISCR batch reactors only to determine its effect on the performance of ZVI in chemically reducing CVOCs and reducing ORP values.

2.3.3 In Situ Stabilization (ISS)

GAC was also tested for its potential to remove CVOCs from groundwater via sorption. GAC may be used with ZVI and EVO in a PRB, or as a stand-alone PRB amendment to polish low concentrations of CVOCs from groundwater. The GAC used in these studies (pictured in **Figure 7**) was obtained from Calgon (Pittsburgh, PA) (**Figure 7**) was also tested for potential use with the other two ISCR amendments in PRBs or as a stand-alone PRB amendment.

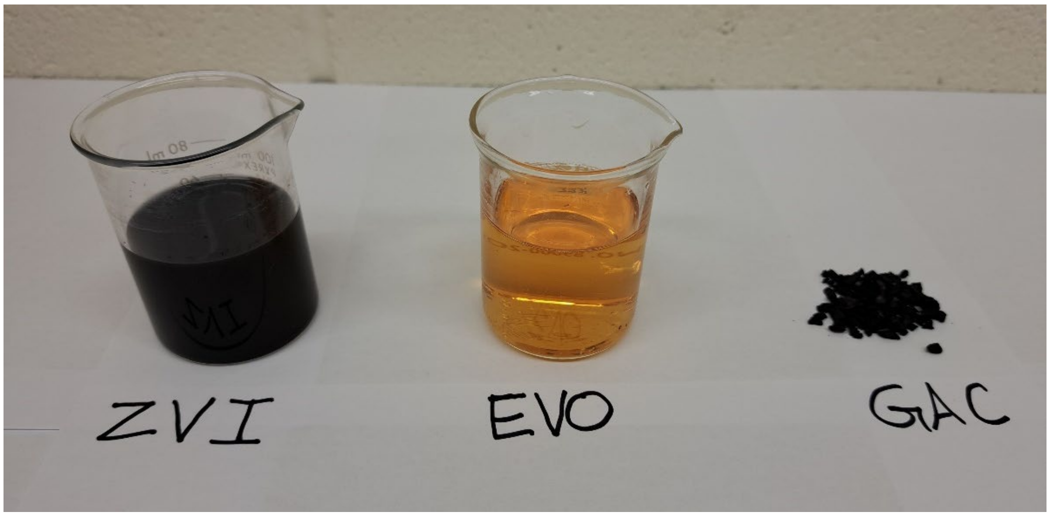

Figure 7. A picture of the ZVI and EVO used in the ISCR studies, and GAC used in the ISS studies.

2.3.4 Studies on NaOH Activation of Persulfate

SPS is a very versatile oxidant. Activation converts the persulfate anion ($S_2O_8^{2-}$), a weak oxidant, to the sulfate radical anion ($SO_4^{-\bullet}$), a strong oxidant known to oxidize PCE and other CVOCs. Activation can be achieved by direct reactions between persulfate and the aquifer materials (autoactivation), or by co-injecting sodium persulfate with activators, such as HP activation and NaOH or other bases (alkaline activation). Alkaline activation requires a minimum pH of 10.5, which is much higher than the circumneutral pH of the site groundwater (**Table 3**). In the field, 25% NaOH solutions are co-injected to activate sodium persulfate, at a mass ratio (g NaOH/g SPS) commonly between 1.1 and 1.6, depending on the pH of the site groundwater and the buffering capacity of the aquifer material. Activation of SPS generates sulfuric acid, reducing the pH. If the pH does not remain at or above 10.5 for long enough to activate all the SPS, NaOH activation will not be complete. The higher the dose of SPS, the more acid will be generated upon activation. In the experience of Perivallon, even high SPS doses are generally completely activated within 5-days if the pH is maintained at or above 10.5 during this time. The calculated low and high doses of SPS used in the batch reactors were 1.65 g and 3.31 g, respectively. Batch tests were performed to determine the NaOH dose required to keep the pH at or above 10.5 for 5 days. Baseline soil from Zone B (100 mL) was mixed with site groundwater (100 mL) in 500-mL beakers and the contents were mixed with a magnetic stir bar. For the low and high SPS doses, mass ratios of added NaOH/SPS ranging from 1.1 to 1.6 were tested, and the pH of the slurry was measured after 5 days. The results are listed in **Table 4**, and based on these results, a minimum mass ratio of NaOH/SPS of 1.5 was selected for NaOH activation of SPS in the batch ISCO studies.

Table 4. The pH of slurry of Zone B soil and site groundwater after 5 days, as a function of the mass ratio of NaOH/SPS.

g NaOH/g SPS	5-Day pH-Low SPS Dose	5-Day pH-High SPS Dose
1.1	8.9	9.0
1.2	9.4	9.6
1.3	9.9	10.0
1.4	10.1	10.3
1.5	10.6	10.6
1.6	10.9	11.0

2.4 Batch Reactor Setup & Operation

Batch reactors were used in these bench studies to test and measure the following parameters and processes:

1. The soil oxidant demand (SOD) exerted by Zone B soil was determined for three chemical oxidants; HP, SPS, and PM. SOD is an important measure of the tendency of a soil to consume or scavenge oxidants and helps determine doses of the oxidants that will be required in field-scale applications. SOD batch tests were performed only on Zone B soil.
2. ISCO reactions using SPS in three applications; activated with HP, activated with sodium hydroxide (NaOH), and auto-activated SPS (i.e., no activator added). ISCO batch tests were performed on both Zone B and Zone C soil.
3. ISCR reactions using ZVI and EVO were performed on soil from Zone B and Zone C.
4. ISS (adsorption) reactions using GAC. SOD batch tests were performed only on Zone B soil.

The batch reaction vessels consisted of 1-L, amber, screw-cap reagent bottles (**Figure 8**). As a precaution, amber glass was used to reduce the entry of visible light, because the native iron in soils and iron in ZVI catalyzes photolytic reactions that degrade CVOCs and other organic contaminants (Sun et al., 2011). Moreover, hydrogen peroxide and persulfate can combine with visible light to generate free radicals that are capable of degrading organics.

Each reactor first received 500 mL (approximately 800 g, dry weight) of baseline soil. All the amendments received were in solid form, except the concentrated HP, the ZVI, and the EVO. Except for GAC, all the solid amendments in each reaction scenario were first mixed together by grinding in a mortar and pestle, and then added directly to the 500 mL of soil in the reactors and mixed into the soil with a stainless-steel spoon for one minute. Site groundwater was then added to each reactor such that the pores were visibly saturated, but no standing water was visible on top of the soil. Less added groundwater was needed to saturate the pores in Zone B soil (see **Figure 2**), than in Zone C soil (see **Figure 3**). The screw cap was then put on the reaction vessel and the contents were shaken vigorously for 30 seconds. For liquid amendments (HP, ZVI, and EVO) the liquids were first poured into the soil and mixed into the soil with a stainless-steel spoon for one minute. Then site groundwater was added to the reactor such that the pores were visibly saturated, but no standing water was visible on top of the soil. The screw cap was then put on the reaction vessel and the contents were shaken for 30 seconds.

After all the amendments and groundwater were added to the reactors and mixed with the soil, the screw caps were removed and replaced with stoppers having a single, central port. In the ISCO and ISCR batch reactors, the stoppers were fitted with Tenax® TA sorption tubes, which contain a porous polymer of poly-2, 6-diphenyl-p-phenylene oxide, and are especially designed to adsorb and trap CVOCs (see **Figure 8**). This ensured that off-gasses generated from the reactions of the amendments (e.g., O_2 from the decomposition of HP, CO_2 from degradation of CVOCs, H_2 gas accompanying the reaction of ZVI with water) would pass through the tubes and CVOCs in the off-gasses would be captured and quantified. Each time the soil in that batch reactor was sampled, the Tenax tubes were removed, and were thermally extracted using purge-and-trap, followed by GC quantification using EPA Method 8260. The MDL for quantifying PCE in each Tenax trap was 0.010 mg. The mass of CVOCs that were destroyed in each reactor could then be calculated as the difference between the total mass reduction of CVOCs in the soil and the mass measured in the tubes. The SOD reactors only measured oxidant concentrations, and the stoppers were therefore not fitted with Tenax tubes.

The first round of batch reactor experiments started on February 15, 2023, and ran for 20 days, until March 7, 2023. After an internal review of the results from the first round of batch reactors it was decided to run additional batch tests on specific ISCR and ISCO reaction scenarios, which started on March 10, 2023, and ran for 20 days, until March 30, 2023. The batch reaction vessels were kept closed, except when opened periodically (on Day 1, 2, 4, 6, 9, 13, 17, 20) for approximately 2 minutes to collect samples of soil and remove the used Tenax tube for CVOC analyses using EPA Method 8260, and to insert probes to measure pH and oxidation-reduction potential (ORP). One sample of approximately 16 g (dry weight), or 10 mL of saturated soil, was sampled from each reactor at each sampling event. After sampling, a dedicated screw cap for each reactor was screwed onto the bottle and the contents were mixed by shaking vigorously for 30 seconds. Then the stoppers were placed back onto the reactors, with fresh Tenax tubes for the ISCO and ISCR reactors.

Figure 8. A picture of the batch reactors used in these studies. Note the stoppers and Tenax traps used to capture and quantify CVOCs released in off-gasses from the ISCO and ISCR reactors.

2.5 Dosing of Batch Reactors

2.5.1 SOD Batch Reactors

The doses of oxidants used in the six (6) reaction scenarios tested in the SOD batch reactors are listed in **Table 5**. When HP is used as the sole chemical oxidant in ISCO systems, the reactions are referred to as modified Fenton chemistry (MFC). It should be noted that HP as an activator of SPS was also tested in the ISCO batch reactors. For each of three chemical oxidants tested in the SOD reactors, both a low and high dose were tested. For Fe activation in the MFC SOD reactors, ferric iron in the form of iron hydroxide ($Fe(OH)_3$) was used, at the dose listed in **Table 5**. Citrate was used a chelating agent for the Fe(III), using a molar ratio of Citrate:Fe of 10:1. Ferric oxide, citrate, and NaOH were purchased from Sigma-Aldrich (Saint Louis, MO).

The three specific oxidant species used in these tests (HP, SPM, and SPS) were quantified in the aqueous phase (i.e., the pore waters) in the SOD batch reactors. First, 10 mL samples of the slurry were sampled, and were then passed through a 0.2-µm filter to remove all solids. Oxidant concentrations were then quantified in the filtrate, using the standard methods listed and described below.

1. *HP concentrations* were quantified by titrating with a solution of potassium permanganate ($KMnO_4$), as per the method described by Solvay (2008). The MDL for HP was 0.2 g/L.
2. *MnO_4^- concentrations* were quantified by using direct spectrophotometric analysis, as described by McBeath et al. (2020). The MDL for MnO_4^- was 0.1 g/L.
3. *$S_2O_8^{2-}$ concentrations* were quantified using the spectrophotometric method described by Liang et al. (2008). The MDL for $S_2O_8^{2-}$ was 0.1 g/L.

Table 5. Doses of amendments used in the six (6) reaction scenarios tested in the SOD batch reactors.

Reactor	Oxidant	Activator	Oxidant Dose (g)	Activator Dose (g)
1a	HP	Fe(III)	3.15	0.17
1b	HP	Fe(III)	6.3	0.33
2a	SPM	none	2.19	N/A
2b	SPM	none	4.37	N/A
3a	SPS	NaOH	5.51	8.27
3b	SPS	NaOH	11.02	16.54

* Citrate was used to chelate Fe(III) at a molar ratio of Citrate:Fe of 10:1.

2.5.2 ISCO Batch Reactors

Table 6 lists the oxidant and activator doses tested in the eighteen in-situ chemical oxidation (ISCO) batch reactors, and whether the soil tested was from Zone B or Zone C. Reactors 1 through 5b tested various activations of SPS ($Na_2S_2O_8$). In Reactors 1 through 2b, HP was used to activate SPS, although HP can also be a stand-alone oxidant, known as modified Fenton chemistry (**Table 6**). Sodium hydroxide (NaOH) was also tested for its ability to achieve alkaline activation of SPS (reactors 3a to 4b), and the doses of NaOH used were based on the results obtained in the section above titled "Studies on NaOH Activation of Persulfate" and in **Table 4**.

Table 6. Amendment doses in the eighteen batch reactors testing in situ chemical oxidation (ISCO), and whether the soil tested was from Zone B or Zone C.

Reactor	Oxidant	Oxidant Dose (g)	Activator	Activator Dose(g)	Zone
1a	SPS	5.51	HP	2.36	B
1b	SPS	11.02	HP	4.73	B
2a	SPS	5.51	HP	4.73	B
2b	SPS	11.02	HP	9.45	B
3a	SPS	5.51	NaOH	2.5	B
3b	SPS	11.02	NaOH	7.5	B
4a	SPS	5.51	NaOH	5	B
4b	SPS	11.02	NaOH	15	B
5a	SPS	5.51	None	NA	B
5b	SPS	11.02	None	NA	B
6	None	NA	None	NA	B
7a	SPM	2.19	N/A	N/A	B
7b	SPM	4.37	N/A	N/A	B
8a	SPS	11.02	HP	4.73	C
8b	SPS	11.02	HP	9.45	C
8c	SPS	11.02	none	N/A	C
9	SPM	4.37	N/A	N/A	C
10	None	NA	None	NA	C

2.5.3 ISCR Batch Reactors

Amendment doses in the nine (9) batch reactors testing in-situ chemical reduction (ISCR) are listed in **Table 7**. Both Zone B and Zone C soil were tested. As mentioned previously, EVO was included in these ISCR batch reactors solely to evaluate its impact of the ability of ZVI to degrade PCE and other CVOCs and to reduce the ORP to levels suitable for reductive dechlorination by native microorganisms. Two ISCR tests on Zone C soil (Reactors 5a & 5b) were amended with the same dose of ZVI, but Reactor 5b received no EVO, so the effect of this electron donor for anaerobic dechlorination on the CVOC degradation performance of ZVI could be evaluated. Reactor 6 was the Control for Zone C soil.

GAC was also tested on Zone B soil (Reactor 2 in **Table 7**) as a sole amendment to evaluate its ability to adsorb and remove CVOCs from pore water in the host aquifer. GAC adsorbs but does not degrade CVOCs, and its performance is evaluated by measuring CVOCs in pore water rather than soil. Therefore, the results and discussion for Reactor 2 will be presented separately from the other ISCR reactors. A 50 mL sample of soil and pore water from Reactor 2, after 20 days of reaction time, was passed through a 0.45-µm filter, and the pore water was analyzed for CVOCs. A separate Control reactor with no amendments added (not listed in any tables) was kept for 20 days, and this reactor was sampled and analyzed identically to Reactor 2. It should be noted that the Control for Zone B soil (Reactor 3) was not used to compare with Reactor 2 because it had been opened multiples times before Day 20.

Table 7. Amendment doses in the nine (9) batch reactors testing in situ chemical reduction (ISCR), and whether Zone B or Zone C soil.

Reactor	Zone	Reagent	ZVI Dose (g)	EVO Dose (g)
1a	B	ZVI	1.5	1.5
1b	B	ZVI	3	4.5
1c	B	ZVI	5	5
1d	B	ZVI	10	15
2	B	GAC (25 g)	N/A	N/A
3	B	Control	None	N/A
4a	C	ZVI	10	10
4b	C	ZVI	10	None
5	C	Control	Control	None

*Represents the actual dose of ZVI itself, which is only 40% by weight of the product used.

2.6 Column Reactor Setup & Operation

A picture of the column reactors is shown in **Figure 9**. The column reactors were made of PVC pipe. The columns were 2 feet (61 cm) in length and had a 2-inch (5-cm) inner diameter. The total volume of the columns was 1.35 L (1,350 mL), and assuming a porosity of 0.35, the total pore volume in each column was approximately 0.432 L (432 mL). The tops and bottoms of the columns were fitted with PVC caps with holes drilled to fit tubing through which groundwater could be pumped. Groundwater was pumped through the soil in the columns upwards, from bottom to top, which displaces any bubbles and ensures the pores are saturated with groundwater. To keep soil particles from entering the openings for the tubes carrying water, six (6) layers of T-304 stainless steel wire mesh with openings of 0.01 inches (0.254 mm) were stacked on top of each other, each layer rotated 30° relative to the layer underneath. This placement of six layers T-304 stainless steel wire mesh prevents even clay-sized particles from being displaced through the tubing. Cole-Parmer Masterflex® peristaltic pumps were used to pump the groundwater.

Figure 9. A picture showing the column reactors used to treat Zone B soil with groundwater.

2.7 Dosing and Operation of the Column Reactors

Zone B soil and Site groundwater from MW-12R were treated in six (6) column reactors. **Table 8** lists the amendments and doses used in each column. Note that the six (6) columns were arranged into three treatment trains as discussed below.

Table 8. Amendments and doses used in the 6 columns treating Zone B soil and groundwater.

Column	Reaction Scenario	Amendment Doses	Column Effluent Analyzed
1	Control (nothing added)	N/A	Column 1
2	Bottom Half-ISCO;	13.775 g SPS	Column 4
2	Top Half-Untreated Soil	N/A	Column 4
3	ISCR	25 g ZVI + 25 g EVO	Column 4
4	GAC	62.5 g GAC	Column 4
5	ISCR	25 g ZVI + 25 g EVO	Column 6
6	Untreated Soil	N/A	Column 6

- Column 1 was a Control column containing untreated soil with nothing added.

- Columns 2, 3, and 4 were plumbed together, and were intended to simulate the PRBs that will be employed in the field at different locations along the groundwater flow path; ISCO-PRB upgradient near the buildings (bottom half of Column 2) with untreated soil downgradient (top half of Column 2), followed by ISCR-PRB (Column 3), followed by GAC-PRB (Column 4). To achieve this, effluent from Column 2 was pumped directly into Column 3, effluent from Column 3 was pumped directly into Column 4, and effluent from Column 4 was analyzed for CVOCs, pH, and ORP.

- Columns 5 and 6 were plumbed together, and were intended to simulate the ISCR-PRB application furthest downgradient, near the residential area. Effluent from Column 5 (ISCR-PRB) was pumped directly in Column 6 (untreated soil), and Column 6 effluent was analyzed for CVOCs, pH, and ORP.

The amendments were mixed into the soil by hand for one minute using a stainless-steel spoon, and the amended soil was then placed into the columns from the top and packed down with a 1.9-inch diameter stainless-steel disc attached to a steel rod. Once the correct volume (1,350 mL) of soil was added and packed down, groundwater was pumped at 100 mL/min from the bottom of each column upward until the water surface was at the very top of the column. The caps were then placed on all six columns; Columns 2, 3, and 4 were connected; and Columns 4 & 5 were connected. The pumps were then turned on. The column experiments started on March 10, 2023, and were operated for 20 days, until March 30, 2023. The pumps were set and calibrated to 0.3 mL/minute, replacing one column pore volume (432 mL) daily.

Every day, 500 mL of groundwater were placed in 500-mL amber reagent bottles that were stoppered (to minimize CVOC stripping). These 500-mL bottles served as the influent water reservoirs for Column 1, 2, and 5. The tubing in the influent bottles reached all the way to the bottom, and volume was greater than the 432 mL/day, to ensure no air entered the tubing as the bottles emptied. The same 500-mL amber reagent bottles were also used to collect the effluent from Reactor 1, Reactor 4, and Reactor 6, which were stoppered to minimize stripping. The influent water to the Column 1, 2, and 5 was analyzed daily for CVOCs, as was the effluent from Column 1, 4, and 6.

Figure 10. A picture showing the columns, influent and effluent bottles, and the pumps used to force water upward through the columns.

3.0 RESULTS & DISCUSSION

3.1 Batch Reactors

3.1.1 SOD Batch Reactors

Table 9 lists the initial calculated oxidant concentrations in the SOD reactors, based on the doses (**Table 5**) and the concentrations measured over time. The results show that even the high dose of HP was decreased to below detection levels within 24 hours. In contrast, there was still permanganate ion after 17 days in the SOD reactor with the high dose of SPM. The high dose of SPS lasted over 4 days. **Figure 10** shows a plot of oxidant concentrations vs. time in the SOD reactors over the 20-day reaction period. The SOD results are consistent with the experience of Perivallon and others, both in bench studies and field application of oxidants. Generally, in the presence of soil and groundwater, HP lasts hours, SPS lasts days, and SPM lasts weeks.

Table 9. The initial, calculated oxidant concentrations in the SOD reactors with a high and low dose for each oxidant, and the concentrations of each oxidant measured over time.

Time (Days)	HP low	HP high	SPM low	SPM high	SPS low	SPS high
0	18.00	36.00	12.50	25.00	31.50	63.00
0.25	7.26	18.13	-[2]	-	-	-
0.5	0.94	6.68	-	-	20.26	36.55
0.75	BD[1]	2.34	-	-	-	-
1	-	BD	-	-	14.77	27.58
2	-	-	-	-	7.13	14.33
3	-	-	-	-	2.23	4.81
4	-	-	-	-	BD	1.62
5	-	-	5.98	15.85	BD	BD
6	-	-	-	-	-	-
7	-	-	-	-	-	-
8	-	-	-	-	-	-
10	-	-	2.44	9.97	-	-
12	-	-	-	-	-	-
15	-	-	-	-	-	-
17	-	-	BD	2.63	-	-
18	-	-	-	-	-	-
19	-	-	-	-	-	-
20	-	-	-	BD	-	-

[1] BD is below MDL; HP MDL = 0.2 g/L; SPM MDL = 0.1 g/L; SPS MDL = 0.1 g/L.
[2] "-" means no measurement was taken.

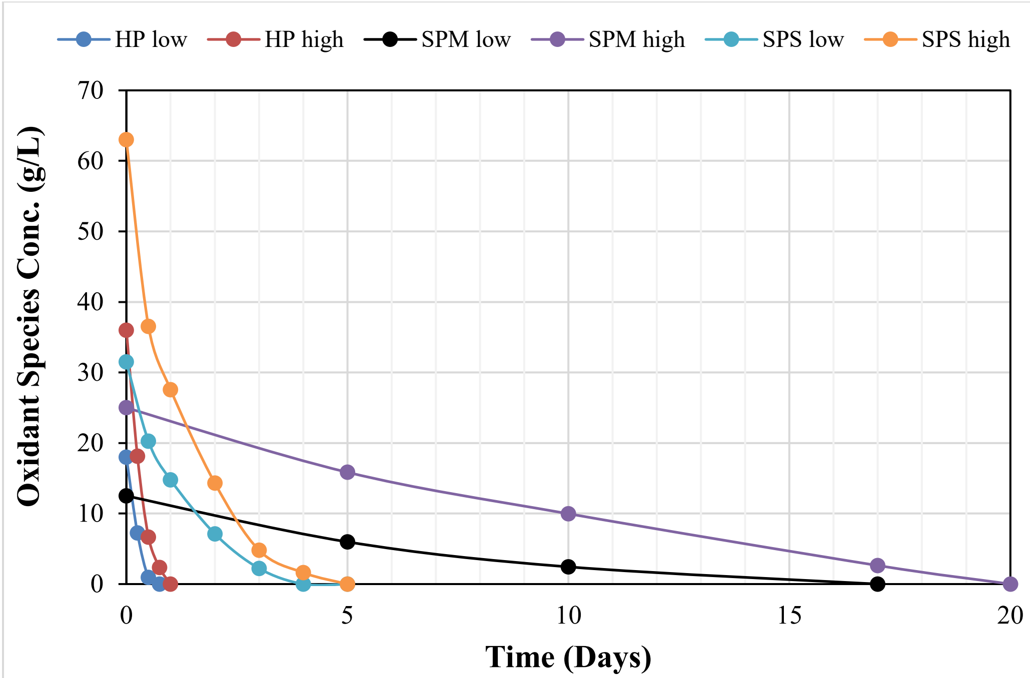

Figure 10. A plot of oxidant concentrations vs. time in the SOD reactors.

3.1.2 ISCO Batch Reactors

3.1.2.1 Contaminant Measurements & Calculations in the ISCO Batch Reactors

The ISCO batch data presented below in the body of this report will focus on PCE, which was the CVOC present at by far the highest concentration in both Zone B and Zone C soils and in groundwater from MW-12R (**Table 1** & **Table 2**). TCE and 1,1,1-TCA were also present at significant concentrations in the Site soil and groundwater, albeit much lower than PCE, and the final, 20-day results and calculations for TCE and 1,1,1-TCA will be presented and discussed here in the body of the report with PCE. However, the data and calculations for all the sampling events over the 20-day reaction period will only be presented for PCE here in the body of the report, and those data for TCE and 1,1,1-TCA are be provided in **APPENDIX 1**.

Figure 11 shows a plot of the PCE concentrations in soil (in mg/kg) measured over the 20-day reaction period in the thirteen ISCO reactors treating Zone B soil (Reactors 1a through 6 in **Table 6**). **Figure 12** shows a plot of the PCE concentrations in soil (in mg/kg) measured over the 20-day reaction period in the five ISCO reactors treating Zone C soil (Reactors 7a through 10 in **Table 6**). The negative (nothing-added) Controls were Reactor 6 for Zone B and Reactor 10 for Zone C. The time profiles of PCE removal in the batch reactors illustrated in **Figure 11** and **Figure 12** show that SPS (activated with HP and NaOH, and self-activated) was exhausted in approximately 5 days, whereas SPM lasted more than 15 days. This is consistent with the longevity of each oxidation scenario in the SOD data (**Table 9**, **Figure 10**). Note that in **Figure 11**, Reactors 7a (low dose of SPM) and 7b (high dose of SPM) show reductions in PCE concentrations over a longer time than the reactors dosed with low and high doses of SPS. The same pattern was observed in the Zone C soil (**Figure 12**), where SPM (Reactor 9) degraded PCE more slowly than the three reactors dosed with SPS (Reactors 8a, 8b, and 8c). These observations are also consistent with the SOD data. In batch reactors treating both Zone B and Zone C soil, the high doses of SPS and SPM achieved very similar final PCE concentrations. It can be concluded, from the SOD data (**Table 9**, **Figure 10**) and the time profiles of PCE concentrations (**Figure 11** & **Figure 12**), that both SPS and SPM are likely to be equally effective at PCE source removal in field applications at the Site. However, SPM would have the longer reaction period, and therefore the greater radius of influence around the injection wells. The two Controls (Reactor 6 for Zone B soil and Reactor 10 for Zone C soil) showed little PCE removal over the 20-day period, indicating that they served as reliable and useful control reactors. SPM is more expensive than SPS, but could be strategically applied in areas, such as the contact between Zone B and Zone C.

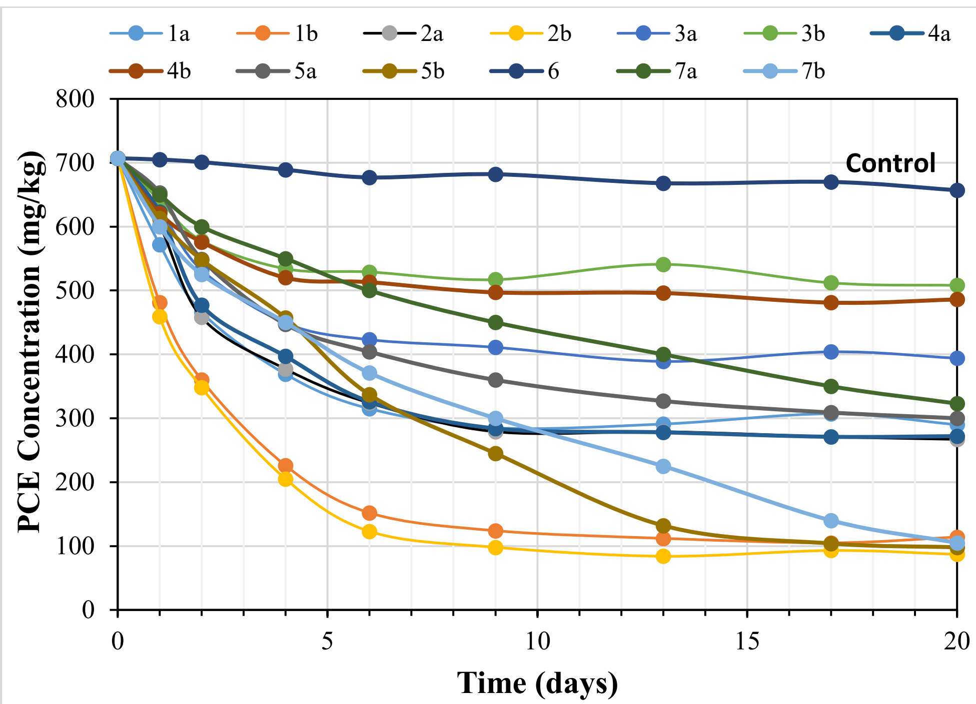

Figure 11. A plot of the PCE concentrations in soil (in mg/kg) measured over the 20-day reaction period in the thirteen ISCO reactors treating Zone B soil.

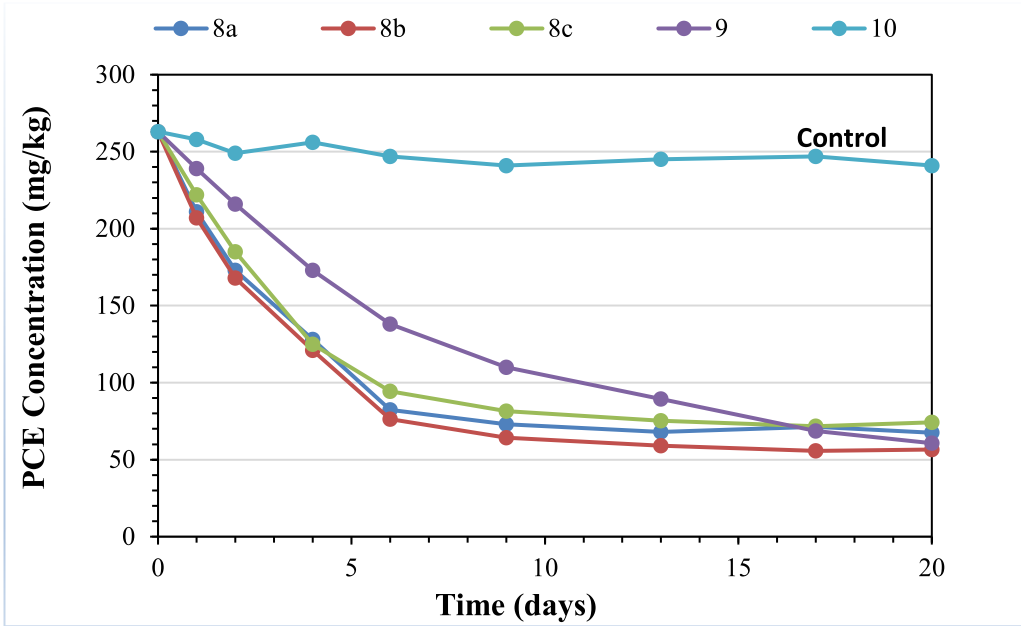

Figure 12. A plot of the PCE concentrations in soil (in mg/kg) measured over the 20-day reaction period in the five ISCO reactors treating Zone C soil.

Because PCE and the other CVOCs at the Site are volatile, it is critical in bench studies to quantify how much of the decrease in concentrations measured in the soil in the ISCO batch reactors shown in **Figure 11** & **Figure 12** is due to stripping vs. chemical destruction. The batch reactor setup used Tenax traps so that any CVOCs volatilized during the reactions would be captured on the sorbent, specially designed for CVOCs, so they could be quantified with EPA Method 8260. The Tenax tubes were sacrificed to quantify CVOCs and replaced at each sampling event when the CVOC concentrations in the soil were measured. To quantify how much PCE and other CVOCs was removed from the soils was due to chemical destruction vs. stripping, the PCE concentrations measured in soil were used to calculate the total mass of PCE removed between each sampling event and compared to the mass quantified in the Tenax tubes.

Table 10 lists the PCE concentrations (in mg/kg) measured in the ISCO batch reactors at each sampling event (the data plotted in **Figure 11** and **Figure 12**). **Table 11** lists the calculated mass (in mg) of PCE removed during the reaction time between each sampling event, as the difference in concentration between each event (in mg/kg) multiplied by the mass of dry soil in the reactor ((C_0-C_t) x soil mass). Day 0 is not included in the Tables because no sampling took place before Day 1. The PCE removal between Day 0 and Day 1 used the mean PCE concentration of 707 mg/kg for Zone B (**Table 1**) and 263 mg/kg for Zone C (**Table 2**). The calculations listed in **Table 11** account for the fact that each sampling event removed 16 g, or 0.016 kg (dry weight) of soil from each batch reactor. On Day 0, each reactor contained 800 g, 0.80 kg of dry soil, and after 20 days only contained 688 g, or 0.688 kg of dry soil. It is important to note that negative values of PCE removal in **Table 11** do not mean that PCE was generated in the batch reactors.

Rather, negative values were calculated in reactors and or certain periods of time in which PCE concentrations varied little, but measurements fluctuated up and down. For example, negative values of the mass of PCE removed between sampling events were calculated in the Controls (Reactors 6 and 10), and in some of the Test (i.e., oxidant-dosed) reactors towards the end of the 20-day reaction period, when the oxidants became exhausted and no further significant PCE removal took place. When PCE concentrations measured at any sampling event are less than the previous sampling event, the calculated PCE removal values will be negative. The calculated values for PCE removal were not negative in reactors during time periods when chemical oxidation was significantly reducing PCE concentrations and the slope of the PCE concentration vs. time was steep (see **Figure 11** & **Figure 12**). Not surprisingly, the data in **Table 11** show that Reactors 6 and 10 (Controls) had the lowest mass of PCE removed between each sampling event, and that the oxidant-dosed (Test) reactors had the greatest mass of PCE removed between each sampling event, especially during the early days when each oxidant was present at its highest concentrations. This is consistent with the SOD data and with **Figure 11** and **Figure 12**.

Table 10. PCE concentrations (mg/kg) measured in ISCO batch reactors at each sampling event.

Reactor	Oxidant	Zone	Day 0	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	SPS	B	707	572	466	369	315	285	291	307	290
1b	SPS	B	707	481	360	226	152	124	112	105	114
2a	SPS	B	707	602	458	377	324	279	279	271	267
2b	SPS	B	707	459	348	205	123	98	84	93	87
3a	SPS	B	707	627	532	449	423	411	389	404	394
3b	SPS	B	707	641	578	534	529	517	541	512	508
4a	SPS	B	707	623	477	397	326	284	278	271	272
4b	SPS	B	707	621	576	520	513	497	496	481	486
5a	SPS	B	707	653	549	447	404	360	327	309	300
5b	SPS	B	707	613	548	457	337	245	132	104	98
6	None	B	707	705	701	689	677	682	668	670	657
7a	SPM	B	707	650	600	550	500	450	400	350	323
7b	SPM	B	707	600	525	450	371	300	225	140	105
8a	SPS	C	263	211	173	128	82.3	72.9	68.1	71.4	67.5
8b	SPS	C	263	207	168	121	76.4	64.3	59.0	55.7	56.6
8c	SPS	C	263	222	185	125	94.3	81.6	75.2	71.7	74.2
9	SPM	C	263	239	216	173	138	110	89.5	68.7	60.7
10	None	C	263	258	249	256	247	241	245	247	241

Table 11. Calculated mass of PCE (in mg) removed between each sampling event in the ISCO batch reactors.

Reactor	Oxidant	Zone	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	SPS	B	108.0	83.1	74.5	40.6	22.1	-4.3	-11.3	11.7
1b	SPS	B	180.8	94.9	102.9	55.6	20.6	8.6	4.9	-6.2
2a	SPS	B	84.0	112.9	62.2	39.9	33.1	2.0	5.6	2.8
2b	SPS	B	198.4	87.0	109.8	61.7	18.4	10.1	-6.3	4.1
3a	SPS	B	64.0	74.5	63.7	19.6	8.8	15.8	-10.6	6.9
3b	SPS	B	52.8	49.4	33.8	3.8	8.8	-17.3	20.4	2.8
4a	SPS	B	67.2	114.5	61.4	53.4	30.9	4.3	4.9	-0.7
4b	SPS	B	68.8	35.3	43.0	5.3	11.8	0.7	10.6	-3.4
5a	SPS	B	43.2	81.5	78.3	32.3	32.4	23.8	12.7	6.2
5b	SPS	B	75.2	51.0	69.9	90.2	67.7	81.4	19.7	4.1
6	None	B	1.6	3.1	9.2	9.0	-3.7	10.1	-1.4	8.9
7a	SPM	B	45.6	39.2	38.4	37.6	36.8	36.0	35.2	18.6
7b	SPM	B	85.6	58.8	57.6	59.4	52.3	54.0	59.8	24.1
8a	SPS	C	41.6	29.8	34.6	34.4	6.9	3.5	-2.3	2.7
8b	SPS	C	44.8	30.6	36.1	33.5	8.9	3.8	2.3	-0.6
8c	SPS	C	32.8	29.0	46.1	23.1	9.3	4.6	2.5	-1.7
9	SPM	C	19.2	18.0	33.0	26.3	20.6	14.8	14.6	5.5
10	None	C	2.7	5.1	-5.4	6.8	4.4	-2.9	-1.4	4.1

Table 12 lists the mass (in mg) of PCE measured in the Tenax traps and the cumulative mass measured in each reactor after 20 days. The Tenax tubes were collected and sacrificed at each sampling event in the reactors to quantify all the CVOCs, and the mass of of CVOCs measured in the Tenax traps at each sampling event represents the mass of each CVOC that was lost via volatilization since the previous sampling event. The data in **Table 12** clearly show that the greatest mass of PCE volatilized was observed in the Controls (Reactor 6 for the Zone B and Reactor 10 for the Zone C soil). This is explained by the fact that no ISCO amendments were added to the Controls and little or no PCE destruction took place in these reactors. Therefore, all the PCE present in the baseline soils for Zone B and Zone C were available to be volatilize over the 20-day reaction period, and stripping was the only CVOC removal mechanism.

The equivalent measurements in **Table 10** and **Table 12** and calculations in **Table 11** for PCE are provided in **APPENDIX 1** for TCE and 1,1,1-TCA. It should be noted that all other CVOCs besides PCE, TCE, and 1,1,1-TCA present above the detection limit in the baseline Zone B and Zone C soils (**Table 1** & **Table 2**) were completely removed via chemical oxidation in all the ISCO Test reactors and their concentrations were non-detect by Day 1 and remained so until Day 20. Furthermore, none of the other CVOCs besides PCE, TCE, and 1,1,1-TCA were detected in the Tenax tubes during the entire 20-day ISCO batch reaction period.

Table 12. Mass of PCE (in mg*) measured in the Tenax traps at each sampling event, and cumulatively (SUM) over 20 days in the ISCO batch reactors.

Reactor	Oxidant	Zone	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20	SUM
1a	SPS	B	1.02	0.76	0.72	0.37	0.2	0.16	0.14	0.13	3.50
1b	SPS	B	1.74	0.89	0.9	0.5	0.19	0.18	0.15	0.14	4.69
2a	SPS	B	0.75	0.99	0.57	0.37	0.31	0.29	0.15	0.13	3.56
2b	SPS	B	1.75	0.77	1.02	0.55	0.17	0.19	0.18	0.34	4.95
3a	SPS	B	0.58	0.66	0.58	0.18	0.22	0.14	0.19	0.16	2.71
3b	SPS	B	0.48	0.45	0.3	0.13	0.08	0.15	0.19	0.16	1.94
4a	SPS	B	0.6	1.01	0.55	0.49	0.28	0.19	0.16	0.15	3.43
4b	SPS	B	0.43	0.55	0.49	0.45	0.32	0.31	0.25	0.17	2.97
5a	SPS	B	0.41	0.74	0.72	0.29	0.29	0.21	0.17	0.14	2.97
5b	SPS	B	0.68	0.46	0.64	0.84	0.66	0.64	0.27	0.21	4.40
6	None	B	1.39	2.95	4.98	5.33	4.36	4.32	4.87	5.77	33.97
7a	SPM	B	0.39	0.32	0.35	0.34	0.33	0.33	0.32	0.18	2.56
7b	SPM	B	0.73	0.54	0.52	0.55	0.48	0.49	0.51	0.44	4.26
8a	SPS	C	0.37	0.27	0.31	0.32	0.27	0.23	0.19	0.17	2.13
8b	SPS	C	0.4	0.4	0.38	0.37	0.28	0.26	0.21	0.15	2.45
8c	SPS	C	0.31	0.36	0.32	0.27	0.28	0.24	0.22	0.19	2.19
9	SPM	C	0.35	0.33	0.27	0.24	0.25	0.23	0.21	0.17	2.05
10	None	C	1.65	2.88	1.63	1.36	2.05	2.44	1.22	0.35	13.58

*The MDL for quantifying PCE in each Tenax trap was 0.010 mg.

Table 13 is a summary table for PCE measurements and calculations in the ISCO batch reactors that lists the final (20-day) PCE concentration in soil, the % reduction in PCE concentration after 20 days, the mass (mg) of PCE removed from the reactors over 20 days, the cumulative mass (mg) of PCE stripped and measured in the Tenax tubes over 20 days, and the % of the total mass of PCE removed due to stripping (i.e., mg stripped/mg removed). **Table 14** and **Table 15** are the equivalent summary tables for TCE and 1,1,1-TCA, respectively.

Table 13. Final PCE concentration, % reduction in concentration, mass (mg) removed, cumulative mass (mg) stripped, and % of the mass stripped from the ISCO batch reactors.

Reactor	Zone	Oxidant/ Activator	Dose (g)	Final Conc. (mg/kg)	% Reduction	mg Removed	mg Stripped	% Stripped
1a	B	SPS/HP	5.51/2.36	290	59.0	333.6	3.5	1.05
1b	B	SPS/HP	11.02/4.73	114	83.9	474.4	4.69	0.99
2a	B	SPS/HP	5.51/4.73	267	62.2	352.0	3.56	1.01
2b	B	SPS/HP	11.02/9.45	87	87.7	496.0	4.95	1.03
3a	B	SPS/NaOH	5.51/2.5	394	44.3	250.4	2.71	1.08
3b	B	SPS/NaOH	11.02/7.5	508	28.1	159.2	1.94	1.22
4a	B	SPS/NaOH	5.51/5.0	272	61.5	348.0	3.43	0.99
4b	B	SPS/NaOH	11.02/15	486	31.3	176.8	2.97	1.68
5a	B	SPS	5.51	300	57.6	325.6	2.97	0.91
5b	B	SPS	11.02	98	86.1	487.2	4.4	0.90
6	B	None	NA	657	7.1	40.0	33.97	84.93
7a	B	SPM	2.19	323	54.3	307.2	2.56	0.83
7b	B	SPM	4.37	105	85.1	481.6	4.26	0.88
8a	C	SPS/HP	11.02/4.73	67.5	74.3	156.4	2.13	1.36
8b	C	SPS/HP	11.02/9.45	56.6	78.5	165.1	2.45	1.48
8c	C	SPS	11.02	74.2	71.8	151.0	2.19	1.45
9	C	SPM	4.37	60.7	76.9	161.8	2.05	1.27
10	C	None	NA	241	8.4	17.6	13.58	77.16

The data in **Table 13**, **Table 14**, and **Table 15** clearly demonstrate that the primary mechanism for the observed reduction in concentrations of PCE, TCE, and 1,1,1-TCA was chemical oxidation. This is evidenced by the low percentage of total CVOC removal due to stripping. The percentage of the total CVOC removal due to stripping was much lower in all of the Test (oxidant-dosed) reactors than in the Controls. For PCE, the Test reactors had loss due to stripping less than 2% in every Test (oxidant-dosed) reactor, and near or less than 1% in most. In sharp contrast, the percentage of volatile loss of PCE in the Controls was 77% in Reactor 10 and 85% in Reactor 6. For TCE, the percent of loss due to stripping was practically 100% in the Controls and in all the Test reactors was less than 5%. For 1,1,1-TCA, the percent of loss due to stripping was 100% in Reactor 6 and 80% in Reactor 10, compared to less than 12% in all the Test reactors. For reasons unknown, the NaOH-activated SPS reactors (3a, 3b, 4a, and 4b) had considerably greater values of percent of total removal of PCE and 1,1,1-TCA due to stripping than the other Test reactors. The much higher percentage of CVOC removal due to stripping in the Controls can be attributed to them not having been dosed with ISCO amendments that destroyed significant amounts of the CVOC in the all the Test reactors, rendering all the CVOCs in the baseline soils available to be volatilized over the 20-day period. It can be concluded from the low percentage of volatile losses of the three CVOCs. It should be noted that the low concentrations of 1,1-DCA and *cis*-1,2-DCE in the Zone B and Zone C soil were reduced to below detection after 1 day of ISCO reaction, and data for *cis*-1,2-DCE and all the CVOCs apart from PCE, TCE, and 1,1,1-TCA were below detection throughout the ISCO batch studies, and they are not discussed in this report.

Table 14. Final TCE concentration, % reduction in concentration, mass (mg) removed, cumulative mass (mg) stripped, and % of the mass stripped from the ISCO batch reactors.

Reactor	Zone	Oxidant/ Activator	Dose (g)	Final Conc. (mg/kg)	% Reduction	mg Removed	mg Stripped	% Stripped
1a	B	SPS/HP	5.51/2.36	BD*	100.0	15.8	0.42	2.66
1b	B	SPS/HP	11.02/4.73	BD	100.0	16.0	0.31	1.94
2a	B	SPS/HP	5.51/4.73	BD	100.0	16.3	0.44	2.70
2b	B	SPS/HP	11.02/9.45	BD	100.0	16.7	0.33	1.98
3a	B	SPS/NaOH	5.51/2.5	BD	100.0	16.2	0.67	4.14
3b	B	SPS/NaOH	11.02/7.5	BD	100.0	16.0	0.75	4.69
4a	B	SPS/NaOH	5.51/5.0	BD	100.0	16.2	0.13	4.80
4b	B	SPS/NaOH	11.02/15	BD	100.0	16.6	0.76	4.58
5a	B	SPS	5.51	BD	100.0	15.7	0.43	2.74
5b	B	SPS	11.02	BD	100.0	16.4	0.29	1.77
6	B	None	NA	19.8	16.8	3.1	3.31	106.77
7a	B	SPM	2.19	BD	100.0	15.6	0.43	2.76
7b	B	SPM	4.37	BD	100.0	16.2	0.18	1.11
8a	C	SPS/HP	11.02/4.73	BD	100.0	9.1	0.21	2.31
8b	C	SPS/HP	11.02/9.45	BD	100.0	9.6	0.18	1.88
8c	C	SPS	11.02	BD	100.0	8.8	0.19	2.16
9	C	SPM	4.37	BD	100.0	9.4	0.2	2.13
10	C	None	NA	13.2	13.7	2.7	2.68	99.26

*BD (below detection); MDL = 2 mg/kg.

Table 15. Final 1,1,1-TCA concentration, % reduction in concentration, mass (mg) removed, cumulative mass (mg) stripped, and % of the mass stripped from the ISCO batch reactors.

Reactor	Zone	Oxidant/ Activator	Dose (g)	Final Conc. (mg/kg)	% Reduction	mg Removed	mg Stripped	% Stripped
1a	B	SPS/HP	5.51/2.36	BD	100.0	3.8	0.13	3.42
1b	B	SPS/HP	11.02/4.73	BD	100.0	3.8	0.15	3.95
2a	B	SPS/HP	5.51/4.73	BD	100.0	3.8	0.12	3.16
2b	B	SPS/HP	11.02/9.45	BD	100.0	3.8	0.13	3.42
3a	B	SPS/NaOH	5.51/2.5	BD	100.0	3.8	0.43	11.32
3b	B	SPS/NaOH	11.02/7.5	BD	100.0	3.8	0.44	11.58
4a	B	SPS/NaOH	5.51/5.0	BD	100.0	3.8	0.41	10.79
4b	B	SPS/NaOH	11.02/15	BD	100.0	3.8	0.43	11.32
5a	B	SPS	5.51	BD	100.0	3.8	0.04	1.05
5b	B	SPS	11.02	BD	100.0	3.8	0.05	1.32
6	B	None	NA	4.3	8.5	0.3	0.30	100.00
7a	B	SPM	2.19	BD	100.0	3.8	0.23	2.53
7b	B	SPM	4.37	BD	100.0	3.8	0.08	2.11
8a	C	SPS/HP	11.02/4.73	BD	100.0	16.5	0.66	4.00
8b	C	SPS/HP	11.02/9.45	BD	100.0	16.9	0.54	3.20
8c	C	SPS	11.02	BD	100.0	15.5	0.65	4.19
9	C	SPM	4.37	BD	100.0	16.1	0.33	2.05
10	C	None	NA	19.5	7.6	1.0	0.8	80.00

*BD (below detection); MDL = 2 mg/kg.

Several other patterns are apparent in **Table 13**, **Table 14**, and **Table 15**. First, it is clear from the tests on Zone B soil that NaOH activation of SPS (Reactors 3a, 3b, 4a, and 4b) was much less effective in PCE degradation than was HP activation (Reactors 1a, 1b, 2a, and 2b) and self-activation (i.e., no activator added). For this reason, NaOH activation was not tested on Zone C soil. Except for NaOH activation of SPS in the Zone B soil, higher oxidant doses (SPS and SPM) achieved considerably greater PCE degradation than lower doses. While not surprising, this pattern is promising for field applications, because as more SPS and SPM are added, greater degradation of CVOCs can be expected. It is noteworthy that self-activated SPS performed similarly to HP activation, which would simplify applications and reduce chemical costs in the field. It is also clear that SPM achieved a percent PCE degradation similar to HP-activated and self-activated SPS in both Zone B and Zone C soil. In summary, the ISCO batch studies clearly showed that both SPS and SPM are likely to be effective at source removal of PCE, in both Zone B and Zone C. It is important to mention that the oxidant doses used in the ISCO batch studies were carefully selected as reasonable doses that can be applied in a single injection at the Site. During field applications, multiple ISCO injections have the potential to achieve much lower residual concentrations of PCE and other CVOCs than in these batch studies.

3.1.2.2 Measurements of pH & ORP in the ISCO Batch Reactors

Table 16 and **Table 17** list the values of pH measured at each sampling event in the ISCO batch reactors testing soil from Zone B and Zone C, respectively. The background pH in Zone B soil ranged from 6.8 to 7.2 (circum-neutral), and the background pH in Zone C soil ranged from approximately 6.4 to 6.7. Reactors 1a, 1b, 2a, & 2b and Reactors 8a & 8b showed initial decreases in pH from the background values of both soils, which is to be expected because both HP and SPS reduce pH. Reactors 3a, 3b, 4a, & 4b had pH values above 10.5 through Day 4, because of the NaOH added to activate the SPS. The reactors employing self-activated SPS (Reactors 5a, 5b, & 8c) showed a slight decrease in pH relative to each soil because SPS on its own also decreases the pH, though typically not as much as HP-activated SPS. It is important to note that the pH values in all reactors treating both Zone B and Zone C soil returned to the background pH values well before the experiments ended after 20 days, which can be attributed to the buffering capacity of soil.

Table 16. Values of pH measured at each sampling event in the thirteen ISCO batch reactors testing soil from Zone B.

Days	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6	7a	7b
1	6.0	5.8	5.9	5.6	10.8	10.7	10.8	10.9	6.6	6.5	7.0	7.0	7.1
2	6.5	6.6	6.4	5.9	10.8	10.8	10.8	10.8	6.7	6.6	7.1	6.9	7.0
4	6.9	7.0	6.8	6.9	10.6	10.7	10.6	10.7	6.6	6.6	7.0	7.1	6.9
6	7.0	7.0	7.1	6.9	10.1	10.2	10.0	10.1	6.8	6.6	7.1	7.1	7.1
9	7.1	7.0	7.0	6.9	8.8	8.9	8.7	8.8	6.9	6.7	7.0	7.0	7.0
13	6.9	7.0	7.1	7.0	7.7	7.9	7.6	7.8	6.9	6.9	6.9	6.9	6.9
17	7.1	7.1	7.0	7.0	7.2	7.1	7.0	7.0	7.0	7.1	7.0	7.0	7.0
20	6.9	7.0	7.1	6.9	6.9	7.0	7.1	7.1	7.1	7.0	6.9	7.0	6.9

Table 17. Values of pH measured at each sampling event in the five ISCO batch reactors testing soil from Zone C.

Days	8a	8b	8c	9	10
1	5.6	5.3	6.2	6.8	6.7
2	5.9	5.4	6.3	6.7	6.6
4	6.2	6.1	6.2	6.8	6.7
6	6.5	6.7	6.4	6.8	6.6
9	6.6	6.6	6.5	6.6	6.7
13	6.7	6.7	6.5	6.7	6.6
17	6.7	6.6	6.6	6.8	6.5
20	6.6	6.7	6.7	6.7	6.6

Table 18 and **Table 19** list the values of ORP measured at each sampling event in the ISCO batch reactors testing soil from Zone B and Zone C, respectively. The background ORP in Zone B soil ranged from 96 mV to 124 mV, and the background ORP in Zone C soil ranged from approximately 55 mV to 64 mV. In all the ISCO-dosed reactors (i.e., all except the Controls, Reactor 6 and Reactor 10), ORP values increased by Day 1 to values between 319 mV and 504. The maximum ORP values are common for the oxidants and doses used in the ISCO batch reactors. The highest doses of each oxidant and (activator for HP) resulted in the highest maximum ORP value, which is to be expected. All the ISCO-dosed reactors showed ORP values that reached or approached the background values towards the end of the 20-day reaction period, partly due to the oxidants becoming exhausted over time and partly due to the reactors being opened for soil sampling and measurements.

Table 18. Values of ORP measured at each sampling event in the thirteen ISCO batch reactors testing soil from Zone B.

Days	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6	7a	7b
1	340	389	365	504	321	359	376	425	319	359	114	360	502
2	307	413	341	521	268	359	335	413	277	351	107	372	479
4	277	404	419	478	283	391	307	386	286	359	102	360	513
6	331	381	406	515	288	351	336	377	247	351	109	372	500
9	271	307	310	404	233	275	323	370	301	359	113	358	489
13	136	224	247	253	195	191	229	250	249	288	124	286	438
17	92	166	176	179	147	154	154	171	165	205	97	202	364
20	98	104	92	99	112	121	114	139	113	162	96	142	205

Table 19. Values of ORP measured at each sampling event in the five ISCO batch reactors testing soil from Zone C.

Days	8a	8b	8c	9	10
1	410	466	359	484	55
2	389	504	360	526	58
4	426	475	359	489	64
6	368	468	366	472	59
9	300	397	285	461	62
13	150	261	155	409	60
17	92	168	102	346	57
20	65	123	54	207	59

3.1.3 ISCR Batch Reactors

3.1.3.1 Contaminant Measurements & Calculations in the ISCR Batch Reactors

ISCR batch studies were performed on soil from Zone B and Zone C. As was done for the ISCO batch studies, the data from the ISCR batch studies presented in the body of this report will focus on PCE. Tables summarizing the final, 20-day concentrations of PCE, TCE, and 1,1,1-TCA in the ISCR reactors and % removal of these CVOCs due to stripping will be presented in the body of the report. The measurements and calculations of PCE removal (overall and via volatilization) at each sampling event over the 20-day reaction period will also be presented in body of this report for PCE, whereas similar data for TCE and 1,1,1-TCA will be provided in **APPENDIX 2**. Reactor 3 (testing sorption onto GAC) involves CVOC measurements in pore water only, so the results for this batch reactor are discussed separately, at the end of this section.

Figure 13 shows a plot of the PCE concentrations in soil (in mg/kg) measured over the 20-day period in the six ISCR reactors treating Zone B soil (Reactors 1a, 1b, 1c, 1d, and 3 in **Table 7**). **Figure 14** shows a plot of the PCE concentrations in soil (in mg/kg) measured over the 20-day reaction period in the three ISCR reactors treating Zone C soil (Reactors 4a, 4b, & 5 in **Table 7**). The negative (nothing-added) Controls were Reactor 3 for Zone B and Reactor 5 for Zone C.

It can be concluded from **Figure 13** and **Figure 14** that ZVI effectively destroyed PCE via chemical reduction, and the higher ZVI doses resulted in lower PCE concentrations (i.e., a greater extent of PCE removal). To evaluate the impact of EVO on the ability of ZVI to destroy PCE, Reactor 4a and 4b received the same dose of ZVI, but Reactor 4a received a dose of EVO equal to the ZVI dose (10g) whereas Reactor 4b received no EVO (**Table 7**). The fact that Reactor 4a performed nearly as well as Reactor 4b indicates that the presence of EVO did not have a significant impact on the ability of ZVI to chemically reduce PCE in the Zone C soil. While no such direct test of the impact of EVO on ZVI was done on Zone B soil, the effectiveness of ZVI in reducing PCE concentrations in the presence of a wide range in EVO doses EVO indicates that EVO had little or no impact on Zone B soil either. The results indicate that ZVI can successfully destroy PCE in field applications. Moreover, the report from Microbial Insights (2021) indicates that the aquifer in Zone B is host to a robust consortium of organohalide-respiring bacteria, which can use the added EVO to further reduce concentrations of PCE and other CVOCs at the site.

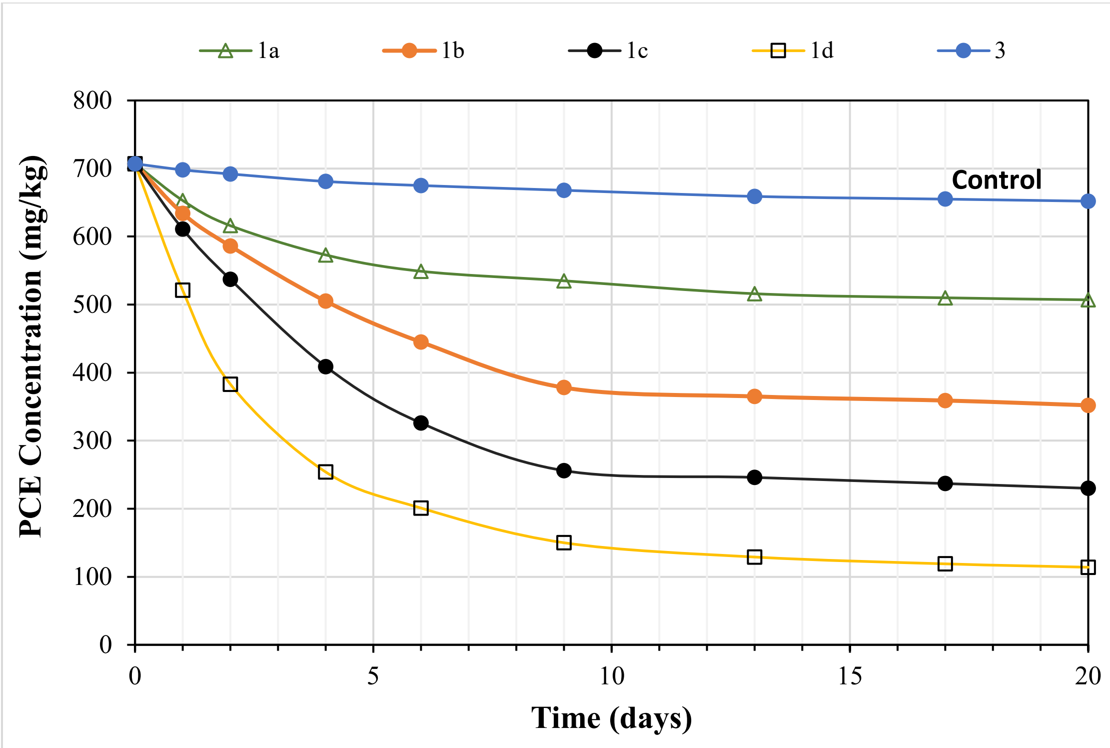

Figure 13. A plot of the PCE concentrations in soil (in mg/kg) measured over the 20-day reaction period in the five ISCR reactors treating Zone B soil.

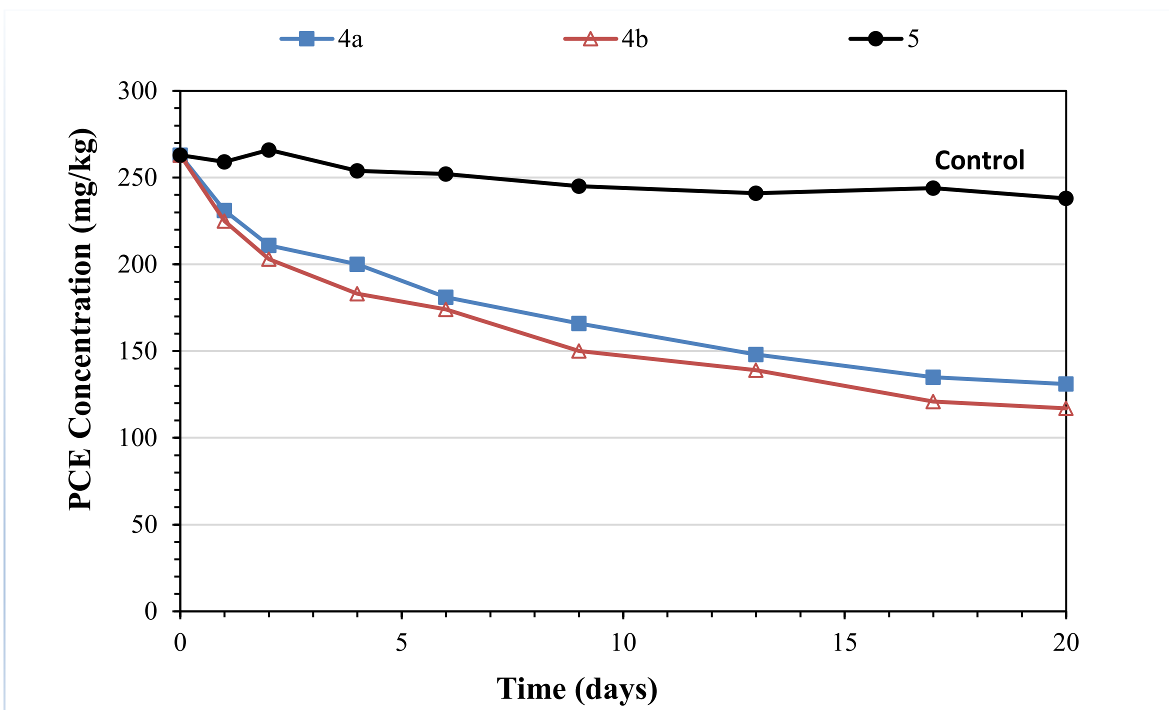

Figure 14. A plot of the PCE concentrations in soil (in mg/kg) measured over the 20-day reaction period in the three ISCR reactors treating Zone C soil.

Table 20 lists the PCE concentrations (in mg/kg) measured in the ISCR batch reactors at each sampling event (the data plotted in **Figure 13** and **Figure 14**). **Table 21** lists the calculated mass (in mg) of PCE removed during the ISCR reaction time between each sampling event, as the difference in concentration between each event (in mg/kg) multiplied by the mass of dry soil in the reactor (C_0-C_t) x soil mass). Note, these calculations take into account that 16 g of soil were sampled from each reactor at each sampling event. **Table 22** lists the mass (in mg) of PCE measured in the Tenax traps at each sampling event, and cumulatively over 20 days.

Table 20. PCE concentrations (mg/kg) measured in ISCR batch reactors at each sampling event.

Reactor	Zone	ZVI/EVO	Day 0	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	B	1.5/1.5	707	653	616	573	549	535	516	510	507
1b	B	3.0/4.5	707	634	586	505	445	378	365	359	352
1c	B	5.0/5.0	707	611	537	409	326	256	246	237	230
1d	B	10.0/15.0	707	521	383	254	201	150	129	119	114
3	B	None	707	698	692	681	675	668	659	655	652
4a	C	10.0/10.0	263	231	211	200	181	166	148	135	131
4b	C	10.0/None	263	225	203	183	174	150	139	121	117
5	C	None	263	259	266	254	252	245	241	244	238

Table 21. Calculated mass of PCE (in mg) removed between each sampling event in the ISCR batch reactors.

Reactor	Zone	ZVI/EVO	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	B	1.5/1.5	43.2	29.6	34.4	19.2	11.2	15.2	4.8	2.4
1b	B	3.0/4.5	58.4	38.4	64.8	48.0	53.6	10.4	4.8	5.6
1c	B	5.0/5.0	76.8	59.2	102.4	66.4	56.0	8.0	7.2	5.6
1d	B	10.0/15.0	148.8	110.4	103.2	42.4	40.8	16.8	8.0	4.0
3.0	B	None	7.2	4.8	8.8	4.8	5.6	7.2	3.2	2.4
4a	C	10.0/10.0	25.6	16.0	8.8	15.2	12.0	14.4	10.4	3.2
4b	C	10.0/None	30.4	17.6	16.0	7.2	19.2	8.8	14.4	3.2
5	C	None	3.2	-5.6	9.6	1.6	5.6	3.2	-2.4	4.8

Table 22. Mass (in mg*) of PCE measured in the Tenax traps at each sampling event in the ISCR reactors, and cumulatively (SUM) over 20 days.

Reactor	Zone	ZVI/EVO	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20	SUM
1a	B	1.5/1.5	0.43	0.30	0.34	0.19	0.11	0.15	0.05	0.02	1.60
1b	B	3.0/4.5	0.58	0.39	0.65	0.48	0.54	0.10	0.06	0.04	2.84
1c	B	5.0/5.0	0.65	0.48	0.56	0.48	0.63	0.10	0.08	0.07	3.06
1d	B	10.0/15.0	1.23	0.65	0.57	0.39	0.21	0.14	0.12	0.06	3.37
3	B	None	0.03	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.10
4a	C	10.0/10.0	0.17	0.16	0.14	0.09	0.06	0.05	0.04	0.03	0.74
4b	C	10.0/None	0.40	0.45	0.30	0.13	0.08	0.15	0.19	0.16	1.86
5	C	None	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.08

Table 23 is a summary table for PCE measurements and calculations in the ISCR batch reactors that lists the final (20-day) PCE concentration in soil, the % reduction in PCE concentration after 20 days, the mass (mg) of PCE removed from the reactors over 20 days, the cumulative mass (mg) of PCE stripped and measured in the Tenax tubes in ISCR batch reactors over 20 days, and the % of the total mass of PCE removed due to stripping (i.e., mg stripped/mg removed). **Table 24** and **Table 25** are the equivalent summary tables for TCE and 1,1,1-TCA, respectively.

Table 23. Final PCE concentration, % reduction in concentration, mass (mg) removed, cumulative mass (mg) stripped, and % of the mass stripped from the ISCR batch reactors.

Reactor	Zone	ZVI/EVO (g)	% Conc. Reduction	mg Removed	mg Stripped	% Stripped
1a	B	1.5/1.5	28	160.0	1.70	0.94
1b	B	3.0/4.5	50	284.0	2.78	1.02
1c	B	5.0/5.0	67	381.6	2.91	1.31
1d	B	10.0/15.0	84	474.4	3.25	1.46
3	B	None	8	44.0	0.06	84.63
4a	C	10.0/10.0	50	105.6	0.73	1.44
4b	C	10.0/None	56	116.8	0.85	1.37
5	C	None	10	20.0	0.04	72.5

Table 24. Final TCE concentration, % reduction in concentration, mass (mg) removed, cumulative mass (mg) stripped, and % of the mass stripped from the ISCR batch reactors..

Reactor	Zone	ZVI/EVO (g)	% Reduction	mg Removed	mg Stripped	% Stripped
1a	B	1.5/1.5	100	19.0	0.17	0.89
1b	B	3.0/4.5	100	19.0	0.18	0.95
1c	B	5.0/5.0	100	19.0	0.19	1.00
1d	B	10.0/15.0	100	19.0	0.34	1.79
3	B	None	10	1.9	1.66	86.46
4a	C	10.0/10.0	100	12.2	0.06	0.49
4b	C	10.0/None	100	12.2	0.08	0.66
5	C	None	11	1.4	1.29	94.85

Table 25. Final 1,1,1-TCA concentration, % reduction in concentration, mass (mg) removed, cumulative mass (mg) stripped, and % of the mass stripped from the ISCR batch reactors.

Reactor	Zone	ZVI/EVO (g)	% Reduction	mg Removed	mg Stripped	% Stripped
1a	B	1.5/1.5	100	3.76	0.33	8.78
1b	B	3.0/4.5	100	3.76	0.05	1.33
1c	B	5.0/5.0	100	3.76	0.06	1.60
1d	B	10.0/15.0	100	3.76	0.08	2.13
3	B	None	10	0.40	0.38	95.00
4a	C	10.0/10.0	100	16.88	0.14	0.83
4b	C	10.0/None	100	16.88	0.19	1.13
5	C	None	11	1.28	1.13	88.28

The data in **Table 23**, **Table 24**, and **Table 25** and the relevant tables in **APPENDIX 2** (**Table 2.1**, **Table 2.2**, **Table 2.3**) show that ZVI achieved significant removal of PCE, TCE, and 1,1,1-TCA in both the Zone B and Zone C soils. It should be noted that the low concentrations of 1,1-DCA and *cis*-1,2-DCE in the Zone B and Zone C soil were reduced to below detection after 1 day of ISCR reaction, and data for all the CVOCs apart from PCE, TCE, and 1,1,1-TCA were below detection throughout the ISCR batch studies, and they are not discussed in this report. The low degree of reduction in the concentrations of the CVOCs in the Controls (Reactor 3 for Zone B and Reactor 5 for Zone C) and the small percentage of the mass of CVOCs removed via stripping in the Test reactors make it clear that the primary mechanism for the CVOCs removal was chemical reduction. It is also noteworthy that the performance of ZVI vis-à-vis destruction of the PCE was dose dependent and increased considerably with each increasing dose of ZVI (compared Reactors 1a, 1b, 1c, and 1d). The removal of PCE in the Zone B soil was 84% for the highest ZVI dose (Reactor 1d). These results indicate that ZVI is an excellent candidate for use in ISCR PRBs at the Site, and that each episode of ZVI injection will pay off in terms of the destruction of PCE and the other CVOCs. In some cases, ZVI treatment of PCE can result in temporary accumulation of TCE. However, this clearly did not occur in the Zone B or Zone C soils at the Site, as the TCE concentrations decreased steadily from the baseline concentrations (**Table 2.1**, **Table 2.2**, **Table 2.3** in **APPENDIX 2**). Finally, the results from the ISCR batch reactors indicate that addition of EVO with ZVI does not interfere with the chemical reduction of CVOC achieved by ZVI (cf. Reactors 4a and 4b and note the increasing dose of EVO from Reactor 1a through 1d). This outcome bodes well for the application of EVO to promote the anaerobic biodegradation of CVOCs by native bacteria in the aquifer in Zone B, which will provide polishing of the CVOCs as groundwater moves downgradient from the ISCR PRBs.

3.1.3.2 GAC Adsorption of CVOCs in the ISCR Batch Reactors

ISCO batch Reactor 2 in **Table 7** tested adsorption of CVOCs in Zone B soil and groundwater onto GAC. Because water, not soil, was the medium analyzed in this reactor, the data are presented and discussed separately from the other ISCR batch reactors. GAC is not an ISCR amendment but is often used in ISCR PRBs with the other ISCR amendments tested. GAC is also often used as the sole amendment in a PRB, and it is possible that one of the PRBs at the site may only contain GAC. To evaluate the performance of GAC in Reactor 2, pore water from this reactor was passed through a 0.45-µm filter after 20 days of reaction, and the CVOCs in the filtrate were quantified using EPA Method 8260. A dedicated Control reactor (different from the Control for Zone B soil (Reactor 3) was set up, left to react for 20 days, after which the pore water was sampled and analyzed. The results are shown in **Table 26**, which lists the concentrations of the CVOCs measured in untreated pore water from the Control and in GAC-treated pore water from Reactor 2, and also lists the calculated values for in the percent removal of concentration and the mass (in µg) removed from pore water. Only CVOCs above detection are listed. GAC treatment reduced concentrations of 1,1-DCA, *cis*-1,2-DCE, and *trans*-1,2-DCE in pore water to below detection. PCE and TCE concentrations in pore water were reduced by 44.7% and 96.4%, respectively. The mass of PCE and TCE removed by were approximately 37 µg and 11 µg/, respectively. The results in **Table 26** indicate that GAC will be effective at removing PCE, TCE, and the other CVOCs from groundwater in a PRB at the site. In the experience of Perivallon, the performance of GAC is not negatively impacted by the other ISCR amendments, so GAC can be used in PRBs at the Site alone or combined with ZVI and/or EVO.

Table 26. Concentrations (in µg/L) of CVOCs in filtered pore water from Zone B soil after 20 days of contact with GAC and a Control with no GAC. Note, only CVOCs above detection are listed, and those below the MDL are not included.

---	PCE	TCE	1,1,1-TCA	1,1-DCA	*cis*-1,2-DCE	*trans*-1,2-DCE
No GAC	472	65.8	16.9	4.7	23.6	0.62
GAC-Treated	261	2.4	BD*	BD	BD	BD
% Removed	44.7	96.4	100	100	100	100
µg Removed	36.93	11.10	2.96	0.83	4.13	0.11

*BD (below detection); MDL = 0.3 µg/L.

3.1.3.3 Measurements of pH & ORP in the ISCR Batch Reactors

Table 27 lists the pH values measured at each sampling event in the ISCR batch reactors testing soil from Zone B and Zone C. The pH values measured rose significantly in the reactors dosed with ZVI (Reactors 1a, 1b, 1c, 1d, 4a, & 4b), to values above 9.0 in Reactors 1d, 4a, & 4b, which received the highest dose of ZVI. However, the pH in all the ZVI-dosed reactors returned to the baseline values in each soil by Day 6, because of the buffering capacity of soil. ZVI is known to increase the pH, and the maximum values observed are not out of the ordinary.

Table 27. Values of pH measured at each sampling event in the ISCR batch reactors testing soil from both Zone B and Zone C.

Days	1a	1b	1c	1d	3	4a	4b	5
1	8.1	8.4	8.8	9.1	7.0	9.1	9.2	6.7
2	7.4	8.0	8.4	8.6	7.1	7.9	7.8	6.6
4	7.1	7.4	8.0	7.4	7.0	7.3	7.2	6.7
6	7.1	7.0	7.2	7.1	7.1	6.7	6.5	6.6
9	7.0	7.0	7.0	7.0	7.0	6.5	6.6	6.7
13	6.9	6.9	7.1	6.9	6.9	6.5	6.4	6.6
17	7.0	7.1	6.9	7.1	7.0	6.4	6.5	6.5
20	7.0	6.9	7.1	7.0	6.9	6.5	6.6	6.6

Table 28 lists the values of ORP measured at each sampling event in the ISCR batch reactors testing soil from Zone B and Zone C. In all the ZVI-dosed reactors ORP measurements increased to values between -142 mV and -320 by Day 1, and continued to increase slightly until approximately Day 6, after which they began to decrease. The maximum negative ORP values were greater as the ZVI dose increased. The decrease in ORP values after Day 6 can be explained by the reaction of all the ZVI and the fact that the reactors were opened for sampling.

The negative ORP values achieved were well within the range of what is required for anaerobic dehalogenation of the CVOCs, which can polish CVOCs in groundwater further downgradient than the distance of influence from the ZVI. Finally, the difference in the pH and ORP values observed in Reactor 4a vs Reactor 4b demonstrates that the presence of EVO did not negatively impact the ability of ZVI to reach desirable ORP values.

Table 28 lists the values of ORP measured at each sampling event in the ISCR batch reactors testing soil from both Zone B and Zone C.

Days	1a	1b	1c	1d	3	4a	4b	5
1	-142	-266	-268	-309	114	-320	-304	55
2	-139	-276	-296	-362	107	-371	-354	58
4	-151	-255	-304	-349	102	-358	-362	64
6	-143	-271	-319	-361	109	-349	-354	59
9	-156	-249	-297	-314	113	-330	-332	62
13	-116	-195	-186	-269	124	-267	-281	60
17	-87	-128	-150	-204	97	-228	-233	57
20	-43	-87	-102	-178	96	-188	-192	59

3.2 Column Reactors

3.2.1 Contaminant Measurements in the Column Reactors

The concentrations (in µg/L) of PCE, TCE, *cis*-1,2-DCA, 1,1,1-TCA, and 1,1-DCA measured in influent water to the columns and in the effluent water from Columns 1, 4, and 6 are listed in **Table 29**, **Table 30**, **Table 31**, **Table 32**, and **Table 33**, respectively. All the other CVOCs (*trans*-1,2-DCE, 1,1-DCE, VC, 1,2-DCA, and MC) were present in the influent water at concentrations slightly above the detection limit (**Table 3**) and by Day 1 were below detection in the effluent to Columns 1, 4, and 6, and remained so throughout the 20 days of operation.

Concentrations of all the CVOCs in the tables below were nearly identical in the influent and in the effluent from Column 1 (the Control column, with nothing added by untreated soil from Zone B). This observation demonstrates that Column 1 was a valid control. PCE concentrations (**Table 29**) were reduced from approximately 780 µg/L in the influent to below detection (BD) by day 9 in Column 4 and by day 11 in Column 6. Concentrations of CVOCs other than PCE also decreased to below detection, first in effluent from Column 4 and a day or two later, in effluent from Column 6 (**Tables 30**, **31**, **32**, & **33**). All CVOCs remained below detection throughout the 20 days, except for PCE concentrations in Column 6 effluent, which increased to 0.42 µg/L on day 18 and continued to increase to 1.6 µg/L on day 20. This can be explained by the fact that effluent from Column 6 had only been treated with ZVI (Column 5) followed by GAC (Column 6), whereas effluent from Column 4 represented water treated first by ISCO (bottom half of Column 2), and then by ZVI (Column 3) and GAC (Column 4). The chemical oxidation of PCE achieved by SPS would have greatly reduced the mass of PCE entering the ZVI- and GAC-amended columns (see results from the ISCO batch reactors above). This explains the observation that PCE concentrations remained below detection longer in Column 4 effluent than in Column 6 effluent. The treatment train tested in Columns 2, 3, and 4 included untreated soil in the top half of Column 2 (downgradient from ISCO), which was intentionally designed to simulate conditions in the field, where there will be untreated aquifer between the ISCO treatment area and ISCR-PRB. Doses of SPS and ZVI in the column studies were the same as those used in the batch reactors. It should be noted that, if the column reactors had been operated for more than 20 days, the concentrations of PCE in the effluent from Column 4 (**Table 29**), and the other CVOCs in effluent from Column 4 and Column 6 (**Tables 30**, **31**, **32**, & **33**) would eventually have increased to steady-state concentrations similar to their respective concentrations in the influent. The reaction time of the SPS and ZVI is on the order of several days, after which no further chemical destruction of CVOCs takes place. Likewise, the GAC eventually becomes saturated with CVOCs, and no further removal of CVOCs from pore water takes place.

The CVOC measurements in effluent from the columns demonstrate that both treatment trains tested (ISCO→ISCR→GAC and ISCR→GAC) were able to temporarily reduce very high PCE concentrations in water to below detection, with only one application. The concentrations of the other CVOCs were also reduced to below detection in effluent from these two treatment trains. The results from these column studies are very encouraging and suggest that the proposed placement of PRBs with ISCO and ISCR amendments at the Site have a very good chance of being successful, especially if multiple applications/injections of these amendments are done. Also, during in-situ application, subsequent bioremediation through reductive dechlorination would be expected to become an ongoing remedial mechanism once ISCO, ZVI-induced abiotic ISCR, and GAC adsorption is depleted. This subsequent bioremediation may also extend the adsorptive capacity of in-situ GAC.

Table 29. Concentrations (in μg/L) of PCE measured in the influent and in effluent from Columns 1, 4, and 6.

Day	Influent	Column 1 Effluent	Column 4 Effluent	Column 6 Effluent
1	784	784	631	646
2	786	767	525	519
3	784	782	397	414
4	765	772	274	303
5	782	793	168	182
6	784	765	51	95
7	795	769	6.6	44
8	785	783	0.59	12.6
9	774	775	BD*	4.7
10	801	773	BD	0.46
11	786	786	BD	BD
12	784	788	BD	BD
13	777	767	BD	BD
14	793	790	BD	BD
15	784	789	BD	BD
16	768	770	BD	BD
17	776	773	BD	BD
18	762	773	BD	0.42
19	784	769	BD	0.92
20	774	788	BD	1.6

*BD=Below Detection (0.30 μg/L).

Table 30. Concentrations (in μg/L) of TCE measured in the influent and in effluent from Columns 1, 4, and 6.

Day	Influent	Column 1 Effluent	Column 4 Effluent	Column 6 Effluent
1	142	149	103	111
2	150	148	51	66
3	141	143	16.4	23
4	149	136	3.9	7.1
5	156	142	0.62	0.84
6	152	138	BD*	BD
7	145	146	BD	BD
8	139	147	BD	BD
9	150	132	BD	BD
10	138	154	BD	BD
11	142	151	BD	BD
12	149	146	BD	BD
13	151	144	BD	BD
14	154	153	BD	BD
15	141	147	BD	BD
16	138	141	BD	BD
17	147	140	BD	BD
18	150	138	BD	BD
19	145	142	BD	BD
20	143	146	BD	BD

*BD=Below Detection (0.30 μg/L).

Table 31. Concentrations (in µg/L) of *cis*-1,2-DCA measured in the influent and in effluent from Columns 1, 4, and 6.

Day	Influent	Column 1 Effluent	Column 4 Effluent	Column 6 Effluent
1	318	320	327	323
2	323	326	241	264
3	326	311	142	183
4	320	323	96	119
5	320	331	61	69
6	313	312	12.4	18.2
7	315	324	2.6	5.1
8	326	324	BD*	0.53
9	311	318	BD	0.53
10	322	334	BD	BD
11	321	327	BD	BD
12	323	330	BD	BD
13	312	326	BD	BD
14	310	319	BD	BD
15	334	325	BD	BD
16	319	322	BD	BD
17	324	317	BD	BD
18	325	332	BD	BD
19	320	315	BD	BD
20	326	326	BD	BD

*BD=Below Detection (0.30 µg/L).

Table 32. Concentrations (in µg/L) of 1,1,1-TCA measured in the influent and in effluent from Columns 1, 4, and 6.

Day	Influent	Column 1 Effluent	Column 4 Effluent	Column 6 Effluent
1	34.9	34.7	33.4	32.0
2	29.6	29.4	15.6	17.0
3	35.1	34.9	4.38	4.92
4	33.2	33	0.39	0.51
5	27.8	27.6	BD*	BD
6	31.8	31.6	BD	BD
7	30.8	30.6	BD	BD
8	31.2	31	BD	BD
9	26.9	26.7	BD	BD
10	30.5	30.3	BD	BD
11	29.6	29.4	BD	BD
12	33.7	33.5	BD	BD
13	31.6	31.4	BD	BD
14	33.2	33	BD	BD
15	28.8	28.6	BD	BD
16	27.0	26.8	BD	BD
17	36.9	36.7	BD	BD
18	34.2	34	BD	BD
19	35.6	35.4	BD	BD
20	31.1	30.9	BD	BD

*BD=Below Detection (0.30 µg/L).

Table 33. Concentrations (in µg/L) of 1,1-DCA measured in the influent and in effluent from Columns 1, 4, and 6.

Day	Influent	Column 1 Effluent	Column 4 Effluent	Column 6 Effluent
1	18.7	18.9	21.7	19.8
2	19.6	24.9	11.9	13.1
3	22.5	22.7	4.3	5.5
4	23.7	23.9	BD*	0.46
5	20.2	26.4	BD	BD
6	21.8	22.0	BD	BD
7	17.9	23.5	BD	BD
8	25.7	25.9	BD	BD
9	20.9	21.1	BD	BD
10	22.0	22.2	BD	BD
11	18.8	23.7	BD	BD
12	19.5	19.7	BD	BD
13	19.7	19.9	BD	BD
14	20.4	25.2	BD	BD
15	20.8	21.0	BD	BD
16	22.5	22.7	BD	BD
17	23.1	23.3	BD	BD
18	19.9	20.1	BD	BD
19	20.5	24.1	BD	BD
20	20.6	20.8	BD	BD

*BD=Below Detection (0.30 µg/L).

3.2.2 Measurements of pH & ORP in the Column Reactors

Values of pH and ORP measured in the influent to the columns and in effluent from Columns 1, 4, and 6 are listed in **Table 34** and **Table 35**, respectively. The measured pH values in the influent and in the all the effluent from Columns 1, 4, and 6 were all very similar and were circum-neutral. ORP values in the influent and the effluent from Column 1 were very similar, ranging from approximately +95 mV to +120 mV. By Day 7, ORP values in the effluent from both Column 4 and Column 6 were below -100 mV, which is the well-accepted threshold ORP below which halorespiring bacteria begin to degrade CVOCs. ORP values remained below -100 mV throughout the 20-day period, ranging from approximately -150 mV to -170 mV in effluent from Column 4, and approximately -185 mV to -205 mV in effluent from Column 6. The drop in ORP in effluent from Column 4 and Column 6 is due to the up-gradient ISCR treatment in

Column 3 and Column 5, respectively. If the columns had operated long enough, we would naturally expect ORP values in effluent from Columns 4 and 6 to eventually have increased to steady-state values similar to those in the influent. However, it is worth noting that, even with an up-gradient ISCO treatment in the bottom half of Column 2, the ISCR treatment in Column 3 was able to drive OPR values down to below -100 mV in the effluent from Column 4. The GAC would not be expected to have any effect on ORP values across Column 4. The results from the column studies indicate that the design for placement of the ISCO treatment areas and ISCR-PRBs at the Site will likely be effective at reducing concentrations of PCE and other CVOCs.

Table 34. Measurements of pH in the influent and in effluent from Columns 1, 4, and 6.

Day	Influent	Column 1 Effluent	Column 4 Effluent	Column 6 Effluent
1	7.1	6.8	7.1	7.0
2	7.0	6.9	6.8	6.9
3	7.1	7.1	7.0	7.0
4	7.2	6.9	6.9	6.8
5	6.9	7.0	7.1	7.1
6	6.8	7.2	6.9	7.0
7	6.9	7.1	7.0	7.1
8	7.1	7.0	7.2	7.2
9	6.8	6.9	7.1	6.9
10	7.0	7.1	6.9	6.8
11	6.9	7.2	6.8	6.9
12	7.0	6.9	6.9	7.0
13	7.2	6.8	7.1	7.2
14	7.1	6.9	6.8	7.1
15	7.0	7.1	7.2	7.0
16	7.1	6.8	7.1	6.9
17	6.9	6.9	7.0	6.9
18	7.1	7.1	7.1	6.8
19	7.0	6.8	6.9	6.9
20	7.1	7.0	7.0	7.1

Table 35. Values of ORP (in mV) in the influent and in effluent from Columns 1, 4, and 6.

Day	Influent	Column 1 Effluent	Column 4 Effluent	Column 6 Effluent
1	105	104	88	75
2	97	96	62	58
3	115	111	34	28
4	101	100	7	-6
5	89	98	-21	-39
6	96	92	-62	-81
7	108	99	-104	-119
8	113	120	-121	-133
9	104	101	-134	-158
10	97	109	-152	-184
11	96	95	-167	-193
12	100	107	-155	-186
13	121	112	-160	-200
14	102	103	-163	-182
15	110	96	-152	-205
16	96	95	-171	-191
17	108	107	-166	-184
18	119	112	-159	-197
19	104	103	-162	-201
20	97	96	-151	-189

4.0 CONCLUSIONS

PCE, the primary contaminant, and other CVOCs were effectively degraded by the ISCO amendments sodium persulfate and sodium permanganate, and by the ISCR amendment ZVI. Both ISCO and ISCR reduced concentrations of PCE by over 80% in soil in the batch reactors and in porewater in the column reactors. This means that both ISCO and ZVI can effectively remove an important mass of PCE and other CVOCs in a PRB, which will greatly reduce concentrations downgradient. Furthermore, the ability of ZVI to degrade PCE and other CVOCs was not impacted by the presence of EVO, and ZVI effectively reduced ORP to values lower than -100 mV, necessary for halorespiring bacteria that biodegrade CVOCs. This is significant because ISCR-PRBs dosed with both ZVI and EVO will result in significant degradation of CVOCs by ZVI near PRB and will promote anaerobic biodegradation of CVOCs at a significant distance downgradient the PRB, which will provide a polishing effect. Finally, GAC treatment was very effective at significantly reducing concentrations of PCE and other CVOCs via adsorption. At the Site, GAC can be used in a PRB as a sole amendment or with ZVI and EVO.

The results of these bench-scale tests will be used to support the in-situ remedy design with respect to ISCO and ISCR reagents selected, doses applied, and formulations for the PRBs. Given the rate of groundwater flow and pore volume exchanges in the column studies being approximately 5-times that of natural groundwater flow rates, the results can also provide insight into the timing for subsequent remedial injection events for ISCO and/or ISCR treatment areas.

5.0 REFERENCES

IWM Consulting Group, LLC. (2022). Second Supplemental Corrective Measures Study (SSCMS), Franklin Power Products, Inc./Amphenol Corporation. Former Bendix Facility, Administrative Order on Consent, Docket #R8H-5-99-002, EPA ID # IND 044 587 848, 980 Hurricane Road, Franklin, Indiana 46131.

Liang C, Huang CF, Mohanty N, Kurakalva RM. (2008). A rapid spectrophotometric determination of persulfate anion in ISCO, *Chemosphere*, **73(9)**: 1540–1543, doi.org/10.1016/j.chemosphere.2008.08.043.

McBeath ST, Wilkinson DP, Graham NJD. (2020). Quantification of aqueous permanganate: Direct and indirect spectrophotometric determination for water treatment processes, *Chemosphere*, 251: 126626, doi.org/10.1016/j.chemosphere.2020.126626.

Microbial Insights (2021). SITE LOGIC Report, QuantArray®-Chlor Study for the Former Amphenol Facility, IN.AMP18.02.

Solvay. (2008). Hydrogen Peroxide Concentration Determination-Technical Data Sheet, Solvay & Cie., Method FN 1167/01.

Sun C, Chen C, Ma W, Zhao J. (2011). Photodegradation of organic pollutants catalyzed by iron species under visible light irradiation, *Physical Chemistry Chemical Physics*, **13(6)**: 1957-1969, DOI:10.1039/c0cp01203c

6.0 APPENDICES

APPENDIX	TITLE
1	Data from the ISCO batch reactors for TCE and 1,1,1-TCA equivalent to Table 10, Table 11, and Table 12 in the body of the report.
2	Data from the ISCO batch reactors for TCE and 1,1,1-TCA equivalent to Table 16, Table 17, and Table 18 in the body of the report.

APPENDIX 1: Data from the ISCO batch reactors for TCE and 1,1,1-TCA equivalent to Table 10, Table 11, and Table 12 in the body of the report.

Table 1.1. TCE concentrations (mg/kg) measured in soil in the ISCO batch reactors at each sampling event.

Reactor	Oxidant	Zone	Day 0	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	SPS	B	23.8	9.8	4.0	BD	BD	BD	BD	BD	BD
1b	SPS	B	23.8	3.8	BD	BD	BD	BD	BD	BD	BD
2a	SPS	B	23.8	9.0	3.4	BD	BD	BD	BD	BD	BD
2b	SPS	B	23.8	2.9	BD	BD	BD	BD	BD	BD	BD
3a	SPS	B	23.8	13.3	5.4	3.5	BD	BD	BD	BD	BD
3b	SPS	B	23.8	14.6	6.3	3.8	BD	BD	BD	BD	BD
4a	SPS	B	23.8	9.2	3.5	BD	BD	BD	BD	BD	BD
4b	SPS	B	23.8	16.4	8.4	3.2	BD	BD	BD	BD	BD
5a	SPS	B	23.8	10.1	4.3	BD	BD	BD	BD	BD	BD
5b	SPS	B	23.8	3.3	BD	BD	BD	BD	BD	BD	BD
6	None	B	23.8	23.4	22.9	21.8	22.4	21.6	20.7	20.4	19.8
7a	SPM	B	23.8	10.9	4.3	BD	BD	BD	BD	BD	BD
7b	SPM	B	23.8	3.5	BD	BD	BD	BD	BD	BD	BD
8a	SPS	C	15.3	3.9	BD	BD	BD	BD	BD	BD	BD
8b	SPS	C	15.3	3.3	BD	BD	BD	BD	BD	BD	BD
8c	SPS	C	15.3	4.3	BD	BD	BD	BD	BD	BD	BD
9	SPM	C	15.3	3.5	BD	BD	BD	BD	BD	BD	BD
10	None	C	15.3	15.1	14.8	14.1	14.4	14.0	13.8	13.5	13.2

*BD (below detection); MDL = 2 mg/kg.

Table 1.2. Calculated mass (mg) of TCE removed during the reaction time between each sampling event in the ISCO batch reactors.

Reactor	Oxidant	Zone	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	SPS	B	11.2	4.6	0.0	0.0	0.0	0.0	0.0	0.0
1b	SPS	B	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2a	SPS	B	11.8	4.5	0.0	0.0	0.0	0.0	0.0	0.0
2b	SPS	B	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3a	SPS	B	8.4	6.3	1.5	0.0	0.0	0.0	0.0	0.0
3b	SPS	B	7.4	6.6	2.0	0.0	0.0	0.0	0.0	0.0
4a	SPS	B	11.7	4.5	0.0	0.0	0.0	0.0	0.0	0.0
4b	SPS	B	6.0	6.4	4.2	0.0	0.0	0.0	0.0	0.0
5a	SPS	B	11.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0
5b	SPS	B	16.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	None	B	0.3	0.4	0.9	-0.5	0.6	0.7	0.2	0.5
7a	SPM	B	10.3	5.3	0.0	0.0	0.0	0.0	0.0	0.0
7b	SPM	B	16.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8a	SPS	C	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8b	SPS	C	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8c	SPS	C	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	SPM	C	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	None	C	0.2	0.2	0.6	-0.2	0.3	0.2	0.2	0.2

Table 1.3. Measured mass (mg*) of TCE measured in the Tenax traps at each sampling event in the ISCO batch reactors, and the cumulative mass after 20 days (SUM).

Reactor	Oxidant	Zone	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20	SUM
1a	SPS	B	0.28	0.14	BD	BD	BD	BD	BD	BD	0.42
1b	SPS	B	0.31	0.17	BD	BD	BD	BD	BD	BD	0.31
2a	SPS	B	0.29	0.15	BD	BD	BD	BD	BD	BD	0.44
2b	SPS	B	0.33	0.12	BD	BD	BD	BD	BD	BD	0.33
3a	SPS	B	0.32	0.23	0.12	BD	BD	BD	BD	BD	0.67
3b	SPS	B	0.36	0.25	0.14	BD	BD	BD	BD	BD	0.75
4a	SPS	B	0.09	0.04	BD	BD	BD	BD	BD	BD	0.13
4b	SPS	B	0.34	0.27	0.15	BD	BD	BD	BD	BD	0.76
5a	SPS	B	0.27	0.16	BD	BD	BD	BD	BD	BD	0.43
5b	SPS	B	0.29	0.15	BD	BD	BD	BD	BD	BD	0.29
6	None	B	0.27	0.36	0.67	0.52	0.41	0.45	0.22	0.41	3.31
7a	SPM	B	0.29	0.14	BD	BD	BD	BD	BD	BD	0.43
7b	SPM	B	0.18	BD	BD	BD	BD	BD	BD	BD	0.18
8a	SPS	C	0.21	BD	BD	BD	BD	BD	BD	BD	0.21
8b	SPS	C	0.18	BD	BD	BD	BD	BD	BD	BD	0.18
8c	SPS	C	0.19	BD	BD	BD	BD	BD	BD	BD	0.19
9	SPM	C	0.20	BD	BD	BD	BD	BD	BD	BD	0.20
10	None	C	0.46	0.46	0.41	0.33	0.36	0.27	0.20	0.19	2.68

*The method detection limit (MDL) for quantifying PCE in each Tenax trap was 0.010 mg.

Table 1.4. 1,1,1-TCA concentrations (mg/kg) measured in soil in the ISCO batch reactors at each sampling event.

Reactor	Oxidant	Zone	Day 0	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	SPS	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
1b	SPS	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
2a	SPS	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
2b	SPS	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
3a	SPS	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
3b	SPS	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
4a	SPS	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
4b	SPS	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
5a	SPS	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
5b	SPS	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
6	None	B	4.7	4.6	4.6	4.5	4.4	4.5	4.4	4.4	4.3
7a	SPM	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
7b	SPM	B	4.7	BD	BD	BD	BD	BD	BD	BD	BD
8a	SPS	C	21.1	12.5	3.2	BD	BD	BD	BD	BD	BD
8b	SPS	C	21.1	10.4	BD	BD	BD	BD	BD	BD	BD
8c	SPS	C	21.1	16.0	5.8	BD	BD	BD	BD	BD	BD
9	SPM	C	21.1	16.3	12.1	5.2	BD	BD	BD	BD	BD
10	None	C	21.1	20.5	20.3	20.4	20.1	19.9	19.8	20.1	19.9

*BD (below detection); MDL = 2 mg/kg.

Table 1.5. Calculated mass (mg) of 1,1,1-TCA removed during the reaction time between each sampling event in the ISCO batch reactors.

Reactor	Oxidant	Zone	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	SPS	B	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1b	SPS	B	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2a	SPS	B	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2b	SPS	B	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3a	SPS	B	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3b	SPS	B	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4a	SPS	B	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4b	SPS	B	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5a	SPS	B	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5b	SPS	B	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	None	B	0.1	0.0	0.1	0.1	-0.1	0.1	0.0	0.1
7a	SPM	B	3.8	5.3	0.0	0.0	0.0	0.0	0.0	0.0
7b	SPM	B	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8a	SPS	C	6.9	7.1	2.6	0.0	0.0	0.0	0.0	0.0
8b	SPS	C	8.6	8.3	0.0	0.0	0.0	0.0	0.0	0.0
8c	SPS	C	4.1	6.8	4.6	0.0	0.0	0.0	0.0	0.0
9	SPM	C	3.8	3.4	4.7	4.2	0.0	0.0	0.0	0.0
10	None	C	0.48	0.16	-0.08	0.24	0.16	0.08	-0.24	0.16

Table 1.6. Measured mass (mg*) of 1,1,1-TCA measured in the Tenax traps at each sampling event in the ISCO batch reactors, and the cumulative mass after 20 days (SUM).

Reactor	Oxidant	Zone	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20	SUM
1a	SPS	B	0.13	BD	BD	BD	BD	BD	BD	BD	0.13
1b	SPS	B	0.15	BD	BD	BD	BD	BD	BD	BD	0.15
2a	SPS	B	0.12	BD	BD	BD	BD	BD	BD	BD	0.12
2b	SPS	B	0.13	BD	BD	BD	BD	BD	BD	BD	0.13
3a	SPS	B	0.17	0.13	0.11	BD	0.02	BD	BD	BD	0.43
3b	SPS	B	0.17	0.14	0.13	BD	BD	BD	BD	BD	0.44
4a	SPS	B	0.16	0.13	0.12	BD	BD	BD	BD	BD	0.41
4b	SPS	B	0.17	0.14	0.12	BD	BD	BD	BD	BD	0.43
5a	SPS	B	0.02	0.02	BD	BD	BD	BD	BD	BD	0.04
5b	SPS	B	0.03	0.02	BD	BD	BD	BD	BD	BD	0.05
6	None	B	0.30	BD	BD	BD	BD	BD	BD	BD	0.30
7a	SPM	B	0.13	0.10	BD	BD	BD	BD	BD	BD	0.23
7b	SPM	B	0.04	0.03	BD	BD	BD	BD	BD	BD	0.08
8a	SPS	C	0.31	0.22	0.13	BD	BD	BD	BD	BD	0.66
8b	SPS	C	0.30	0.24	BD	BD	BD	BD	BD	BD	0.54
8c	SPS	C	0.30	0.23	0.12	BD	BD	BD	BD	BD	0.65
9	SPM	C	0.19	0.14	BD	BD	BD	BD	BD	BD	0.33
10	None	C	0.30	0.20	0.20	0.04	0.02	0.02	0.02	BD	0.80

*The method detection limit (MDL) for quantifying PCE in each Tenax trap was 0.010 mg.

APPENDIX 2: Data from the ISCO batch reactors for TCE and 1,1,1-TCA equivalent to Table 16, Table 17, and Table 18 in the body of the report.

Table 2.1. TCE concentrations (mg/kg) measured in soil in the ISCR batch reactors at each sampling event.

Reactor	Zone	ZVI/EVO	Day 0	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	B	1.5/1.5	23.8	12.8	5.3	BD	BD	BD	BD	BD	BD
1b	B	3.0/4.5	23.8	6.2	BD	BD	BD	BD	BD	BD	BD
1c	B	5.0/5.0	23.8	3.7	BD	BD	BD	BD	BD	BD	BD
1d	B	10.0/15.0	23.8	BD	BD	BD	BD	BD	BD	BD	BD
3	B	None	23.8	23.5	22.9	22.4	22.6	22.1	21.5	21.8	21.4
4a	C	10.0/10.0	15.3	4.7	BD	BD	BD	BD	BD	BD	BD
4b	C	10.0/None	15.3	5.2	BD	BD	BD	BD	BD	BD	BD
5	C	None	15.3	14.9	15.4	14.9	14.3	14.2	13.9	14.1	13.6

*BD (below detection); MDL = 2 mg/kg.

Table 2.2. Calculated mass (mg) of TCE removed during the reaction time between each sampling event in the ISCR batch reactors.

Reactor	Zone	ZVI/EVO	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	B	1.5/1.5	8.8	6.0	4.2	0.0	0.0	0.0	0.0	0.0
1b	B	3.0/4.5	14.1	5.0	0.0	0.0	0.0	0.0	0.0	0.0
1c	B	5.0/5.0	16.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0
1d	B	10.0/15.0	19.0	19.0	0.0	0.0	0.0	0.0	0.0	0.0
3.0	B	None	0.2	0.5	0.4	-0.2	0.4	0.5	-0.2	0.3
4a	C	10.0/10.0	8.5	3.8	0.0	0.0	0.0	0.0	0.0	0.0
4b	C	10.0/None	8.1	4.2	0.0	0.0	0.0	0.0	0.0	0.0
5.0	C	None	0.3	-0.4	0.4	0.5	0.1	0.2	-0.2	0.4

Table 2.3. Measured mass (mg*) of TCE measured in the Tenax traps at each sampling event in the ISCR batch reactors, and the cumulative mass after 20 days (SUM).

Reactor	Zone	ZVI/EVO	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20	SUM
1a	B	1.5/1.5	0.09	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.17
1b	B	3.0/4.5	0.14	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.18
1c	B	5.0/5.0	0.16	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.19
1d	B	10.0/15.0	0.19	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.34
3	B	None	0.40	0.40	0.50	0.30	0.04	0.02	0.00	0.00	1.66
4a	C	10.0/10.0	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
4b	C	10.0/None	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
5	C	None	0.40	0.30	0.30	0.20	0.06	0.03	0.00	0.00	1.29

*The method detection limit (MDL) for quantifying PCE in each Tenax trap was 0.010 mg.

Table 2.4. 1,1,1-TCA concentrations (mg/kg) measured in soil in the ISCR batch reactors at each sampling event.

Reactor	Zone	ZVI/EVO	Day 0	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	B	1.5/1.5	4.7	BD	BD	BD	BD	BD	BD	BD	BD
1b	B	3.0/4.5	4.7	BD	BD	BD	BD	BD	BD	BD	BD
1c	B	5.0/5.0	4.7	BD	BD	BD	BD	BD	BD	BD	BD
1d	B	10.0/15.0	4.7	BD	BD	BD	BD	BD	BD	BD	BD
3	B	None	4.7	4.5	5.2	4.6	4.7	4.5	4.2	4.1	4.2
4a	C	10.0/10.0	21.1	BD	BD	BD	BD	BD	BD	BD	BD
4b	C	10.0/None	21.1	BD	BD	BD	BD	BD	BD	BD	BD
5	C	None	21.1	21.3	21.4	20.7	20.9	20.3	19.8	19.5	19.5

*BD (below detection); MDL = 2 mg/kg.

Table 2.5. Calculated mass (mg) of 1,1,1-TCA removed during the reaction time between each sampling event in the ISCR batch reactors.

Reactor	Zone	ZVI/EVO	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20
1a	B	1.5/1.5	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1b	B	3.0/4.5	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1c	B	5.0/5.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1d	B	10.0/15.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.0	B	None	0.2	-0.6	0.5	-0.1	0.2	0.2	0.1	-0.1
4a	C	10.0/10.0	16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4b	C	10.0/None	16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.0	C	None	-0.2	-0.1	0.6	-0.2	0.5	0.4	0.2	0.0

Table 2.6. Measured mass (mg*) of 1,1,1-TCA measured in the Tenax traps at each sampling event in the ISCR batch reactors, and the cumulative mass after 20 days (SUM).

Reactor	Zone	ZVI/EVO	Day 1	Day 2	Day 4	Day 6	Day 9	Day 13	Day 17	Day 20	SUM
1a	B	1.5/1.5	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
1b	B	3.0/4.5	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
1c	B	5.0/5.0	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
1d	B	10.0/15.0	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
3	B	None	0.12	0.08	0.06	0.05	0.04	0.03	0.00	0.00	0.38
4a	C	10.0/10.0	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
4b	C	10.0/None	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
5	C	None	0.41	0.28	0.16	0.11	0.07	0.05	0.03	0.02	1.13

*The method detection limit (MDL) for quantifying PCE in each Tenax trap was 0.010 mg.

OFF-SITE GROUNDWATER TREATMENT PILOT STUDY EVALUATION REPORT

Franklin Power Products, Inc. / Amphenol Corporation
Administrative Order on Consent, Docket #R8H-5-99-002
EPA ID # IND 044 587 848
980 Hurricane Road
Franklin, Indiana 46131

Prepared For:

Carolyn Bury
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Date: September 28, 2020

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Senior Project Manager — Date

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Vice President/Brownfield Coordinator — Date

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ACRONYM DEFINITIONS

Amphenol – Amphenol Corporation (Performing Respondent)
BLS – Below land surface
BDI+ - Bio-Dechlor Inoculum Plus®
CAOs – Corrective Action Objectives
COC – Chemical of Concern
cVOC – chlorinated Volatile Organic Compound
CSM – Conceptual Site Model
DOT – Department of Transportation
1,1-DCA – 1,1-Dichloroethane
1,2-DCA – 1,2-Dichloroethane
cis-1,2-DCE – cis-1,2-Dichloroethene
trans-1,2-DCE – trans-1,2-Dichloroethene
DO – Dissolved Oxygen
gpm – Gallons Per Minute
GVESL – Groundwater Vapor Exposure Screening Level
HRC – Hydrogen Release Compound™
IDEM – Indiana Department of Environmental Management
IWM Consulting – Industrial Waste Management Consulting Group, LLC
MS/MSD - Matrix Spike/Matrix Spike Duplicate
MCLs – Maximum Contaminant Levels
MC – Methylene Chloride
mg/L – Milligrams per Liter
MV – Millivolts
NAPL – Non-Aqueous Phase Liquid
OIM – Off-Site Interim Measure
OIM Work Plan – Off-Site Interim Measure Work Plan dated June 18, 2019
ORP – Oxidation-Reduction Potential
ppb – Parts per billion
ppm – Parts per million
PCE – Tetrachloroethene
PlumeStop – PlumeStop Liquid Activated Carbon®

Pilot Study Work Plan – Off-site Groundwater Treatment Pilot Study dated October 9, 2019
PVC – Polyvinyl Chloride
psi – Pounds per Square Inch
QA/QC – Quality Assurance/Quality Control
ROI – Radius of Influence
RRS – Regenesis Remediation Services
RCG – Remediation Closure Guide dated March 22, 2012 with corrections through July 9, 2012 and most recently updated March 2, 2020
Res – Residential
RTC – Conditionally Approved OIM Work Plan – Response to Comments dated September 30, 2019
TOC - Top of Casing
S-MZVI – Sulfidated-MicroZVI™
1,1,1-TCA – 1,1,1-Trichloroethane
TCE – Trichloroethene
USEPA – United States Environmental Protection Agency
VI – Vapor Intrusion
VC – Vinyl Chloride
VOC – Volatile Organic Compound
ZVI – Zero-Valent Iron

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EXECUTIVE SUMMARY

The following is a brief summary of the *Off-Site Groundwater Treatment Pilot Study Evaluation Report*. Please refer to the full text of this report in its entirety for a comprehensive understanding of the information presented in this Executive Summary, as specifics are not fully discussed in this section.

In accordance with the *Pilot Study Work Plan*, which was approved by the USEPA on October 18, 2019, IWM Consulting implemented pilot study work activities in order to evaluate a potential supplemental off-Site groundwater remedy. IWM Consulting evaluated various in-situ groundwater remediation techniques and selected a technology that has been shown to provide quick reductions in dissolved cVOC concentrations, including PCE and TCE, with minimal production of daughter products (i.e. cis-1,2-DCE and VC). The in-situ technology selected for the pilot study included the injection of a mixture of PlumeStop and S-MZVI supplied by Regenesis® in two (2) areas within the Study Area. The Study Area includes portions of streets and adjacent structures that are near and downgradient of the Former Amphenol facility located at 980 Hurricane Road, Franklin, IN (Site), including Hurricane Road, Hamilton Avenue, Forsythe Street, Glendale Drive, and Ross Court. A map depicting the Study Area has been included as **Figure 1.**

PlumeStop is a microscopic insoluble particle of activated carbon with a surface treatment that allows the material to move more readily through soil pores, increasing the ability to absorb contaminants since they are more easily distributed throughout saturated sub-surface soils. PlumeStop has been shown to result in immediate reductions in the dissolved VOC concentrations since contaminants adsorb to the carbon. Once the VOCs are concentrated on the surface of the carbon, the contaminant molecules are available and readily destroyed by the supplemental S-MZVI injected with the PlumeStop.

S-MZVI is a microscopic insoluble particle of sulfidated ZVI product which is suspended in glycerol using proprietary environmentally acceptable dispersants. This product provides reactivity with cVOCs and bypasses the formation of cis-1,2-DCE and VC. Instead, this degradation process results in the production of ethenes and ethanes, which are much less toxic than cVOCs. The sulfidation of the ZVI will also increase the stability of the S-MZVI and provide long-term (up to two to three years) cVOC degradation.

Two (2) separate areas were chosen to evaluate the selected in-situ technology. The first area (Area 1) surrounds monitoring well MW-35, near the entrance to Glendale Drive. This area provides a relatively undisturbed off-Site sub-surface lithology which is more representative of natural sub-surface conditions within the Study Area. Any observed groundwater improvements would be more representative of the expected results if this technology were to be employed throughout portions of the Study Area which were not disturbed or affected during implementation of the OIM.

The second area (Area 2) was within the sewer bedding material located adjacent to the southern portion of the newly installed sewer main on Forsythe Street. Temporary injection wells were periodically installed within the observed saturated portion of the sewer main trench as the sewer main was being replaced prior to backfilling the trench during OIM implementation activities. The temporary injection wells allowed the PlumeStop and S-MZVI to be gravity fed directly along the base of the backfill of the newly installed sewer main prior installing new pavement on Forsythe Street. Any observed groundwater improvements down-gradient (south-southeast) of these injection locations may be a combination of positive impacts from impacted soil and groundwater removal completed during OIM implementation activities and the selected in-situ technology. Two (2) key monitoring wells (MW-31 and MW-38) were evaluated within Area 2 in order to determine if dissolved COC concentrations decreased post-OIM and pilot study injection activities. Monitoring well MW-38 is screened across the top of the groundwater surface, which corresponds to the same depth as the sewer main temporary injection points, thus may be more indicative of positive results originating from the pilot study injection activities. Monitoring well MW-31 is screened across the base of Unit B, which is deeper than the depth of the sewer main temporary injection points and would be less likely to see positive results from the pilot study injection activities.

On October 22, 2019, approximately 3,200-lbs of PlumeStop and 100-lbs of S-MZVI (which equaled a combined 1,923 gallons of remedial solution once the material was thoroughly mixed with water) were pressure injected within Area 1 via five (5) temporary injection points, treating an area approximately 400-square feet in size. The vertical treatment area was from 11-16 feet BLS, which included treatment from the base of Unit B upward 5 feet, which fully treated the saturated thickness of Unit B (including any potentially unusually high-water table periods). Remedial solution was detected in monitoring well MW-35 after approximately 30 gallons of remedial solution were pressure injected into injection point INJ-1. Based on this observation, the injection of the remedial solution had at least a 7.5-foot ROI in the vicinity of monitoring well MW-35. A soil core obtained from a soil boring installed adjacent to monitoring well MW-35 following the injection activities displayed visual evidence (the five-foot saturated portion of the soil core was stained black, similar to the carbon color of the PlumeStop) that adequate distribution of the remedial solution throughout the saturated zone of Unit B was achieved.

On October 23, 2019, approximately 3,600-lbs of PlumeStop and 200-lbs of S-MZVI (which equaled a combined 2,892 gallons of remedial solution once the material was thoroughly mixed with water) were low-pressure injected within Area 2. This covered an area of approximately 383 linear feet along the southern portion of the newly installed sewer main trench. It is likely that the remedial solution stayed within the more permeable backfilled sewer trench and probably only minimally expanded into the native subsurface saturated soils, especially since this material was only gravity fed into the injection points. The objective of this application was to provide additional groundwater treatment for the base of the trench, VOC impacted groundwater present within the trench, and to act as a barrier to treat any VOCs that may potentially back diffuse out of the native soil surrounding the newly installed sewer trench, which could result in the presence of dissolved phase COCs within or adjacent to the newly installed sewer main trench.

All of the temporary injection points in Area 1 and Area 2 were permanently removed from the subsurface once the injection activities were completed and are no longer present or accessible. Pilot study injection activities have improved groundwater conditions in Area 1 and Area 2. Observed COC concentrations in MW-31, MW-35, and MW-38 have been reduced as shown below (Pre-Pilot Study to August 2020):

PILOT STUDY INJECTION AREA 1

Monitoring Point	PCE % Reduction	TCE % Reduction	Total VOC % Reduction
MW-35	NA	100	100

PILOT STUDY INJECTION AREA 2

Monitoring Point	PCE % Reduction	TCE % Reduction	Total VOC % Reduction
MW-31	36	35	35
MW-38	53	81	74

The pressure injection into the undisturbed formation in Area 1 has exhibited the most promising results of the three pilot study sampling points. This is likely due to several factors including the proximity to the injection locations surrounding the monitoring point, the ability to pressure inject the PlumeStop and S-MZVI directly into the targeted formation, and the total saturated depth in which the mixture was applied. Injection depths were only partially submerged within multiple injection points in Area 2 and although both monitoring wells exhibited decreases in COC concentrations, the reason for the decreases cannot be definitively identified based upon the data obtained during the pilot study. Undoubtably, the source removal activities (both soil and groundwater) implemented during the OIM activities resulted in an immediate decrease in dissolved COC concentrations. However, the data obtained during this pilot study does suggest that the PlumeStop and S-MZVI did further decrease the dissolved COC concentrations. Based on the screened interval of MW-38 (intersects the top of the groundwater table) and the screened intervals of the Area 2 temporary injection points (base of the sewer main trench and top of the groundwater table), it is likely that the higher dissolved COC concentration decreases (when compared to MW-31) in Area 2 at MW-38 were related to the PlumeStop and S-MZVI injections. Monitoring well MW-31 is screened across the base of Unit B and not the top of the groundwater surface; therefore, the low-pressure injection events in Area 2 did not target this deeper depth and reductions in COC concentrations were not as high in this location. The decrease in COC concentrations at the deeper saturated interval of MW-38 is more likely a direct result from the implemented OIM activities and not the Pilot Study injection activities.

The generation of daughter products (i.e. cis-1,2-DCE and VC) were not observed during the pilot study in any monitoring wells. However, an increase in ethene and ethane were observed in monitoring well MW-35 which indicates the β-elimination of chlorinated compounds is likely occurring.

Based upon the results obtained during this pilot study, it appears that this technology is a feasible option for groundwater remediation in off-Site areas and this remedial approach does not generate harmful by-products (cis-1,2-DCE and VC). Depending upon the results of the on-Site source investigation, this remedial technology may also be a viable option for one or more areas on-Site.

Decreasing the dissolved COC concentrations would subsequently reduce COC concentrations in soil gas, which is generated by volatilization of the COCs present in the groundwater.

If a larger scale application of this technology is implemented, the injection methods and dosages utilized, and results observed should be similar to those in Area 1. Additional drilling or injection activities within the limits of the newly paved roadway will not be permitted by the City of Franklin. Therefore, drilling would be required in the right-of-way and on select private properties to target optimal remedial solution delivery.

PCE concentrations have been reduced by pilot study and OIM implementation activities throughout the off-Site Study Area to levels less than short-term CAOs. PCE is the primary COC originating from the Amphenol site and elevated off-Site TCE concentrations are not solely related to historical permitted discharges to the sanitary sewer by Amphenol or its predecessors. Regardless, as indicated within the *Draft Post-OIM Implementation Sewer Gas Vapor Intrusion Evaluation Report*, additional source investigation and delineation activities should be completed by other potential responsible parties prior to implementing any further off-Site remedial activities. All source areas and impacts should be assessed and considered during design of injection locations and dosage loading for proper mitigation of impacts and to ensure long-term success of remedial efforts.

Differences in groundwater, soil gas, and sewer vapor COC concentration ratios have been observed through different portions of the Study Area and are likely due to secondary sources, separate from the Amphenol release. As a result, mitigation of contributions from the former Amphenol Facility is unlikely to remove all groundwater impacts (and thereby vapor impacts present in soil and sewer gas). Contribution from secondary source areas will continue to result in concentrations of COCs in the groundwater and sewer gas above indoor air screening limits following the completion of any future potential remedial actions completed by Amphenol. Additional analysis of the potential additional sources was included in the *Draft Post-OIM Implementation Sewer Gas Vapor Intrusion Evaluation Report.*

Off-Site Groundwater Treatment Pilot Study Evaluation Report
Franklin Power Products, Inc./Amphenol Corporation
Administrative Order on Consent, Docket # R8H-5-99-002
EPA ID # IND 044 587 848
980 Hurricane Road
Franklin, Indiana 46131

1.0 Introduction and Objectives

IWM Consulting submitted a *Pilot Study Work Plan*, which was subsequently approved by the USEPA on October 18, 2019. Pilot study activities were completed as outlined in the approved *Pilot Study Work Plan*. Pilot study activities were conducted to support evaluation of potential full-scale deployment of an in-situ sorption and biodegradation technology to treat cVOCs in groundwater within the Study Area.

The Study Area includes portions of streets and adjacent structures that are near and downgradient of the Former Amphenol facility located at 980 Hurricane Road, Franklin, IN (Site), including Hurricane Road, Hamilton Avenue, Forsythe Street, Glendale Drive, and Ross Court. A map depicting the Study Area has been included as **Figure 1** and a Site Map has been included as **Figure 2**. Groundwater flow direction throughout the Study Area has been defined to the south-southeast.

The *Pilot Study Work Plan* identified three (3) key components for development of a successful in-situ sorption and biodegradation groundwater remedial strategy and included the following: 1) Determine the radius of influence of injections within native substrate; 2) Determine if the technology effectively removes cVOCs from groundwater or produces daughter products; and 3) Determine the expected volumetric loading requirements. The objectives of the pilot study were to gain information sufficient to evaluate the components noted above, to determine the level of effort necessary to complete the activities on a potential full-scale remedial design, and to support a more thorough evaluation of the injectability and longevity of the dissolved cVOC treatment using an in-situ sorption and biodegradation remedial approach.

Two (2) separate areas were chosen to evaluate the selected in-situ technology.

Area 1

Area 1 surrounds monitoring well MW-35, near the entrance to Glendale Drive. This area provides a relatively undisturbed off-Site sub-surface lithology which is more representative of natural sub-surface conditions within the Study Area. Any observed groundwater improvements would be more representative of the expected results if this technology were to be employed throughout portions of the Study Area.

Area 2

Area 2 is situated along the southern portion of the newly installed sewer main on Forsythe Street, approximately located between monitoring well MW-37 and Ross Court. Temporary injection wells were spatially installed within the observed saturated portion (maximum thickness of saturation was 2.5 feet) of the sewer main trench as the sewer main was being replaced prior to backfilling the trench during OIM implementation activities. These temporary injection points would allow for the introduction of a remedial mixture along the base of the newly installed sewer main. The low-pressure injections at the base of the trench would function as a remedial barrier as groundwater fluctuates within and across the sewer backfill area. Any observed groundwater improvements hydraulically down-gradient (south-southeast) of these injection locations would likely be attributed to a combination of positive results from impacted soil (6,400 tons) and groundwater (324,330 gallons) removal completed during OIM implementation activities in combination with the selected in-situ technology. Therefore, results obtained from Area 2 would not necessarily be representative of the expected results if this technology were to be employed throughout portions of the Study Area. Additionally, one must also take into consideration the fact that the remedial solution in Area 2 was only low-pressure injected into the base of the sewer main trench, which limits the radius of influence of each injection point.

2.0 Proposed Pilot Study Remedial Technology

A design-level CSM was developed to aid in the selection of a remedial technology to complete on a pilot study level in order to evaluate the effectiveness of the remedial technology prior to any potential larger scale application. Since this pilot study would be employed off-Site near residential areas, the technology should be protective of human health and the environment. The application of the technology should not produce effects that could be potentially harmful to the general public or the environment during the application process. Additionally, the reactions and potential by-products that the technology produced should also be protective of human health and the environment. The remedial technology should complete the desired effect of remediating dissolved VOC concentrations to meet the applicable CAOs, shown on the table below, or remove potential risks associated with VI. Since the shallow groundwater in the Study Area ranges in depth from three (3) to thirteen (13) feet bgs, soil vapor generated from impacted groundwater has the potential to impact basements, utility conduits, or other preferential pathways. Site-specific CAOs were proposed and submitted in the conditionally approved *OIM Work Plan*. Short-term shallow groundwater CAOs (for groundwater located in Unit B) are defined by IDEM RCG Res GVESLs. Additionally, long-term CAOs specified for the site, per USEPA policy, are to return groundwater to drinking water conditions. While there are no receptors for impacted groundwater (i.e. no potable wells, industrial wells, or unacceptable impacts to hydraulically connected surface water bodies), the USEPA requires groundwater to be returned to MCLs. These long-term CAOs will likely be achieved using monitored natural attenuation. The State of Indiana requires potable wells to be cased to a minimum depth of twenty-five (25) feet bgs. Since off-Site impacts are limited to the area above twenty-feet (20) bgs, this shallow groundwater should not be utilized as a potable aquifer. CAOs for the COCs have been given on the table at the top of the following page.

Table: CAOs for COCs

Chemical of Concern	Short Term CAO Groundwater Vapor Exposure Screening Level (µg/L)	Long Term CAO Maximum Contaminant Level (µg/L)
1,1-DCA	130	28
1,2-DCA	50	5
cis-1,2-DCE	NE*	70
trans-1,2-DCE	NE*	100
MC	7,580	5
PCE	110	5
1,1,1-TCA	13,000	200
TCE	9.1	5
VC	2.1	2

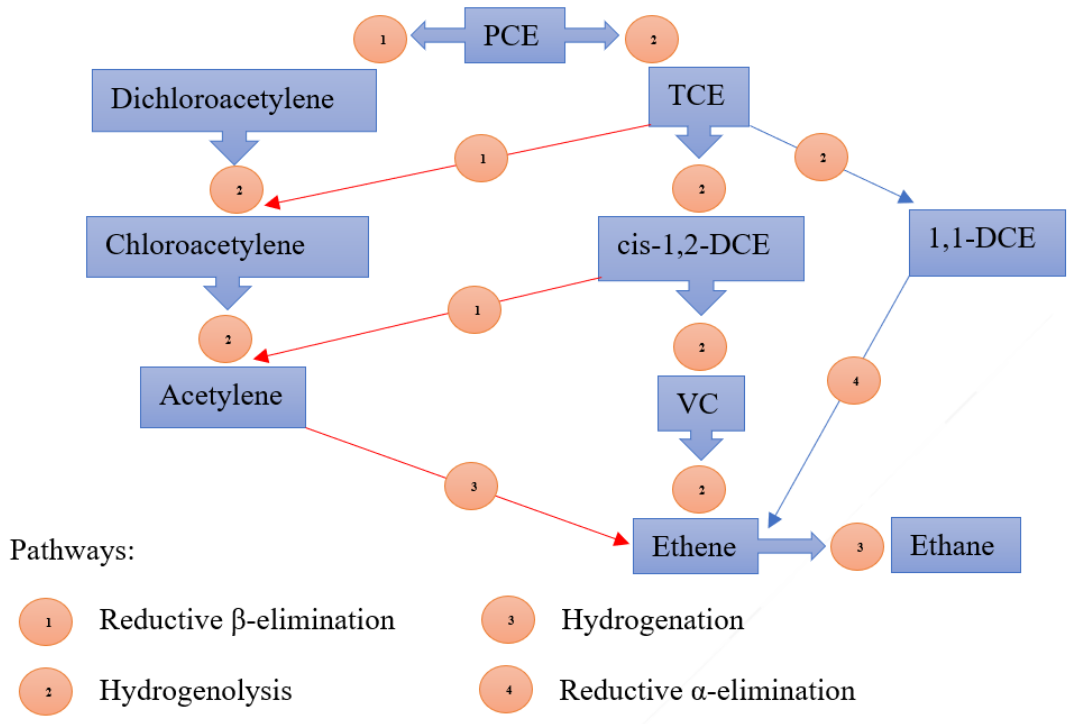
NE: Not Established

IWM Consulting evaluated various in-situ groundwater remediation techniques and selected a technology that has been shown to provide quick reductions in dissolved VOC concentrations, including TCE, with minimal production of chlorinated solvent daughter products (i.e. cis-1,2-DCE and VC). The pilot study in-situ technology included the application of a mixture of PlumeStop and S-MZVI.

PlumeStop is a colloidal form of activated carbon with a surface treatment that allows the material to move more readily through the soil pores, increasing the sorption surface of the PlumeStop since it is thoroughly distributed throughout the sub-surface. PlumeStop has been shown to result in immediate reductions in the dissolved VOC concentrations since the contaminants adsorb to the carbon. Once the VOCs are concentrated on the surface of the carbon, the molecules are available and readily destroyed by a supplemental product, such as S-MZVI, HRC, and/or BDI+. For this pilot study, Regenesis® proposed utilizing S-MZVI to assist with the destruction of the cVOCs.

S-MZVI is a colloidal, sulfidated ZVI product which is suspended in glycerol using proprietary environmentally acceptable dispersants. This product provides reactivity with chlorinated hydrocarbons (such as TCE and PCE) and generates reductive β-elimination of chlorinated compounds, which bypasses the formation of cis-1,2-DCE and VC. Instead, this abiotic degradation process results in the production of ethenes and ethanes. The passivation technique of sulfidation of the ZVI will also increase the stability of the S-MZVI and provide long-term (up to two to three years) of chlorinated hydrocarbon degradation.

Chlorinated Compound Degradation Pathways via S-MZVI



The utilization of the S-MZVI in conjunction with PlumeStop will force the degradation of PCE, TCE, and cis-1,2-DCE to follow the β-elimination pathway (“1”) in lieu of hydrogenolysis chlorinated compound degradation (“2”) and will bypass the creation of VC. The β-elimination pathway reactions showing the β-elimination of PCE, the primary COC associated with the Site, as an example, are shown below:

PCE β-Elimination Pathway

$$
\begin{aligned}
\textbf{(MZVI) } Fe^{0} + \textbf{(PCE) } C_2Cl_4 &\rightarrow \textbf{(Dichloroacetylene) } C_2Cl_2 + Fe^{+2} + 2Cl^{-} \\
2H_2O &\rightarrow 2H^{+} + 2OH^{-} \\
2H^{+} + 2e^{-} &\rightarrow H_2 \\
C_2Cl_2 + H_2 &\rightarrow \textbf{(Chloroacetylene) } C_2ClH + H^{+} + Cl^{-} \\
C_2ClH + H_2 &\rightarrow \textbf{(Acetylene) } C_2H_2 + H^{+} + Cl^{-} \\
C_2\,H_2 + H_2 &\rightarrow \textbf{(Ethene) } C_2H_4 \\
C_2\,H_4 + H_2 &\rightarrow \textbf{(Ethane) } C_2H_6
\end{aligned}
$$

The free chloride ions readily dissolve into groundwater and will generally amount to concentrations less than background chloride concentrations.

Degradation of PCE via the β-elimination pathway by-passes the creation of daughter products and produces ethenes and ethanes, which is the preferable degradation pathway. This reaction pathway avoids the generation of the chlorinated daughter products, such as TCE and VC, which have higher volatility potentials (vapor pressures) than PCE, indicating that TCE and VC are easier to volatilize and become soil vapor. Additionally, TCE and VC have been demonstrated to be more toxic than PCE, which is why TCE and VC have lower IDEM RCG Residential Indoor Air Vapor Exposure Screening Levels.

Table: Properties of cVOCs

Constituent	Vapor Pressure (mm Hg at 20°C)	IDEM RCG Residential Indoor Air Vapor Exposure Screening Level (μg/m^3)
PCE	18.47	42
TCE	74	2.1
cis-1,2-DCE	35.3	NA
VC	2,580	1.7

NA – not applicable

Groundwater monitoring activities were completed pre-pilot study activities to determine a baseline for evaluations of pilot study results at monitoring wells MW-31 and MW-35 (MW-38 was not installed until after injection activities had been completed). For evaluation purposes, the results of a one-time grab groundwater sample obtained in March 2019 from a temporary groundwater monitoring well (TW-13) located within 5-feet of the MW-38 location, was utilized as a baseline concentration for MW-38. Subsequent monitoring events were monthly for a period of six (6) months (November 2019 through April 2020) to verify that the employed in-situ technology was performing as designed.

3.0 Pilot Study Scope of Work

IWM Consulting contracted with Regenesis® to design an injection work scope and provide remedial products to complete the pilot study in Area 1 and Area 2 in order to reduce or eliminate the presence of cVOCs in groundwater. IWM Consulting provided Regenesis® available groundwater analytical data, geologic information, and hydrogeological data for the areas of concern in order for Regenesis® to propose the most effective and feasible in-situ technology to remediate cVOCs in groundwater and project remedial product loading, injection pressures, and water requirements to complete pilot study injection activities. Both PlumeStop and S-MZVI are manufactured and supplied by Regenesis® and RRS supplied the injection trailer, personnel, and injection equipment during the implementation phase of the pilot study. IWM Consulting was present throughout the work activities in order to provide oversight during pilot study implementation. IWM Consulting supplied a qualified drilling contractor to complete the installation of the direct push injection point locations.

Area 1 – MW-35 Injection Activities

On October 21, 2019, RRS installed a soil boring near MW-35 in order to gain a perspective of the geology within Area 1, determine specific injection intervals, and obtain a pre-injection visual observation of the subsurface.

On October 22, 2019, approximately 3,200-lbs of PlumeStop and 100-lbs of S-MZVI (which equaled a combined 1,923 gallons of remedial solution once the material was thoroughly mixed with water) were injected evenly into five (5) temporary injection points (INJ-1 through INJ-5) placed in a star pattern around monitoring well MW-35, treating an area approximately 400-square feet in size. The temporary injection points were installed with a direct push drilling unit equipped with 1.5-inch diameter drill rods and retractable screens (up to 3 feet in length). The mixture was pressure injected into the formation using a bottom up injection technique via the above ground pumps placed inside the injection trailer. The vertical treatment area was from 11-16 feet BLS, which included treatment from the base of Unit B upward 5 feet, which fully treats the saturated thickness of Unit B (including any potentially unusually high-water table periods). The ability to control the depth and length of the injection interval allowed for the precise injection of the remedial solution. Prior to injection activities, depth to water was measured in monitoring well MW-35 at 11.24 feet below top of casing. Remedial solution was injected at a rate of 2.9 to 3.5 gpm and at a pressure of 15 to 35 psi. It appeared that this was close to the highest pressure that could safely inject the remedial solution into the subsurface without causing the solution to surface (i.e. material breaching the ground surface) during the injection activities. This observation was consistent with RRS' previous experience with injection projects.

The distance to monitoring well MW-35 from the injection points is shown on at the top of the following page.

Table: Distance to Injection Points to Monitoring Well MW-35

Injection Point	Nearest Monitoring Point to Injection Location	Distance/Direction to Nearest Monitoring Point from Injection Location
INJ-1	MW-35	7.5 Feet; West-Northwest (up-gradient)
INJ-2	MW-35	5.5 Feet; North (up-gradient)
INJ-3	MW-35	5.75 Feet; Northeast (cross-gradient)
INJ-4	MW-35	5 Feet; Southeast (down-gradient)
INJ-5	MW-35	5.25 Feet; South (down-gradient)

Remedial solution was detected in monitoring well MW-35 after approximately 30 gallons of remedial solution were injected into injection point INJ-1. Based on this observation, the injection of the remedial solution had at least a 7.5-foot ROI in the vicinity of monitoring well MW-35. A soil core obtained from a soil boring installed approximately 10 feet from monitoring well MW-35 following injection activities displayed visual evidence (soil core was stained black, similar to the carbon color of the PlumeStop) that adequate distribution of the remedial solution was achieved throughout the saturated zone of Unit B. Therefore, based on previous experience, the Regenesis® estimation of an approximate 10-foot radius of influence for the injection of remedial solution is likely correct. No surfacing of remedial solution was observed and no infiltration was detected in the nearby utility pathways (i.e. sewer line). The applied pressures and quantities of remedial solution appeared to be appropriate for the application to reduce or eliminate COCs in groundwater and it is assumed that these conditions could be similarly applied within the Study Area in a larger scale application and produce similar results. Subsequent groundwater sampling of monitoring well MW-35 has shown the complete elimination of dissolved COCs, therefore, the concentration of PlumeStop and S-MZVI appear to be optimal for the elimination of dissolved COCs.

The amount of material injected into each injection point and interval, associated injection pressures, the start and end time of the injections, and notations regarding any surfacing of the injected material (if any) were recorded during the injection activities and are summarized in the RRS *Application Summary Report* dated November 7, 2019, which has been included as **Attachment A**. A figure displaying the injection area location has been included as **Figure 3 (MW-35 Injection Area)**.

Area 2 – Trench Injection Activities

On October 23, 2019, approximately 3,600-lbs of PlumeStop and 200-lbs of S-MZVI (which equaled a combined 2,892 gallons of remedial solution once the material was thoroughly mixed with water) were injected evenly into five (5) 2-inch diameter temporary PVC injection wells (IP-1, IP-2, IP-3, IP-4, and IP-6) and one (1) temporary direct push injection point (DPT-1) placed within the backfill of the newly installed sewer main trench. Due to damage caused by construction equipment to temporary injection well IP-5, a temporary direct push injection point (DPT-1) was installed using the Geoprobe drill rig near the intersection of Ross Court and Forsythe Street in lieu of the damaged 2-inch diameter temporary PVC injection well (IP-5). This covered an area of approximately 383 linear feet along the southern portion of the newly installed sewer main trench. Each well was constructed with 5-feet of 0.020-inch slot PVC screen and the wells were placed as close as possible to the bottom of the sewer main trench prior to the trench being backfilled with No. 8 limestone aggregate. Remedial solution was injected at a rate of 10 to 15 gpm and at a pressure under 5 psi and under 15 psi at the direct push boring location. Due to the lack of fine-grained soils within the sewer backfill material (#8 stone), it appeared the backfill material surrounding the new sewer main could handle higher remedial solution flow rates without restrictions or surfacing of the remedial solution.

The nearest monitoring wells surrounding the injection points are shown below.

Table: Distance of Injection Points to Nearest Monitoring Well

Injection Point	Nearest Monitoring Point to Injection Location	Distance/Direction to Nearest Monitoring Point from Injection Location
DPT-1	MW-39	160 Feet; East-Southeast (cross-gradient)
IP-1	MW-39	180 Feet; Southeast (down-gradient)
IP-2	MW-38	30 Feet; Northeast (up-gradient)
IP-3	MW-38	60 Feet; South-Southeast (down-gradient)
IP-4	MW-31	25 Feet; Southeast (down-gradient)
IP-6	MW-37	30 Feet; Northwest (up-gradient)

Based on the distance to monitoring locations, the ROI was not able to be determined. However, it is likely that the remedial solution stayed within the more permeable backfilled sewer trench and may have only minimally expanded into the native subsurface saturated soils. These injection points were temporary in nature and were permanently abandoned immediately after the injection activities in order for the new paved road to be installed. The temporary direct push injection point was installed to a depth of 12 feet BLS, where Unit C was encountered. The PlumeStop and S-MZVI mixture were pressure injected into the trench excavation backfill material using a bottom up injection technique via the above ground pumps placed inside the injection trailer.

The objective of this application was to provide additional groundwater treatment for the base of the trench, VOC impacted groundwater present within the trench, and to act as a barrier to treat any VOCs that back diffuse out of the surrounding soil which convert into the dissolved phase. Regenesis® had assumed that the bottom 2.5-feet of the trench was targeted for treatment since the saturated thickness of the sidewalls and base did not exceed that during the excavation work activities. However, based on groundwater levels within the temporary wells prior to injection activities, approximately 0.19 to 0.80 feet of the southern-most temporary wells (IP-1 through IP-4) were placed within the saturated unit, with the saturated thickness generally decreasing as the points progressed north beyond IP-3 on Forsythe Street. The two (2) northern-most temporary wells (IP-5 and IP-6) were not able to be installed deep enough during excavation activities to be within the saturated unit since the base of the trench did not intersect the underlying groundwater table. As the excavation proceeded north along Forsythe Street, the base of trench excavation elevation rose due to the rise in the sanitary sewer main and the excavated material was no longer within the saturated portion of Unit B. Additionally, injection well IP-5 was damaged during construction activities and was not able to be utilized for injection purposes. Injection well screens were installed as deep as possible during excavation activities. Saturated sands flowing back into the excavated areas prevented installation of the injection wells much deeper than the top of the observed potentiometric surface. Depth to groundwater, screen intervals, and total well depths on October 23, 2019 are displayed on the table below.

Table: Depth to Water and Injection Well Construction Information

Injection Well ID	Depth to Water (Feet)	Screen Interval (Feet BLS)	Total Well Depth (Feet)
DPT-1	NG	10.0 – 12.0	12.0
IP-1	8.95	4.65 – 9.65	9.65
IP-2	9.57	5.31 – 10.31	10.31
IP-3	9.25	5.05 – 10.05	10.05
IP-4	10.55	5.74 – 10.74	10.74
IP-5	Dry	5.0 – 10.0*	4.62*
IP-6	Dry	4.65 – 9.65	9.65

*Well damaged during construction activities and partially filled with stone/backfill Material. No injection completed at this point (IP-5).
NG – Not Gauged since it was temporary direct push injection point

A figure displaying the injection area location has been included as **Figure 4 (Southern Portion of the Study Area Along North Forsythe Street Injection Area)**.

A cross-section location map has been included as **Figure 5**. Cross-sections displaying the geology of Hamilton Avenue and Forsythe Street have been included as **Figure 6** and **Figure 7**, respectively. Cross-sections showing the treated area surrounding MW-35 and surrounding the temporary injection wells in Forsythe Street have been included as **Figure 8** and **Figure 9**, respectively. A photographic log of injection activities has been included in **Attachment B**.

4.0 Groundwater Sampling Activities

Groundwater samples were collected over a period of six (6) months (November 2019 through April 2020) from a total of three (3) selected monitoring wells (MW-31, MW-35, and MW-38) located within pilot study Areas 1 and 2 in order to evaluate the effectiveness of the proposed in-situ remedial technology following the baseline groundwater sampling event. Groundwater samples associated with the pilot study were analyzed for additional parameters beyond short-list VOCs in order to determine if cVOCs were being destroyed via the β-elimination pathway. Groundwater samples from monitoring well MW-35 were collected to evaluate groundwater conditions in Area 1 and groundwater samples from monitoring wells MW-31 and MW-38 were collected to evaluate groundwater conditions in Area 2. However, the required placement for the installation of monitoring wells within Area 2 (outside of paved area) did not necessarily provide optimal locations for measuring the effects of the pilot study. Any effects measured would be delayed based on groundwater migration. The pilot study evaluation groundwater samples were collected concurrently with confirmatory groundwater samples associated with OIM implementation activities collected from monitoring wells IT-2, MW-12R, and MW-31 through MW-40. Additional groundwater results (select VOCs only) were available for review and continued verification of the pilot study results. Per the schedule outlined in the OIM Work Plan, confirmatory groundwater samples are collected on a monthly basis for a period of one (1) year post OIM implementation activities (November 2019 – October 2020). This provides data from control wells (MW-12R and MW-36) located outside of the pilot study areas to evaluate whether OIM remediation activities by itself may have an impact on groundwater concentration trends, especially within Area 2.

Immediately prior to the implementation of the pilot study activities, IWM Consulting obtained low-flow groundwater samples from monitoring well MW-31 and MW-35 on October 18, 2019. Monitoring wells MW-36 through MW-40 were not installed until November 12, 2019; therefore, these sampling points were not available for pre-pilot study groundwater sampling activities in October 2019. Monitoring wells MW-36 through MW-40 were designed so the well screens (five foot in length) would intersect the top of the observed groundwater surface in order to evaluate groundwater conditions for short-term CAOs (Res GWVESLs). Due to the reduced thickness of Unit B, monitoring wells MW-39 and MW-40 are also screened across the base of Unit B. Monitoring well MW-35 is constructed with a ten-foot screen and is screened across both the observed groundwater surface and to the base of Unit B. Monitoring well MW-31 is constructed with a five-foot screen and is screened across the base of Unit B and does not intersect the top of the groundwater surface.

Following pilot study injection activities, additional groundwater sampling events were completed in November 2019, January 2020, February 2020, March 2020, and April 2020 in order to evaluate the effectiveness of the pilot study technology within Areas 1 and 2. During the additional groundwater sampling events, groundwater samples were obtained from monitoring wells MW-31, MW-35, and newly installed monitoring well MW-38. The pilot study evaluation groundwater sampling of these wells coincided with the confirmatory groundwater sampling of additional monitoring wells associated with the OIM implementation confirmatory groundwater sampling events. All of the new groundwater monitoring wells (MW-36 through MW-40) previously proposed as part of the *OIM Work Plan* were installed on November 12, 2019. The well locations and installation methods were discussed in the *OIM Work Plan*. All available monitoring well boring logs and construction diagrams have been included in **Attachment C**.

A portable bladder pump in conjunction with a Horiba® U-52 Multi-Probe Field Meter was utilized to collect groundwater samples from the monitoring wells. The pump was equipped with a disposable bladder sleeve that was exchanged between wells. Dedicated tubing was used for each well. The Multi-Probe Field Meter included probes for turbidity, temperature, pH, specific conductance, DO, and ORP. Purge rates were established at a rate that minimized groundwater drawdown in order to help reduce turbidity. Purge water generated during groundwater sampling activities was temporarily containerized within a labeled 55-gallon DOT approved steel drum, transported back to the Site, and then treated by the onsite groundwater remediation system, prior to discharge to the on-Site sanitary sewer per the approved municipal discharge permit with the City of Franklin.

Field parameters were measured during each sampling event, and groundwater samples were collected after the field parameters had stabilized (for three consecutive readings) or after a maximum of 1 hour of purge time. Care was taken to ensure that the bladder pump discharge tubing and flow through cell had evacuated several volumes of water before the samples were obtained. Groundwater stabilization criteria which was utilized during the purging activities are listed below:

- pH — ± 0.1 pH units
- Specific Conductance — ± 3% of reading
- DO — ± 10% of reading or ± 0.2 mg/L
- ORP — ± 10 mV
- Turbidity — ± 10%

The groundwater samples were collected from the wells and placed into the appropriate laboratory provided pre-labeled containers. The groundwater samples were submitted to Pace Analytical Services, LLC located in Indianapolis, Indiana and analyzed for shortlist VOCs using SW-846 Method 8260 and Level IV QA/QC. The VOC shortlist included the following compounds: TCE, PCE, VC, trans-1,2-DCE, 1,1-DCA, cis-1,2-DCE, 1,2-DCA, MC, and 1,1,1-TCA. In accordance with the *RTC* document, on-site monitoring well MW-12R and offsite monitoring wells IT-2, and MW-31 through MW-40 were sampled for VOCs on a monthly basis starting in November 2019 following substantial completion of OIM implementation activities. Consequently, VOC samples were obtained from monitoring wells MW-31, MW-35, and MW-38 on an approximate monthly basis beginning in late-November 2019 and will be sampled monthly through October 2020 (as part of post-OIM confirmatory sampling activities). Analysis for short-list VOCs allowed for the evaluation of groundwater COC concentrations within Areas 1 and 2, in addition to control wells MW-12R and MW-36. These concentration trends document whether or not the primary COCs were being removed or if daughter compounds were being generated.

The samples obtained from monitoring wells MW-31, MW-35, and MW-38 were also analyzed for the following parameters during the baseline (October 2019) and monthly sampling events (November through April 2020):

- Total Iron (SW-846 Method 6010)
- Dissolved Iron (SW-846 Method 6010)
- Total Manganese (SW-846 Method 6010)
- Dissolved Manganese (SW-846 Method 6010)
- Sulfate (SW-846 Method 9038)
- Sulfide (USEPA Method 376.1)
- Nitrate (USEPA Method 353.1)
- Dissolved Gases - Ethene/Ethane/Methane (RSK 175)

Analysis of additional dissolved gases (ethene, ethane, and methane) should exhibit increases in ethene and ethane concentrations related to the β-elimination of chlorinated compounds, as well as insignificant increases in methane concentrations related to the reduction of chlorinated compounds via hydrogenolysis. The sustained reductions of nitrate, increases in dissolved manganese, reductions in sulfate, and increases in iron would indicate that groundwater conditions are manganese reducing, which is ideal for maintaining lower dissolved methane concentrations. The oxygen scavenger sodium sulfite is converted to sulfate as it scavenges oxygen, under reducing conditions, and then transitions to sulfite and sulfide. Ferrous iron then combines with the sulfide, forming pyrite, producing a secondary abiotic mechanism for the remedial process. Pyrite is known to have similar kinetic properties as zero valent iron. However, if reducing conditions are not present, then the sulfate will not be utilized, and pyrite will not be formed.

For QA/QC purposes, one (1) field duplicate sample was collected at a rate of one (1) sample per every ten (10) groundwater samples and was analyzed for the same analytical parameters. Additionally, one (1) MS/MSD sample was collected at a rate of one (1) sample per every twenty (20) groundwater samples and was analyzed for the same analytical parameters. One (1) trip blank for VOC analysis accompanied each cooler shipment that contained samples for select VOC analyses. One (1) equipment blank per day was also obtained and submitted for laboratory analysis.

5.0 Groundwater Elevation Results

IWM personnel gauged the recovery and monitoring well network at the Site using an electronic oil/water interface probe to determine the depth to water and the presence of detectable thickness of NAPL. Depth to water in the monitoring wells during the monthly sampling events ranged from 3.02 feet below TOC in MW-32 to 18.07 feet below TOC in MW-22, with groundwater being shallower and closer to the ground surface in the southern portion of the Study Area. None of the wells exhibited the presence of measurable amounts of NAPL during any gauging event. In general, recovery wells RW-1, RW-2, RW-3, RW-4, and RW-5 were operational during groundwater gauging activities.

The groundwater elevation data is summarized in **Table 1** and a Groundwater Elevation Map, based on the August 4, 2020 depth to water measurements, has been included as **Figure 10**. Review of the groundwater elevation data has shown a south-southeast groundwater flow within the Study Area, which is consistent with historical groundwater flow interpretations.

6.0 Groundwater Sampling Results

A total of six (6) groundwater sampling events (October 2019 through April 2020) were completed in order to evaluate groundwater conditions at monitoring wells MW-31, MW-35, and MW-38 in relation to pilot study injection activities. These results were also compared with data obtained from control wells MW-12R and MW-36, which are solely associated with implementation of the OIM. The results from the groundwater sampling events were compared to short-term and long-term CAOs and the baseline sampling results (if available) to determine the effectiveness of the pilot study technology.

The pre-injection sampling activities (October 2019) documented the baseline groundwater conditions prior to implementing the pilot study activities. However, since groundwater samples could not be obtained from monitoring well MW-38 prior to initiating the sampling activities (since the well was installed in November 2019), the VOC concentrations observed in the adjacent historical temporary monitoring well TW-13 (March 2019) were used for the baseline VOC concentrations for monitoring well sampling location MW-38. This temporary well was located within 5-feet of monitoring well MW-38.

Pilot Study injection points and the nearest monitoring points are described in the table below.

Pilot Study Area 1

Injection Point	Nearest Monitoring Point to Injection Location	Distance/Direction to Nearest Monitoring Point from Injection Location	Expected Time Frame to Observe Results from Pilot Study Injection Event
INJ-1	MW-35	7.5 Feet; West-Northwest (up-gradient)	Immediate
INJ-2	MW-35	5.5 Feet; North (up-gradient)	Immediate
INJ-3	MW-35	5.75 Feet; Northeast (cross-gradient)	Immediate
INJ-4	MW-35	5 Feet; Southeast (down-gradient)	Immediate
INJ-5	MW-35	5.25 Feet; South (down-gradient)	Immediate

Pilot Study Area 2

Injection Point	Nearest Monitoring Point to Injection Location	Distance/Direction to Nearest Monitoring Point from Injection Location	Expected Time Frame to Observe Results from Pilot Study Injection Event
DPT-1	MW-39	160 Feet; East-Southeast (cross-gradient)	Not Expected; Unknown
IP-1	MW-39	180 Feet; Southeast (down-gradient)	Not Expected; Unknown
IP-2	MW-38	30 Feet; Northeast (up-gradient)	Weeks-Months
IP-3	MW-38	60 Feet; South-Southeast (down-gradient)	Weeks-Months
IP-4	MW-31	25 Feet; Southeast (down-gradient)	Weeks-Months
IP-6	MW-37	30 Feet; Northwest (up-gradient)	Not Expected; Unknown

Due to the distance or the monitoring well being located up- or cross-gradient of the injection point, monitoring wells MW-37 and MW-39 were not utilized as pilot study monitoring points. However, these monitoring wells were being monitored as part of post-OIM implementation confirmatory sampling and did not show any discernable decreases in dissolved COC concentrations.

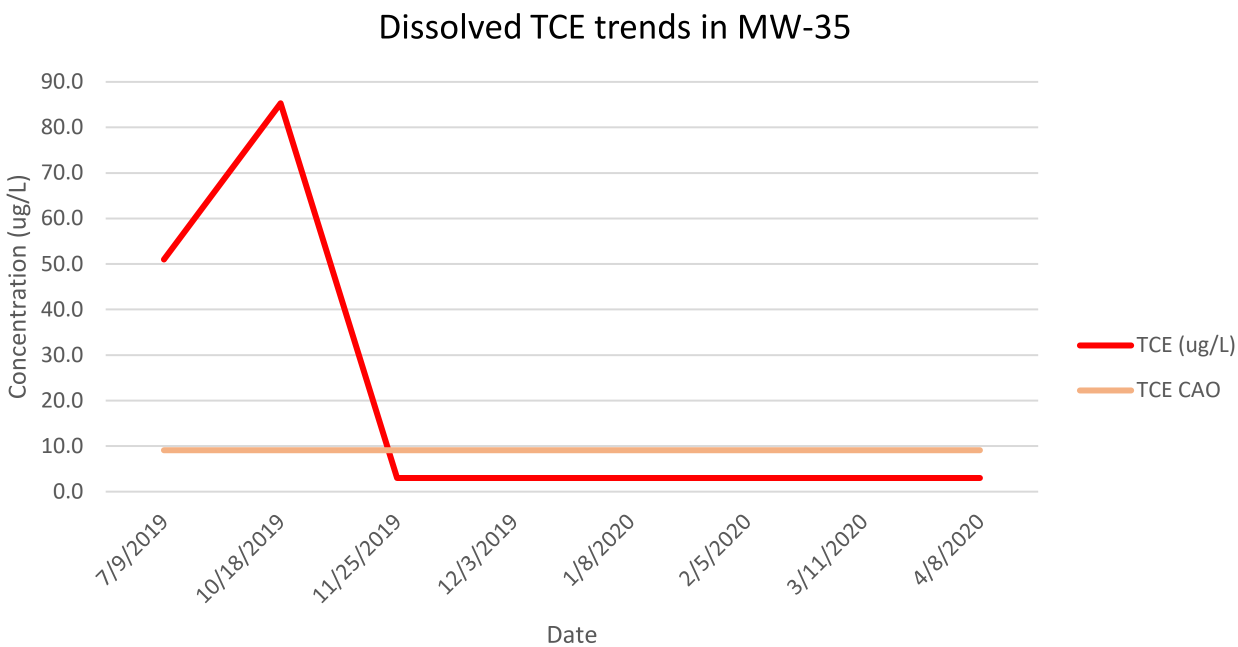
In conjunction with the pilot study evaluation groundwater sampling events, post-OIM implementation confirmation groundwater sampling events were completed on monitoring wells IT-2, MW-12R, MW-32, MW-33, MW-34, MW-36, MW-37, MW-39, and MW-40. The post-OIM implementation confirmation groundwater sampling events also include MW-31, MW-35, and MW-38 following the April 2020 sampling event and are scheduled to be completed on a monthly basis through October 2020. The post-OIM confirmatory groundwater sampling events provide additional data to verify results of the pilot study and provides data from control wells (MW-12R and MW-36) outside of the pilot study areas to evaluate whether OIM remediation activities by itself may have an impact on groundwater concentration trends, especially within Area 2.

The groundwater analytical results and groundwater field data are summarized in **Table 2**, **Table 3**, and **Table 4**. A figure displaying the results from select pilot study wells collected in August 2020 has been included as **Figure 11A**. A figure displaying the results from all post-OIM confirmatory samples collected in August 2020 has been included as **Figure 11B**. A TCE isoconcentration map displaying baseline concentrations prior to OIM implementation activities versus current concentrations (August 2020) has been included as **Figure 12**. A copy of each laboratory analytical report is included in **Attachment D**. The pilot test data review prepared by Regenesis® has been included as **Attachment E**. The analytical results are summarized in the following sub-sections.

Area 1 Results

VOCs

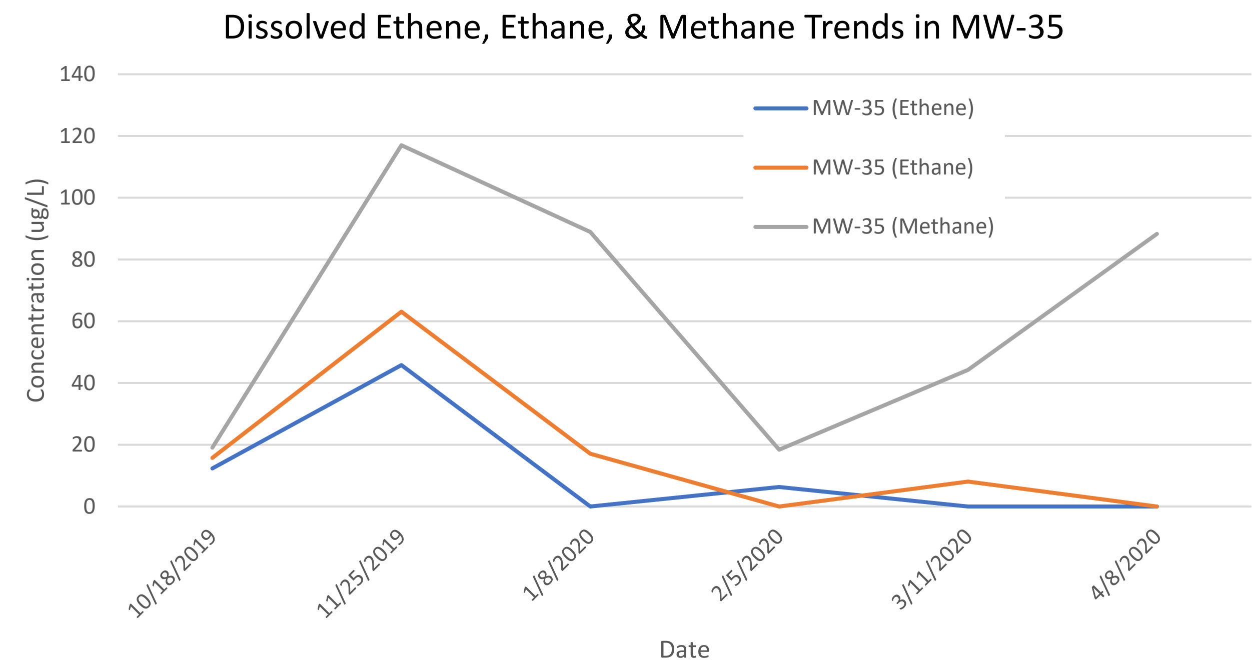
Following pilot study injection activities surrounding monitoring well MW-35, dissolved COC concentrations in groundwater samples obtained from monitoring well MW-35 have not been detected in excess of laboratory detection limits or short- or long-term CAOs during the pilot study period. Dissolved TCE trends versus the short-term CAO at monitoring well MW-35 have been depicted on the graph at the top of the following page for the pilot study period.



Ethene/Ethane/Methane

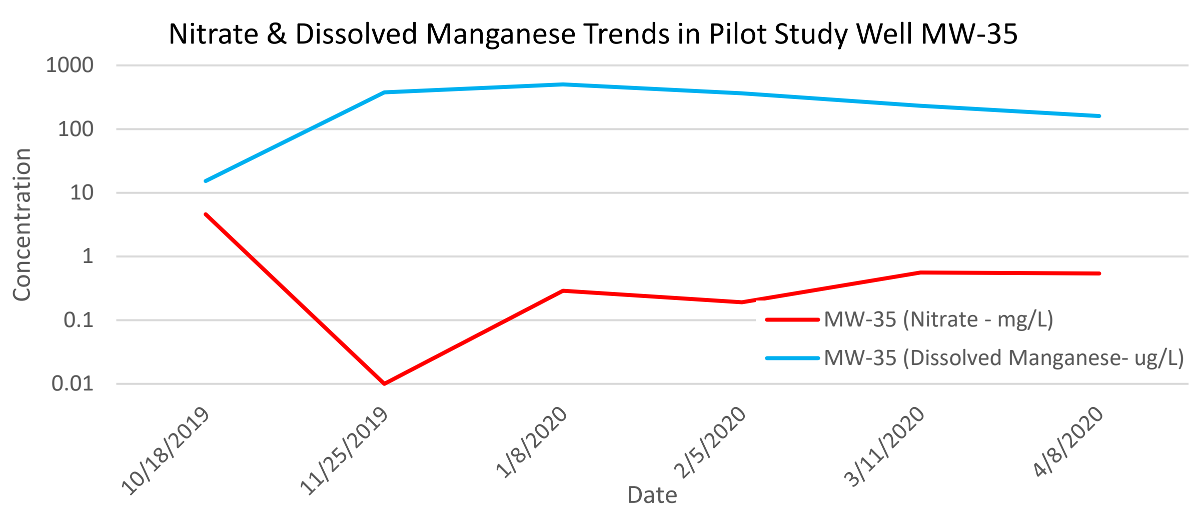
As shown on **Table 3**, analysis of additional dissolved gases (ethene, ethane, and methane) have exhibited an increase in ethene and ethane concentrations related to the β-elimination of chlorinated compounds in monitoring well MW-35, as well as an insignificant increase in methane concentrations related to the reduction of chlorinated compounds via hydrogenolysis. IDEM typically requires dissolved methane concentrations to be less than 10,000 ppb during the remediation of chlorinated compounds to maintain a safe subsurface environment. Note that the generation of ethane presents a delayed response when compared to the presence of ethene concentrations as it is generated from the degradation of ethene when chlorinated ethanes are not present as constituents of concern.

Dissolved methane concentrations indicate that reductive chlorination is taking place within MW-35. It should be noted that the methane concentrations generated are well below concentrations which would be observed if hydrogenolysis was the primary reductive process. Sites in which hydrogenolysis is the primary reductive process produces dissolved methane concentrations in the thousands of ppb. The ethene, ethane, and methane graph at monitoring well MW-35 has been included at the top of the following page.

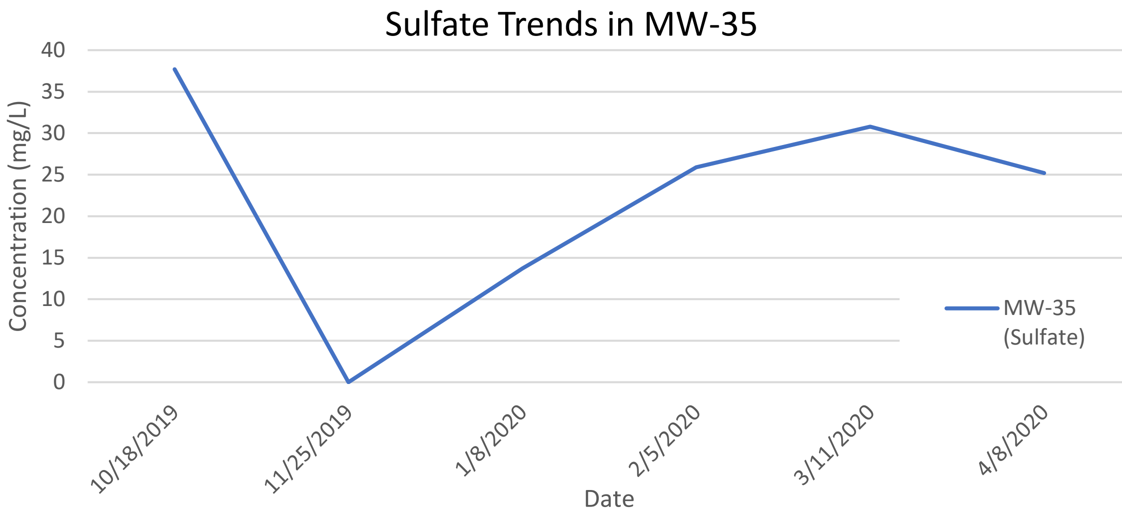


Nitrate/Manganese/Sulfate

The sustained reduction of nitrate and increase in dissolved manganese with only temporary reductions in sulfate and the temporary increase in iron indicates that groundwater reducing conditions in the area are manganese reducing, which is ideal for maintaining lower dissolved methane concentrations.

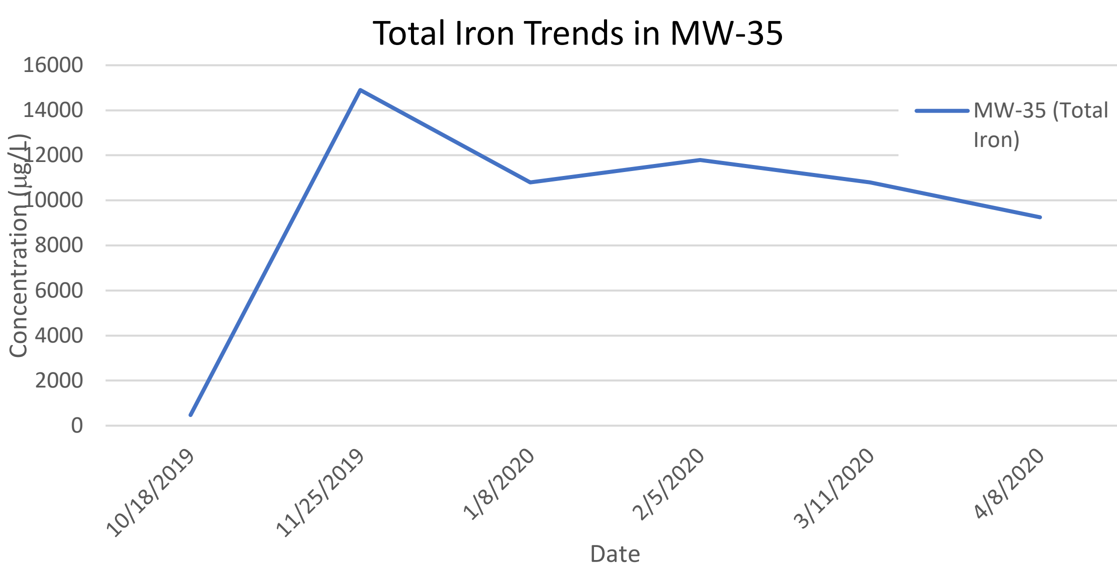


The oxygen scavenger sodium sulfite is converted to sulfate as it scavenges oxygen, under reducing conditions, and then transitions to sulfite and sulfide. Ferrous iron then combines with the sulfide, forming pyrite, producing a secondary abiotic mechanism for the remedial process. Pyrite is known to have similar kinetic properties as zero valent iron for the treatment of the COCs. However, if reducing conditions are not present, then the sulfate will not be utilized, and pyrite will not be formed. In general, it appears that sulfate was being utilized periodically at MW-35, indicating that the abiotic process may be occurring intermittently.



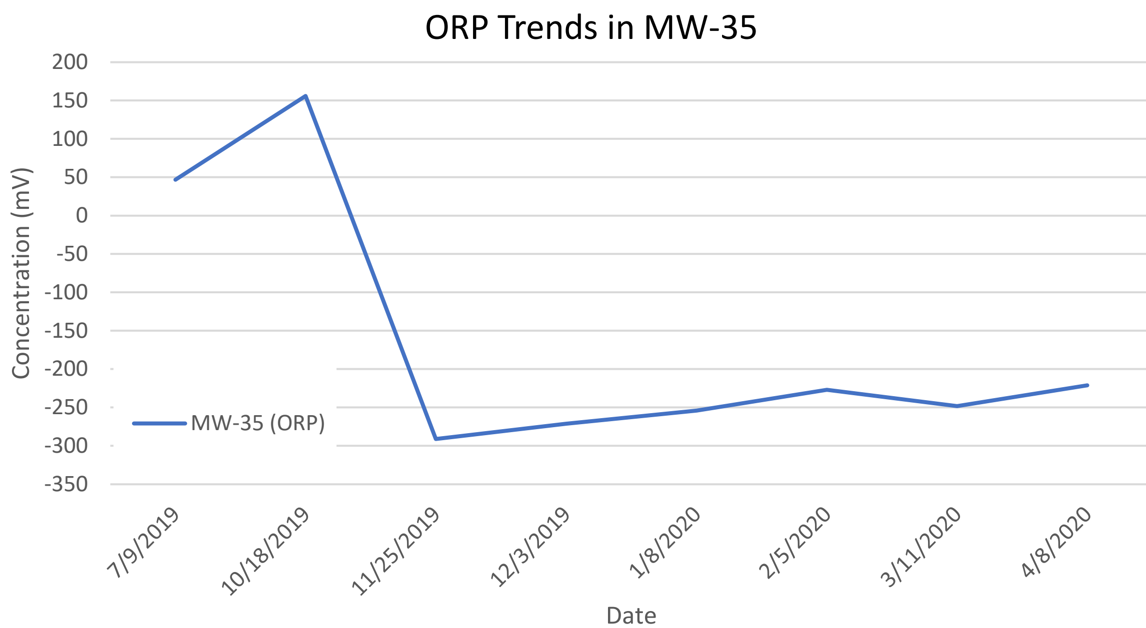
Iron

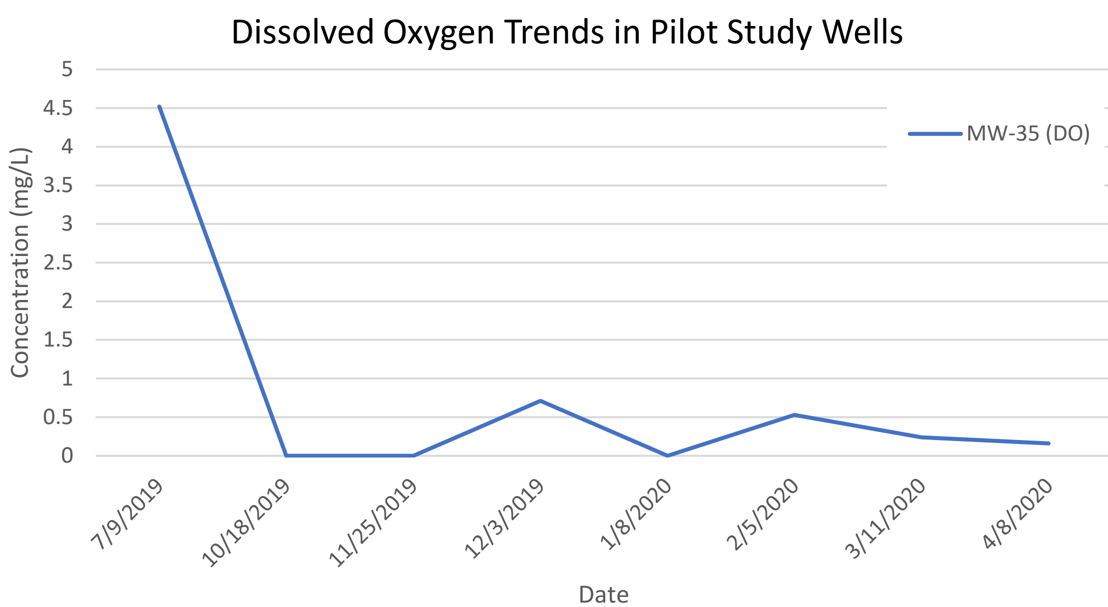
As shown in the previous graph, there is a reduction of sulfate following the pilot study injection surrounding MW-35 which indicates that the available sulfate was utilized in the abiotic process. Iron concentrations have also shown a slow decrease in concentrations, as shown below, further indicating that the available iron in the vicinity of MW-35 is being utilized for the abiotic process to produce pyrite.



Additional Field Parameters

Additional field parameters were evaluated to determine if aerobic or anaerobic conditions were present during groundwater sampling events. Groundwater field parameters have been summarized on **Table 4**. Anaerobic conditions have been observed at MW-35 since pilot study injection activities were completed with DO concentrations present at ranges from 0.02 to 0.71 ppm and ORP readings ranging from -221 to -291 mV. The negative ORP value and DO concentrations less than 1.0 ppm observed at MW-35 are indicative of a reducing environment.

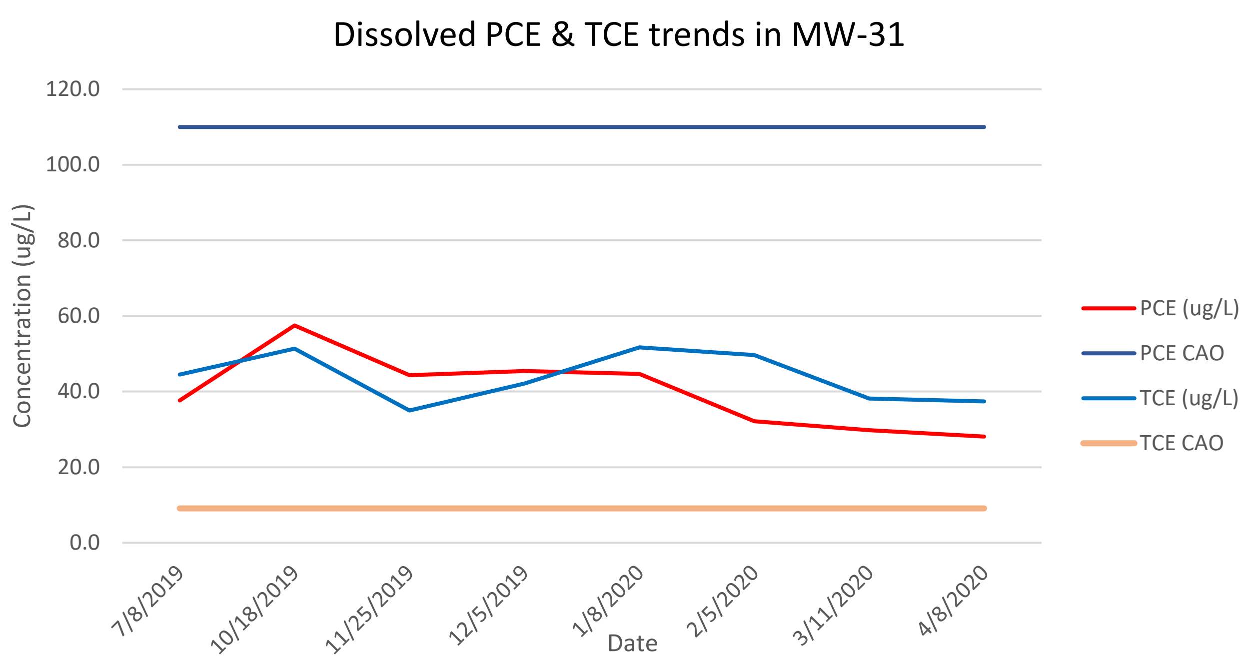




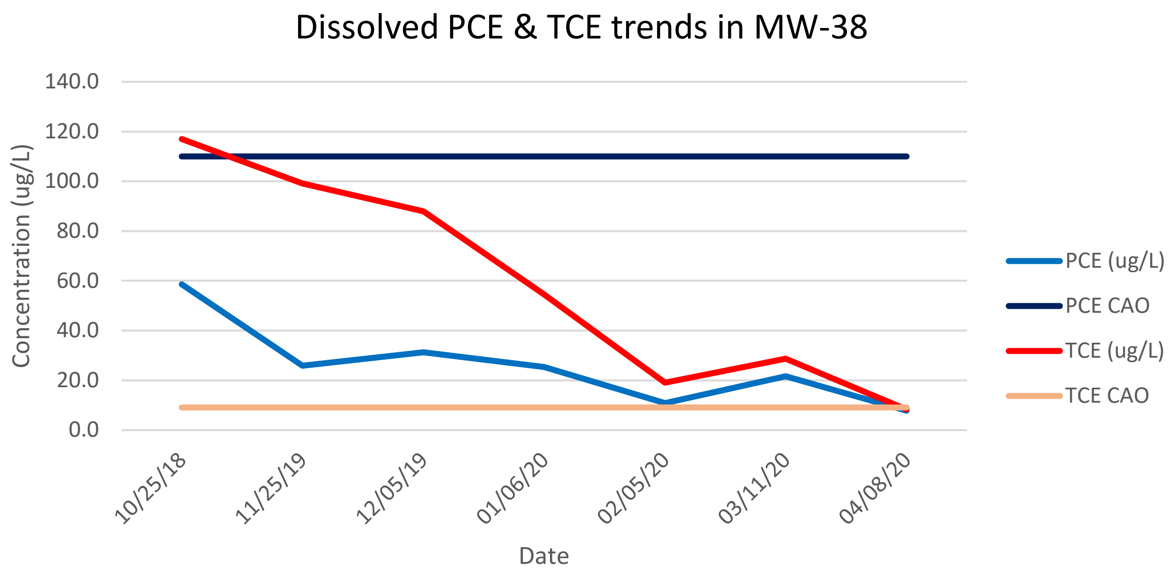
Area 2 Results

VOCs

Following pilot study injection activities within IP-4, located hydraulically up-gradient of monitoring well MW-31, dissolved TCE concentrations have ranged from 51.7 ppb (January 8, 2020) to 35.0 ppb (November 25, 2019) and dissolved PCE concentrations have ranged from 57.5 ppb (October 18, 2019) to 28.1 ppb (April 8, 2020) in groundwater samples obtained from monitoring well MW-31. No other COCs have exhibited dissolved COC concentrations in excess of CAOs. Since monitoring well MW-31 is screened across the base of Unit B and does not intersect the top of the groundwater surface, significant decreases in dissolved COCs were not expected at monitoring well MW-31 as the pilot study injection activities were targeted at the groundwater surface in the injection points along the sewer trench. Dissolved PCE and TCE trends versus short-term CAOs at monitoring well MW-31 have been depicted on the graph below for the pilot study period.



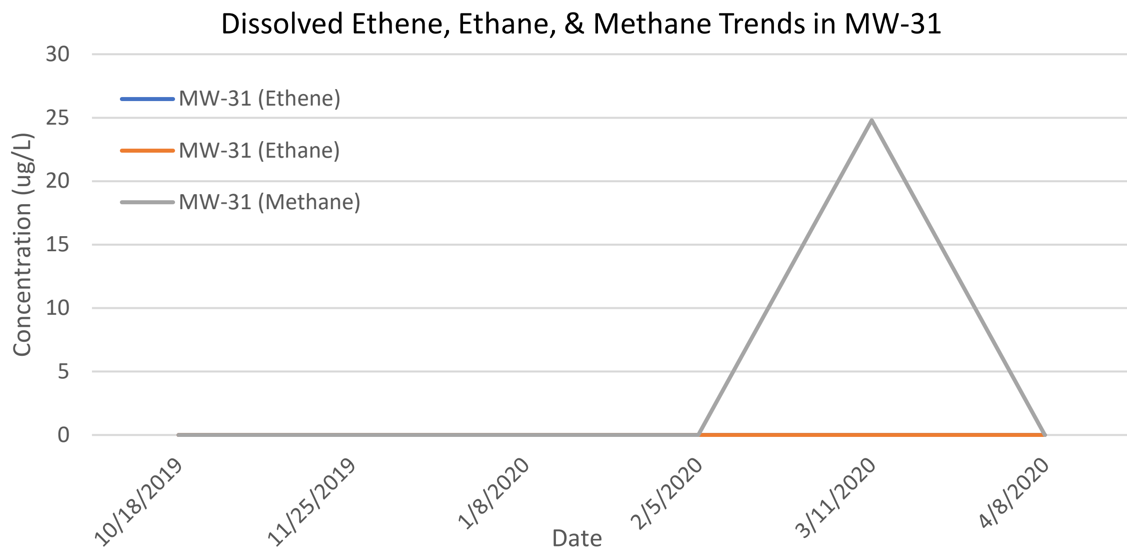
Following pilot study injection activities within IP-2 and IP-3, located hydraulically up-gradient of monitoring well MW-38, dissolved TCE concentrations have ranged from 99.1 ppb (November 25, 2019) to 8.3 ppb (April 8, 2020) and dissolved PCE concentrations have ranged from 31.3 ppb (December 5, 2019) to 7.8 ppb (April 8, 2020) in groundwater samples obtained from MW-38. No other COCs have exhibited dissolved COC concentrations in excess of short- or long-term CAOs during the pilot study period. Since monitoring well MW-38 is screened across the top of the groundwater surface of Unit B, decreases in dissolved COCs were expected at monitoring well MW-38 as the pilot study injection activities were targeted at the groundwater surface in the injection points along the sewer trench. Dissolved PCE and TCE trends versus short-term CAOs at monitoring well MW-38 have been depicted on the graph at the top of the following page for the pilot study period.



Ethene/Ethane/Methane

As shown on **Table 3**, analysis of additional dissolved gases (ethene, ethane, and methane) have not exhibited an increase in ethene and ethane concentrations in monitoring wells MW-31 and MW-38. However, these monitoring points are five to ten times further away from the pilot study injection points when compared to the injection and monitoring point distance within Area 1. Based upon observations made for MW-35 in Area 1, IWM Consulting would anticipate ethene/ethane to be present in Area 2 if the pilot study monitoring points could have been installed closer to the injection points.

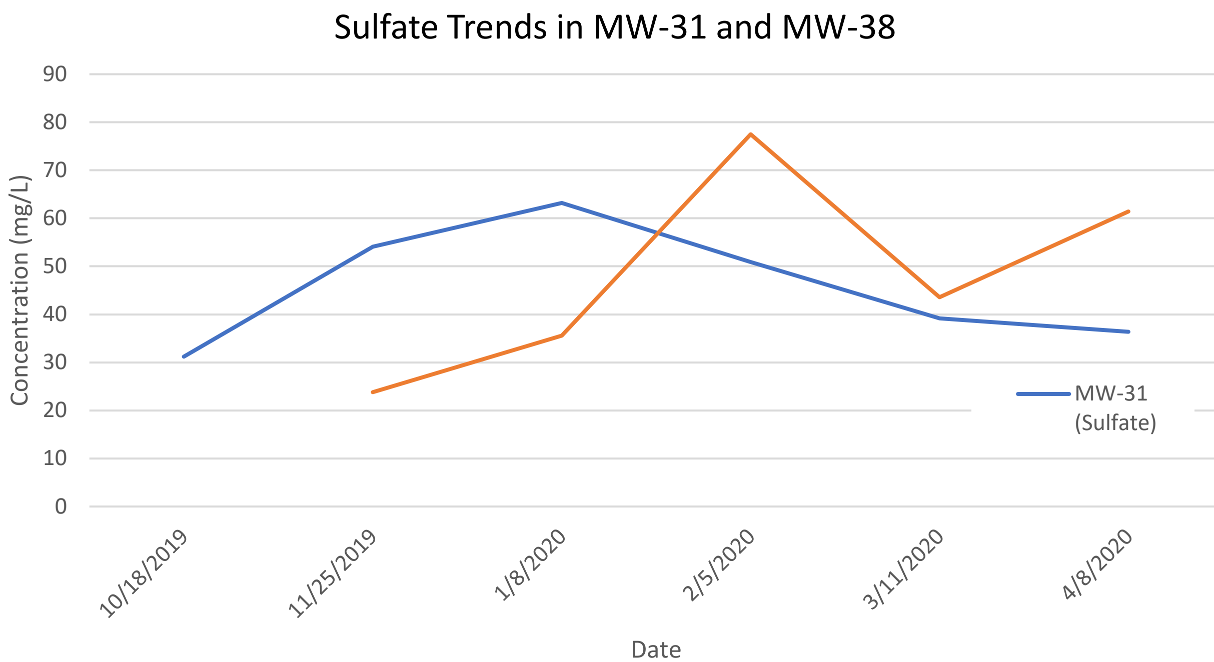
Dissolved methane concentration detection in MW-31 did indicate that reductive chlorination may be taking place to some extent, downgradient from the sewer main trench barrier. Dissolved methane was not detected in monitoring well MW-38. It should be noted that the methane concentrations generated are well below concentrations which would be observed if hydrogenolysis was the primary reductive process. Sites in which hydrogenolysis is the primary reductive process produces dissolved methane concentrations in the thousands of ppb.



Nitrate/Manganese/Sulfate

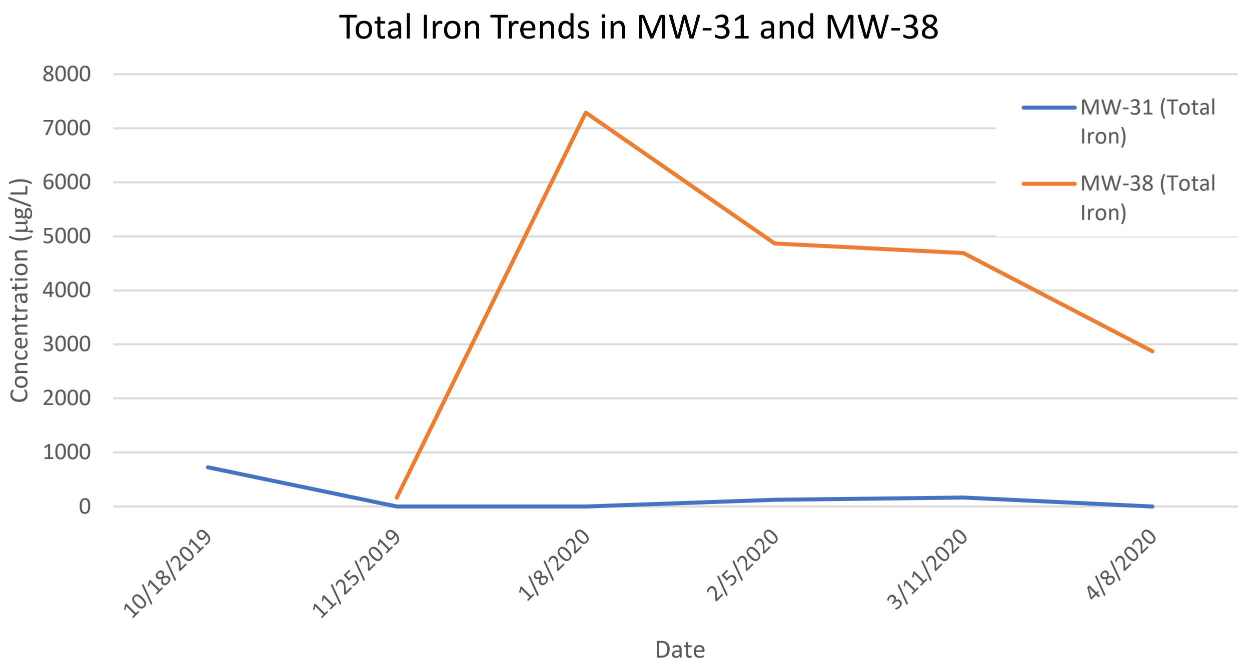
The sustained reduction of nitrate and increase in dissolved manganese with only temporary reductions in sulfate and the temporary increase in iron indicates that groundwater reducing conditions in the area are manganese reducing, which is ideal for maintaining lower dissolved methane concentrations. However, nitrate and manganese concentrations were not detected in monitoring wells MW-31 and MW-38.

The oxygen scavenger sodium sulfite is converted to sulfate as it scavenges oxygen, under reducing conditions, and then transitions to sulfite and sulfide. Ferrous iron then combines with the sulfide, forming pyrite, producing a secondary abiotic mechanism for the remedial process. Pyrite is known to have similar kinetic properties as zero valent iron for the treatment of the COCs. However, if reducing conditions are not present, then the sulfate will not be utilized, and pyrite will not be formed. In general, it appears that sulfate has been utilized periodically at monitoring wells MW-31 and MW-38, indicating that the abiotic process may be occurring intermittently.



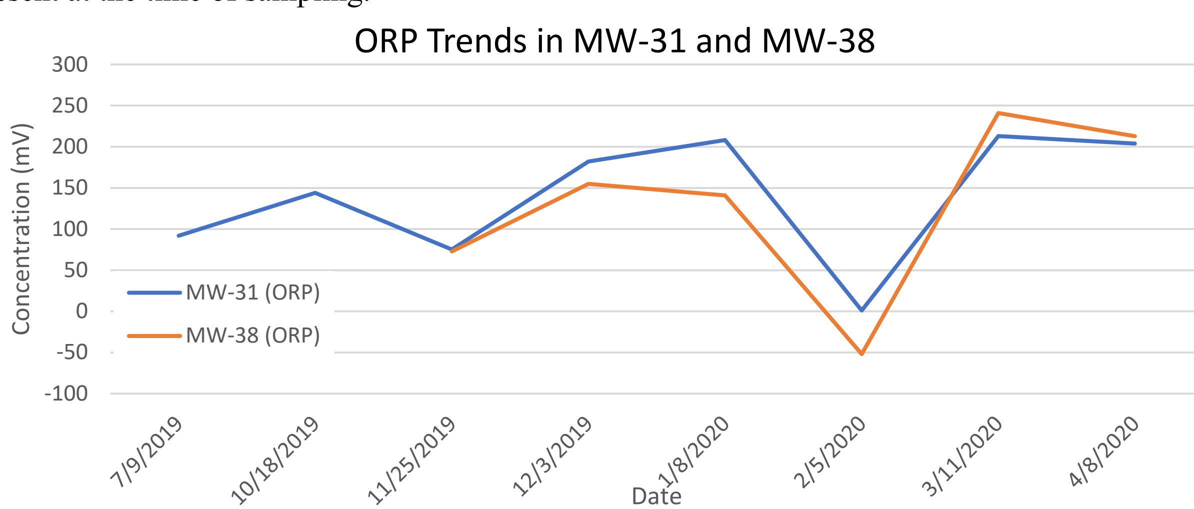
Iron

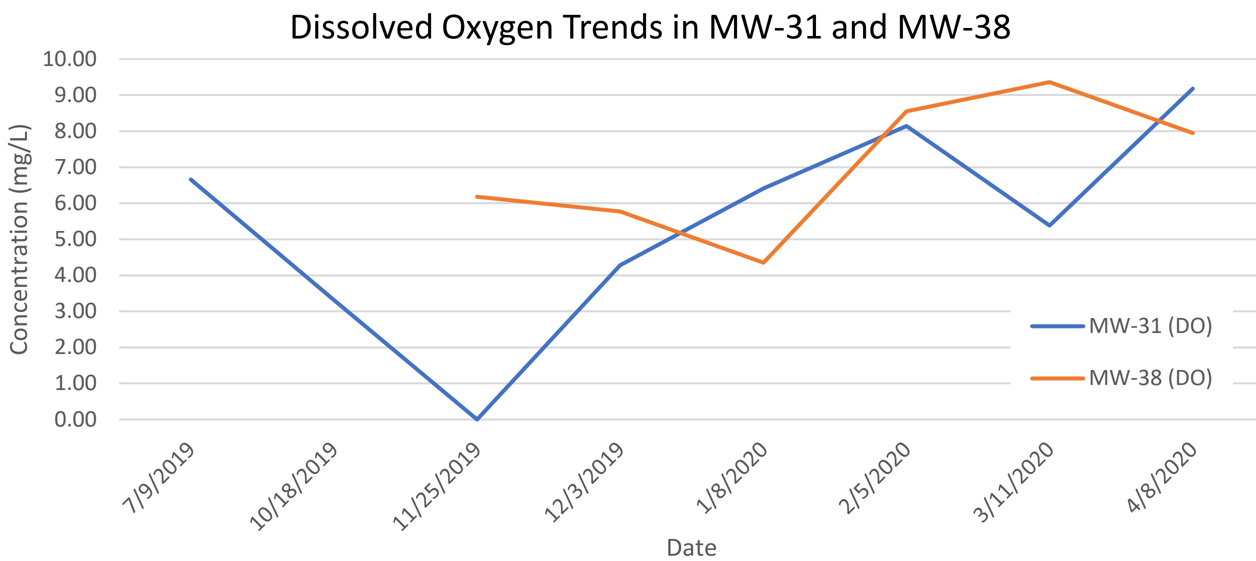
Due to the distance to MW-38 form the injection points, the initial increase in the total iron concentration was delayed following injection activities, when compared to the total iron concentration increase observed in MW-35. No changes were observed in total iron concentrations at MW-31.



Additional Field Parameters

Additional field parameters were evaluated to determine if aerobic or anaerobic conditions were present during groundwater sampling events. Groundwater field parameters have been summarized on **Table 4**. Aerobic conditions have been observed at MW-31 since pilot study injection activities were completed with DO concentrations present at ranges from 3.31 to 9.18 ppm and ORP readings ranging from 1 to 213 mV. Additionally, aerobic conditions have been also observed at MW-38 since pilot study injection activities were completed with DO concentrations present at ranges from 4.35 to 9.36 ppm and ORP readings ranging from -52 to 241 mV. The slightly negative ORP value observed at MW-38 during the February 2020 sampling event indicates a reducing environment may have been present at the time of sampling.

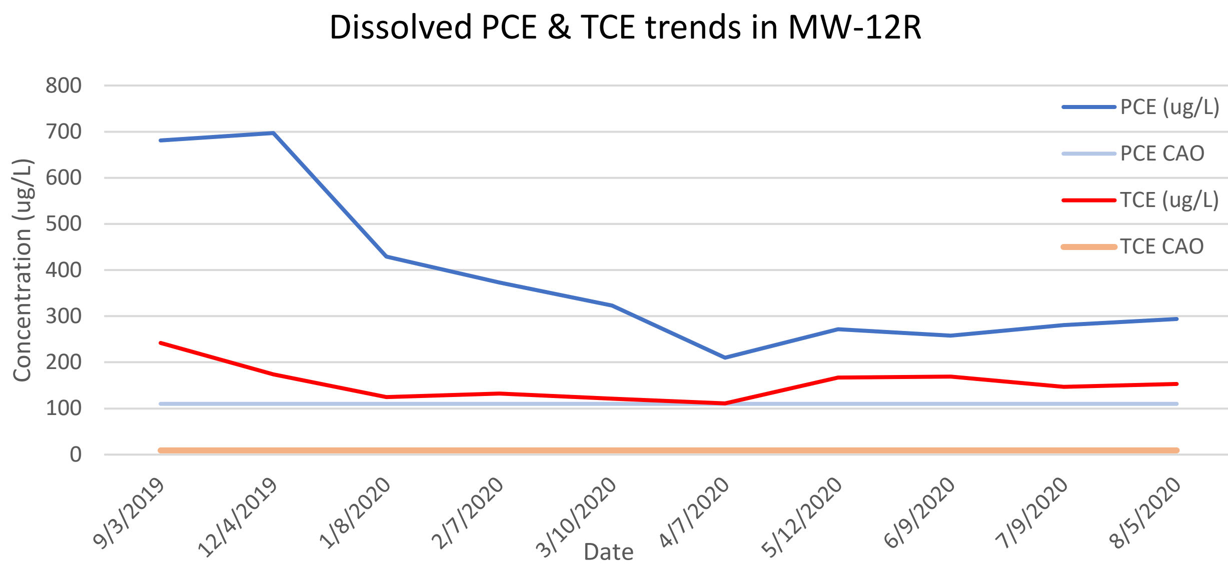




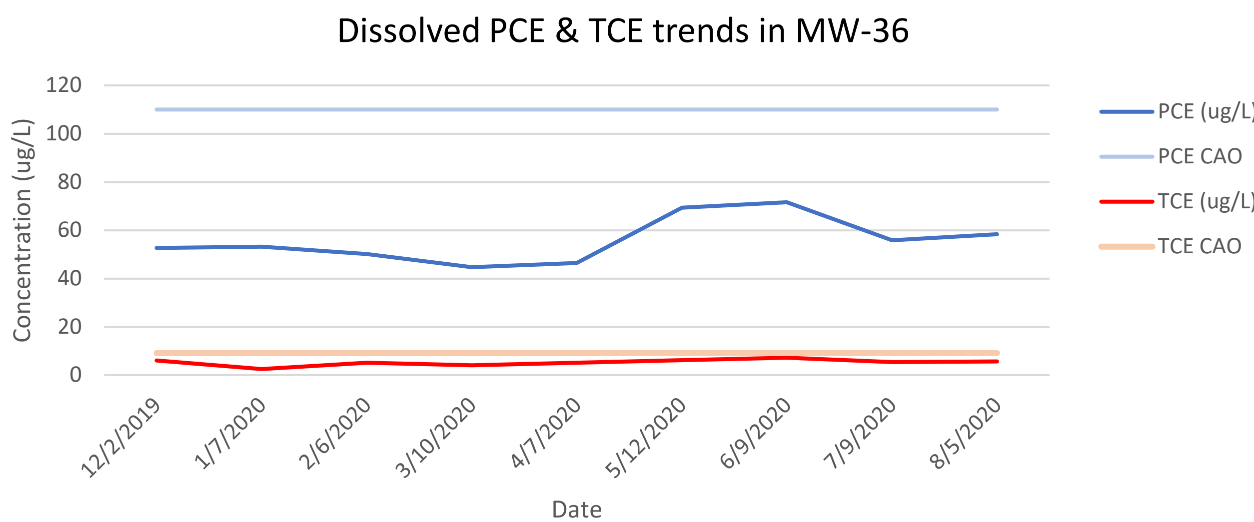
Control Wells

Monitoring wells MW-12R and MW-36 were utilized as control wells related to Area 2, as decreases in groundwater concentrations may be related to OIM implementation activities. A table summarizing select VOC groundwater analytical results has been included as **Table 2**, which also includes analytical results obtained as part of the OIM implementation confirmation groundwater sampling events for additional monitoring wells (IT-2, MW-12R, MW-32, MW-33, MW-34, MW-36, MW-37, MW-39, and MW-40).

Similar to monitoring well MW-38, dissolved COC concentrations have been reduced at monitoring well MW-12R as shown at the top of the following page. However, monitoring well MW-12R is screened similarly to monitoring well MW-31, across the base of Unit B. Therefore, it appears that OIM implementation activities have caused significant decreases in COC concentrations at MW-12R, but less significant concentration reductions at MW-31.



However, in monitoring well MW-36, dissolved COC concentrations have not changed significantly. Rather, observed PCE and TCE concentrations have been relatively stable.



Monitoring well MW-36 is screened similarly to monitoring well MW-38, however significant decreases in COC concentrations were not observed at MW-36. Based on the screened interval of MW-38 and the screened intervals of the Area 2 injections, it is likely that the higher rates of dissolved COC concentration decreases observed in MW-38 (when compared to MW-31) can be attributed to the PlumeStop and S-MZVI injections.

7.0 Findings

Mann-Kendall Trend Analysis was completed utilizing the USEPA's ProUCL software using a 95% confidence level for PCE and TCE concentrations obtained from select pilot study monitoring wells

(MW-31 and MW-38) and OIM implementation compliance wells using baseline sampling results obtained prior to OIM implementation through August 2020 in order to evaluate statistical trends. Since monthly data has been collected from these monitoring wells since December 2019 following implementation of the OIM, the most up to date data was utilized in order to have a larger data set for analysis. Trend analysis summary sheets have been included in **Attachment F** and has been summarized on the table below.

Location ID	PCE ProUCL Conclusion	TCE ProUCL Conclusion
MW-12R	Statistical evidence of a decreasing trend.	Insufficient evidence (IE) of a significant trend. Negative regression slope suggests an overall decrease in concentrations.
MW-31	**Current groundwater concentration below short-term CAO.** IE of a significant trend. Negative regression slope suggests an overall decrease in concentrations. Current groundwater concentration below short-term CAO.	Statistical evidence of a decreasing trend.
MW-35	**Current groundwater concentration below all CAOs.** COC not detected.	**Current groundwater concentration below all CAOs.** COC not detected.
MW-36	**Current groundwater concentration below short-term CAO.** IE of a significant trend. Positive regression slope suggests an overall increase in concentrations.	**Current groundwater concentration below short-term CAO.** IE of a significant trend. Positive regression slope suggests an overall increase in concentrations.
MW-38	**Current groundwater concentration below short-term CAO.** IE of a significant trend. Negative regression slope suggests an overall decrease in concentrations.	Statistical evidence of a decreasing trend.

Pilot study injection activities have improved groundwater conditions in the areas selected for evaluation of the in-situ technology. Observed COC concentrations in MW-31, MW-35, and MW-38 have been reduced as shown below (Pre-Pilot Study to August 2020):

Pilot Study Area 1

Monitoring Point	PCE % Reduction	TCE % Reduction	Total VOC % Reduction
MW-35	NA	100	100

Pilot Study Area 2

Monitoring Point	PCE % Reduction	TCE % Reduction	Total VOC % Reduction
MW-31	36	35	35
MW-38	53	81	74

The injection into the undisturbed formation surrounding MW-35 has exhibited the most promising results of the three pilot study sampling points. This is likely due to several factors including the proximity to the injection locations surrounding the monitoring point, the ability to inject the PlumeStop and S-MZVI directly into the targeted formation, and the total saturated depth in which the mixture was applied. Injection depths were only partially submerged within the injection points in the sanitary sewer excavation trench (IP-1, IP-2, IP-3, IP-4, and IP-6) while injection intervals within DPT-1 and INJ-1 through INJ-5 were fully submerged. Additionally, COC concentration reductions in monitoring wells MW-31 and MW-38 may have been partially aided by OIM implementation activities by the reduction of source material present (soil excavation and groundwater recovery). However, the top of the groundwater surface was targeted in Area 2 during pilot study injection activities and the monitoring point screened across the groundwater surface demonstrated significant COC concentration reductions, while the monitoring well screened across the base of Unit B only exhibited minor COC concentration reductions. Due to its selected location, OIM implementation activities should have had little impact on subsurface conditions in the vicinity of monitoring well MW-35 and all observed reductions are likely due solely to the reactions provided by the PlumeStop and S-MZVI.

While the reduction of PCE was not observed in monitoring well MW-35 since it was not initially present, it can be assumed that it would react similar to other VOCs which were remediated in monitoring well MW-35. PlumeStop is a colloidal carbon product and will adsorb all dissolved VOC constituents. PCE and TCE are similar in chemical structure and nature and has similar Freundlich Adsorption Isotherm Constants as benzene. A PlumeStop technical document has been included in **Attachment G**. Additional studies completed by Regenesis® utilizing PlumeStop have shown success with the reduction of PCE, similar to the TCE reductions observed during this pilot study, with a combination of other treatment products. Case studies from Regenesis® have been included in **Attachment G**.

The reduction of sulfate following the pilot study injection surrounding MW-35 indicates that the available sulfate was utilized in abiotic processes. Iron concentrations have also shown a slow decrease in concentrations further indicating that the available iron in the vicinity of monitoring well MW-35 is being utilized for abiotic processes and the production of pyrite, which has similar kinetic properties as ZVI.

The production of dissolved methane in groundwater has been limited by the utilization of the β-elimination pathway when compared to methane generation at other sites which have employed anaerobic chlorinated reduction in-situ technologies which utilize hydrogenolysis reduction of chlorinated compounds. Dissolved methane concentrations often reach concentrations in the thousands of ppb at these other sites which utilize hydrogenolysis, which then can become a potential health and safety concern.

In general, changes in COC concentrations, additional analytical parameters, and field data readings were delayed by approximately one (1) month in monitoring well MW-38 due to the distance of the well from the pilot study injection points located in the excavation trench. The increase of total iron present at MW-38 indicates that the pilot study injections have had some affect in this area. However, the reductions of COC concentrations observed at MW-38 may also be attributed to OIM implementation activities (i.e. source removal). However, since the injections within Area 2 were at the top of the groundwater surface and monitoring well MW-38 is screened across the top of the groundwater surface, the increase reductions in COC concentrations in comparison to MW-31 suggest that the pilot study activities accelerated remediation of the groundwater located near the top of the groundwater table. Reductions were observed in MW-31, but at lower percentages and since MW-31 is screened at the base of Unit B, this reduction is probably a result of the source removal activities completed during the OIM.

The generation of daughter products (i.e. cis-1,2-DCE and VC) were not observed during the pilot study in any monitoring wells. However, an increase in ethene and ethane were observed in monitoring well MW-35 which indicates the β-elimination of chlorinated compounds is likely occurring.

8.0 Conclusions

Ultimately, the success of this pilot study is based on the observed decrease in dissolved chlorinated VOC concentrations in groundwater. However, the generation of ethenes and ethanes have also demonstrated that chlorinated VOCs are being destroyed via the β-elimination pathway, in lieu of the hydrogenolysis reductive dichlorination pathway which generates cis-1,2-DCE, trans-1,2-DCE, and VC. PCE was not present in monitoring well MW-35 during the baseline sampling event, however, PCE was reduced 53 percent at monitoring well MW-38 which is located 30 to 60 feet from the nearest pilot study injection points. Groundwater results at monitoring well MW-35 have exhibited the complete elimination of chlorinated VOCs without the generation of any daughter by-products and groundwater results at monitoring well MW-38 have exhibited a 74% reduction in VOC concentrations. If adequate distribution of the PlumeStop and S-MZVI are made vertically throughout the saturated impacted areas, significant decreases in dissolved COCs can be expected. Even with limited distribution at the top of the groundwater surface, significant decreases in COC concentrations were observed at the top of the groundwater surface approximately 30 to 60 feet from the injection points.

Dissolved oxygen and ORP field data readings have demonstrated that an anaerobic environment is present in the vicinity of monitoring well MW-35 while data obtained from monitoring wells MW-31 and MW-38 have only exhibited temporary periods where the subsurface environment may have become anaerobic. This is likely due to the distance located between the injection points and the monitoring points and the fact that the injection points within Forsythe Street were not fully submerged within the saturated portion of Unit B and the area immediately surrounding those injection points had been backfilled with limestone aggregate creating a preferential flow pathway for the injected remedial solution. Significant source removal activities occurred during the OIM and certainly resulted in decreases in COC concentrations within and hydraulically downgradient of the sewer main trench. However, based on the screened interval of MW-38 and the screened intervals of the Area 2 injections (both being screened across the top of the groundwater table), it is likely that the observed higher percentage of dissolved COC decreases in MW-38 were a result of the PlumeStop and S-MZVI injections. Monitoring well MW-31 is screened across the base of Unit B and not the groundwater surface; therefore, the injection events in Area 2 did not target this area and thus the lower percentages of COC reductions are primarily attributable to the OIM source removal activities.

Increases in dissolved COC concentrations have been noted during the May and June 2020 groundwater sampling events. This is likely a factor of changes in groundwater elevations combined with the continued migration of impacted groundwater from up-gradient directions. Groundwater elevations raised one to two feet over the zone where the PlumeStop was injected within the IP injection points during October 2019.

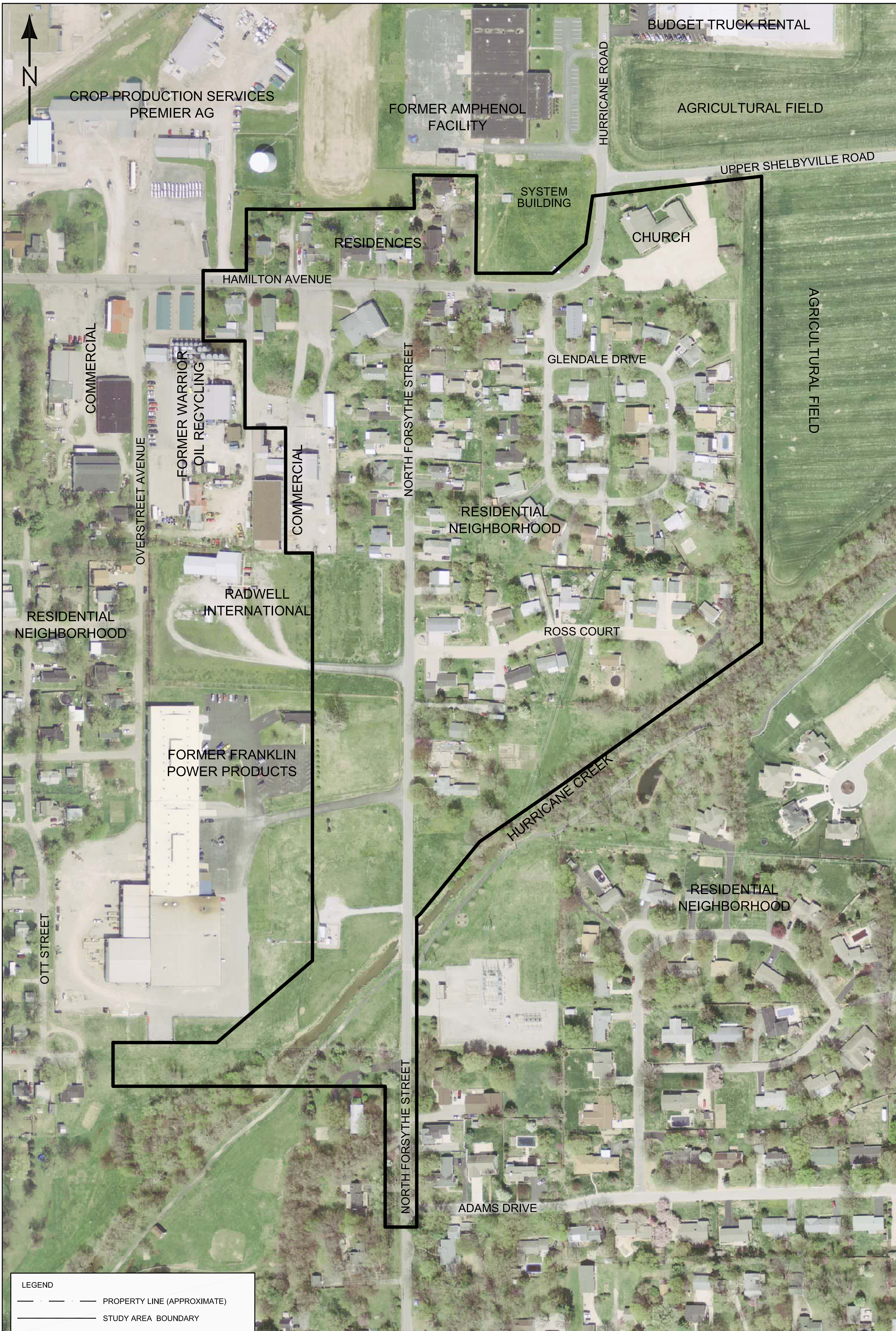
It appears that this technology is a feasible option for groundwater remediation in off-Site areas and will not generate harmful by-products (cis-1,2-DCE and VC). This would reduce COC concentrations in soil gas generated by volatilization from groundwater which in turn should assist in reducing COC vapor concentrations within sewer gas. Additionally, this technology would be feasible for on-Site treatment of groundwater, however, this technology by itself would not actively remediate soil impacts observed at the Site. During Site soil investigation activities, the majority of absorbed soil impacts have been observed in silty sand lenses in the bottom six (6) feet of the saturated portion of Unit B and within the top two (2) feet of the silty clay within Unit C. It is unlikely that this remedial approach can adequately penetrate these soil matrices and distribute the remedial solution into these less permeable zones. IWM Consulting will take this into consideration when developing an on-Site remedial plan and if this technology is utilized to treat the groundwater on-Site, additional remedial technologies may also need to be incorporated to actively treat the less permeable impacted soil zones beneath the Site.

If a larger scale application of this technology is implemented, the injection methods and dosages utilized should be similar to those employed near monitoring well MW-35 and the expected results should be similar to the observations made at monitoring well MW-35, as the remedial solution injections would take place in native soil conditions and not within the sanitary sewer main trench. Additional drilling or injection activities within the limits of the newly paved roadway will not be permitted by the City of Franklin, however, injections would be permitted within unpaved ROW and on private property where access is granted. The injection program would treat the entire length of the saturated zone, treating any COCs present in both the top and base of the groundwater table.

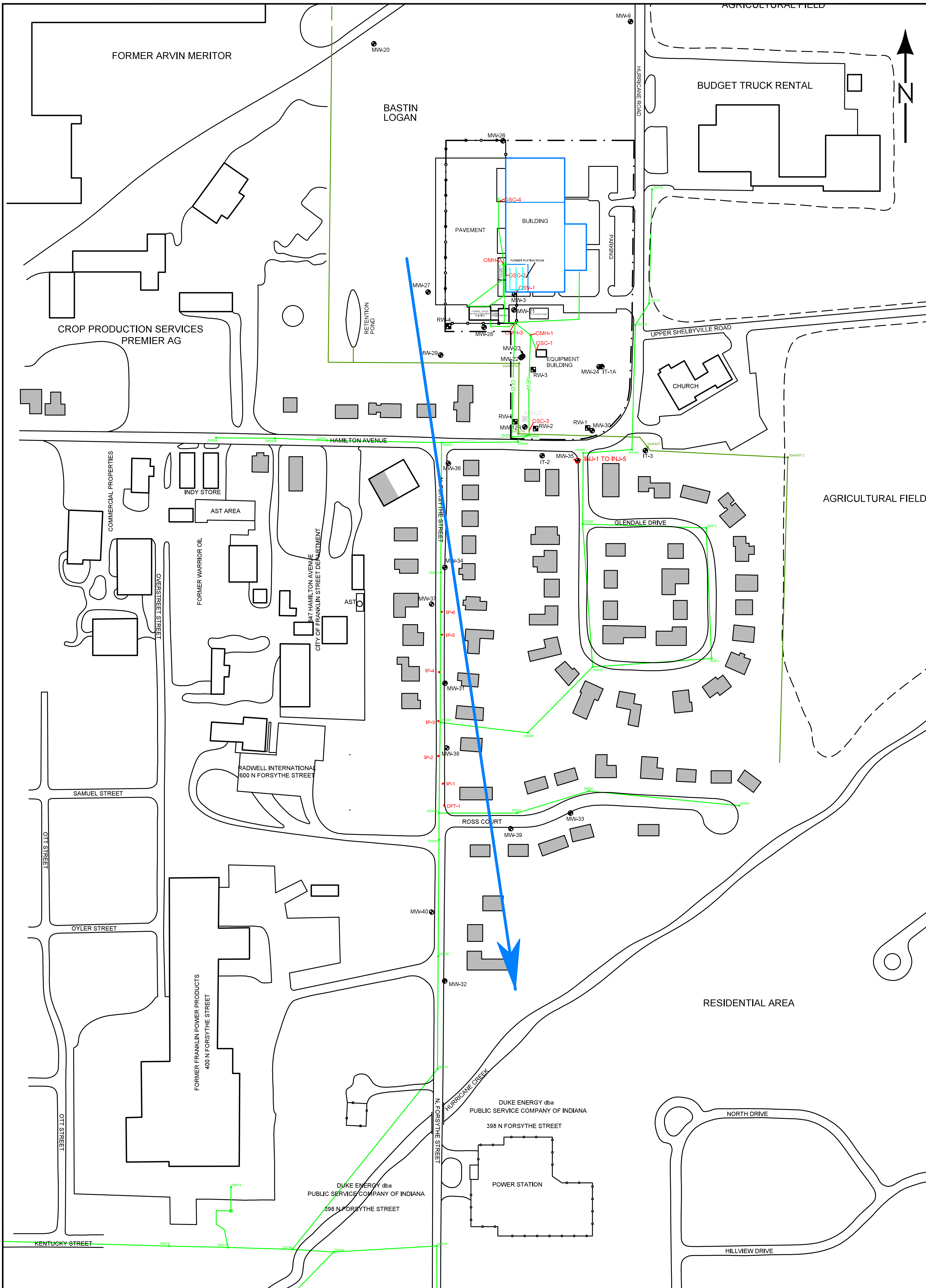
PCE concentrations have been reduced by pilot study and OIM implementation activities throughout the off-Site Study Area to levels less than short-term CAOs. PCE is the primary COC originating from the Amphenol site and elevated off-Site TCE concentrations are not solely related to historical permitted discharges to the sanitary sewer by Amphenol or its predecessors. Regardless, as indicated within the *Draft Post-OIM Implementation Sewer Gas Vapor Intrusion Evaluation Report*, additional source investigation and delineation activities should be completed by other potential responsible parties prior to implementing any further off-Site remedial activities. All source areas and impacts should be assessed and considered during design of injection locations and dosage loading for proper mitigation of impacts and to ensure long-term success of remedial efforts.

Differences in groundwater, soil gas, and sewer vapor COC concentration ratios have been observed through different portions of the Study Area and are likely due to secondary sources, separate from the Amphenol release. As a result, mitigation of contributions from the former Amphenol Facility is unlikely to remove all groundwater impacts (and thereby unlikely to prevent all soil vapor impacts present in soil and sewer gas). Contribution from secondary source areas will continue to result in concentrations of COCs in the groundwater and sewer gas above indoor air screening limits following the completion of any future potential remedial actions completed by Amphenol. Additional analysis of the potential additional sources was included as Attachment D of the *Draft Post-OIM Implementation Sewer Gas Vapor Intrusion Evaluation Report.*

Figures



0' 200' SCALE IN FEET	DRAWN BY: L. STRUM DATE: 9/27/99 REVISED: 06/24/2020 HWPA #111291-01 DWG. NO. 111291S1	FIGURE 1 STUDY AREA MAP	FORMER AMPHENOL RFI/CMS 980 HURRICANE ROAD FRANKLIN, INDIANA	IWM CONSULTING GROUP



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- PLUMESTOP INJECTION POINT
- GENERAL GROUNDWATER FLOW DIRECTION

0' 200'
SCALE IN FEET

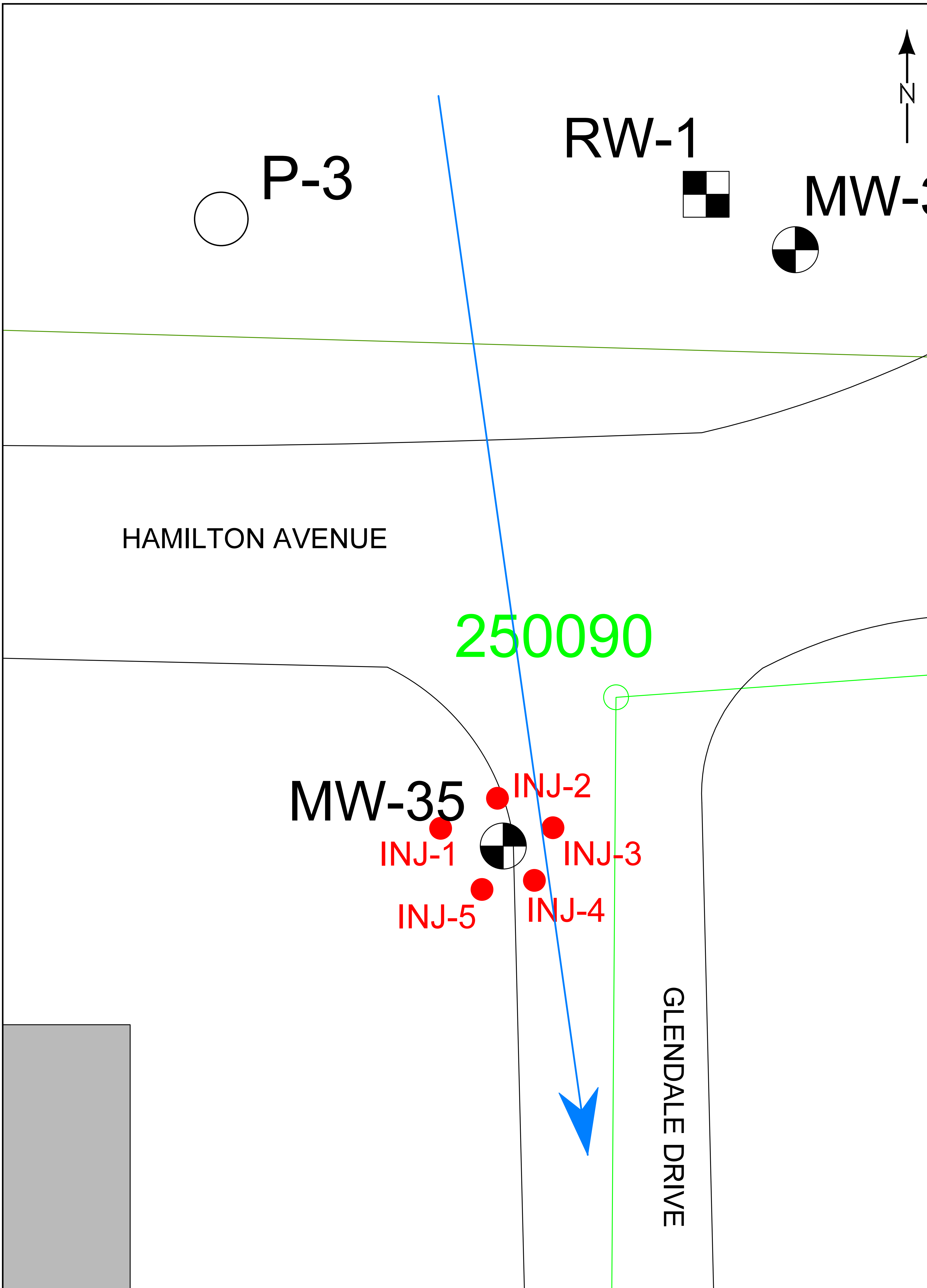
DRAWN BY: L. STRUM	
DATE: 9/27/99	
REVISED: 09/01/2020	
HWPA #111291-01	
DWG. NO. 111291S1	

FIGURE 2

SITE MAP

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PIEZOMETERS
- PLUMESTOP INJECTION POINT
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- GENERAL GROUNDWATER FLOW DIRECTION

0' 10'
SCALE IN FEET

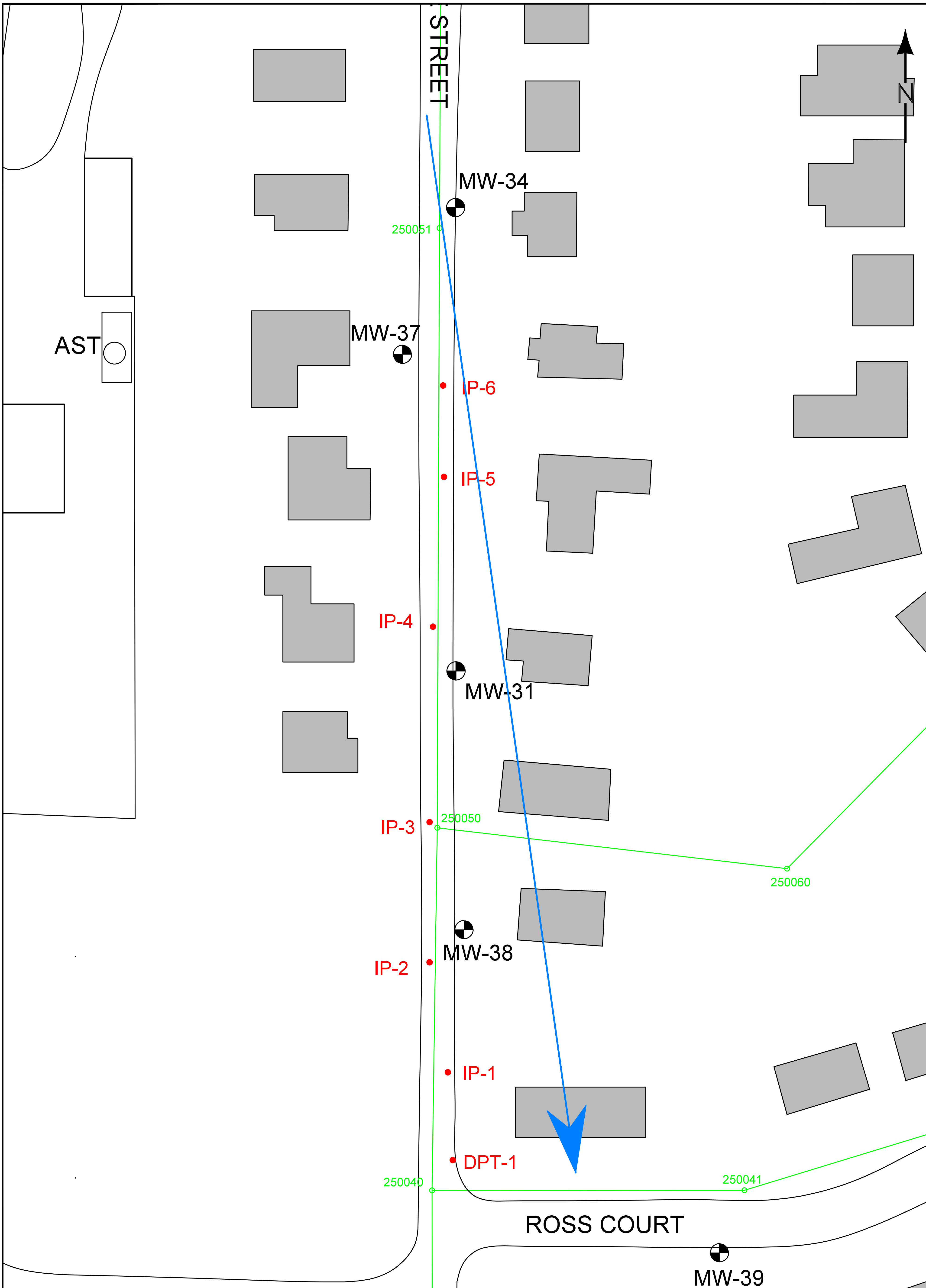
DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 09/01/2020
HWPA #111291-01
DWG. NO. 111291S1

FIGURE 3

MW-35 INJECTION AREA

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- PLUMESTOP INJECTION POINT
- GENERAL GROUNDWATER FLOW DIRECTION

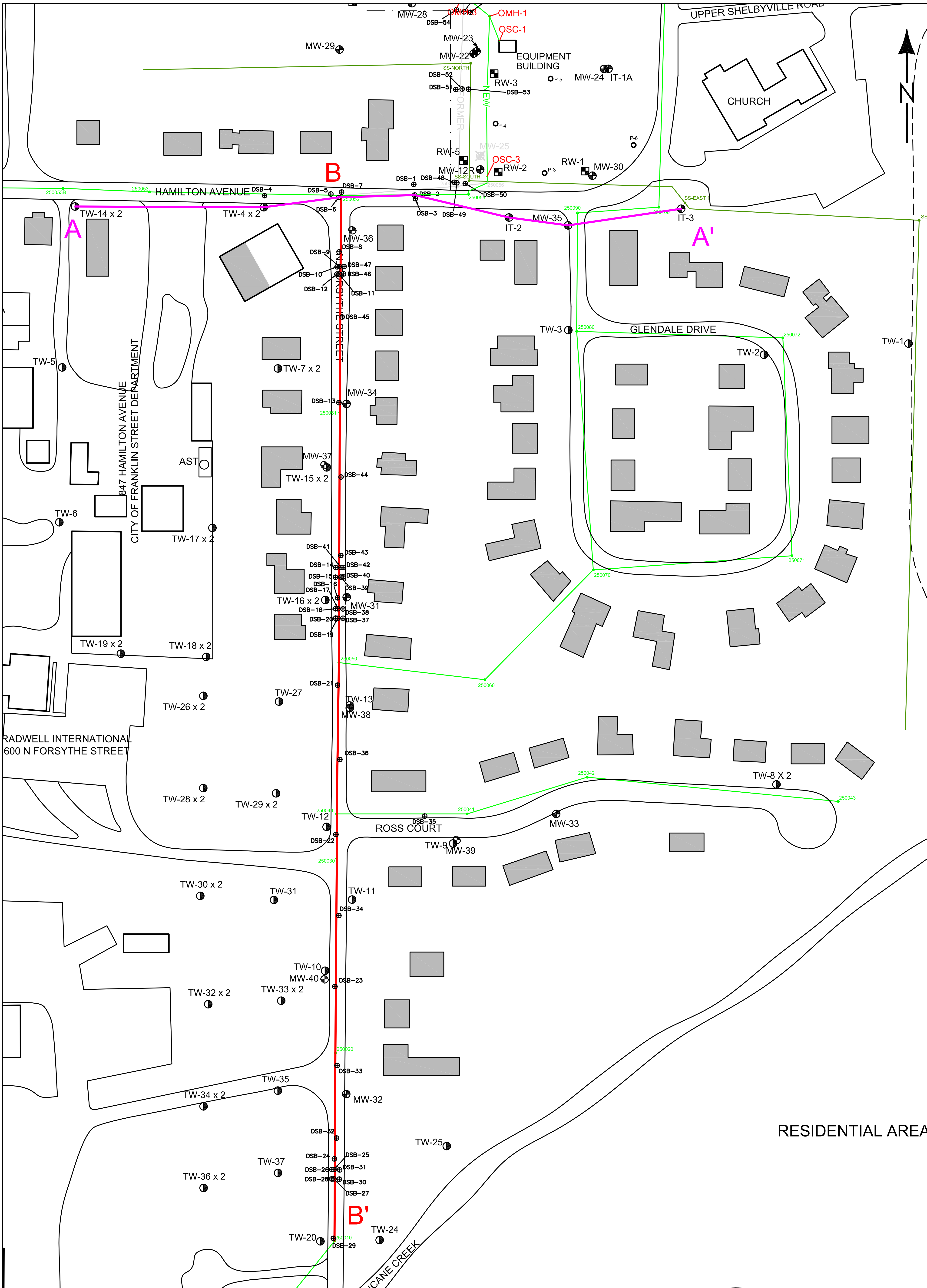
0' 50'
SCALE IN FEET

DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 09/01/2020
HWPA #111291-01
DWG. NO. 111291S1

FIGURE 4
SOUTHERN PORTION OF THE STUDY AREA ALONG NORTH FORSYTHE STREET

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP

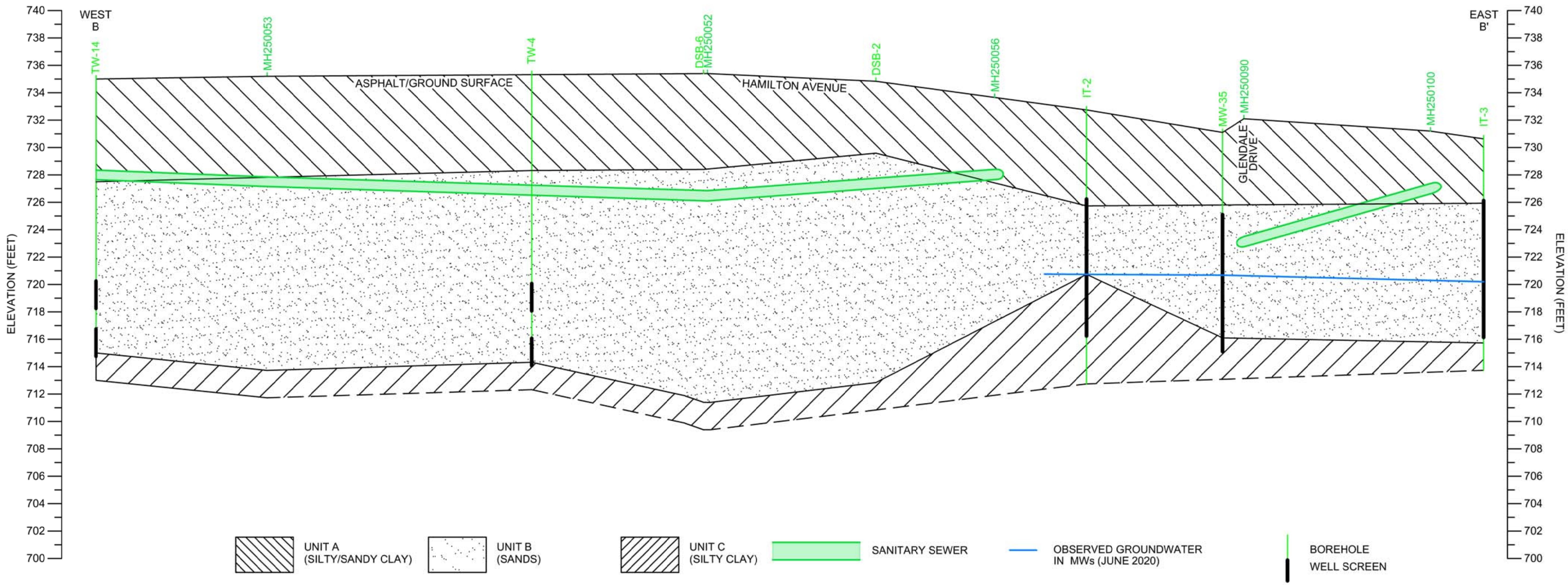


LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PIEZOMETERS
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- RESIDENTIAL HOME * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- TEMPORARY WELLS
- SOIL BORING LOCATION

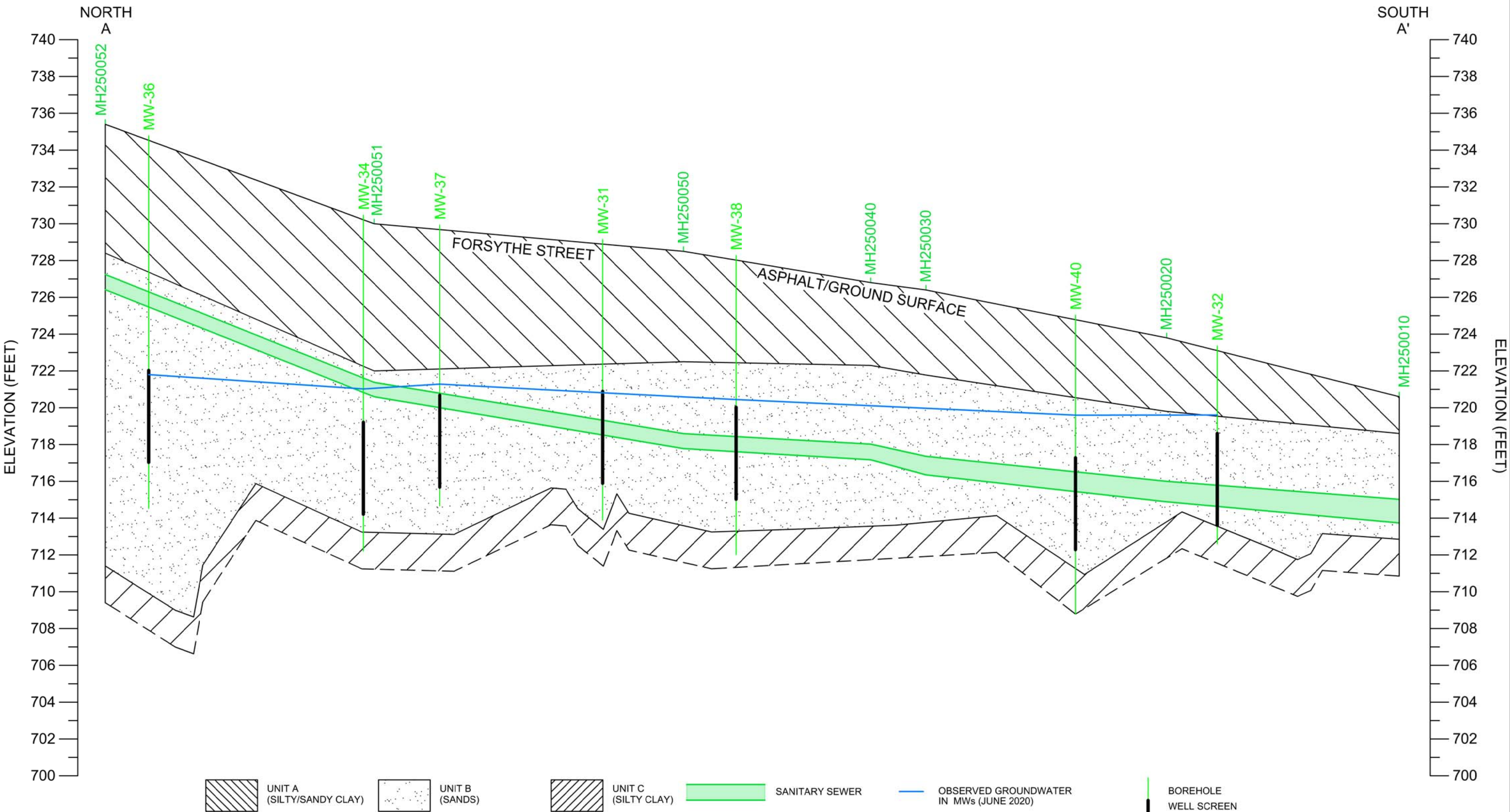
0' 120'
SCALE IN FEET

DRAWN BY: L. STRUM	FIGURE 5 CROSS-SECTION LOCATION MAP	FORMER AMPHENOL RFI/CMS 980 HURRICANE ROAD FRANKLIN, INDIANA	IWM CONSULTING GROUP
DATE: 9/27/99			
REVISED: 06/25/2020			
HWPA #111291-01			
DWG. NO. 111291S1			



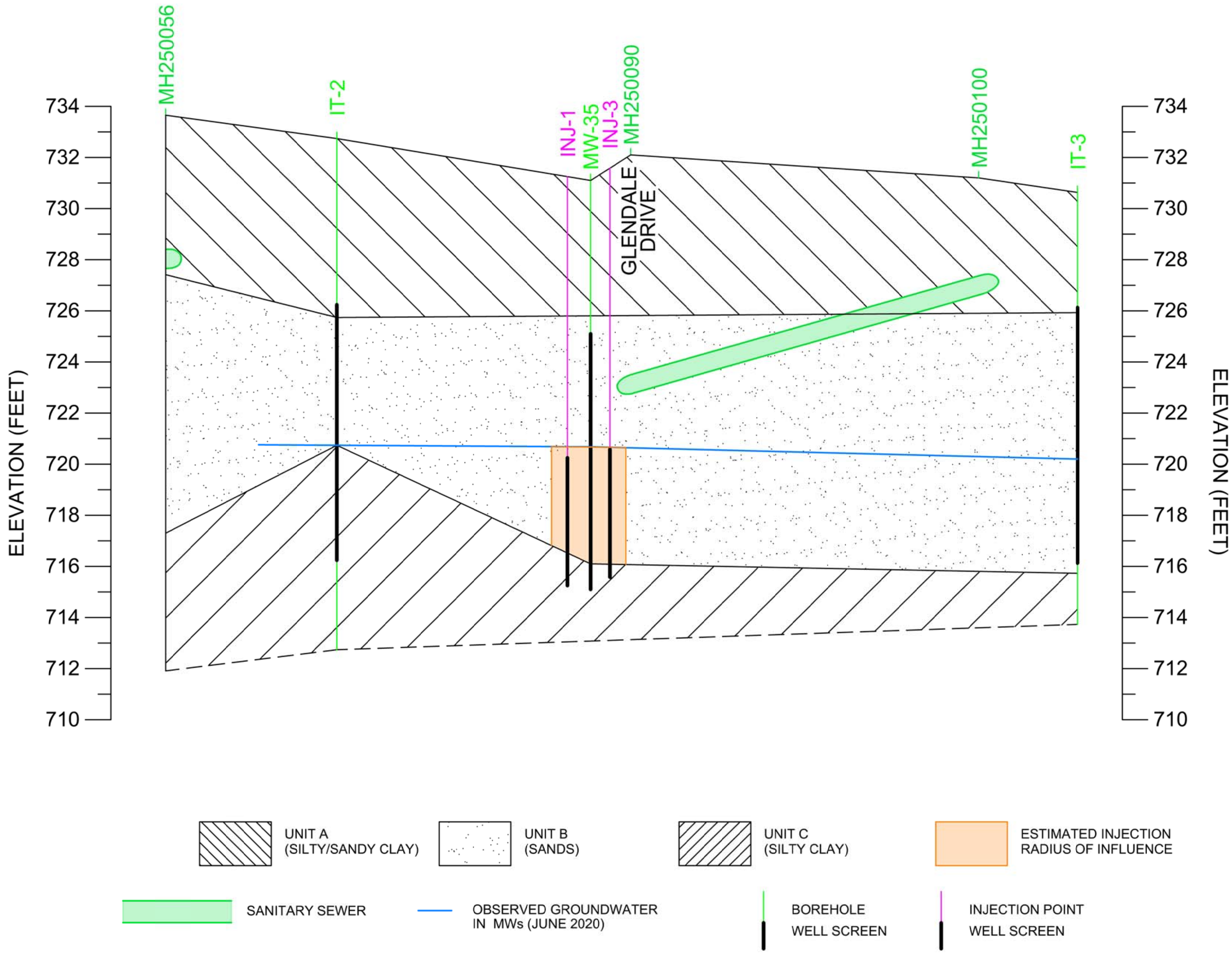
*NOTE: SANITARY MAIN EXCAVATION BACKFILLED WITH #8 LIMESTONE AGGREGATE FROM MH250053 TO MH250056, APPROXIMATELY 2 FEET BELOW MAIN & TO APPROXIMATELY 2 FEET BELOW SURFACE & 4 - 5 FEET PERPENDICULAR TO MAIN.

VERTICAL SCALE: 1" = 5.5' HORIZONTAL SCALE: 1" = 60'	DRAWN BY: C. NEWELL DATE: 04/04/2019 REVISED: 06/25/2020 HWPA #111291-01 DWG. NO. 111291S1	FIGURE 6 HAMILTON AVENUE CROSS-SECTION (WEST TO EAST)	FORMER AMPHENOL RFI/CMS 980 HURRICANE ROAD FRANKLIN, INDIANA	IWM CONSULTING GROUP



*NOTE: SANITARY MAIN EXCAVATION BACKFILLED WITH #8 LIMESTONE AGGREGATE FROM MH250052 TO MH250040, APPROXIMATELY 2 FEET BELOW MAIN & TO APPROXIMATELY 2 FEET BELOW SURFACE & 4 - 5 FEET PERPENDICULAR TO MAIN.

VERTICAL SCALE: 1" = 5' HORIZONTAL SCALE: 1" = 100'	DRAWN BY: C. NEWELL DATE: 04/04/2019 REVISED: 06/25/2020 HWPA #111291-01 DWG. NO. 111291S1	FIGURE 7 FORSYTHE STREET CROSS-SECTION (NORTH TO SOUTH)	FORMER AMPHENOL RFI/CMS 980 HURRICANE ROAD FRANKLIN, INDIANA	IWM CONSULTING GROUP

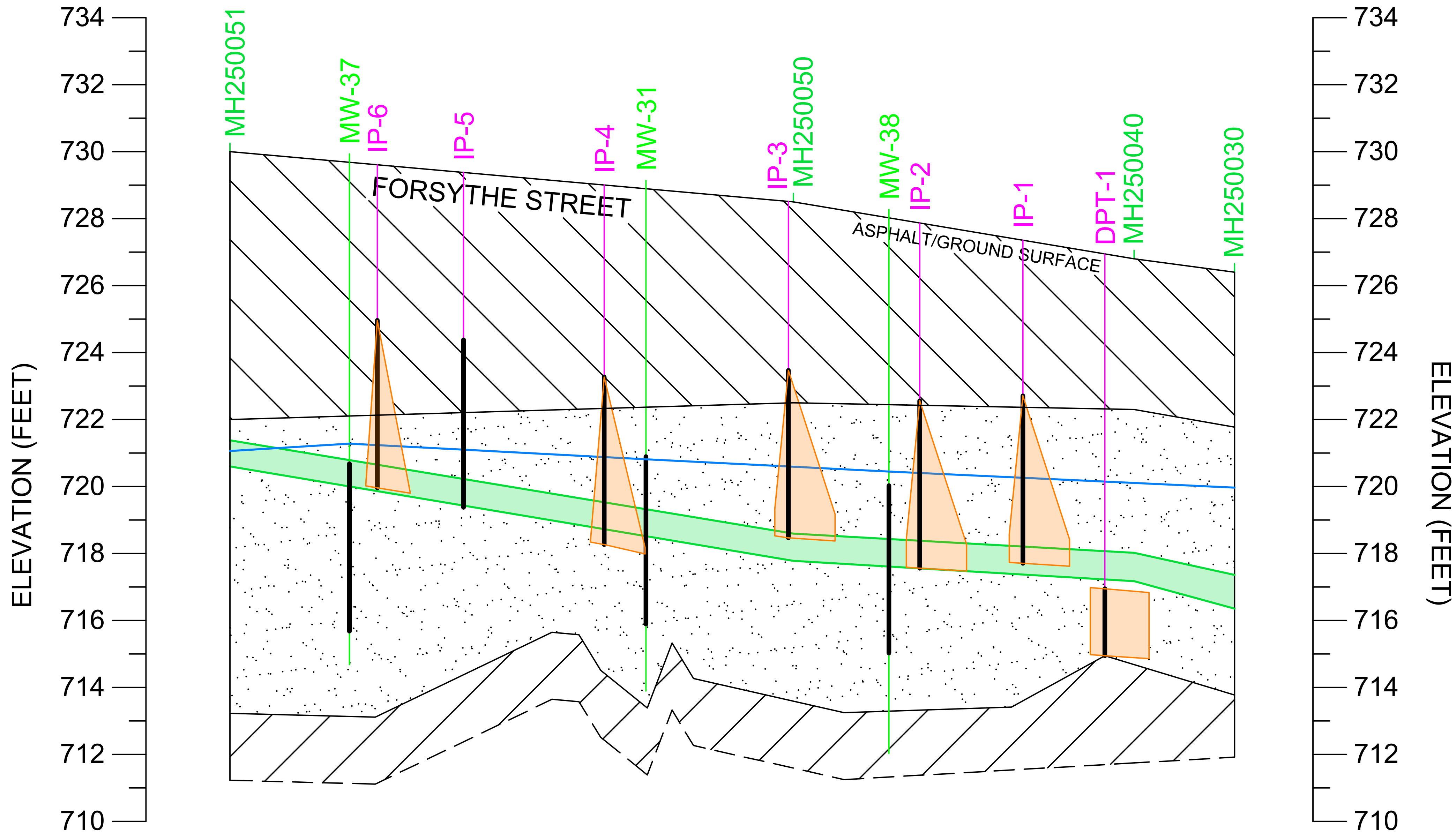


FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

FIGURE 8
MW-35 INJECTION AREA
CROSS-SECTION

DRAWN BY: C. NEWELL
DATE: 04/03/2019
REVISED:06/25/2020
HWPA #111291-01
DWG. NO. 111291S1

VERTICAL SCALE: 1" = 4'
HORIZONTAL SCALE: 1" = 32'



UNIT A (SILTY/SANDY CLAY)

UNIT B (SANDS)

UNIT C (SILTY CLAY)

ESTIMATED INJECTION RADIUS OF INFLUENCE

*NOTE: IP-5 WAS NOT USED IN THE PILOT STUDY

SANITARY SEWER

OBSERVED GROUNDWATER IN MWs (JUNE 2020)

BOREHOLE

WELL SCREEN

INJECTION POINT

WELL SCREEN

IWM CONSULTING GROUP

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

FIGURE 9
CENTRAL-SOUTHERN
FORSYTHE STREET
INJECTION CROSS-SECTION

DRAWN BY: C. NEWELL

DATE: 04/03/2019

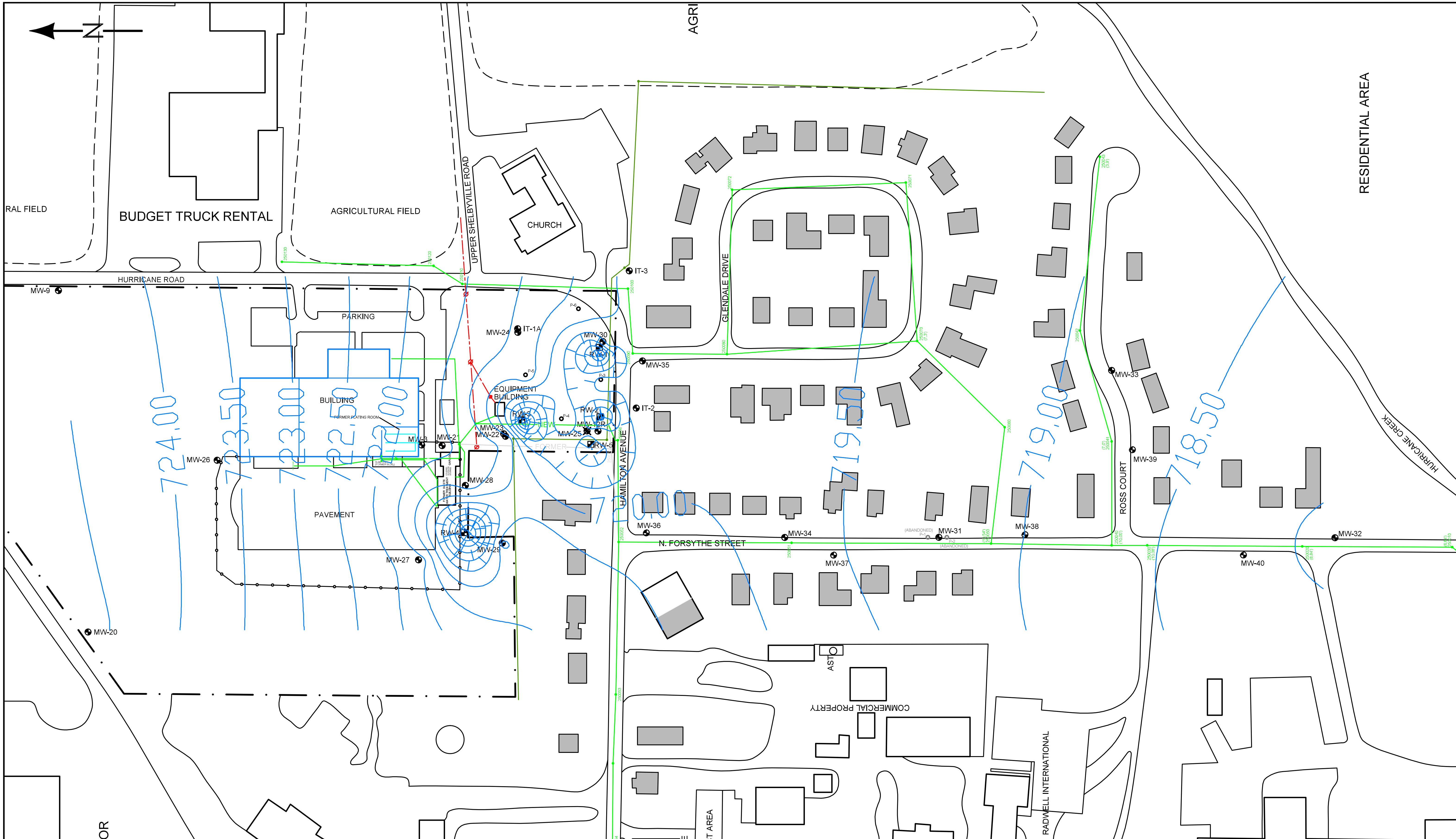
REVISED:09/01/2020

HWPA #111291-01

DWG. NO. 111291S1

VERTICAL SCALE: 1" = 4'

HORIZONTAL SCALE: 1" = 80'



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PROPERTY LINE (APPROXIMATE)
- PRIMARY BUILDING WALLS
- PIEZOMETER
- STORM SEWER
- SANITARY SEWER
- O/H POWER
- 721.0 POTENTIONMETRIC SURFACE (CONTOUR INTERVAL = 0.5 FT.)

0' 100'
SCALE IN FEET

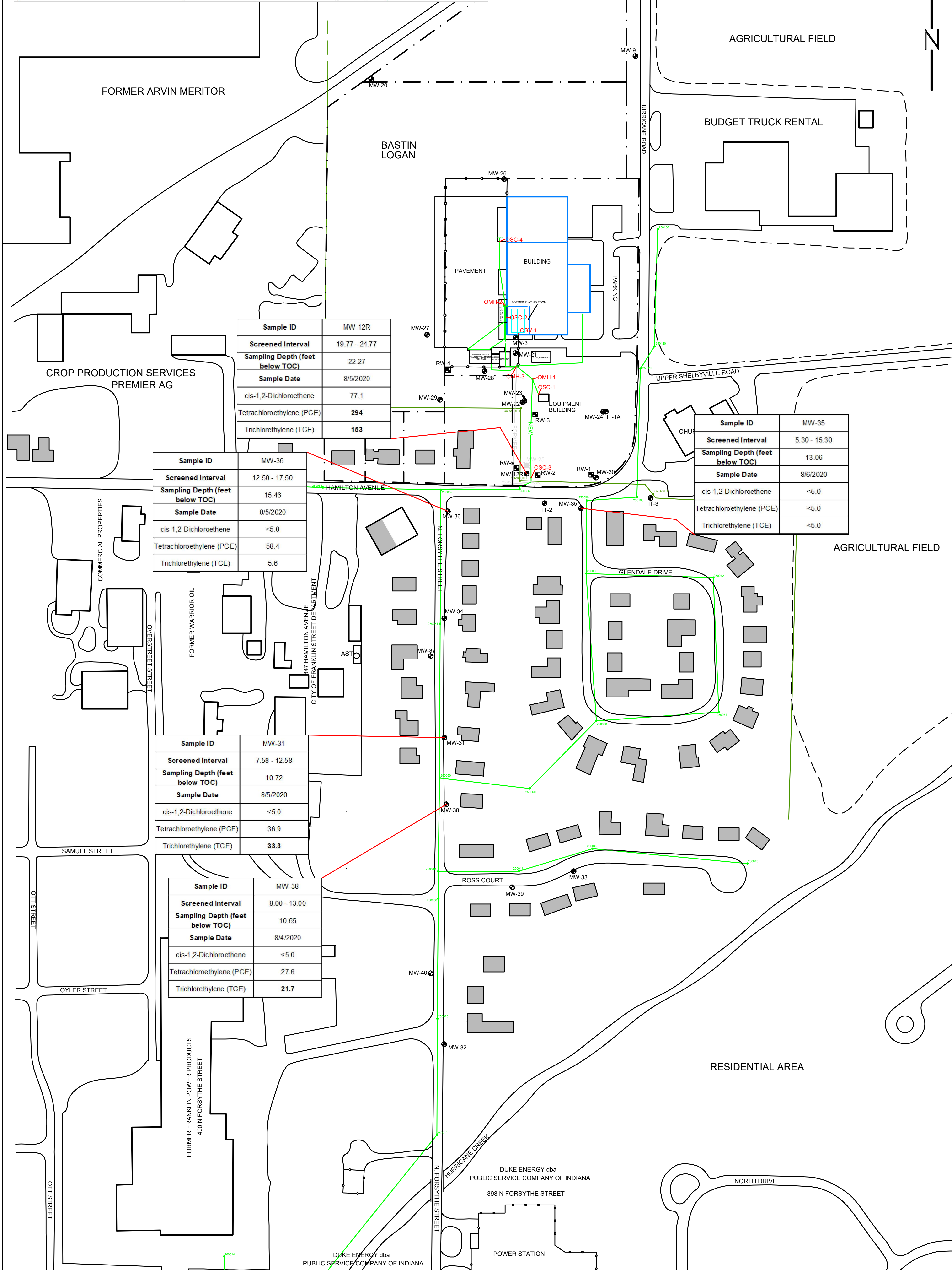
DRAWN BY: L. STRUM	
DATE: 9/27/99	
REVISED: 09/10/2020	
HWPA #111291-01	
DWG. NO. 111291S1	

FIGURE 10
GROUNDWATER ELEVATION MAP
(08/04/2020)

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP

All results in ug/L.
TOC: Top of casing.
Concentrations in **bold** exceed IDEM RCG Residential Groundwater Vapor Exposure Screening Level.
ǂ : Indicates estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.



Sample ID	MW-12R
Screened Interval	19.77 - 24.77
Sampling Depth (feet below TOC)	22.27
Sample Date	8/5/2020
cis-1,2-Dichloroethene	77.1
Tetrachloroethylene (PCE)	**294**
Trichlorethylene (TCE)	**153**

Sample ID	MW-36
Screened Interval	12.50 - 17.50
Sampling Depth (feet below TOC)	15.46
Sample Date	8/5/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	58.4
Trichlorethylene (TCE)	5.6

Sample ID	MW-35
Screened Interval	5.30 - 15.30
Sampling Depth (feet below TOC)	13.06
Sample Date	8/6/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	<5.0
Trichlorethylene (TCE)	<5.0

Sample ID	MW-31
Screened Interval	7.58 - 12.58
Sampling Depth (feet below TOC)	10.72
Sample Date	8/5/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	36.9
Trichlorethylene (TCE)	**33.3**

Sample ID	MW-38
Screened Interval	8.00 - 13.00
Sampling Depth (feet below TOC)	10.65
Sample Date	8/4/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	27.6
Trichlorethylene (TCE)	**21.7**

LEGEND
- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- O/H POWER
- RESIDENTIAL HOME
  - * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS

0' 200'
SCALE IN FEET

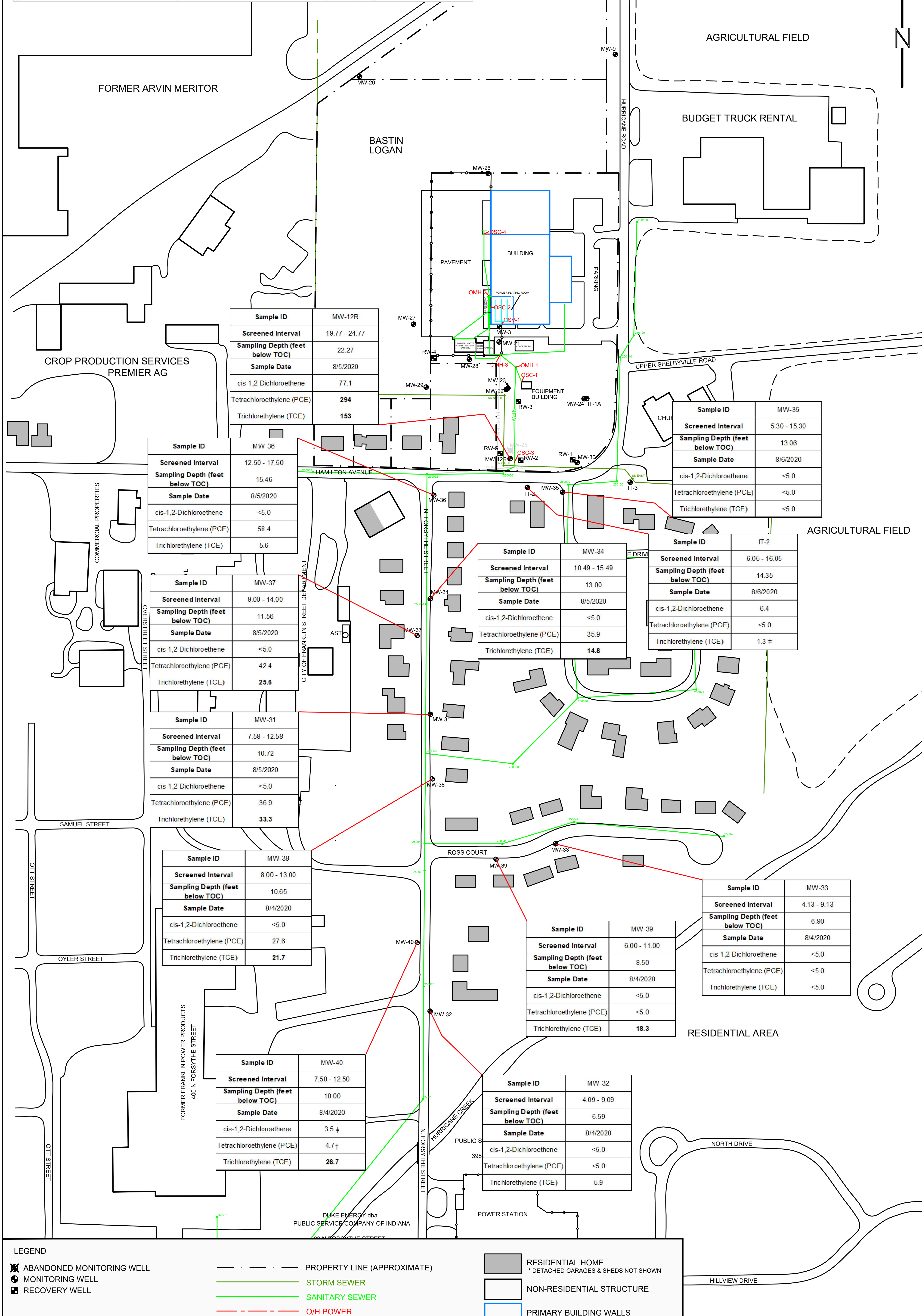
DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 09/09/2020
HWPA #111291-01
DWG. NO. 111291S1

FIGURE 11A
PILOT STUDY WELLS, GROUNDWATER ANALYTICAL RESULTS (AUGUST 2020)

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP

All results in ug/L.
TOC: Top of casing.
Concentrations in **bold** exceed IDEM RCG Residential Groundwater Vapor Exposure Screening Level.
ǂ : Indicates estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.



Sample ID	MW-12R
Screened Interval	19.77 - 24.77
Sampling Depth (feet below TOC)	22.27
Sample Date	8/5/2020
cis-1,2-Dichloroethene	77.1
Tetrachloroethylene (PCE)	**294**
Trichlorethylene (TCE)	**153**

Sample ID	MW-36
Screened Interval	12.50 - 17.50
Sampling Depth (feet below TOC)	15.46
Sample Date	8/5/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	58.4
Trichlorethylene (TCE)	5.6

Sample ID	MW-35
Screened Interval	5.30 - 15.30
Sampling Depth (feet below TOC)	13.06
Sample Date	8/6/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	<5.0
Trichlorethylene (TCE)	<5.0

Sample ID	IT-2
Screened Interval	6.05 - 16.05
Sampling Depth (feet below TOC)	14.35
Sample Date	8/6/2020
cis-1,2-Dichloroethene	6.4
Tetrachloroethylene (PCE)	<5.0
Trichlorethylene (TCE)	1.3 ǂ

Sample ID	MW-34
Screened Interval	10.49 - 15.49
Sampling Depth (feet below TOC)	13.00
Sample Date	8/5/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	35.9
Trichlorethylene (TCE)	**14.8**

Sample ID	MW-37
Screened Interval	9.00 - 14.00
Sampling Depth (feet below TOC)	11.56
Sample Date	8/5/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	42.4
Trichlorethylene (TCE)	**25.6**

Sample ID	MW-31
Screened Interval	7.58 - 12.58
Sampling Depth (feet below TOC)	10.72
Sample Date	8/5/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	36.9
Trichlorethylene (TCE)	**33.3**

Sample ID	MW-38
Screened Interval	8.00 - 13.00
Sampling Depth (feet below TOC)	10.65
Sample Date	8/4/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	27.6
Trichlorethylene (TCE)	**21.7**

Sample ID	MW-33
Screened Interval	4.13 - 9.13
Sampling Depth (feet below TOC)	6.90
Sample Date	8/4/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	<5.0
Trichlorethylene (TCE)	<5.0

Sample ID	MW-39
Screened Interval	6.00 - 11.00
Sampling Depth (feet below TOC)	8.50
Sample Date	8/4/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	<5.0
Trichlorethylene (TCE)	**18.3**

Sample ID	MW-40
Screened Interval	7.50 - 12.50
Sampling Depth (feet below TOC)	10.00
Sample Date	8/4/2020
cis-1,2-Dichloroethene	3.5 ǂ
Tetrachloroethylene (PCE)	4.7 ǂ
Trichlorethylene (TCE)	**26.7**

Sample ID	MW-32
Screened Interval	4.09 - 9.09
Sampling Depth (feet below TOC)	6.59
Sample Date	8/4/2020
cis-1,2-Dichloroethene	<5.0
Tetrachloroethylene (PCE)	<5.0
Trichlorethylene (TCE)	5.9

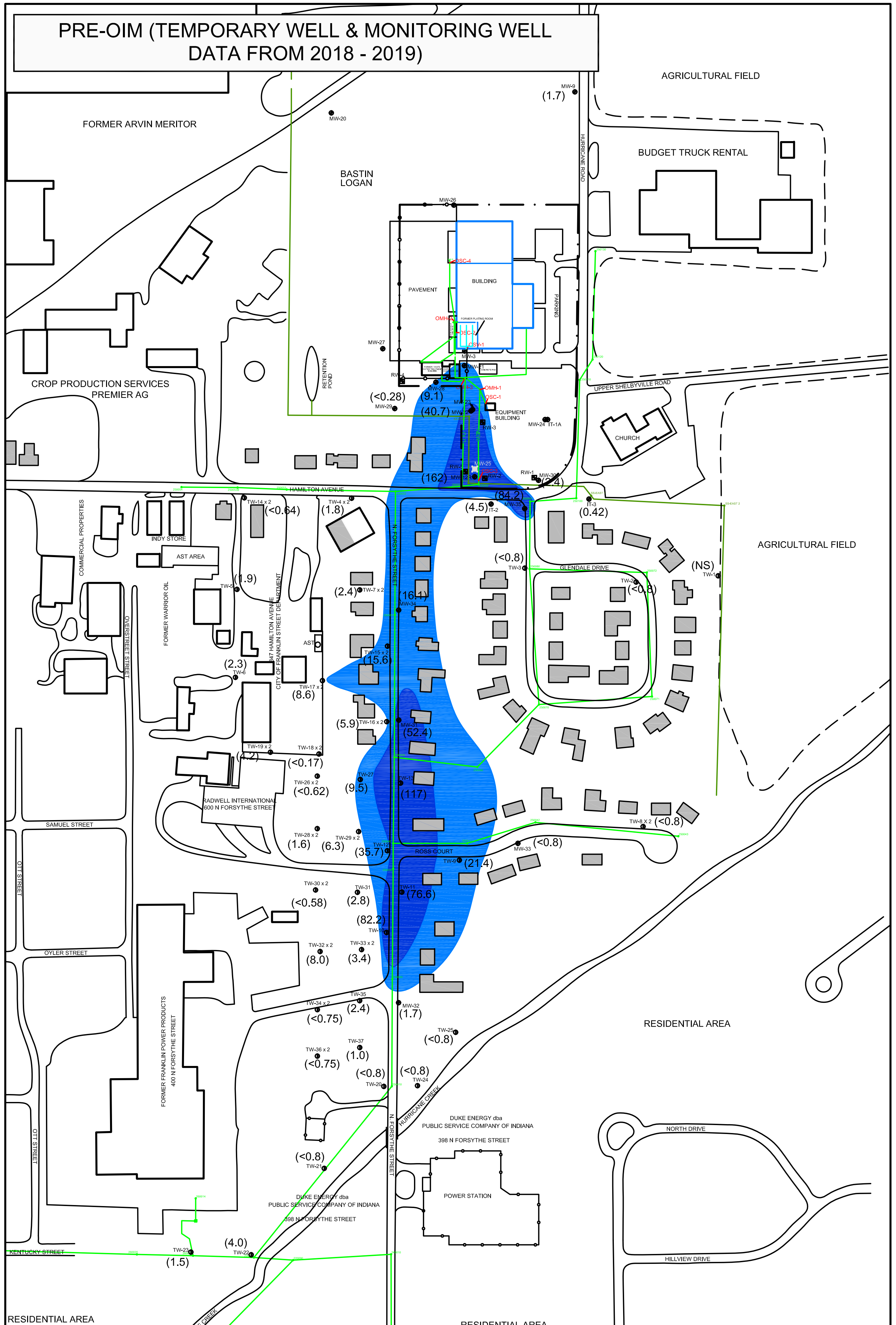
0' 200'
SCALE IN FEET

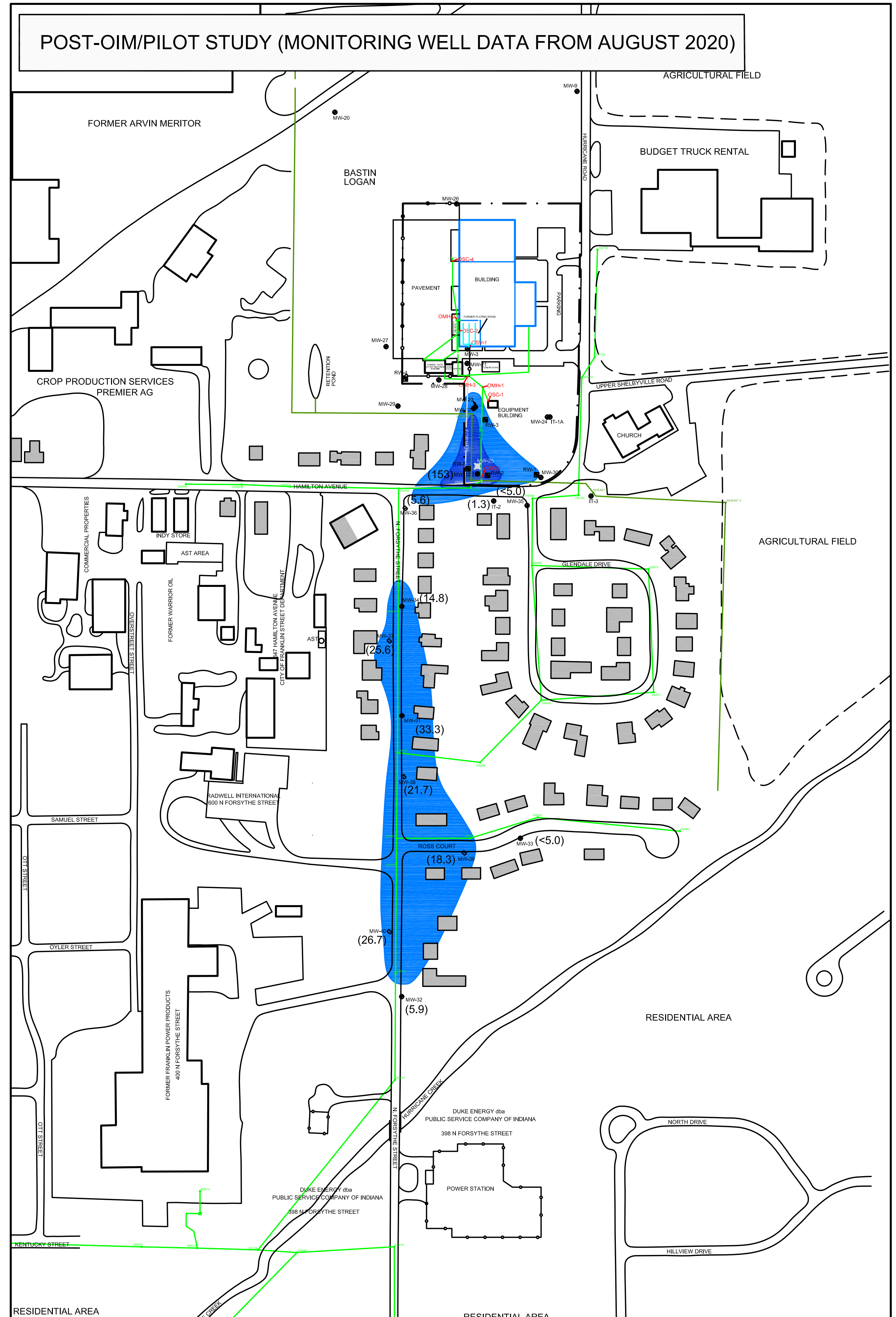
DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 09/09/2020
HWPA #111291-01
DWG. NO. 111291S1

FIGURE 11B
POST-OIM CONFIRMATORY GROUNDWATER ANALYTICAL RESULTS (AUGUST 2020)

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP





LEGEND

- PROPERTY LINE (APPROX.)
- STORM SEWER
- SANITARY SEWER
- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELLS
- TEMPORARY WELLS
- RESIDENTIAL HOME
  - * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- TCE CONCENTRATION >9.1 ug/L
- TCE CONCENTRATION >38 ug/L
- (153) TCE CONCENTRATION AT MONITORING POINT IN ug/L

FIGURE 12
TCE IN GROUNDWATER ISOCONCENTRATION MAP

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

N

0' 300'
SCALE IN FEET

IWM CONSULTING GROUP

DRAWN BY: C.NEWELL
DATE: 06/09/2020
REVISED: 09/09/2020
HWPA #111291-01
DWG. NO. 111291S1

Tables

Table 1
Groundwater Elevation Measurements
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Well Number	Gauging Date	TOC Elevation (Feet)	Screen Interval Elevation (Feet)	Depth to Water (Feet)	Corrected Groundwater Elevation (Feet)
IT-2	07/11/19	732.63	726.58-716.58	11.93	720.70
IT-2	08/16/19	732.63	726.58-716.58	12.69	719.94
IT-2	09/13/19	732.63	726.58-716.58	12.38	720.25
IT-2	10/14/19	732.63	726.58-716.58	12.89	719.74
IT-2	11/15/19	732.63	726.58-716.58	12.95	719.68
IT-2	12/02/19	732.63	726.58-716.58	12.83	719.80
IT-2	01/06/20	732.63	726.58-716.58	12.44	720.19
IT-2	02/05/20	732.63	726.58-716.58	12.07	720.56
IT-2	03/09/20	732.63	726.58-716.58	12.38	720.25
IT-2	04/06/20	732.63	726.58-716.58	11.78	720.85
IT-2	05/11/20	732.63	726.58-716.58	12.37	720.26
IT-2	06/08/20	732.63	726.58-716.58	12.00	720.63
IT-2	07/08/20	732.63	726.58-716.58	12.60	720.03
IT-2	08/04/20	732.63	726.58-716.58	12.60	720.03
IT-3	07/11/19	730.41	726.46-716.46	10.60	719.81
IT-3	08/16/19	730.41	726.46-716.46	10.96	719.45
IT-3	09/13/19	730.41	726.46-716.46	10.82	719.59
IT-3	10/14/19	730.41	726.46-716.46	11.10	719.31
IT-3	11/15/19	730.41	726.46-716.46	11.10	719.31
IT-3	12/02/19	730.41	726.46-716.46	10.91	719.50
IT-3	01/06/20	730.41	726.46-716.46	10.82	719.59
IT-3	02/05/20	730.41	726.46-716.46	10.60	719.81
IT-3	03/09/20	730.41	726.46-716.46	10.70	719.71
IT-3	04/06/20	730.41	726.46-716.46	10.20	720.21
IT-3	05/11/20	730.41	726.46-716.46	10.59	719.82
IT-3	06/08/20	730.41	726.46-716.46	10.43	719.98
IT-3	07/08/20	730.41	726.46-716.46	10.64	719.77
IT-3	08/04/20	730.41	726.46-716.46	10.58	719.83
MW-3	07/11/19	736.80	718.24-708.24	14.43	722.37
MW-3	08/16/19	736.80	718.24-708.24	15.41	721.39
MW-3	09/13/19	736.80	718.24-708.24	15.20	721.60
MW-3	10/14/19	736.80	718.24-708.24	15.97	720.83
MW-3	11/15/19	736.80	718.24-708.24	16.00	720.80
MW-3	12/02/19	736.80	718.24-708.24	15.89	720.91
MW-3	01/06/20	736.80	718.24-708.24	15.28	721.52
MW-3	02/05/20	736.80	718.24-708.24	14.57	722.23
MW-3	03/09/20	736.80	718.24-708.24	14.77	722.03
MW-3	04/06/20	736.80	718.24-708.24	13.99	722.81
MW-3	05/11/20	736.80	718.24-708.24	14.78	722.02
MW-3	06/08/20	736.80	718.24-708.24	14.49	722.31
MW-3	07/08/20	736.80	718.24-708.24	15.13	721.67
MW-3	08/04/20	736.80	718.24-708.24	15.18	721.62

Table 1
Groundwater Elevation Measurements
Former Amphenol Facility
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Well Number	Gauging Date	TOC Elevation (Feet)	Screen Interval Elevation (Feet)	Depth to Water (Feet)	Corrected Groundwater Elevation (Feet)
MW-9	07/11/19	733.41	713.87-708.87	7.94	725.47
MW-9	08/16/19	733.41	713.87-708.87	9.34	724.07
MW-9	09/13/19	733.41	713.87-708.87	9.30	724.11
MW-9	10/14/19	733.41	713.87-708.87	10.19	723.22
MW-9	11/15/19	733.41	713.87-708.87	10.27	723.14
MW-9	12/02/19	733.41	713.87-708.87	9.84	723.57
MW-9	01/06/20	733.41	713.87-708.87	9.16	724.25
MW-9	02/05/20	733.41	713.87-708.87	8.07	725.34
MW-9	03/09/20	733.41	713.87-708.87	8.07	725.34
MW-9	04/06/20	733.41	713.87-708.87	7.06	726.35
MW-9	05/11/20	733.41	713.87-708.87	8.09	725.32
MW-9	06/08/20	733.41	713.87-708.87	7.85	725.56
MW-9	07/08/20	733.41	713.87-708.87	8.56	724.85
MW-9	08/04/20	733.41	713.87-708.87	8.95	724.46
MW-12R	07/11/19	736.80	717.03-712.03	16.15	720.65
MW-12R	08/16/19	736.80	717.03-712.03	16.87	719.93
MW-12R	09/13/19	736.80	717.03-712.03	16.43	720.37
MW-12R	10/14/19	736.80	717.03-712.03	17.24	719.56
MW-12R	11/15/19	736.80	717.03-712.03	17.20	719.60
MW-12R	12/02/19	736.80	717.03-712.03	17.00	719.80
MW-12R	01/06/20	736.80	717.03-712.03	16.68	720.12
MW-12R	02/05/20	736.80	717.03-712.03	16.30	720.50
MW-12R	03/09/20	736.80	717.03-712.03	16.91	719.89
MW-12R	04/06/20	736.80	717.03-712.03	15.45	721.35
MW-12R	05/11/20	736.80	717.03-712.03	16.90	719.90
MW-12R	06/08/20	736.80	717.03-712.03	16.49	720.31
MW-12R	07/08/20	736.80	717.03-712.03	17.11	719.69
MW-12R	08/04/20	736.80	717.03-712.03	17.11	719.69
MW-20	07/11/19	734.09	721.11-711.11	8.94	725.15
MW-20	08/16/19	734.09	721.11-711.11	10.22	723.87
MW-20	09/13/19	734.09	721.11-711.11	9.89	724.20
MW-20	10/14/19	734.09	721.11-711.11	10.95	723.14
MW-20	11/15/19	734.09	721.11-711.11	10.87	723.22
MW-20	12/02/19	734.09	721.11-711.11	10.78	723.31
MW-20	01/06/20	734.09	721.11-711.11	9.77	724.32
MW-20	02/05/20	734.09	721.11-711.11	9.01	725.08
MW-20	03/09/20	734.09	721.11-711.11	9.02	725.07
MW-20	04/06/20	734.09	721.11-711.11	8.41	725.68
MW-20	05/11/20	734.09	721.11-711.11	10.37	723.72
MW-20	06/08/20	734.09	721.11-711.11	8.94	725.15
MW-20	07/08/20	734.09	721.11-711.11	9.48	724.61
MW-20	08/04/20	734.09	721.11-711.11	9.53	724.56

Table 1
Groundwater Elevation Measurements
Former Amphenol Facility
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Well Number	Gauging Date	TOC Elevation (Feet)	Screen Interval Elevation (Feet)	Depth to Water (Feet)	Corrected Groundwater Elevation (Feet)
MW-21	07/11/19	738.45	720.78-710.78	16.17	722.28
MW-21	08/16/19	738.45	720.78-710.78	17.12	721.33
MW-21	09/13/19	738.45	720.78-710.78	16.92	721.53
MW-21	10/14/19	738.45	720.78-710.78	17.68	720.77
MW-21	11/15/19	738.45	720.78-710.78	17.69	720.76
MW-21	12/02/19	738.45	720.78-710.78	17.57	720.88
MW-21	01/06/20	738.45	720.78-710.78	17.00	721.45
MW-21	02/05/20	738.45	720.78-710.78	16.31	722.14
MW-21	03/09/20	738.45	720.78-710.78	16.51	721.94
MW-21	04/06/20	738.45	720.78-710.78	15.77	722.68
MW-21	05/11/20	738.45	720.78-710.78	16.52	721.93
MW-21	06/08/20	738.45	720.78-710.78	16.23	722.22
MW-21	07/08/20	738.45	720.78-710.78	16.86	721.59
MW-21	08/04/20	738.45	720.78-710.78	16.91	721.54
MW-22	07/11/19	738.24	724.00-714.00	16.78	721.46
MW-22	08/16/19	738.24	724.00-714.00	17.78	720.46
MW-22	09/13/19	738.24	724.00-714.00	17.37	720.87
MW-22	10/14/19	738.24	724.00-714.00	18.02	720.22
MW-22	11/15/19	738.24	724.00-714.00	18.07	720.17
MW-22	12/02/19	738.24	724.00-714.00	17.93	720.31
MW-22	01/06/20	738.24	724.00-714.00	17.42	720.82
MW-22	02/05/20	738.24	724.00-714.00	16.91	721.33
MW-22	03/09/20	738.24	724.00-714.00	17.23	721.01
MW-22	04/06/20	738.24	724.00-714.00	16.58	721.66
MW-22	05/11/20	738.24	724.00-714.00	17.19	721.05
MW-22	06/08/20	738.24	724.00-714.00	16.89	721.35
MW-22	07/08/20	738.24	724.00-714.00	17.41	720.83
MW-22	08/04/20	738.24	724.00-714.00	17.45	720.79
MW-24	07/11/19	736.39	723.51-713.51	14.84	721.55
MW-24	08/16/19	736.39	723.51-713.51	15.68	720.71
MW-24	09/13/19	736.39	723.51-713.51	15.58	720.81
MW-24	10/14/19	736.39	723.51-713.51	16.12	720.27
MW-24	11/15/19	736.39	723.51-713.51	16.22	720.17
MW-24	12/02/19	736.39	723.51-713.51	16.09	720.30
MW-24	01/06/20	736.39	723.51-713.51	15.63	720.76
MW-24	02/05/20	736.39	723.51-713.51	15.03	721.36
MW-24	03/09/20	736.39	723.51-713.51	15.22	721.17
MW-24	04/06/20	736.39	723.51-713.51	14.48	721.91
MW-24	05/11/20	736.39	723.51-713.51	15.24	721.15
MW-24	06/08/20	736.39	723.51-713.51	14.92	721.47
MW-24	07/08/20	736.39	723.51-713.51	15.45	720.94
MW-24	08/04/20	736.39	723.51-713.51	15.54	720.85

Table 1
Groundwater Elevation Measurements
Former Amphenol Facility
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Well Number	Gauging Date	TOC Elevation (Feet)	Screen Interval Elevation (Feet)	Depth to Water (Feet)	Corrected Groundwater Elevation (Feet)
MW-26	07/11/19	736.64	716.54-706.54	12.23	724.41
MW-26	08/16/19	736.64	716.54-706.54	13.41	723.23
MW-26	09/13/19	736.64	716.54-706.54	13.32	723.32
MW-26	10/14/19	736.64	716.54-706.54	14.18	722.46
MW-26	11/15/19	736.64	716.54-706.54	14.18	722.46
MW-26	12/02/19	736.64	716.54-706.54	13.94	722.70
MW-26	01/06/20	736.64	716.54-706.54	13.26	723.38
MW-26	02/05/20	736.64	716.54-706.54	12.39	724.25
MW-26	03/09/20	736.64	716.54-706.54	12.43	724.21
MW-26	04/06/20	736.64	716.54-706.54	11.59	725.05
MW-26	05/11/20	736.64	716.54-706.54	12.44	724.20
MW-26	06/08/20	736.64	716.54-706.54	12.21	724.43
MW-26	07/08/20	736.64	716.54-706.54	12.87	723.77
MW-26	08/04/20	736.64	716.54-706.54	13.02	723.62
MW-27	07/11/19	737.03	721.93-711.93	14.85	722.18
MW-27	08/16/19	737.03	721.93-711.93	15.84	721.19
MW-27	09/13/19	737.03	721.93-711.93	15.50	721.53
MW-27	10/14/19	737.03	721.93-711.93	16.35	720.68
MW-27	11/15/19	737.03	721.93-711.93	16.32	720.71
MW-27	12/02/19	737.03	721.93-711.93	16.12	720.91
MW-27	01/06/20	737.03	721.93-711.93	15.47	721.56
MW-27	02/05/20	737.03	721.93-711.93	14.88	722.15
MW-27	03/09/20	737.03	721.93-711.93	15.07	721.96
MW-27	04/06/20	737.03	721.93-711.93	15.43	721.60
MW-27	05/11/20	737.03	721.93-711.93	15.09	721.94
MW-27	06/08/20	737.03	721.93-711.93	14.85	722.18
MW-27	07/08/20	737.03	721.93-711.93	15.44	721.59
MW-27	08/04/20	737.03	721.93-711.93	15.45	721.58
MW-28	07/11/19	738.44	723.31-713.31	16.53	721.91
MW-28	08/16/19	738.44	723.31-713.31	17.46	720.98
MW-28	09/13/19	738.44	723.31-713.31	17.18	721.26
MW-28	10/14/19	738.44	723.31-713.31	17.93	720.51
MW-28	11/15/19	738.44	723.31-713.31	17.95	720.49
MW-28	12/02/19	738.44	723.31-713.31	17.80	720.64
MW-28	01/06/20	738.44	723.31-713.31	17.20	721.24
MW-28	02/05/20	738.44	723.31-713.31	16.62	721.82
MW-28	03/09/20	738.44	723.31-713.31	16.84	721.60
MW-28	04/06/20	738.44	723.31-713.31	16.71	721.73
MW-28	05/11/20	738.44	723.31-713.31	16.87	721.57
MW-28	06/08/20	738.44	723.31-713.31	16.60	721.84
MW-28	07/08/20	738.44	723.31-713.31	17.22	721.22
MW-28	08/04/20	738.44	723.31-713.31	17.19	721.25

Table 1
Groundwater Elevation Measurements
Former Amphenol Facility
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Well Number	Gauging Date	TOC Elevation (Feet)	Screen Interval Elevation (Feet)	Depth to Water (Feet)	Corrected Groundwater Elevation (Feet)
MW-29	07/11/19	737.99	722.68-712.68	16.38	721.61
MW-29	08/16/19	737.99	722.68-712.68	17.31	720.68
MW-29	09/13/19	737.99	722.68-712.68	16.97	721.02
MW-29	10/14/19	737.99	722.68-712.68	17.70	720.29
MW-29	11/15/19	737.99	722.68-712.68	17.73	720.26
MW-29	12/02/19	737.99	722.68-712.68	17.51	720.48
MW-29	01/06/20	737.99	722.68-712.68	16.90	721.09
MW-29	02/05/20	737.99	722.68-712.68	16.37	721.62
MW-29	03/09/20	737.99	722.68-712.68	16.83	721.16
MW-29	04/06/20	737.99	722.68-712.68	16.01	721.98
MW-29	05/11/20	737.99	722.68-712.68	16.63	721.36
MW-29	06/08/20	737.99	722.68-712.68	16.40	721.59
MW-29	07/08/20	737.99	722.68-712.68	15.27	722.72
MW-29	08/04/20	737.99	722.68-712.68	16.95	721.04
MW-30	07/11/19	735.17	723.96-713.96	15.27	719.90
MW-30	08/16/19	735.17	723.96-713.96	15.72	719.45
MW-30	09/13/19	735.17	723.96-713.96	15.58	719.59
MW-30	10/14/19	735.17	723.96-713.96	15.89	719.28
MW-30	11/15/19	735.17	723.96-713.96	16.02	719.15
MW-30	12/02/19	735.17	723.96-713.96	14.81	720.36
MW-30	01/06/20	735.17	723.96-713.96	15.66	719.51
MW-30	02/05/20	735.17	723.96-713.96	15.38	719.79
MW-30	03/09/20	735.17	723.96-713.96	15.54	719.63
MW-30	04/06/20	735.17	723.96-713.96	15.11	720.06
MW-30	05/11/20	735.17	723.96-713.96	15.49	719.68
MW-30	06/08/20	735.17	723.96-713.96	15.27	719.90
MW-30	07/08/20	735.17	723.96-713.96	15.56	719.61
MW-30	08/04/20	735.17	723.96-713.96	15.55	719.62
MW-31	07/09/19	727.97	720.39-715.39	8.62	719.35
MW-31	12/02/19	727.97	720.39-715.39	9.40	718.57
MW-31	01/06/20	727.97	720.39-715.39	8.46	719.51
MW-31	02/05/20	727.97	720.39-715.39	8.10	719.87
MW-31	03/09/20	727.97	720.39-715.39	8.23	719.74
MW-31	04/06/20	727.97	720.39-715.39	7.49	720.48
MW-31	05/11/20	727.97	720.39-715.39	8.38	719.59
MW-31	06/08/20	727.97	720.39-715.39	8.08	719.89
MW-31	07/08/20	727.97	720.39-715.39	8.79	719.18
MW-31	08/04/20	727.97	720.39-715.39	8.79	719.18

Table 1
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Former Amphenol Facility
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Well Number	Gauging Date	TOC Elevation (Feet)	Screen Interval Elevation (Feet)	Depth to Water (Feet)	Corrected Groundwater Elevation (Feet)
MW-32	07/09/19	721.72	717.63-712.63	5.79	715.93
MW-32	12/02/19	721.72	717.63-712.63	6.05	715.67
MW-32	01/06/20	721.72	717.63-712.63	3.47	718.25
MW-32	02/05/20	721.72	717.63-712.63	3.30	718.42
MW-32	03/09/20	721.72	717.63-712.63	3.45	718.27
MW-32	04/06/20	721.72	717.63-712.63	3.02	718.70
MW-32	05/11/20	721.72	717.63-712.63	3.53	718.19
MW-32	06/08/20	721.72	717.63-712.63	3.50	718.22
MW-32	07/08/20	721.72	717.63-712.63	4.01	717.71
MW-32	08/04/20	721.72	717.63-712.63	3.78	717.94
MW-33	07/09/19	723.56	719.43-714.43	4.83	718.73
MW-33	12/02/19	723.56	719.43-714.43	5.09	718.47
MW-33	01/06/20	723.56	719.43-714.43	4.19	719.37
MW-33	02/05/20	723.56	719.43-714.43	4.10	719.46
MW-33	03/09/20	723.56	719.43-714.43	4.14	719.42
MW-33	04/06/20	723.56	719.43-714.43	3.75	719.81
MW-33	05/11/20	723.56	719.43-714.43	4.23	719.33
MW-33	06/08/20	723.56	719.43-714.43	4.16	719.40
MW-33	07/08/20	723.56	719.43-714.43	4.71	718.85
MW-33	08/04/20	723.56	719.43-714.43	4.66	718.90
MW-34	07/09/19	729.67	719.18-714.18	9.39	720.28
MW-34	08/16/19	729.67	719.18-714.18	10.36	719.31
MW-34	09/13/19	729.67	719.18-714.18	NG	NG
MW-34	10/14/19	729.67	719.18-714.18	10.27	719.40
MW-34	11/15/19	729.67	719.18-714.18	9.03	720.64
MW-34	12/02/19	729.67	719.18-714.18	10.38	719.29
MW-34	01/06/20	729.67	719.18-714.18	9.60	720.07
MW-34	02/05/20	729.67	719.18-714.18	9.19	720.48
MW-34	03/09/20	729.67	719.18-714.18	9.38	720.29
MW-34	04/06/20	729.67	719.18-714.18	8.74	720.93
MW-34	05/11/20	729.67	719.18-714.18	9.44	720.23
MW-34	06/08/20	729.67	719.18-714.18	9.19	720.48
MW-34	07/08/20	729.67	719.18-714.18	9.90	719.77
MW-34	08/04/20	729.67	719.18-714.18	9.90	719.77

Table 1
Groundwater Elevation Measurements
Former Amphenol Facility
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Well Number	Gauging Date	TOC Elevation (Feet)	Screen Interval Elevation (Feet)	Depth to Water (Feet)	Corrected Groundwater Elevation (Feet)
MW-35	07/09/19	730.64	725.34-715.34	10.41	720.23
MW-35	08/16/19	730.64	725.34-715.34	10.98	719.66
MW-35	09/13/19	730.64	725.34-715.34	10.84	719.80
MW-35	10/14/19	730.64	725.34-715.34	11.20	719.44
MW-35	11/15/19	730.64	725.34-715.34	11.18	719.46
MW-35	12/02/19	730.64	725.34-715.34	10.95	719.69
MW-35	01/06/20	730.64	725.34-715.34	10.75	719.89
MW-35	02/05/20	730.64	725.34-715.34	10.53	720.11
MW-35	03/09/20	730.64	725.34-715.34	10.69	719.95
MW-35	04/06/20	730.64	725.34-715.34	10.17	720.47
MW-35	05/11/20	730.64	725.34-715.34	10.68	719.96
MW-35	06/08/20	730.64	725.34-715.34	10.42	720.22
MW-35	07/08/20	730.64	725.34-715.34	10.78	719.86
MW-35	08/04/20	730.64	725.34-715.34	10.76	719.88
MW-36	12/02/19	733.70	721.20-716.20	13.88	719.82
MW-36	01/06/20	733.70	721.20-716.20	13.17	720.53
MW-36	02/05/20	733.70	721.20-716.20	12.70	721.00
MW-36	03/09/20	733.70	721.20-716.20	12.96	720.74
MW-36	04/06/20	733.70	721.20-716.20	12.27	721.43
MW-36	05/11/20	733.70	721.20-716.20	12.99	720.71
MW-36	06/08/20	733.70	721.20-716.20	12.73	720.97
MW-36	07/08/20	733.70	721.20-716.20	13.45	720.25
MW-36	08/04/20	733.70	721.20-716.20	13.41	720.29
MW-37	12/02/19	728.66	719.66-714.66	9.84	718.82
MW-37	01/06/20	728.66	719.66-714.66	8.82	719.84
MW-37	02/05/20	728.66	719.66-714.66	8.41	720.25
MW-37	03/09/20	728.66	719.66-714.66	8.59	720.07
MW-37	04/06/20	728.66	719.66-714.66	7.89	720.77
MW-37	05/11/20	728.66	719.66-714.66	8.65	720.01
MW-37	06/08/20	728.66	719.66-714.66	8.40	720.26
MW-37	07/08/20	728.66	719.66-714.66	9.11	719.55
MW-37	08/04/20	728.66	719.66-714.66	9.10	719.56
MW-38	12/02/19	727.32	719.32-714.32	8.78	718.54
MW-38	01/06/20	727.32	719.32-714.32	9.03	718.29
MW-38	02/05/20	727.32	719.32-714.32	7.58	719.74
MW-38	03/09/20	727.32	719.32-714.32	7.73	719.59
MW-38	04/06/20	727.32	719.32-714.32	7.06	720.26
MW-38	05/11/20	727.32	719.32-714.32	7.80	719.52
MW-38	06/08/20	727.32	719.32-714.32	7.58	719.74
MW-38	07/08/20	727.32	719.32-714.32	8.30	719.02
MW-38	08/04/20	727.32	719.32-714.32	8.30	719.02

Table 1
Groundwater Elevation Measurements
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Well Number	Gauging Date	TOC Elevation (Feet)	Screen Interval Elevation (Feet)	Depth to Water (Feet)	Corrected Groundwater Elevation (Feet)
MW-39	12/02/19	724.42	718.42-713.42	6.80	717.62
MW-39	01/06/20	724.42	718.42-713.42	5.16	719.26
MW-39	02/05/20	724.42	718.42-713.42	5.01	719.41
MW-39	03/09/20	724.42	718.42-713.42	5.09	719.33
MW-39	04/06/20	724.42	718.42-713.42	4.66	719.76
MW-39	05/11/20	724.42	718.42-713.42	5.12	719.30
MW-39	06/08/20	724.42	718.42-713.42	5.07	719.35
MW-39	07/08/20	724.42	718.42-713.42	5.68	718.74
MW-39	08/04/20	724.42	718.42-713.42	5.60	718.82
MW-40	12/02/19	723.92	716.42-711.42	6.44	717.48
MW-40	01/06/20	723.92	716.42-711.42	5.42	718.50
MW-40	02/05/20	723.92	716.42-711.42	5.24	718.68
MW-40	03/09/20	723.92	716.42-711.42	5.34	718.58
MW-40	04/06/20	723.92	716.42-711.42	4.73	719.19
MW-40	05/11/20	723.92	716.42-711.42	5.33	718.59
MW-40	06/08/20	723.92	716.42-711.42	5.19	718.73
MW-40	07/08/20	723.92	716.42-711.42	5.83	718.09
MW-40	08/04/20	723.92	716.42-711.42	5.78	718.14
P-3	08/16/19	736.04	728.48-718.48	16.16	719.88
P-3	09/13/19	736.04	728.48-718.48	NG	NG
P-3	10/14/19	736.04	728.48-718.48	16.48	719.56
P-3	11/15/19	736.04	728.48-718.48	16.51	719.53
P-3	12/02/19	736.04	728.48-718.48	NG	NG
P-3	01/14/20	736.04	728.48-718.48	15.30	720.74
P-3	02/05/20	736.04	728.48-718.48	15.76	720.28
P-3	03/09/20	736.04	728.48-718.48	16.03	720.01
P-3	04/06/20	736.04	728.48-718.48	15.54	720.50
P-3	05/11/20	736.04	728.48-718.48	16.04	720.00
P-3	06/08/20	736.04	728.48-718.48	15.71	720.33
P-3	07/08/20	736.04	728.48-718.48	16.16	719.88
P-3	08/04/20	736.04	728.48-718.48	16.13	719.91
P-4	08/16/19	737.15	725.04-715.04	16.92	720.23
P-4	09/13/19	737.15	725.04-715.04	16.73	720.42
P-4	10/14/19	737.15	725.04-715.04	17.30	719.85
P-4	11/15/19	737.15	725.04-715.04	17.38	719.77
P-4	12/02/19	737.15	725.04-715.04	NG	NG
P-4	01/14/20	737.15	725.04-715.04	15.85	721.30
P-4	02/05/20	737.15	725.04-715.04	16.34	720.81
P-4	03/09/20	737.15	725.04-715.04	16.72	720.43
P-4	04/06/20	737.15	725.04-715.04	15.48	721.67
P-4	05/11/20	737.15	725.04-715.04	16.71	720.44
P-4	06/08/20	737.15	725.04-715.04	16.36	720.79
P-4	07/08/20	737.15	725.04-715.04	16.91	720.24
P-4	08/04/20	737.15	725.04-715.04	16.95	720.20

Table 1
Groundwater Elevation Measurements
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Well Number	Gauging Date	TOC Elevation (Feet)	Screen Interval Elevation (Feet)	Depth to Water (Feet)	Corrected Groundwater Elevation (Feet)
P-5	08/16/19	737.01	724.47-714.47	16.38	720.63
P-5	09/13/19	737.01	724.47-714.47	16.25	720.76
P-5	10/14/19	737.01	724.47-714.47	16.88	720.13
P-5	11/15/19	737.01	724.47-714.47	16.94	720.07
P-5	12/02/19	737.01	724.47-714.47	NG	NG
P-5	01/14/20	737.01	724.47-714.47	15.30	721.71
P-5	02/05/20	737.01	724.47-714.47	15.75	721.26
P-5	03/09/20	737.01	724.47-714.47	16.05	720.96
P-5	04/06/20	737.01	724.47-714.47	15.32	721.69
P-5	05/11/20	737.01	724.47-714.47	16.03	720.98
P-5	06/08/20	737.01	724.47-714.47	15.69	721.32
P-5	07/08/20	737.01	724.47-714.47	16.23	720.78
P-5	08/04/20	737.01	724.47-714.47	16.31	720.70
P-6	08/16/19	735.52	726.83-716.83	15.43	720.09
P-6	09/13/19	735.52	726.83-716.83	15.34	720.18
P-6	10/14/19	735.52	726.83-716.83	15.73	719.79
P-6	11/15/19	735.52	726.83-716.83	15.87	719.65
P-6	12/02/19	735.52	726.83-716.83	NG	NG
P-6	01/14/20	735.52	726.83-716.83	14.52	721.00
P-6	02/05/20	735.52	726.83-716.83	14.93	720.59
P-6	03/09/20	735.52	726.83-716.83	15.11	720.41
P-6	04/06/20	735.52	726.83-716.83	14.49	721.03
P-6	05/11/20	735.52	726.83-716.83	15.07	720.45
P-6	06/08/20	735.52	726.83-716.83	14.81	720.71
P-6	07/08/20	735.52	726.83-716.83	15.20	720.32
P-6	08/04/20	735.52	726.83-716.83	15.23	720.29
RW-1	07/11/19	731.30	726.01-721.01	13.05	718.25
RW-1	08/16/19	731.30	726.01-721.01	11.55	719.75
RW-1	09/13/19	731.30	726.01-721.01	NG	NG
RW-1	10/14/19	731.30	726.01-721.01	13.79	717.51
RW-1	11/15/19	731.30	726.01-721.01	13.48	717.82
RW-1	12/02/19	731.30	726.01-721.01	NG	NG
RW-1	01/06/20	731.30	726.01-721.01	15.47	715.83
RW-1	02/05/20	731.30	726.01-721.01	14.10	717.20
RW-1	03/09/20	731.30	726.01-721.01	14.70	716.60
RW-1	04/06/20	731.30	726.01-721.01	15.62	715.68
RW-1	05/11/20	731.30	726.01-721.01	15.56	715.74
RW-1	06/08/20	731.30	726.01-721.01	14.24	717.06
RW-1	07/08/20	731.30	726.01-721.01	14.32	716.98
RW-1	08/04/20	731.30	726.01-721.01	14.18	717.12

Table 1
Groundwater Elevation Measurements
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Well Number	Gauging Date	TOC Elevation (Feet)	Screen Interval Elevation (Feet)	Depth to Water (Feet)	Corrected Groundwater Elevation (Feet)
RW-2	07/11/19	732.39	718.39-713.39	12.38	720.01
RW-2	08/16/19	732.39	718.39-713.39	13.45	718.94
RW-2	09/13/19	732.39	718.39-713.39	NG	NG
RW-2	10/14/19	732.39	718.39-713.39	14.02	718.37
RW-2	11/15/19	732.39	718.39-713.39	14.19	718.20
RW-2	12/02/19	732.39	718.39-713.39	NG	NG
RW-2	01/06/20	732.39	718.39-713.39	17.15	715.24
RW-2	02/05/20	732.39	718.39-713.39	16.09	716.30
RW-2	03/09/20	732.39	718.39-713.39	16.97	715.42
RW-2	04/06/20	732.39	718.39-713.39	15.29	717.10
RW-2	05/11/20	732.39	718.39-713.39	17.18	715.21
RW-2	06/08/20	732.39	718.39-713.39	13.63	718.76
RW-2	07/08/20	732.39	718.39-713.39	14.77	717.62
RW-2	08/04/20	732.39	718.39-713.39	14.87	717.52
RW-3	07/11/19	732.90	716.90-711.90	16.10	716.80
RW-3	08/16/19	732.90	716.90-711.90	15.68	717.22
RW-3	09/13/19	732.90	716.90-711.90	15.72	717.18
RW-3	10/14/19	732.90	716.90-711.90	16.05	716.85
RW-3	11/15/19	732.90	716.90-711.90	16.00	716.90
RW-3	12/02/19	732.90	716.90-711.90	NG	NG
RW-3	01/06/20	732.90	716.90-711.90	15.84	717.06
RW-3	02/05/20	732.90	716.90-711.90	15.37	717.53
RW-3	03/09/20	732.90	716.90-711.90	16.58	716.32
RW-3	04/06/20	732.90	716.90-711.90	15.46	717.44
RW-3	05/11/20	732.90	716.90-711.90	15.93	716.97
RW-3	06/08/20	732.90	716.90-711.90	15.25	717.65
RW-3	07/08/20	732.90	716.90-711.90	15.80	717.10
RW-3	08/04/20	732.90	716.90-711.90	15.85	717.05
RW-4	07/11/19	736.25	723.25-713.25	16.80	719.45
RW-4	08/16/19	736.25	723.25-713.25	18.14	718.11
RW-4	09/13/19	736.25	723.25-713.25	17.65	718.60
RW-4	10/14/19	736.25	723.25-713.25	16.55	719.70
RW-4	11/15/19	736.25	723.25-713.25	18.81	717.44
RW-4	12/02/19	736.25	723.25-713.25	NG	NG
RW-4	01/06/20	736.25	723.25-713.25	17.49	718.76
RW-4	02/05/20	736.25	723.25-713.25	16.73	719.52
RW-4	03/09/20	736.25	723.25-713.25	17.76	718.49
RW-4	04/06/20	736.25	723.25-713.25	16.76	719.49
RW-4	05/11/20	736.25	723.25-713.25	18.66	717.59
RW-4	06/08/20	736.25	723.25-713.25	18.92	717.33
RW-4	07/08/20	736.25	723.25-713.25	19.50	716.75
RW-4	08/04/20	736.25	723.25-713.25	19.04	717.21

Table 1
Groundwater Elevation Measurements
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Well Number	Gauging Date	TOC Elevation (Feet)	Screen Interval Elevation (Feet)	Depth to Water (Feet)	Corrected Groundwater Elevation (Feet)
RW-5	07/11/19	732.57	718.57-708.57	12.20	720.37
RW-5	08/16/19	732.57	718.57-708.57	13.96	718.61
RW-5	09/13/19	732.57	718.57-708.57	13.90	718.67
RW-5	10/14/19	732.57	718.57-708.57	13.20	719.37
RW-5	11/15/19	732.57	718.57-708.57	13.20	719.37
RW-5	12/02/19	732.57	718.57-708.57	NG	NG
RW-5	01/06/20	732.57	718.57-708.57	12.97	719.60
RW-5	02/05/20	732.57	718.57-708.57	12.15	720.42
RW-5	03/09/20	732.57	718.57-708.57	17.32	715.25
RW-5	04/06/20	732.57	718.57-708.57	15.19	717.38
RW-5	05/11/20	732.57	718.57-708.57	16.12	716.45
RW-5	06/08/20	732.57	718.57-708.57	16.37	716.20
RW-5	07/08/20	732.57	718.57-708.57	15.19	717.38
RW-5	08/04/20	732.57	718.57-708.57	14.18	718.39

NG-Not Gauged

Table 2
Groundwater Analytical Results - Select VOCs
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
IT-2 / 6.06-16.05	14.00	7/8/2019	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
IT-2 / 6.06-16.05	14.20	12/4/2019	<5.0	<5.0	16.9	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
IT-2 / 6.06-16.05	14.30	1/7/2020	<5.0	<5.0	12.6	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
IT-2 / 6.06-16.05	14.10	2/7/2020	<5.0	<5.0	9.4	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
IT-2 / 6.06-16.05	14.21	3/10/2020	1.0‡	<5.0	5.4	<5.0	<5.0	0.50‡	0.67‡	3.0‡	<2.0
IT-2 / 6.06-16.05	13.94	4/7/2020	<5.0	<5.0	4.2‡	<5.0	<5.0	0.76‡	<5.0	3.7‡	<2.0
IT-2 / 6.06-16.05	14.20	5/12/2020	<5.0	<5.0	3.3ǂ	<5.0	<5.0	<5.0	<5.0	1.4ǂ	<2.0
IT-2 / 6.06-16.05	14.03	6/10/2020	<5.0	<5.0	4.2‡	<5.0	<5.0	<5.0	<5.0	1.1‡	<2.0
IT-2 / 6.06-16.05	14.35	7/9/2020	<5.0	<5.0	4.8‡	<5.0	<5.0	<5.0	0.60‡	2.1‡	<2.0
IT-2 / 6.06-16.05	14.35	8/6/2020	<5.0	<5.0	6.4	<5.0	<5.0	<5.0	<5.0	1.3‡	<2.0
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
MW-12R / 19.77-24.77	22.20	9/3/2019	<5.0	<5.0	66.5	<5.0	<5.0	**681**	22.9	**242**	<2.0
MW-12R / 19.77-24.77	22.27	12/4/2019	<50.0	<50.0	<50.0	<50.0	<50.0	**697**	<50.0	**174**	<20.0
MW-12R / 19.77-24.77	22.30	1/8/2020	<50.0	<50.0	<50.0	<50.0	<50.0	**429**	<50.0	**125**	<20.0
MW-12R / 19.77-24.77	22.30	2/7/2020	<5.0	<5.0	6.0	<5.0	<5.0	**373**	22.3	**132**	<2.0
MW-12R / 19.77-24.77	22.30	3/10/2020	2.9‡	<5.0	3.6‡	<5.0	<5.0	**323**	27.0	**121**	<2.0
MW-12R / 19.77-24.77	22.22	4/7/2020	<5.0	<5.0	<5.0	<5.0	<5.0[3]	**210**	25.0	**111**	<2.0
MW-12R / 19.77-24.77	22.27	5/12/2020	3.2ǂ	<5.0	2.8ǂ	<5.0	<5.0	**272**	36.9	**167**	<2.0
MW-12R / 19.77-24.77	22.30	6/9/2020	2.8ǂ	<5.0	2.5ǂ	<5.0	<5.0	**258**	28.2	**169**	<2.0
MW-12R / 19.77-24.77	22.27	7/9/2020	2.9ǂ	<5.0	29.3	0.65ǂ	<5.0	**281**	28.6	**147**	**10.0**
MW-12R / 19.77-24.77	22.27	8/5/2020	4.0ǂ	<5.0	77.1	0.76ǂ	<5.0	**294**	28.5	**153**	**15.3**
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Notes:
TOC: Top of casing, NE: Not established.
Results and screening levels in µg/L.
Monitoring wells MW-36 through MW-40 installed on November 12, 2019.
RCG: Remediation Closure Guide with screening levels dated March 4, 2019.
Concentrations in **bold** exceed IDEM RCG Residential Groundwater Vapor Exposure Screening Level.
ǂ : Indicates observed concentration likely a lab artifact.
‡ : Indicates estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
1. Due to surrogate percent recovery, matrix spike/matrix spike duplicate percent recovery, or relative percent differences, data were qualified as estimated based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
2. Due to laboratory blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
3. Due to laboratory blank contamination, trip blank contamination, or equipment blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated June 1, 2020.

Table 2 (Continued)
Groundwater Analytical Results - Select VOCs
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
MW-31 / 7.58-12.58	10.60	7/8/2019	<5.0	<5.0	<5.0	<5.0	<5.0	37.7	7.1	**44.5**	<2.0
MW-31 / 7.58-12.58	11.43	10/18/2019	<5.0	<5.0	<5.0	<5.0	<5.0	57.5	8.0	**51.4**	<2.0
MW-31 / 7.58-12.58	11.28	11/25/2019	<5.0	<5.0	<5.0	<5.0	<5.0	44.3	5.8	**35.0**	<2.0
MW-31 / 7.58-12.58	11.02	12/5/2019	<5.0	<5.0	<5.0	<5.0	<5.0	45.4	6.8	**42.1**	<2.0
MW-31 / 7.58-12.58	10.50	1/8/2020	<5.0[1]	<5.0[1]	<5.0[1]	<5.0[1]	<5.0[1]	44.7[1]	10.3[1]	**51.7**[1]	<2.0[1]
MW-31 / 7.58-12.58	10.34	2/5/2020	<5.0	<5.0	<5.0	<5.0	<5.0	32.2	10	**49.7**	<2.0
MW-31 / 7.58-12.58	10.40	3/11/2020	<5.0	<5.0	<5.0	<5.0	<5.0	29.8	6.8	**38.2**	<2.0
MW-31 / 7.58-12.58	10.00	4/8/2020	<5.0	<5.0	<5.0	<5.0	<5.03	28.1	7.5	**37.4**	<2.0
MW-31 / 7.58-12.58	10.50	5/11/2020	<5.0	<5.0	<5.0	<5.0	<5.0	43.6	6.9	**39.5**	<2.0
MW-31 / 7.58-12.58	10.33	6/9/2020	<5.0	<5.0	<5.0	<5.0	<5.0	46.5	6.0	**43.7**	<2.0
MW-31 / 7.58-12.58	10.72	7/9/2020	<5.0	<5.0	<5.0	<5.0	<5.0	37.7	5.0ǂ	**31.3**	<2.0
MW-31 / 7.58-12.58	10.72	8/5/2020	<5.0	<5.0	<5.0	<5.0	<5.0	36.9	5.5	**33.3**	<2.0
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
MW-32 / 4.09-9.09	7.50	7/8/2019	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-32 / 4.09-9.09	7.60	12/2/2019	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-32 / 4.09-9.09	6.30	1/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-32 / 4.09-9.09	6.30	2/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-32 / 4.09-9.09	6.60	3/9/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.80ǂ	1.3ǂ	<2.0
MW-32 / 4.09-9.09	6.60	4/6/2020	<5.0	<5.0	<5.0	<5.0	<5.03	<5.0	<5.0	<5.0	<2.0
MW-32 / 4.09-9.09	6.60	5/11/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	2.4ǂ	<2.0
MW-32 / 4.09-9.09	6.59	6/8/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.2ǂ	4.5ǂ	<2.0
MW-32 / 4.09-9.09	6.60	7/8/2020	0.89ǂ	<5.0	<5.0	<5.0	<5.0	<5.0	2.4ǂ	7.5	<2.0
MW-32 / 4.09-9.09	6.59	8/4/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.5ǂ	5.9	<2.0
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Notes:
TOC: Top of casing, NE: Not established.
Results and screening levels in µg/L.
Monitoring wells MW-36 through MW-40 installed on November 12, 2019.
RCG: Remediation Closure Guide with screening levels dated March 4, 2019.
Concentrations in **bold** exceed IDEM RCG Residential Groundwater Vapor Exposure Screening Level.
⸙ : Indicates observed concentration likely a lab artifact.
ǂ : Indicates estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
1. Due to surrogate percent recovery, matrix spike/matrix spike duplicate percent recovery, or relative percent differences, data were qualified as estimated based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
2. Due to laboratory blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
3. Due to laboratory blank contamination, trip blank contamination, or equipment blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated June 1, 2020.

Table 2 (Continued)
Groundwater Analytical Results - Select VOCs
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
MW-33 / 4.13-9.13	7.00	7/8/2019	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-33 / 4.13-9.13	7.32	12/4/2019	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-33 / 4.13-9.13	6.65	1/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-33 / 4.13-9.13	6.63	2/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-33 / 4.13-9.13	6.65	3/9/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-33 / 4.13-9.13	6.63	4/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0[3]	<5.0	<5.0	<5.0	<2.0
MW-33 / 4.13-9.13	6.63	5/12/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-33 / 4.13-9.13	6.65	6/8/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-33 / 4.13-9.13	6.95	7/8/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-33 / 4.13-9.13	6.90	8/4/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
MW-34 / 10.49-15.49	12.40	7/9/2019	<5.0	<5.0	<5.0	<5.0	<5.0	23.1	<5.0	7.4	<2.0
MW-34 / 10.49-15.49	12.99	12/2/2019	<5.0	<5.0	<5.0	<5.0	<5.0	38.2	<5.0	**14.9**	<2.0
MW-34 / 10.49-15.49	13.00	1/7/2020	<5.0	<5.0	<5.0	<5.0	<5.0	35.0	<5.0	**12.6**	<2.0
MW-34 / 10.49-15.49	13.00	2/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	32.8	<5.0	**15.3**	<2.0
MW-34 / 10.49-15.49	13.00	3/10/2020	0.33‡	<5.0	<5.0	<5.0	<5.0	31.1	2.9‡	**11.9**	<2.0
MW-34 / 10.49-15.49	12.99	4/7/2020	<5.0	<5.0	<5.0	<5.0	<5.0[3]	26.4	3.3‡	**13.6**	<2.0
MW-34 / 10.49-15.49	13.25	5/12/2020	<5.0	<5.0	<5.0	<5.0	<5.0	40.6	2.9ǂ	**14.7**	<2.0
MW-34 / 10.49-15.49	13.00	6/9/2020	<5.0	<5.0	<5.0	<5.0	<5.0	43.0	2.5‡	**16.7**	<2.0
MW-34 / 10.49-15.49	12.99	7/9/2020	<5.0	<5.0	<5.0	<5.0	<5.0	36.2	2.5‡	**14.6**	<2.0
MW-34 / 10.49-15.49	13.00	8/5/2020	<5.0	<5.0	<5.0	<5.0	<5.0	35.9	2.5ǂ	**14.8**	<2.0
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Notes:
TOC: Top of casing, NE: Not established.
Results and screening levels in µg/L.
Monitoring wells MW-36 through MW-40 installed on November 12, 2019.
RCG: Remediation Closure Guide with screening levels dated March 4, 2019.
Concentrations in **bold** exceed IDEM RCG Residential Groundwater Vapor Exposure Screening Level.
ǂ : Indicates observed concentration likely a lab artifact.
‡ : Indicates estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
1. Due to surrogate percent recovery, matrix spike/matrix spike duplicate percent recovery, or relative percent differences, data were qualified as estimated based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
2. Due to laboratory blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
3. Due to laboratory blank contamination, trip blank contamination, or equipment blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated June 1, 2020.

Table 2 (Continued)
Groundwater Analytical Results - Select VOCs
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Groundwater Sampling Location MW-35, Screened Interval 5.30 - 15.30

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
MW-35 / 5.30-15.30	12.80	7/9/2019	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	10.4	**51.0**	<2.0
MW-35 / 5.30-15.30	13.25	10/18/2019	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	17.8	**85.3**	<2.0
MW-35 / 5.30-15.30	13.50	11/25/2019	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-35 / 5.30-15.30	12.63	12/3/2019	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-35 / 5.30-15.30	13.00	1/8/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-35 / 5.30-15.30	12.91	2/5/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-35 / 5.30-15.30	12.94	3/11/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-35 / 5.30-15.30	12.75	4/8/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-35 / 5.30-15.30	12.96	5/12/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-35 / 5.30-15.30	12.46	6/10/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-35 / 5.30-15.30	13.07	7/9/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
MW-35 / 5.30-15.30	13.06	8/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Groundwater Sampling Location MW-36, Screened Interval 12.50 - 17.50

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
MW-36 / 12.50-17.50	15.41	12/2/2019	<5.0	<5.0	<5.0	<5.0	<5.0	52.6	<5.0	6.1	<2.0
MW-36 / 12.50-17.50	15.00	1/7/2020	<5.0	<5.0	<5.0	<5.0	<5.0	53.2	<5.0	<5.0	<2.0
MW-36 / 12.50-17.50	15.10	2/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	50.2	<5.0	5.1	<2.0
MW-36 / 12.50-17.50	15.23	3/10/2020	<5.0	<5.0	<5.0	<5.0	<5.0	44.7	0.92ǂ	4.1ǂ	<2.0
MW-36 / 12.50-17.50	15.00	4/7/2020	<5.0	<5.0	<5.0	<5.0	<5.03	46.5	<5.0	5.1	<2.0
MW-36 / 12.50-17.50	15.25	5/12/2020	<5.0	<5.0	<5.0	<5.0	<5.0	69.3	<5.0	6.2	<2.0
MW-36 / 12.50-17.50	15.14	6/9/2020	<5.0	<5.0	<5.0	<5.0	<5.0	71.6	<5.0	7.2	<2.0
MW-36 / 12.50-17.50	15.48	7/9/2020	<5.0	<5.0	<5.0	<5.0	<5.0	55.8	0.90ǂ	5.4	<2.0
MW-36 / 12.50-17.50	15.46	8/5/2020	<5.0	<5.0	<5.0	<5.0	<5.0	58.4	0.77ǂ	5.6	<2.0
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Notes:
TOC: Top of casing, NE: Not established.
Results and screening levels in µg/L.
Monitoring wells MW-36 through MW-40 installed on November 12, 2019.
RCG: Remediation Closure Guide with screening levels dated March 4, 2019.
Concentrations in **bold** exceed IDEM RCG Residential Groundwater Vapor Exposure Screening Level.
⸙ : Indicates observed concentration likely a lab artifact.
ǂ : Indicates estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
1. Due to surrogate percent recovery, matrix spike/matrix spike duplicate percent recovery, or relative percent differences, data were qualified as estimated based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
2. Due to laboratory blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
3. Due to laboratory blank contamination, trip blank contamination, or equipment blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated June 1, 2020.

Table 2 (Continued)
Groundwater Analytical Results - Select VOCs
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
TW-15 / 9.75-11.75	10.75	3/5/2019	<5.0	<0.27	<5.0	<5.0	<5.0	45.6	1.7ǂ	**15.6**	<0.22
TW-15 / 14.25-16.25	15.25	3/5/2019	<5.0	<0.27	<5.0	<5.0	<5.0	56.6	8.3	**57.2**	<0.22
MW-37 / 9.00-14.00	11.81	12/2/2019	<5.0	<5.0	<5.0	<5.0	<5.0	48.4	<5.0	**27.7**	<2.0
MW-37 / 9.00-14.00	11.50	1/7/2020	<5.0	<5.0	<5.0	<5.0	<5.0	47.1	<5.0	**27.1**	<2.0
MW-37 / 9.00-14.00	11.50	2/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	39.4	<5.0	**26.5**	<2.0
MW-37 / 9.00-14.00	11.50	3/10/2020	<5.0	<5.0	<5.0	<5.0	<5.0	34.8	2.7ǂ	**18.0**	<2.0
MW-37 / 9.00-14.00	11.50	4/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0[3]	38.9	3.5ǂ	**31.2**	<2.0
MW-37 / 9.00-14.00	11.50	5/11/2020	<5.0	<5.0	<5.0	<5.0	<5.0	55.1	3.5ǂ	**34.5**	<2.0
MW-37 / 9.00-14.00	11.50	6/9/2020	<5.0	<5.0	<5.0	<5.0	<5.0	51.3	2.9ǂ	**35.2**	<2.0
MW-37 / 9.00-14.00	11.58	7/9/2020	<5.0	<5.0	<5.0	<5.0	<5.0	44.9	2.6ǂ	**26.9**	<2.0
MW-37 / 9.00-14.00	11.56	8/5/2020	<5.0	<5.0	<5.0	<5.0	<5.0	42.4	2.4ǂ	**25.6**	<2.0
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
TW-13 / 11.25-13.25	12.25	10/25/2018	2.7ǂ	<0.27	<5.0	<5.0	<5.0	58.6	21.1	**117**	<0.97
MW-38 / 8.00-13.00	10.15	11/25/2019	<5.0	<5.0	<5.0	<5.0	<5.0	25.9	20.6[1]	**99.1**	<2.0
MW-38 / 8.00-13.00	10.19	12/5/2019	<5.0	<5.0	<5.0	<5.0	<5.0	31.3	16.1	**88.0**	<2.0
MW-38 / 8.00-13.00	10.50	1/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	25.4	10.0	**54.6**	<2.0
MW-38 / 8.00-13.00	10.30	2/5/2020	<5.0	<5.0	<5.0	<5.0	<5.0	10.8	<5.0	**19.1**	<2.0
MW-38 / 8.00-13.00	10.50	3/11/2020	<5.0	<5.0	<5.0	<5.0	<5.0	21.6	4.1ǂ	**28.7**	<2.0
MW-38 / 8.00-13.00	10.50	4/8/2020	<5.0	<5.0	<5.0	<5.0	<5.03	7.8	<5.0	8.3	<2.0
MW-38 / 8.00-13.00	10.50	5/11/2020	<5.0	<5.0	<5.0	<5.0	<5.0	34.9[4]	3.4ǂ[4]	24.8	<2.0
MW-38 / 8.00-13.00	10.50	6/8/2020	<5.0	<5.0	<5.0	<5.0	<5.0	26.2	2.7ǂ	**20.6**	<2.0
MW-38 / 8.00-13.00	10.68	7/8/2020	<5.0	<5.0	<5.0	<5.0	<5.0	27.4	3.3ǂ	**21.3**	<2.0
MW-38 / 8.00-13.00	10.65	8/4/2020	<5.0	<5.0	<5.0	<5.0	<5.0	27.6	3.3ǂ	**21.7**	<2.0
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Notes:
TOC: Top of casing, NE: Not established.
Results and screening levels in µg/L.
Monitoring wells MW-36 through MW-40 installed on November 12, 2019.
RCG: Remediation Closure Guide with screening levels dated March 4, 2019.
Concentrations in **bold** exceed IDEM RCG Residential Groundwater Vapor Exposure Screening Level
⸙ : Indicates observed concentration likely a lab artifact.
ǂ : Indicates estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
1. Due to surrogate percent recovery, matrix spike/matrix spike duplicate percent recovery, or relative percent differences, data were qualified as estimated based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
2. Due to laboratory blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
3. Due to laboratory blank contamination, trip blank contamination, or equipment blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated June 1, 2020.
4. Due to continuing calibration percent differences, data were qualified as estimated based on the Laboratory Data Consultants, Inc. report dated June 24, 2020.

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Table 2 (Continued)
Groundwater Analytical Results - Select VOCs
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
TW-9 / 7.25-9.25	8.25	10/24/2018	2.2ǂ	<0.32	<5.0	<5.0	<5.0	<0.61	4.1ǂ	**21.4**	<0.27
MW-39 / 6.00-11.00	8.45	12/3/2019	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**10.3**	<2.0
MW-39 / 6.00-11.00	7.66	1/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**8.6**	<2.0
MW-39 / 6.00-11.00	8.50	2/5/2020	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	7.8	<2.0
MW-39 / 6.00-11.00	8.50	3/9/2020	1.5ǂ	<5.0	<5.0	<5.0	<5.0	<5.0	2.2ǂ	6.6	<2.0
MW-39 / 6.00-11.00	8.50	4/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0[3]	<5.0	<5.0	6.9	<2.0
MW-39 / 6.00-11.00	9.50	5/12/2020	2.6ǂ	<5.0	<5.0	<5.0	<5.0	<5.0	3.0ǂ	**11.1**	<2.0
MW-39 / 6.00-11.00	8.50	6/8/2020	3.5‡	<5.0	<5.0	<5.0	<5.0	<5.0	3.1‡	**13.7**	<2.0
MW-39 / 6.00-11.00	8.50	7/8/2020	3.0‡	<5.0	<5.0	<5.0	<5.0	<5.0	4.3‡	**16.0**	<2.0
MW-39 / 6.00-11.00	8.50	8/4/2020	2.6ǂ	<5.0	<5.0	<5.0	<5.0	<5.0	4.5ǂ	**18.3**	<2.0
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Sampling Location / Screened Interval	Sampling Depth (feet below TOC)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethylene (PCE)	1,1,1-Trichloroethane	Trichlorethylene (TCE)	Vinyl Chloride
TW-10 / 10.25-12.25	11.25	10/24/2018	<5.0	<0.32	<5.0	<5.0	<5.0	32.5	11.0	**82.2**	<0.27
MW-40 / 7.50-12.50	10.00	12/2/2019	<5.0	<5.0	<5.0	<5.0	<5.0	20.2	9.6	**61.0**	<2.0
MW-40 / 7.50-12.50	8.00	1/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	22.2	8.2	**58.2**	<2.0
MW-40 / 7.50-12.50	8.90	2/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	17.8	8.4	**56.6**	<2.0
MW-40 / 7.50-12.50	10.00	3/9/2020	0.46ǂ	<5.0	4.9ǂ	<5.0[1]	<5.0	18.0[1]	8.2	**46.1**[1]	<2.0
MW-40 / 7.50-12.50	10.00	4/6/2020	<5.0	<5.0	<5.0	<5.0	<5.0	22.2	8.8	**51.6**	<2.0
MW-40 / 7.50-12.50	10.00	5/11/2020	<5.0	<5.0	3.1ǂ	<5.0	<5.0	27.0	8.7[4]	**60.0**[4]	<2.0
MW-40 / 7.50-12.50	10.00	6/8/2020	<5.0	<5.0	2.1‡	<5.0	<5.0	25.5	8.0	**60.0**	<2.0
MW-40 / 7.50-12.50	10.00	7/8/2020	<5.0	<5.0	4.2‡	<5.0	<5.0	8.8	5.0‡	**29.0**	<2.0
MW-40 / 7.50-12.50	10.00	8/4/2020	<5.0	<5.0	3.5ǂ	<5.0	<5.0	4.7ǂ	5.1	**26.7**	<2.0
RCG Residential Groundwater Vapor Exposure Screening Level (Corrective Action Objective Screening Levels)	N/A	N/A	130	50	NE	NE	NE	110	13,000	9.1	2.1

Notes:
TOC: Top of casing, NE: Not established.
Results and screening levels in µg/L.
Monitoring wells MW-36 through MW-40 installed on November 12, 2019.
RCG: Remediation Closure Guide with screening levels dated March 4, 2019.
Concentrations in **bold** exceed IDEM RCG Residential Groundwater Vapor Exposure Screening Level
ǂ : Indicates observed concentration likely a lab artifact.
‡ : Indicates estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
1. Due to surrogate percent recovery, matrix spike/matrix spike duplicate percent recovery, or relative percent differences, data were qualified as estimated based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
2. Due to laboratory blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated May 28, 2020.
3. Due to laboratory blank contamination, trip blank contamination, or equipment blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated June 1, 2020.
4. Due to continuing calibration percent differences, data were qualified as estimated based on the Laboratory Data Consultants, Inc. report dated June 24, 2020.

Table 3
Groundwater Analytical Results - Additional Parameters
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sample ID	**Screened Interval**	**Sampling Depth (feet below TOC)**	**Sample Date**	Ethane	Ethene	Methane	Total Iron	Dissolved Iron	Total Manganese	Dissolved Manganese	Sulfide	Sulfate	Nitrite	Nitrate
MW-31	7.58 - 12.58	11.43	10/18/2019	<10.0	<10.0	<10.0	726	<100	23.8	<10.0	<0.10[1]	31.2[1]	<0.10[1]	4.2[1]
MW-31	7.58 - 12.58	11.28	11/25/2019	<10.0[1]	<10.0	<10.0	<100	<100	24.7	18.8	<0.10	54.1[1]	<0.10	3.1[1]
MW-31	7.58 - 12.58	10.50	1/8/2020	<10.0	<10.0	<10.0	<100	<100	<10.0	<10.0	<0.10	63.2	<0.10[1]	4.6[1]
MW-31	7.58 - 12.58	10.34	2/5/2020	<10.0	<10.0	<10.0	125[1]	241	<10.0	<10.0	<0.10[1]	50.9	<0.10[1]	4.3[1]
MW-31	7.58 - 12.58	10.40	3/11/2020	<10.0	<10.0	24.8	168	<100	<10.0[2]	0.82‡	<0.10	39.2[1]	<0.10	4.0[1]
MW-31	7.58 - 12.58	10.00	4/8/2020	<10.0	<10.0	<10.0	<100[2]	<100	<10.0[2]	<10.0	<0.10[1]	36.4[1]	<0.10[1]	4.1[1]
MW-35	5.30 - 15.30	13.25	10/18/2019	15.8	12.3	19.1	472	<100	25.8	15.3	<0.10[1]	37.7[1]	<0.10[1]	4.6[1]
MW-35	5.30 - 15.30	13.50	11/25/2019	63.1[1]	45.8	117	14,900	168	580	378	<0.50	<10.0	<0.11	<0.11
MW-35	5.30 - 15.30	13.00	1/8/2020	17.1	<10.0	88.9	10,800	<100	564	503	<0.50	13.7	0.03[1]	0.29[1]
MW-35	5.30 - 15.30	12.91	2/5/2020	<10.0	<10.0	18.4	11,800[1]	<100	406	364	<0.10[1]	25.9	0.03[1]	0.19[1]
MW-35	5.30 - 15.30	12.94	3/11/2020	8.1‡	6.3‡	44.2‡	10,800	<100	252	232	<0.10	30.8[1]	0.07	0.56[1]
MW-35	5.30 - 15.30	12.75	4/8/2020	<10.0	<10.0	88.3	9,250	<100	173	160	<0.10[1]	25.2[1]	0.02[1]	0.54[1]
MW-38	8.00 - 13.00	10.15	11/25/2019	<10.0[1]	<10.0	<10.0	164	<100	<10.0	<10.0	<0.10	23.8[1]	<0.10	4.7[1]
MW-38	8.00 - 13.00	10.50	1/6/2020	<10.0	<10.0	<10.0	7,290	<100	276	28.4	<0.10	35.6	<0.10	3.9[1]
MW-38	8.00 - 13.00	10.30	2/5/2020	<10.0	<10.0	<10.0	4,870[1]	<100	186	<10.0	<0.10[1]	77.5	<0.10[1]	4.8[1]
MW-38	8.00 - 13.00	10.50	3/11/2020	<10.0	<10.0	<10.0	4,690	<100	184	1.8‡	<0.10	43.6[1]	<0.10	3.0[1]
MW-38	8.00 - 13.00	10.50	4/8/2020	<10.0	<10.0	<10.0	2,870	<100	98.5	<10.0[2]	<0.10[1]	61.4[1]	<0.10[1]	4.2[1]

Sample ID	**Screened Interval**	**Sampling Depth (feet below TOC)**	**Sample Date**	Ethane	Ethene	Methane	Alkalinity	Sulfate	Nitrite	Nitrate
MW-21	17.67 - 27.67	22.67	8/6/2020	<10.0	<10.0	10.1	359	28.9	<0.10	1.9
MW-22	14.24 - 24.24	20.85	8/6/2020	<10.0	<10.0	7.3‡	327	30.8	<0.10	1.7

Notes:
Ethane, Ethene, Methane, and Total/Dissolved Iron/Manganese results in µg/L.
Sulfide, Sulfate, Nitrite, and Nitrate results in mg/L.
Additional parameters analyzed at monitoring wells targeted for PlumeStop Pilot Study analysis. PlumeStop Pilot Study injections completed on October 22 to 23, 2019.
TOC: Top of casing
‡: Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
1. Due to technical holding time, matrix spike/matrix spike duplicate percent recovery, laboratory control sample percent recovery, or initial calibration verification percent difference, data were qualified as estimated based on the Laboratory Data Consultar
2. Due to laboratory blank contamination, data were qualified as non-detect based on the Laboratory Data Consultants, Inc. report dated June 1, 2020.

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Table 4
Groundwater Field Data
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sample ID	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
IT-2	6.05 - 16.05	14.00	7/8/2019	7.40	0.761	2.1	1.10	24.68	-141
IT-2	6.05 - 16.05	14.20	12/4/2019	7.30	0.831	25.6	0.00*	13.97	-112
IT-2	6.05 - 16.05	14.30	1/7/2020	8.04	0.747	1.5	4.82	12.91	-106
IT-2	6.05 - 16.05	14.10	2/7/2020	6.93	0.642	0.0	0.59	7.90	-86
IT-2	6.05 - 16.05	14.21	3/10/2020	7.11	0.733	75.4	1.26	9.69	-101
IT-2	6.05 - 16.05	13.94	4/7/2020	7.26	0.751	69.9	0.93	19.85	-93
IT-2	6.05 - 16.05	14.20	5/12/2020	7.29	0.772	21.3	0.79	17.29	-142
IT-2	6.05 - 16.05	14.03	6/10/2020	7.23	0.812	2.5	0.46	20.65	-150
IT-2	6.05 - 16.05	14.35	7/9/2020	7.05	0.801	15.2	0.26	20.64	-139
IT-2	6.05 - 16.05	14.35	8/6/2020	7.12	0.821	10.1	1.09	22.36	-120

Sample ID	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
MW-12R	19.77 - 24.77	22.20	9/3/2019	7.09	0.844	12.8	0.00*	16.23	212
MW-12R	19.77 - 24.77	22.27	12/4/2019	7.10	0.858	4.6	0.95	15.12	87
MW-12R	19.77 - 24.77	22.30	1/8/2020	7.80	0.810	15.9	0.00*	12.17	152
MW-12R	19.77 - 24.77	22.30	2/7/2020	6.80	0.870	9.3	0.79	11.73	-38
MW-12R	19.77 - 24.77	22.30	3/10/2020	6.94	0.981	64.7	0.89	11.38	-41
MW-12R	19.77 - 24.77	22.22	4/7/2020	7.12	0.827	51.3	0.88	18.06	67
MW-12R	19.77 - 24.77	22.27	5/12/2020	7.13	0.738	23.9	0.88	14.79	157
MW-12R	19.77 - 24.77	22.30	6/9/2020	7.06	0.659	0.0	3.36	21.01	151
MW-12R	19.77 - 24.77	22.27	7/9/2020	7.02	0.681	20.8	1.81	21.01	212
MW-12R	19.77 - 24.77	22.27	8/5/2020	6.96	0.677	39.1	2.37	18.82	116

Notes:
TOC: Top of casing
* Malfunction with dissolved oxygen sensor.

Table 4 (Continued)
Groundwater Field Data
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sample ID	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
MW-31	7.58 - 12.58	10.60	7/9/2019	7.30	0.649	5.4	6.66	18.97	92
MW-31	7.58 - 12.58	11.43	10/18/2019	7.14	0.747	71.1	3.31	19.31	144
MW-31	7.58 - 12.58	11.28	11/25/2019	7.12	0.821	10.9	0.00*	16.74	75
MW-31	7.58 - 12.58	11.02	12/5/2019	6.97	0.902	23.6	4.28	15.73	182
MW-31	7.58 - 12.58	10.50	1/8/2020	7.81	0.993	0.6	6.41	12.38	208
MW-31	7.58 - 12.58	10.34	2/5/2020	7.15	0.946	12.8	8.14	11.29	1
MW-31	7.58 - 12.58	10.40	3/11/2020	6.96	0.900	0.0	5.38	10.81	213
MW-31	7.58 - 12.58	10.00	4/8/2020	6.99	0.854	0.5	9.18	14.07	204
MW-31	7.58 - 12.58	10.50	5/11/2020	7.21	0.826	8.9	4.19	13.12	169
MW-31	7.58 - 12.58	10.33	6/9/2020	6.9	0.788	0.0	4.08	18.15	207
MW-31	7.58 - 12.58	10.72	7/9/2020	6.97	0.755	0.0	2.73	20.20	158
MW-31	7.58 - 12.58	10.72	8/5/2020	6.93	0.810	10.1	2.87	19.21	230

Sample ID	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
MW-32	4.09 - 9.09	7.50	7/9/2019	7.17	0.742	2.5	3.86	18.27	187
MW-32	4.09 - 9.09	7.60	12/2/2019	7.03	0.739	7.5	3.66	13.31	214
MW-32	4.09 - 9.09	6.30	1/6/2020	6.98	1.180	0.0	0.79	11.59	199
MW-32	4.09 - 9.09	6.30	2/6/2020	6.31	2.060	0.0	2.21	8.77	4
MW-32	4.09 - 9.09	6.60	3/9/2020	6.79	0.788	20.8	7.09	14.89	184
MW-32	4.09 - 9.09	6.60	4/6/2020	6.79	0.806	4.5	2.16	11.61	247
MW-32	4.09 - 9.09	6.60	5/11/2020	6.89	1.010	0.0	1.75	12.66	209
MW-32	4.09 - 9.09	6.59	6/8/2020	6.91	0.926	0.0	1.67	16.19	233
MW-32	4.09 - 9.09	6.60	7/8/2020	6.79	0.913	6.1	0.34	21.02	105
MW-32	4.09 - 9.09	6.59	8/4/2020	6.69	1.050	0.0	0.40	19.66	-2

Notes:
TOC: Top of casing
* Malfunction with dissolved oxygen sensor.

Table 4 (Continued)
Groundwater Field Data
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sample ID	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
MW-33	4.13 - 9.13	7.00	7/8/2019	7.10	0.823	0.4	5.59	20.12	-29
MW-33	4.13 - 9.13	7.32	12/4/2019	7.05	0.830	46.6	0.43	12.97	127
MW-33	4.13 - 9.13	6.65	1/6/2020	7.05	0.757	100	0.29	11.55	3
MW-33	4.13 - 9.13	6.63	2/6/2020	6.43	2.070	0.1	0.34	8.78	0
MW-33	4.13 - 9.13	6.65	3/9/2020	7.44	0.770	5.1	3.36	12.06	-82
MW-33	4.13 - 9.13	6.63	4/6/2020	7.06	0.775	16.6	0.48	12.62	-58
MW-33	4.13 - 9.13	6.63	5/12/2020	6.95	0.854	0.0	0.73	13.91	-57
MW-33	4.13 - 9.13	6.65	6/8/2020	6.92	0.835	0.0	4.83	20.38	-30
MW-33	4.13 - 9.13	6.95	7/8/2020	6.93	0.72	0.0	1.27	20.86	-8
MW-33	4.13 - 9.13	6.90	8/4/2020	6.86	0.664	281.0	2.51	21.88	70

Sample ID	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
MW-34	10.49 - 15.49	12.40	7/9/2019	7.30	0.649	5.4	6.69	18.87	93
MW-34	10.49 - 15.49	12.99	12/2/2019	7.14	0.890	151	3.91	12.61	177
MW-34	10.49 - 15.49	13.00	1/7/2020	7.85	0.854	81.4	6.81	13.35	218
MW-34	10.49 - 15.49	13.00	2/6/2020	6.69	2.490	31.4	9.30	10.64	73
MW-34	10.49 - 15.49	13.00	3/10/2020	6.91	1.050	20.6	4.02	11.61	172
MW-34	10.49 - 15.49	12.99	4/7/2020	6.84	0.990	30.1	6.21	12.96	215
MW-34	10.49 - 15.49	13.25	5/12/2020	7.11	0.866	47.6	8.94	13.82	75
MW-34	10.49 - 15.49	13.00	6/9/2020	7.04	0.790	0.4	6.08	17.60	159
MW-34	10.49 - 15.49	12.99	7/9/2020	7.01	0.738	3.1	2.92	19.74	125
MW-34	10.49 - 15.49	13.00	8/5/2020	6.99	0.734	33.1	3.86	18.36	158

Notes:
TOC: Top of casing

Table 4 (Continued)
Groundwater Field Data
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sample ID	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
MW-35	5.30 - 15.30	12.80	7/9/2019	7.25	0.713	36.6	4.52	16.77	47
MW-35	5.30 - 15.30	13.25	10/18/2019	7.12	0.878	25.4	0.00*	16.28	156
MW-35	5.30 - 15.30	13.50	11/25/2019	8.19	0.951	851	0.00*	15.53	-291
MW-35	5.30 - 15.30	12.63	12/3/2019	8.06	1.030	293	0.71	14.00	-271
MW-35	5.30 - 15.30	13.00	1/8/2020	8.86	0.705	76.8	0.00*	12.11	-254
MW-35	5.30 - 15.30	12.91	2/5/2020	7.55	0.736	118	0.53	12.09	-227
MW-35	5.30 - 15.30	12.94	3/11/2020	7.67	0.715	0.0	0.24	11.15	-248
MW-35	5.30 - 15.30	12.75	4/8/2020	7.73	0.696	39.2	0.16	14.56	-221
MW-35	5.30 - 15.30	12.96	5/12/2020	7.88	0.662	0.0	0.02	14.02	-263
MW-35	5.30 - 15.30	14.46	6/10/2020	7.6	0.673	0.0	0.1	17.05	-245
MW-35	5.30 - 15.30	13.07	7/9/2020	7.70	0.601	0.0	0.02	19.74	-266
MW-35	5.30 - 15.30	13.06	8/6/2020	8.00	0.569	0.0	0.09	18.74	-244

Sample ID	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
MW-36	12.50 - 17.50	15.41	12/2/2019	7.25	0.899	5.2	5.62	13.64	166
MW-36	12.50 - 17.50	15.00	1/7/2020	7.85	1.200	50.7	6.91	13.73	223
MW-36	12.50 - 17.50	15.10	2/6/2020	6.75	2.370	69.4	10.71	10.93	84
MW-36	12.50 - 17.50	15.23	3/10/2020	6.99	0.817	88.7	6.27	11.84	142
MW-36	12.50 - 17.50	15.00	4/7/2020	7.02	1.120	22.2	8.56	15.53	211
MW-36	12.50 - 17.50	15.25	5/12/2020	7.13	1.010	103	6.78	14.40	194
MW-36	12.50 - 17.50	15.14	6/9/2020	7.06	1.250	0.0	6.76	16.66	167
MW-36	12.50 - 17.50	15.48	7/9/2020	7.07	0.780	7.4	4.69	19.64	191
MW-36	12.50 - 17.50	15.46	8/5/2020	7.01	0.767	14.3	5.36	18.60	136

Notes:
TOC: Top of casing
* Malfunction with dissolved oxygen sensor.

Table 4 (Continued)
Groundwater Field Data
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sample ID	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
MW-37	9.00 - 14.00	11.81	12/2/2019	7.13	0.893	19.0	3.08	12.74	181
MW-37	9.00 - 14.00	11.50	1/7/2020	7.86	0.877	26.6	7.84	13.86	203
MW-37	9.00 - 14.00	11.50	2/6/2020	6.76	1.630	0.0	5.31	9.70	49
MW-37	9.00 - 14.00	11.50	3/10/2020	6.97	0.670	0.0	6.40	11.71	174
MW-37	9.00 - 14.00	11.50	4/6/2020	7.20	0.661	69.7	3.79	14.82	-16
MW-37	9.00 - 14.00	11.50	5/11/2020	7.24	0.647	11.3	5.66	12.33	193
MW-37	9.00 - 14.00	11.50	6/9/2020	6.76	0.598	0.0	5.14	16.98	189
MW-37	9.00 - 14.00	11.58	7/9/2020	6.99	0.696	0.0	4.13	17.42	209
MW-37	9.00 - 14.00	11.56	8/5/2020	6.85	0.831	0.0	4.97	18.20	159

`	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
MW-38	8.00 - 13.00	10.15	11/25/2019	7.17	0.675	87.9	6.18	16.23	73
MW-38	8.00 - 13.00	10.19	12/5/2019	7.23	0.806	0.0	5.77	15.58	155
MW-38	8.00 - 13.00	10.50	1/6/2020	7.31	0.814	0.0	4.35	12.72	141
MW-38	8.00 - 13.00	10.30	2/5/2020	7.20	1.440	640	8.55	10.25	-52
MW-38	8.00 - 13.00	10.50	3/11/2020	6.86	0.918	129	9.36	10.29	241
MW-38	8.00 - 13.00	10.50	4/8/2020	7.10	1.050	263	7.95	13.55	213
MW-38	8.00 - 13.00	10.50	5/11/2020	7.26	0.848	>1,000	4.77	12.73	167
MW-38	8.00 - 13.00	10.50	6/8/2020	7.14	0.847	215	6.55	17.72	69
MW-38	8.00 - 13.00	10.68	7/8/2020	6.76	0.875	141	3.74	18.49	139
MW-38	8.00 - 13.00	10.65	8/4/2020	6.90	0.765	22.3	4.78	24.52	99

Notes:
TOC: Top of casing
* Malfunction with dissolved oxygen sensor.

Table 4 (Continued)
Groundwater Field Data
Former Amphenol Facility
EPA ID # IND 044 587 848
Franklin, IN 46131

Sample ID	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
MW-39	6.00 - 11.00	8.45	12/3/2019	7.07	0.709	51.2	3.21	13.67	214
MW-39	6.00 - 11.00	7.66	1/6/2020	7.06	0.721	186	2.67	11.79	212
MW-39	6.00 - 11.00	8.50	2/5/2020	7.05	1.010	19.1	4.28	9.71	39
MW-39	6.00 - 11.00	8.50	3/9/2020	7.35	0.805	2.22	9.00	12.39	94
MW-39	6.00 - 11.00	8.50	4/6/2020	6.98	0.887	79.2	3.39	12.21	107
MW-39	6.00 - 11.00	9.50	5/12/2020	7.06	0.662	>1,000	5.42	13.73	14
MW-39	6.00 - 11.00	8.50	6/8/2020	6.84	0.661	66.9	6.04	17.22	187
MW-39	6.00 - 11.00	8.50	7/8/2020	7.03	0.632	101	4.36	21.43	161
MW-39	6.00 - 11.00	8.50	8/4/2020	6.95	0.645	116	3.24	24.39	79

Sample ID	Screened Interval	Sampling Depth (feet below TOC)	Sample Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Oxygen Reduction Potential (mV)
MW-40	7.50 - 12.50	10.00	12/2/2019	7.18	0.786	19.3	2.58	11.95	181
MW-40	7.50 - 12.50	8.00	1/6/2020	7.15	0.753	418	0.00*	12.61	172
MW-40	7.50 - 12.50	8.90	2/6/2020	6.61	2.430	50.6	0.61	8.80	23
MW-40	7.50 - 12.50	10.00	3/9/2020	6.99	1.070	102.9	6.31	10.91	179
MW-40	7.50 - 12.50	10.00	4/6/2020	7.17	0.983	46.7	0.87	12.40	107
MW-40	7.50 - 12.50	10.00	5/11/2020	7.11	1.050	>1,000	8.02	12.03	180
MW-40	7.50 - 12.50	10.00	6/8/2020	7.12	0.856	749	1.11	17.49	188
MW-40	7.50 - 12.50	10.00	7/8/2020	7.01	0.959	22.6	0.28	20.53	130
MW-40	7.50 - 12.50	10.00	8/4/2020	6.89	0.986	260	0.57	21.11	11

Notes:
TOC: Top of casing
* Malfunction with dissolved oxygen sensor.

Attachments

Attachment A

Regenesis Remediation Services Application Summary Report

Global Headquarters
1011 Calle Sombra
San Clemente, CA 92673
Ph: (949) 366-8000
Fax: (949) 366-8090

11/7/2019 **REGENESIS Proposal No. DoD64667**

IWM Consulting Group
7428 Rockville Road
Indianapolis, IN 46214

SUBJECT: Application Summary Report for Remedial Services at the Franklin-Amphenol Site

Brad,

REGENESIS Remediation Services (RRS) has recently completed an *in-situ* injection application of PlumeStop and S-MicroZVI at the Franklin-Amphenol Site located at 980 Hurricane Road, Franklin, IN 46131. The goal of the application was to remediate chlorinated solvents. RRS employed *in-situ* PlumeStop and S-MicroZVI technologies to meet remediation goals. RRS mobilized a support pickup truck, injection trailer, and personnel to the site to begin work over three (3) days on 10/21/19 to 10/23/19. RRS staffed this project with experienced personnel who ensured a safe, successful injection application. After the remedial agent was applied, RRS flushed each well to ensure no particulate buildup occurs within the monitoring well. Please review the attached application summary page, injection log, injection maps, and photo log for more detail on the application.

RRS appreciates the opportunity to work at this site with IWM Consulting Group. RRS will be available to interpret the field data as it is collected or answer any questions. If you need additional information regarding the application process or attached field notes, please contact Andrew Kavanagh at 574.304.4353.

Sincerely,

Andy Kavanagh

Andrew Kavanagh

Central Region Project Manager

REGENESIS Remediation Services

cc: Bhicks@regenesis.com; Ddavis@regenesis.com

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San Clemente, CA 92673
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Application Summary Page

OVERVIEW

Client: IWM Consulting Group
Client PM: Brad Gentry
RRS Project Manager: Andrew Kavanagh

Site Address: 980 Hurricane Road, Franklin, IN 46131
Project Name: Franklin-Amphenol Site
Project Dates: 10/21/19-10/24/19

TREATMENT TECHNOLOGY

RRS employed PlumeStop and S-MicroZVI to treat residual chlorinated solvents. PlumeStop is a colloidal form of activated carbon with a surface treatment which reduces its interactions with the soil matrix. This allows it to move through soil pores leaving a coating on the soil matrix as it distributes from the injection point. This provides a very large sorption surface which will result in immediate reduction of these contaminants while concentrating contaminants to allow for more efficient and controlled remediation through destructive technologies like S-MZVI.

S-MZVI is a concentrated aqueous suspension of sulfidated, colloidal zero valent iron formulated for compatibility with PlumeStop. When applied to the subsurface it imparts an in-situ chemical reduction (ISCR) mechanism that allows for the destruction of chlorinated ethenes (i.e. TCE) via abiotic degradation pathways. This unique mechanism allows for the traditional reduction pathway to be circumvented, minimizing the formation of daughter species such as vinyl chloride. Sulfidation blocks the effects of water on the ZVI particles, allowing the reagent to be effectively focused on the chemical reduction of chlorinated ethenes. As contaminants are degraded to non-toxic and non-sorptive end products, the PlumeStop sorption surface will be regenerated. This allows for further sorption and treatment of contaminants that may diffuse back into the groundwater from the soil matrix over time.

RRS employed remediation design specifications as outlined in designs dated 9/26/19.

MW-35 Pilot Test

RRS conducted a pilot injection test near MW-35 to asses injection radius when applying PlumeStop and S-MicroZVI. The main goal of the pilot test is to confirm the radius of influence (ROI) of the remedial solution. Testing began on the morning of October 21st by taking a pre-injection soil core to observe the target treatment zone (TTZ). After examining the soil core, the treatment zone was changed to 16-11 feet below ground surface (bgs), this was primarily a result of porosity assessments and vadose zone observations. A five (5) point star pattern was laid out for DPT injections and injections began the

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following day October 22nd. Application flow rates and pressures were observed generally between 2.9 to 3.5 gallons per minute (GPM) and 15 to 35 pounds per square inch (PSI). Remedial solution was detected in MW-35 after approximately 30 gallons injected into IP-1. No surfacing was observed and no infiltration of remedial injectate was observed in nearby utility pathways. All borings were backfilled with bentonite chips and patched to match preexisting surface conditions.

A total of 1,923 gallons of remedial solution was mixed with a total of 3,200 pounds of PlumeStop and 100 pounds of S-MicroZVI and applied to the area.

Application Method: Direct push drilling with retractable injection screens — 3 foot screens
Injection Depth: 11 to 16 feet below ground surface
Number of Injection Points: 5

Deviations From Proposal:

Please see attached Table 1 and Figure 1 for details on flow rates, injection pressures, and injection locations.

Trench Barrier Application

RRS also applied the REGENESIS products PlumeStop and S-MicroZVI in the trench barrier area (see figure 2). RRS applied remedial solution to 5 injection wells and 1 direct push location.

Injection was completed by pumping on one location at a time. Initially ,up to four (4) locations at a time were planned, but persistent traffic prevented RRS from pumping on more than one (1) location at a time. Pressures were observed under 5 psi in the wells and under 15 psi at the direct push boring. Flowrates were between 10 and 15 GPM. No product surfacing was observed. RRS backfilled the injection locations, packed up site and demobilized.

A total of 2,892 of remedial solution was mixed with a total of 3,600 pounds of PlumeStop and 200 pounds of S-MicroZVI and applied to the area.

Application Method: Injection wells and 1 DPT location
Injection Depth: Varies based on well screens (see table 2)
Number of Injection Points: 6

Deviations From Proposal: Do not inject into IW-5 per Brad Gentry. Replace with DPT-1. (see figure 2)

Please see Table 2 and Figure 2 for details on flowrates, injection pressures, and injection locations.

IWM Consulting Group-Franklin-Amphenol Site
PlumeStop Injection Summary Log
Pilot Test - MW35

Table 1

Injection Point	Date	Time	Injection Depth (feet)	Injection Pressure (psi)	Flow Rate (gpm)	Volume of PlumeStop Injected			Total Gallons Per Location	Pounds of PlumeStop Injected Per Location	Pounds of S-Micro ZVI Per Location	Comments	Injection Tooling
						Beginning Flow Meter (gal)	Ending Flow Meter (gal)	Gallons Injected Per Interval					
1	10/22/2019	9:33	16-13	19	3.00	0.00	231.00	231.00	385	639	20	Influence MW-35 at 30 gallons injected	3-Foot Screen
	10/22/2019	10:56	13-11	18	2.90	231.00	384.50	153.50				Checked the southern and northern manhole at 65 gallons (10:00 AM). No visible influence.	
												Checked the southern and northern manhole at 65 gallons (10:30 AM). No visible influence.	
												MW-35 at +5,000 ppm at 10:45.	
												Checked the southern and northern manhole at 65 gallons (11:30 AM). No visible influence.	
												Point Complete	
2	10/22/2019	11:45	16-13	20	3.50	0.00	231.00	231.00	385	639	20	Checked southern and northern manhole (12:00 PM). No visible influence.	3-Foot Screen
	10/22/2019	12:38	13-11	17	2.80	231.00	384.50	153.50				Checked southern and northern manhole (12:30 PM). No visible influence.	
												Checked southern and northern manhole (1:00 PM). No visible influence.	
												Point Complete	
3	10/22/2019	9:39	16-13	20	2.50	0.00	231.00	231.00	385	639	20	Checked the southern and manhole at 65 gallons (10:05 AM). No visible influence.	3-Foot Screen
	10/22/2019	11:10	13-11	21	2.40	231.00	384.50	153.50				Checked the southern and manhole at 120 gallons (10:30 AM). No visible influence	
												Checked the southern and manhole at 235 gallons (11:30 AM). No visible influence	
												Point Complete	
4	10/22/2019	9:45	16-13	35	2.80	0.00	231.00	231.00	385	639	20	Checked southern and northern manhole (10:-05AM). No visible influence.	3-Foot Screen
	10/22/2019	11:12	13-11	19	2.80	231.00	384.50	153.50				Checked southern and northern manhole (10:-30AM). No visible influence.	
												Checked southern and northern manhole (11:-30AM). No visible influence.	
												Point Complete	
5	10/22/2019	13:05	16-13	20	2.90	0.00	231.00	231.00	385	639	20	Checked the southern and manhole at 120 gallons (1:30 PM). No visible influence.	3-Foot Screen
	10/22/2019	13:58	13-11	15	2.95	231.00	384.50	153.50				Checked the southern and manhole at 270 gallons (2:15 PM). No visible influence.	
												Point Complete	
												Final water level in MW-35 at 5'7" at end of injection	
												Flush MW-35 with 45 gal of water	
									Total Gallons:	**Total Lbs. PlumeStop**	**Total Lbs. of S-Micro ZVI**		
									1923	3197	100		

IWM Consulting Group-Franklin-Amphenol Site

PlumeStop Injection Summary Log

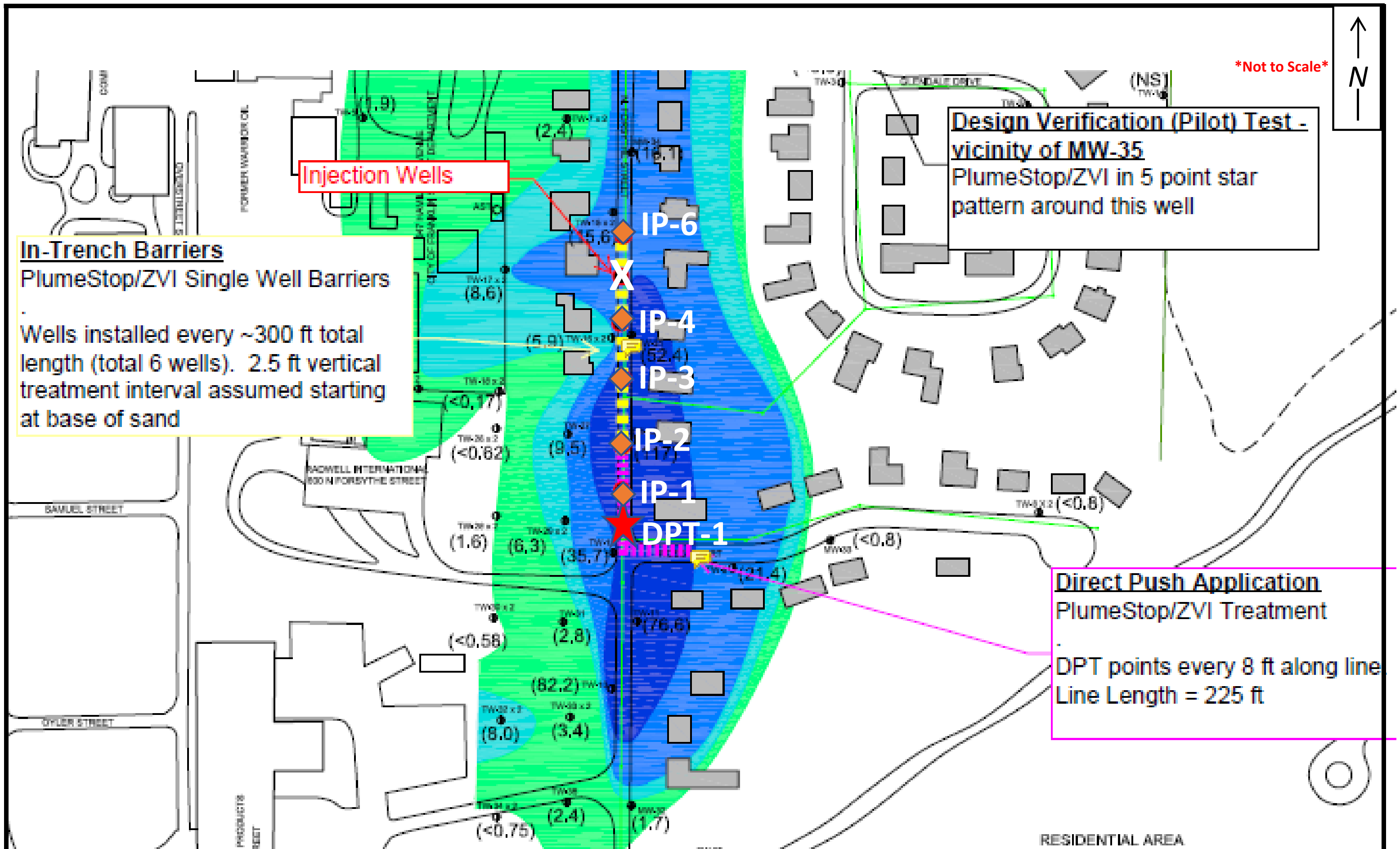
In Trench Barriers

Table 2

Injection Point	Date	Time	Injection Depth (feet)	Injection Pressure (psi)	Flow Rate (gpm)	Volume of PlumeStop Injected			Total Gallons Per Location	Pounds of PlumeStop Injected Per Location	Pounds of S-Micro ZVI Per Location	Comments	Injection Tooling
						Beginning Flow Meter (gal)	Ending Flow Meter (gal)	Gallons Injected Per Interval					
1	10/23/2019	9:40	9.5-11	2	15.00	0.00	482.00	482.00	482	600	33		
2	10/23/2019	10:22	7.8-10.3	0	15.00	0.00	482.00	482.00	482	600	33		
3	10/23/2019	10:53	7.8-10.3	0	15.00	0.00	482.00	482.00	482	600	33		
4	10/23/2019	11:28	8.55-10.55	0	15.00	0.00	482.00	482.00	482	600	33		
6	10/23/2019	12:14	7.15-9.65	0	15.00	0.00	482.00	482.00	482	600	33		
DPT-1	10/23/2019	13:02	10-12	15	10.00	0.00	482.00	482.00	482	600	33		Expendable Tip

Total Gallons:	Total Lbs. PlumeStop	Total Lbs. of S-Micro ZVI
2892	3602	200

LEGEND	Prepared By: ALK	Figure 1 – MW-35 Injection Map 980 Hurricane Road Franklin, IN 46131	Date Prepared: Nov 2019	REGENESIS REMEDIATION SERVICES Technology-Based Solutions for the Environment
Injection Point				



LEGEND
Injection Well
DPT Point

Prepared By: *ALK*

Figure 2 – Trench Barriers Injection Map
980 Hurricane Road
Franklin, IN 46131

Date Prepared: *Nov 2019*

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Photo Log

Photo 1: *RRS Trailer setup at MW-35*

Photo 2: *Bailer at MW-35 showing Plumestop influence*

Photo 3: RRS Trailer at MW-35 (looking East)

Photo 4: *Sample from MW-35 showing injection concentration of Plumestop*

Photo 5: *Pre Injection Soil core taken near MW-35 to confirm Treatment Interval*

Attachment B

Photographic Log

Photo #1: Soil core adjacent to MW-35 prior to injection activities. (October 21, 2019)

Photo #2: RRS injection trailer located and area secured surrounding MW-35 prior to injection activities. (October 22, 2019)

Photo #3: Initial injection into INJ-1. INJ-3 also placed for injection. (October 22, 2019)

Photo #4: Remedial solution present in MW-35 after the injection of 30 gallons at INJ-1. (October 22, 2019)

Franklin Power Products, Inc./Amphenol Corporation, EPA ID #IND 044 587 848 – Pilot Study Photographic Log

Photo #5: INJ-1 thru INJ-5 installed. Injection at various locations. (October 22, 2019)

Photo #6: Soil core adjacent to MW-35 post injection. Visual of remedial solution distribution within saturated soils. (October 22, 2019)

Photo #7: Looking at interior of injection trailer.

Photo #8: Looking at mixing tank in injection trailer.

Photo #9: RRS injection trailer located and secured for injection activities on Forsythe Street. Injection at IP-3. (October 23, 2019)

Photo #10: Injection at IP-6. (October 23, 2019)

Photo #11: Injection at DPT-1. (October 23, 2019)

Photo #12: Injection at IP-1. (October 23, 2019)

Photo #13: Injection at IP-4. (October 23, 2019)

Photo #14: Close-up of IP wellhead injection hookup. (October 23, 2019)

Photo #15: Hose containing remedial solution extending from injection trailer to injection points. (October 23, 2019)

Attachment C

Monitoring Well Boring Logs and Construction Diagrams

IWM CONSULTING GROUP

DATE BEGAN: 4-23-85
DATE FINISHED: 4-23-85
GROUND SURFACE EL.: 734.55'

BORING NO. IT-1A

N ______ E ______

FIELD ENGINEER: L. R. SWEENEY
CHECKED BY: P. E. NEMANIC

ELEV. (FEET)	DEPTH (FEET)	SAMPLE TYPE	DESCRIPTION	U.S.C.S.	PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50	REMARKS
730.0	5	S 1	MEDIUM STIFF DARK BROWN SILTY SAND, SOME CLAY, - MOIST 4.4'	sm		
	10	S 2	LOOSE BROWN FINE TO MEDIUM SAND, - MOIST.	sp		
4-23-85 720.0	15	S 3	14.3'	sp		
	20	S 4	MEDIUM DENSE LIGHT BROWN TO GRAY FINE TO COARSE SAND, WET 20.3'	sw		
			VERY STIFF GRAY SANDY CLAY, SOME GRAVEL, TRACE SILT, WET TO MOIST ~22.0'	cl	76	
710.0	25	S 5	STIFF GRAY SILTY CLAY, SOME COARSE SAND, TRACE GRAVEL, MOIST 27.0'	cl		
	30	S 6	VERY STIFF GRAY SANDY SILT, TRACE CLAY, MOIST.	ml	66	
700.0	35	S 7	STIFF GRAY SANDY SILT, SOME GRAVEL, TRACE TO SOME CLAY, MOIST	ml		
	40	S 8	HARD GRAY SANDY SILT, TRACE GRAVEL, TRACE CLAY, MOIST	ml	75	
			GRADING TO			
690.0	45	S 9	MEDIUM STIFF GRAY SANDY CLAY, TRACE GRAVEL, TRACE SILT, MOIST. 48.8'	sc		
	50	S 10	MED. DENSE GRAVELLY SAND, TRACE SILT, WET.	sp		

PROJECT NO. 846803

BORING NO. IT-1A
SHEET 1 OF 2

DATE BEGAN: 4-23-85

DATE FINISHED: 4-23-85

GROUND SURFACE EL.: 734.55 '

BORING NO. IT-1A

N ____________ E ____________

FIELD ENGINEER: L. R. SWEENEY

CHECKED BY: P. E. NEMANIC

ELEV. (FEET)	DEPTH (FEET)	SAMPLE TYPE	PROFILE	DESCRIPTION	U.S.C.S.	PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50	REMARKS
				MEDIUM DENSE GRAVELLY SAND, TRACE SILT, WET			
				GRADING TO			
680.0	55	S 11		MEDIUM DENSE FINE TO COARSE SAND, SOME GRAVEL, TRACE SILT, WET.	SW		
674.55	60.0	S 12		59.8'	SW / ml		
				MEDIUM STIFF BROWN SILT, MOIST			
				BOTTOM OF BORING 60.0'			

PROJECT NO. 846803

DATE BEGAN: 4-24-85

DATE FINISHED: 4-24-85

GROUND SURFACE EL.: 733.14'

BORING NO. IT-2

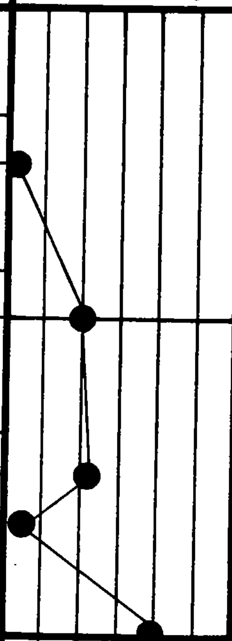
N ____ E ____

FIELD ENGINEER: L. R. SWEENEY

CHECKED BY: P. E. NEMANIC

ELEV. (FEET)	DEPTH (FEET)	SAMPLE TYPE	DESCRIPTION	U.S.C.S.	REMARKS
730.0	5	S 1	MEDIUM STIFF DARK REDDISH BROWN SILT, SOME CLAY, TRACE SAND, MOIST. ~ 7.0'	ml	
	10	S 2	MEDIUM DENSE FINE TO COARSE SAND, TRACE INTERBEDDED CLAY AND GRAVEL MOIST. ~12.0'	sw	DRILLER NOTED GRAVEL LAYER @ ~10.5'
720.0 4-24-85	15	S 3 S 4	STIFF GRAY SILT, SOME CLAY, TRACE TO SOME SAND, INTERLAYERED DENSE BROWN AND GRAY MEDIUM TO COARSE SAND, MOIST. 15.0'	sp/ml	CUTTINGS HAVE SLIGHT "DIESEL LIKE" ODOR, GRAVEL LAYER @ ~13.5'
			SOFT GRAY SANDY SILT, TRACE CLAY, WET. ~17.5'	ml	
713.14	20.0	S 5	VERY STIFF GRAY SILT, SOME CLAY, SOME GRAVEL, MOIST TO DRY.	ml	

PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50



BOTTOM OF BORING

20.0'

PROJECT NO. 846803

BORING NO. IT-2

SHEET 1 OF 1

DATE BEGAN: 4-27-85

DATE FINISHED: 4-27-85

GROUND SURFACE EL.: 729.81'

BORING NO. IT-3

N ______ E ______

FIELD ENGINEER: L. R. SWEENEY

CHECKED BY: P. E. NEMANIC

ELEV. (FEET)	DEPTH (FEET)	SAMPLE TYPE	PROFILE	DESCRIPTION	U.S.C.S.	PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50	REMARKS
	5	S 1		SOFT LIGHT BROWN SANDY CLAY, SOME SILT, SOME INTERLAYERED FINE TO MEDIUM SAND, MOIST. 4.7'	cl		
				VERY LOOSE LIGHT BROWN FINE TO MEDIUM SAND, MOIST.	sw		
720.0	10	S 2		MEDIUM DENSE BROWN FINE TO MED. SAND, TRACE GRAVEL, MOIST.	sw		
	15	S 3		MEDIUM DENSE BROWN MEDIUM SAND, WET. 14.9'	sp		
				MEDIUM STIFF GRAY SILTY CLAY, SOME SAND, WET. ~17.0'	cl		
710.0 709.81	20.0	S 4		STIFF GRAY CLAYEY SILT, SOME GRAVEL, TRACE TO SOME SAND, MOIST	mh		

BOTTOM OF BORING

20.0'

PROJECT NO. 846803

BORING NO. IT-3

SHEET 1 OF 1

DATE BEGAN: 4-24-85

DATE FINISHED: 4-24-85

GROUND SURFACE EL.: 728.86'

BORING NO. IT-4

N ______ E ______

FIELD ENGINEER: L. R. SWEENEY

CHECKED BY: P. E. NEMANIC

ELEV. (FEET)	DEPTH (FEET)	SAMPLE TYPE	PROFILE	DESCRIPTION	U.S.C.S.	PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50	REMARKS
	5	S 1		MEDIUM STIFF LIGHT BROWN SANDY CLAY WITH SOME SILT AND TRACE GRAVEL - MOIST	cl		
720.0 / 4-24-85	10	S 2		MEDIUM DENSE GRAY TO BROWN SANDY SILT, SOME GRAVEL, TRACE TO SOME CLAY, MOIST TO DRY. 10.0'	ml		
	15	S 3		MEDIUM DENSE GRAY COARSE SAND, SOME GRAVEL, TRACE SILT, WET. 14.5'	sp		
				STIFF GRAY SANDY SILT, SOME GRAVEL, SOME CLAY, MOIST. 17.0'	ml		
710.0 / 708.86	20.0	S 4		STIFF GRAY CLAYEY SILT, SOME GRAVEL, TRACE SAND, MOIST. 19.8'	mh		
				DENSE GRAY COARSE SAND, TRACE SILT, WET.	sp		

BOTTOM OF BORING

20.0'

PROJECT NO. 846803

BORING NO. IT-4

SHEET 1 OF 1

DATE BEGAN: 4-27-85

DATE FINISHED: 4-27-85

GROUND SURFACE EL.: 732.89'

BORING NO. IT-5

N ____________ E ____________

FIELD ENGINEER: L. R. SWEENEY

CHECKED BY: P. E. NEMANIC

ELEV. (FEET)	DEPTH (FEET)	SAMPLE TYPE	DESCRIPTION	U.S.C.S.	PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50	REMARKS
730.0	5	S 1	MEDIUM STIFF BROWN SANDY CLAY, SOME SILT, MOIST. 4.0'	cl		
			VERY LOOSE BROWN FINE TO MEDIUM SAND - MOIST.	sp		
	10	S 2	MEDIUM DENSE BROWN FINE SAND, MOIST.	sp		
720.0	15	S 3		sp		
	20	S 4	MEDIUM DENSE BROWN FINE TO MEDIUM SAND, WET.	sp		DRILLER NOTED GRAVEL LAYER AT ~ 21 FT.
710.0	25	S 5	24.1'	sp		
			HARD GRAY SANDY SILT, TRACE CLAY, MOIST.	ml	76/0.9'	
	30	S 6	HARD GRAY SANDY SILT, SOME CLAY, MOIST	ml		
700.0	35	S 7	HARD GRAY SANDY SILT, TRACE GRAVEL TRACE CLAY, MOIST	ml	78	
	40	S 8	~43.0'	ml	50/0.4'	
690.0			VERY DENSE GRAY COARSE SAND AND GRAVEL, WET. 44.0'	sw		
	45	S 9	HARD GRAY SANDY SILT, TRACE CLAY, TRACE GRAVEL, WET.	ml	50/0.3'	
	50	S 10	HARD GRAY SANDY SILT, SOME INTER-BEDDED GRAVEL, TRACE CLAY, WET.	ml	50/0.5'	

PROJECT NO. 846803

BORING NO. IT-5

DATE BEGAN: 4-27-85
DATE FINISHED: 4-27-85
GROUND SURFACE EL.: 732.89'

BORING NO. IT-5

N ________ E ________

FIELD ENGINEER: L. R. SWEENEY
CHECKED BY: P. E. NEMANIC

ELEV. (FEET)	DEPTH (FEET)	SAMPLE TYPE	PROFILE	DESCRIPTION	U.S.C.S.	PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50	REMARKS
680.0	55			HARD GRAY SANDY SILT, SOME INTERBEDDED GRAVEL, TRACE CLAY, WET. ~51.0'			LOTS OF FINE GRAY SAND IN RETURNS
670.0	60 65			UNSAMPLED			DRILLED USING A THICK BEN-TONITE MUD FROM 55' TO 69'
663.89	69.0						
				BOTTOM OF BORING 69.0' NOTE: SAMPLING NEARLY IMPOSSIBLE BELOW 50' DUE TO LARGE AMOUNTS OF SAND SETTLING IN BOTTOM OF BORING IN THE TIME IT TOOK TO REMOVE ROTARY BIT AND RODS AND PUT IN SPLIT SPOON SAMPLER. NO SOIL SAMPLES WERE OBTAINED BELOW 51'.			

IWM CONSULTING GROUP

7428 Rockville Road
Indianapolis, Indiana 46214

BORING/WELL LOG: MW-12R

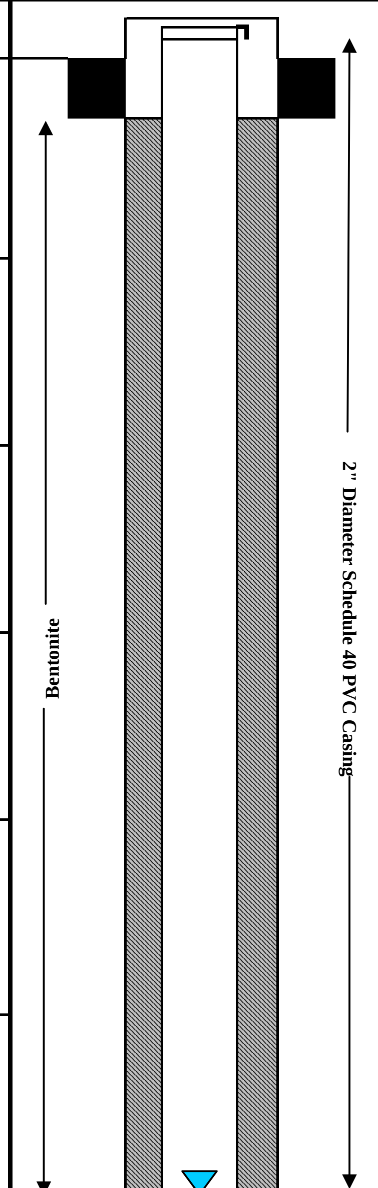
TOC: 736.15
Installation Date: June 30, 2008
Client: Amphenol Corporation
IWM Job No: IN-AMP-07-12

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

SUBSURFACE PROFILE / SAMPLE

DEPTH (ft)	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	PID (ppm)
	Ground Surface			
0	Topsoil, moist, dark brown, medium stiff, silty CLAY (CL), with organics	0-2	100	0
1	Moist, slightly stiff, brown, sandy, silty CLAY (CL)			
2		2-4	100	0.3
3				
4	Moist, medium dense, brown, clayey medium SAND (SC)	4-6	100	1.5
5				
6		6-8	30	1.3
7				
8		8-10*	60	2.2
9	Slightly moist, medium dense, light brown, coarse SAND (SP)			
10	Moist, medium dense, brown, clayey medium to coarse SAND (SC)	10-12	30	1.8
11				

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
- Indicates depth to groundwater.
Boring Diameter: 6.25 inches
Boring Depth: 22.5 feet
Casing Length: 20 feet (2.5' for stickup casing)
Screen Length: 5 feet
Well Diameter: 2 inches
Casing Material: Sch 40 PVC
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split Spoon
Drill Method: Hollow Stem Augers
Drilled By: SCS Environmental
Geologist: Chris Parks

7428 Rockville Road
Indianapolis, Indiana 46214

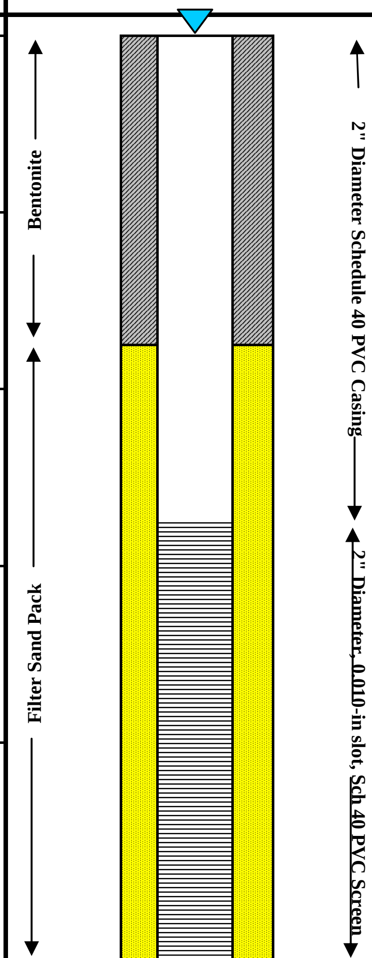
BORING/WELL LOG: MW-12R

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC: 736.15
Installation Date: June 30, 2008
Client: Amphenol Corporation
IWM Job No: IN-AMP-07-12

DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	PID (ppm)
12		Saturated, loose, brown, coarse SAND (SP)	12-14	40	6.0
14		Saturated, medium dense, brown, medium SAND (SW)	14-16	100	7.5
16		Saturated, medium dense, brown, coarse SAND (SP) with gravel	16-18	50	5.7
18			18-20	85	11.7
20			20-22.5*	75	15.5
22		Slightly moist, very stiff, gray, CLAY (CL)			
		End of Boring.			
23					
24					

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
- Indicates depth to groundwater.
Boring Diameter: 6.25 inches
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Sampling Method: Split Spoon
Drill Method: Hollow Stem Augers
Drilled By: SCS Environmental
Geologist: Chris Parks

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	Former Amphenol	**Boring No.**	MW-20
Date	February 5, 1992	**Driller**	A. Schrader
Logged by	J.A. Duwelius	**Elevation**	731.84
Location	1667 N, 1452 E	**Page**	1 of 2

Water Level					**Start**	**Finish**
Time					**Time** 13:00	**Time** 14:40
Date					**Date** 2/5/92	**Date** 2/5/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
SS	2.0	1.0	3, 5, 5, 9	0, 1	0	Loam, dark brown (10 YR 4/3), moist, slightly firm, noncalcareous, contains plant material, (top soil)
SS	2.0	0.6	3, 2, 4, 3	2, 3	0	Sandy clay loam, dark gray (10 YR 4/1), moist, slightly firm, noncalcareous, few, medium, distinct mottles, yellow (10 YR 8/8) and yellowish brown (10 YR 6/8)
SS	2.0	1.0	4, 5, 6, 12	4, 5	0	Sandy clay loam, as 2.0' above
S	2.0	1.3	4, 8, 12, 17	6, 7	0	Sandy clay loam, dark gray (10 YR 4/1), mottling coarse, common, distinct, yellow and yellowish brown (10 YR 8/8) and (10 YR 6/8), dry, hard, noncalcareous, with iron & manganese staining throughout
SS	2.0	1.5	4, 8, 3, 2	8, 9	0	Loamy sand, trace, granules, brown (10 YR 5/3), dry, soft, noncalcareous, clear contact @ 8.9' to sand, fine to medium, brown (10 YR 4/3), dry, loose, poorly sorted
3SS	2.0	1.1	1, 2, 2, 3	10, 1, 2	0	Sand, fine to medium, as above, wet @ 10.6', gradual contact @ 11.5' to muddy sandy gravel, fine, brown, (10 YR 5/3), wet, nonplastic, slightly calcareous, contains large silt clast
SS	2.0	1.0	3, 4, 5, 7	3, 4, 5	0	Sand, medium coarse, pebbly, brown (10 YR 5/3), wet, nonplastic, calcareous, poorly sorted
SS	2.0	1.0	3, 5, 9, 12	6, 7	0	Muddy sandy gravel, fine to medium, brown (10 YR 5/3), wet, nonplastic, calcareous, poorly sorted
SS	2.0	1.3	5, 7, 9, 14	8, 9, 20	0	Muddy sandy gravel, fine to medium, as 15.5' above

Remarks Mobile B-57 equipped with 4 1/4" ID/ 8 1/4" OD HSA

Set monitoring well MW-20 in boring on completion.

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	Former Amphenol	**Boring No.**	MW-20
Date	February 5, 1992	**Driller**	A. Schrader
Logged by	J.A. Duwelius	**Elevation**	731.84
Location	1667 N, 1452 E	**Page**	2 of 2

Water Level						Start		Finish
Time					Time	13:00	Time	14:40
Date					Date	2/5/92	Date	2/5/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
				20		
SS	2.0	0.6	3	1	0	Muddy sandy gravel, f-m, as above, clear contact @ 22.2 ft to loam, sl pebbly, br (10 YR 5/3), dry, v hard, calc
			7			
			12	2		
			18			
				3		
				4		T.D. 22.5 ft
				5		
				6		
				7		
				8		
				9		
				0		
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				0		

Remarks

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	Former Amphenol	**Boring No.**	MW-21
Date	February 20, 1992	**Driller**	A. Schrader
Logged by	J.D. Bryan	**Elevation**	735.11
Location	1021 N, 1766 E	**Page**	1 **of** 2

Water Level					**Start**	**Finish**
Time					**Time** 11:30	**Time** 14:10
Date					**Date** 2/20/92	**Date** 2/20/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
				0		
SS	2.0	1.7	1, 6, 7, 12	1, 2	0.6	Loam, dark brown (10 YR 3/3), slightly moist, friable, noncalcareous, gradual contact @ 1.5' to sandy loam dark yellowish brown (10 YR 4/6), moist, firm, noncalcareous
SS	2.0	1.5	1, 3, 3, 4	3, 4	1.3	Sandy loam, as 1.5' above, clear contact @ 3.3' to loamy sand, dark yellowish brown (10 YR 4/6), moist, friable, noncalcareous
SS	2.0	0.9	1, 2, 2, 1	5, 6	2.4	Sand, medium, strong brown (7.5 R 4/6), slightly moist, friable, noncalcareous
SS	2.0	1.1	4, 6, 6, 12	7, 8	3.4	Sand, medium to coarse, as 4.0' above
3SS	2.0	0.4	4, 12, 18, 31	9, 10	3.8	Sand, medium to coarse, as 4.0' above, but has a slight petroleum (?) odor
3SS	2.0	1.5	6, 13, 17, 23	1, 2		Sand, medium to coarse, as 4.0' above, no odor
				3		
SS	2.0	1.6	10, 12, 12, 14	4, 5	13.2	Sand, medium to coarse, as 4.0' above
				6		
3SS	2.0	1.3	10, 14, 15, 19	7, 8	33.0	Sand, medium to coarse, as 4.0' above, wet, loose, nonplastic
				9, 20		

Remarks Mobile B-57 equipped with 4/ 1/4" ID/ 8 1/4" HSA

Set monitoring well MW-21 in boring on completion.

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e	Former Amphenol	**Boring No.**	MW-21
Date	February 20 , 1992	**Driller**	A. Schrader
Logged by	J.D. Bryan	**Elevation**	735.11
Location	1021 N, 1766 E	**Page**	2 **of** 2

					Start		Finish	
Water Level								
Time					**Time**	11:30	**Time**	14:10
Date					**Date**	2/20/92	**Date**	2/20/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
				20	5.0	
				1		
				2		
				3		
3SS	2.0	0.0				
3SS	2.0	0.3		4		Loam, brown (10 YR 5/3), slightly moist, extra firm, calcareous
				5		
				6		T.D. 25.5 ft
				7		
				8		
				9		
				0		
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				0		

Remarks

Heaving sand from 23 to 25 ft

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:	Former Amphenol	**Boring No.**	MW-22A
Date	February 11, 1992	**Driller**	A. Schrader
Logged by	M. Lytle	**Elevation**	734.97
Location		**Page**	1 of 1

Water Level					**Start**		**Finish**	
Time					**Time**	10:45	**Time**	12:00
Date					**Date**	2/11/92	**Date**	2/11/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
				0		
3SS	2.0	1.7	9, 10, 10, 14	1	6.0	Silt loam, trace pebbles, very dark grayish brown (10 YR 3/2), moist to dry, very friable, massive, abrupt contact @ 0.4' to sandy clay loam, pebbly, dark yellowish brown (10 YR 4/4), moist, friable, massive
SS	2.0	1.3	6, 5, 4, 2	2–3	18.0	Sandy clay loam, as 0.4' above, abrupt contact @ 3.0' to loamy sand, slightly pebbly, dark yellowish brown (10 YR 4/6), moist, very friable, poorly sorted
SS	2.0	0.5	2, 2, 3, 3	4–5	8.0	Sand, coarse, pebbly, dark yellowish brown (10 YR 4/6), moist, loose, poorly washed & sorted
`SS	2.0	1.9	3, 3, 4, 5	6–7	11.0	Sand, coarse, as 4.0' above
3SS	1.0	0.7	5, 50	8–9		Sand, coarse, as 4.0' above
				0		T.D. 9.0 feet
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				0		

Remarks Mobile B-57 equipped with 4 1/4" ID/ 8 1/4" OD HSA

Auger refusal @ 9.0 ft, abandoned boring, relocated, augured 6.0 ft and started sampling MW-22
Borehole was backfilled on completion with cement grout.

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`e	Former Amphenol	**Boring No.**	MW-22
_ate	February 11, 1992	**Driller**	A. Schrader
Logged by	M. Lytle	**Elevation**	735.03
Location	920 N, 1773 E	**Page**	1 of 2

					Start	Finish
Water Level						
Time					Time 13:45	Time 14:50
Date					Date 2/11/92	Date 2/11/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
				0	2.0	Blank drill to 6.0', for soil description see boring log MW-22A
				1		
				2		
				3		
				4		
				5		
3SS	1.0	1.4	6 50	6	15.0	Sand, coarse, pebbly, brown (10 YR 5/3), dry, very hard, poorly sorted
				7		
3SS	1.0	0.7	7 50	8	24.0	Sand, coarse, as 6.0' above
				9		
				10		
				1		
				2		
SS	1.0	1.0	6 50	3	12.0	Sand, Coarse, as 6.0' above
				4		
				5		
				6		
SS	1.5	1.2	10 21 50	7	400.0	Sand, medium to coarse, brown (10 YR 5/3), wet, loose, poorly washed & sorted
				8		
				9		
				20		

Remarks Mobile B-57 equipped with 4 1/4" ID/ 8 1/4" OD HSA

Set monitoring well MW-22 in boring on completion

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e	Former Amphenol	**Boring No.**	MW-22
Date	February 11, 1992	**Driller**	A. Schrader
Logged by	M. Lytle	**Elevation**	735.03
Location	920 N, 1773 E	**Page**	2 of 2

Water Level					**Start**	**Finish**
Time					**Time** 13:45	**Time** 14:50
Date					**Date** 2/11/92	**Date** 2/11/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
				0		
SS	1.5	1.1	6		250.0	Sand, as 17.0 ft. above, abrupt contact @ 20.3' to loam, pebbly, dark gray (10 YR 4/1), moist to dry, very firm, massive
			8	1		
			50			
				2		
				3		T.D. 21.5 feet
				4		
				5		
				6		
				7		
				8		
				9		
				0		
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				0		

Remarks

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	Former Amphenol	**Boring No.**	MW-23
Date	February 14, 1992	**Driller**	A. Schrader
Logged by	J.D. Bryan	**Elevation**	735.07
Location	921 N, 1773 E	**Page**	1 of 3

Water Level					**Start**		**Finish**	
Time					**Time**	14:00	**Time**	15:50
Date					**Date**	2/13/92	**Date**	2/14/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
				20		Blank drill to 21.5 ft, for soil description see boring logs MW-22A and MW-22.
				1		
				2		
SS	2.0	2.0	4	3	3.2	Cement grout, moist, ab contact @ 24.8 ft to lm, dk gry br (10 YR 4/2), moist, v firm, calc, contains blk angular shale frag
			6	4		
			6			
			16	5		
				6		
				7		
SS	2.0	1.6	4	8	1.4	Loam, as 24.8 ft above, gradual contact @ 29.0 ft to lm, as 24.8 ft above, but moist, soft, gradual contact @ 29.4 ft to loam as 24.8 ft above
			6	9		
			6			
			30	30		
				1		
				2		
SS	2.0	1.2	4	3	0	Loam, gran, dk gry br (10 YR 4/2), dry, hard, calc
			6	4		
			12			
			28	5		
				6		
				7		
SS	2.0	2.0	4	8		Loam, gran, as 33.0 ft above, sl hard
			6	9		
			7			
			12	40		

Remarks Mobile B-57 equipped with 4 1/4" ID/ 8 1/4" OD HSA

Installed 10"x22' steel surface casing in concrete 2/13/92.

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?	Former Amphenol	**Boring No.**	MW-23
Date	February 14, 1992	**Driller**	A. Schrader
Logged by	J.D. Bryan	**Elevation**	735.07
Location	921 N, 1773 E	**Page**	2 of 3

Water Level						Start		Finish	
Time					Time	14:00	Time	15:50
Date					Date	2/13/92	Date	2/14/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
				40		
				1		
				2		
				3		
SS	2.0	1.2	4 7 11 14	4 5		Sandy Loam, dk gry br (10 YR 4/2), mottled, com dist grn gry (5 GB 5/4), moist, firm, noncalc
				6		
				7		
				8		
SS	2.0	0.9	2 6 9 12	9 50		Loamy sand, f, gry br (10 Yr 5/2), wet, nonsticky, nonplastic, noncalc
				1		
				2		
				3		
SS	2.0	1.6	3 WOR WOR WOR	4 5		Sand, m, dk gry br (10 YR 4/2), wet, nonsticky, nonplastic, noncalc
				6		
				7		
				8		
SS	2.0	2.0	1 2 4 4	9 60	0.2	Sand, m, as 53.0 ft above

Remarks WOR = weight of rods

me/b:7026/1B

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:	Former Amphenol	**Boring No.**	MW-23
Date	February 14, 1992	**Driller**	A. Schrader
Logged by	J.D. Bryan	**Elevation**	735.07
Location	921 N, 1773 E	**Page**	3 of 3

					Start	Finish
Water Level						
Time					Time 14:00	Time 15:50
Date					Date 2/13/92	Date 2/14/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
				60		
				1		
				2		
				3		
SS	2.0	1.5	1		0	Sand, m, as 53.0 ft above
			2	4		
			2			
			3	5		
				6		
				7		
SS	2.0	0.8			0	Loam, gran, dk yel br (10 YR 4/6), moist, v firm, calc
				8		
				9		
				70		T.D. 69.0 ft
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				0		

Remarks Seated augers in till at 67.0 ft, drove several 3" spoons to clear heaving sand.

Set monitoring well MW-23 in boring on completion.

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	Former Amphenol	**Boring No.**	MW-24
Date	February 6, 1992	**Driller**	A. Schrader
Logged by	M. Lytle	**Elevation**	733.83
Location	894 N, 1958 E	**Page**	1 **of** 2

Water Level					**Start**	**Finish**
Time					**Time** 11:00	**Time** 12:25
Date					**Date** 2/6/92	**Date** 2/6/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
SS	2.0	1.5	2, 4, 6, 14	0, 1	0	Silt loam, dk yel br (10 YR 3/4), moist, friable, noncalc, massive, ab contact @ 0.3 ft to clay loam, pebbly, dk yel br (10 YR 3/6), moist, firm, noncalc, masssive
SS	2.0	1.5	3, 5, 3, 2	2, 3	0	Clay loam, as 0.3 ft above, gradual contact @ 3.0 ft to loamy sand, c, pebbly, dk yel br (10 YR 3/6), moist, loose, noncalc, massive
SS	2.0	1.7	1, 2, 1, 1	4, 5	0	Loamy sand, as 3.0 ft above, contact @ 5.3 ft to sand, m, br (10 YR 5/3), dry, loose, calc
SS	2.0	1.6	14, 19, 13, 11	6, 7	0	Sand, m , as 5.3 ft above, pebbly
SS	2.0	1.0	5, 7, 12, 7	8, 9	0	Sand, m, as 5.3 ft above
SS	2.0	0.0	50	10		cobble in shoe
				1, 2		
3SS	2.0	2.0	45, 30, 25, 22	3, 4, 5	0	Sand, m, as 5.3 ft above
				6, 7		
SS	2.0	1.5	5, 12, 14, 13	8, 9, 20	0	Sand, m, as 5.3 ft above, wet, nonplastic

Remarks Mobile B-57 equipped with 4 1/4" ID/ 8 1/4" OD HSA

Set monitoring well MW-24 in boring on completion.

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[illegible]	Former Amphenol	**Boring No.**	MW-25
Date	February 19, 1992	**Driller**	A.Schrader
Logged by	M. Lytle	**Elevation**	733.77
Location	765 N, 1795 E	**Page**	3 **of** 3

Water Level					**Start**	**Finish**
Time					**Time** 10:00	**Time** 15:00
Date					**Date** 2/18/92	**Date** 2/19/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
				60		
				1		
				2		
				3		
SS	1.5	0.3	5 12 25	4	0.8	Loam, pebbly, dk yel br (10 YR 4/2), moist, firm, calc, massive
				5		
				6		
				7		T.D. 67.0 ft
				8		
				9		
				0		
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				0		

Remarks

Advanced augers to 67.0 feet and removed heave sand with 3-inch spoon.

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	Former Amphenol	**Boring No.**	MW-26
Date	February 4, 1992	**Driller**	A. Schrader
Logged by	J.A. Duwelius	**Elevation**	734.04
Location	1396 N, 1727 E	**Page**	1 of 2

Water Level						**Start**		**Finish**	
Time						**Time**	13:00	**Time**	15:40
Date						**Date**	2/4/92	**Date**	2/4/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	DESCRIPTION
SS	2.0	1.3	3, 4, 5, 7	0, 1		Loam, dk br (10 YR 4/3), moist, v friable, noncalc, contains plant material, (top soil)
SS	2.0	0.8	2, 4, 5, 8	2, 3		Sandy clay loam, granular, dk yel br (10 YR 4/4), sl moist, firm, noncalc
3SS	2.0	2.0	3, 5, 7, 4	4, 5		Sandy clay loam, as above, clear contact @ 5.0 ft to sand, m, tr pebs, br (10 YR 5/3), dry, loose, sl calc
	2.0	1.0	2, 3, 3, 4	6, 7		Sand, m, as 5.0 ft above
SS	2.0	1.5	2, 3, 3, 4	8, 9		Sand, m-c, br (10 YR 5/3), dry, loose, calc
3SS	2.0	2.0	4, 4, 5, 6	10, 1, 2		Sand, m-c, sl pebbly, br (10 YR 5/3), dry, loose, calc
SS	2.0	1.4	3, 5, 7, 12	3, 4		Sand, m-c, as above, wet @ 13.3 ft, nonplastic
SS	2.0	2.0	3, 6, 10, 12	5, 6, 7		Sand, m, br (10 YR 5/3), wet, nonplastic, calc
SS	2.0	2.0	5, 6, 10, 14	8, 9, 20		Sand, m, as 15.5 ft above

Remarks Mobile B-57 equipped with 4 1/4" ID/ 8 1/4" OD HSA

Heaving sand @ 15.5 feet.
Set monitoring well MW-26 in boring on completion.

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	Former Amphenol	**Boring No.**	MW-26
Date	February 4, 1992	**Driller**	A. Schrader
Logged by	J.A. Duwelius	**Elevation**	734.04
Location	1396 N, 1727 E	**Page**	2 of 2

Water Level					**Start**	**Finish**
Time					**Time** 13:00	**Time** 15:40
Date					**Date** 2/4/92	**Date** 2/4/92

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	DESCRIPTION
				20		
SS	2.0	2.0	4 / 7 / 9 / 7	1		Sand, m-c, sl pebbly, br (10 YR 5/3) wet, nonplastic, calc
				2		
				3		
SS	2.0	1.5	3 / 5 / 4 / 2	4		Sand, m-c, 20.5 ft as above
				5		
SS	2.0	1.4	5 / 15 / 17 / 31	6		Gravel, pebbly, clear contact @ 25.9 to sand, f-m, br (10 YR 5/3), wet, nonplastic, calc
				7		
				8		
SS	0.5	0.4	65	9		Loam, gry (10 YR 5/1), moist-dry, ex firm, calc
				0		
				1		T.D. 28.5 ft
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				0		

Remarks

me/b:7026/1B

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	Former Amphenol (07026.05)	**Boring No.**	MW-27
Date	January 13, 1993	**Driller**	A. Schrader, Env. Drilling Svc.
Logged by	J.A. Duwelius	**Elevation**	734.25
Location	1063 N, 1585 E	**Page**	1 of 2

Water Level					**Start**	**Finish**
Time					**Time** 9:55AM	**Time** 1:15PM
Date					**Date** 1/13/93	**Date** 1/13/93

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
SS	2.0	2.0	5, 7, 7, 4	0, 1, 2	0	Loam mixed with crushed stone (asphalt base), clear contact at 0.2' to loam, dark gray (10 YR 4/1), color change at 0.5' to dark yellowish brown (10 YR 4/4), moist, friable, noncalcareous
SS	2.0	1.2	2, 3, 3, 1	3, 4	1.5	Loamy sand, medium, dark yellowish brown (10 YR 4/4), moist, friable, noncalcareous, clear contact at 3.3' to sandy gravel, fine, dry, loose, noncalcareous, clear contact at 3.5' to loam, as 0.2' above, clear contact at 3.8' to sand, medium, brown (10 YR 5/3), dry, loose, calcareous, poorly sorted and washed
SS	2.0	1.0	5, 3, 3, 2	5, 6, 7	2.0	Sand, fine to medium, pebbly, brown (10 YR 5/3), dry, loose, calcareous, moderately sorted and washed
SS	2.0	1.0	5, 7, 8, 8	8, 9	4.5	Sand, fine to medium, pebbly, as 5.0' above
SS	2.0	0.5	4, 5, 5, 6	10, 1	3.5	Sand, fine to medium, brown (10 YR 5/3), wet, loose, calcareous, moderately sorted and washed
SS	2.0	0.0	5, 7, 10, 19	2, 3		
3SS	2.0	2.0	5, 9, 12, 24	4, 5	5.0	Sand, fine to medium, brown (10 YR 5/3), wet, loose, calcareous, moderately sorted and washed
SS	2.0	1.8	3, 5, 7, 12	6, 7	1.0	Sand, fine to medium, as 13.0' above
SS	2.0	2.0	4, 7, 8, 10	8, 9	0	Sand, fine to medium, as 15.0' above, trace pebbles
3SS	2.0	2.0	5, 7	20	0	Sand, fine to medium, as 17.0' above

~emarks Mobile B-57 equipped with 4 1/4" ID X 8 1/4" OD HSA.

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	Former Amphenol (07026.05)	**Boring No.**	MW-27
Date	January 13, 1993	**Driller**	A. Schrader, Env. Drilling Svc.
Logged by	J.A. Duwelius	**Elevation**	734.25
Location	1063 N, 1585 E	**Page**	2 of 2

Water Level					**Start**	**Finish**
Time					**Time** 9:55AM	**Time** 1:15PM
Date					**Date** 1/13/93	**Date** 1/13/93

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	HNu	DESCRIPTION
				20		
			11			
			14	1		
SS	2.0	2.0	5		0	Sand, fine to medium, brown (10 YR 5/3), wet, loose, calcareous, moderately sorted and washed, abrupt contact at 23.0' to loam, granular, gray (10 YR 5/1), dry, hard, calcareous, massive
			12	2		
			19			
			24	3		
SS	2.0	0.1	3			Loam, granular, gray (10 YR 5/1), dry, hard, calcareous
			3	4		
			14			
			29	5		
				6		T.D. 25.0 ft.
				7		
				8		
				9		
				30		
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				40		

Remarks Installed monitoring well MW-27 in boring on completion.

	Former Amphenol (07026.05)	**Boring No.**	MW-28
Date	January 13, 1993	**Driller**	A. Schrader, Environmental Drilling
Logged by	J.A. Duwelius	**Elevation**	735.67
Location	991 N, 1689 E	**Page**	1 of 2

Water Level						**Start**		**Finish**	
Time						**Time**	3:00PM	**Time**	8:50AM
Date						**Date**	1/13/93	**Date**	1/14/93

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	DESCRIPTION
				0		
				1		
				2		
SS	2.0	2.0	4 6 7 8	3 4 5		Loam, dark yellowish brown (10 YR 4/4), moist, friable, noncalcareous, gradual contact to sandy loam, f-m, dk yel br (10 YR 4/4), moist, v friable, noncalc
				6		
				7		
SS	2.0	1.8	4 6 12 4	8 9 10		Sand, fine to medium, brown (10 YR 5/3), dry, loose, calcareous, moderately washed and sorted, contains trace pebbles
				1		
				2		
SS	2.0	0.5	3 5 5 6	3 4 5		Sand, medium, brown (10 YR 5/3), moist, friable, calcareous, poorly washed and sorted
				6		
				7		
				8		
				9		
				20		

Remarks Mobile B-57 equipped with 4 1/4" ID X 8 1/4" HSA.

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	Former Amphenol (07026.05)	**Boring No.**	MW-28
Date	January 13, 1993	**Driller**	A. Schrader, Environmental Drilling
Logged by	J.A. Duwelius	**Elevation**	735.67
Location	991 N, 1689 E	**Page**	2 of 2

Water Level					**Start**		**Finish**	
Time					**Time**	3:00PM	**Time**	8:50AM
Date					**Date**	1/13/93	**Date**	1/14/93

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	DESCRIPTION
				20		
SS	2.0	2.0	4			Sand, fine to medium, brown (10 YR 5/3), wet, loose, calcareous, moderately washed and sorted
			5	1		
			7			
			6	2		
3SS	2.0	2.0	4			Sand, fine to medium, as 20.0' above, abrupt contact at 23.5' to loam, pebbly, gray (10 YR 5/1), dry, hard, calcareous
			7	3		
			8			
			21	4		
				5		
				6		T.D. 24.0 feet
				7		
				8		
				9		
				30		
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				40		

marks Installed monitoring well MW-28 in boring on completion.

BL/mke/JAD/b:/FRANKLIN CURTIS/07026.05/1B/MW-28

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ꝫ	Former Amphenol (07026.05)	**Boring No.**	MW-29
Date	January 15, 1993	**Driller**	A. Schrader, Env. Drilling Svc.
Logged by	J.A. Duwelius	**Elevation**	734.86
Location	918 N, 1604 E	**Page**	1 of 2

					Start		Finish	
Water Level								
Time					**Time**	8:45AM	**Time**	11:45AM
Date					**Date**	1/15/93	**Date**	1/15/93

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	DESCRIPTION
				0		
				1		
				2		
				3		
				4		
SS	2.0	1.5	3			Sandy loam, slightly pebbly, dark yellowish brown (10 YR 4/4), moist, friable, slightly calcareous
			5	5		
			7			
			9	6		
				7		
				8		
				9		
SS	2.0	0.4	7			Loamy sand, fine, dark yellowish brown (10 YR 4/4), moist, friable, calcareous
			5	10		
			3			
			2	1		
				2		
				3		
				4		
SS	2.0	0.0	5			Storm sewer
			9	5		
			14			
			21	6		
				7		
				8		
				9		
SS	2.0	2.0	5			Sandy gravel, fine, strong brown (7.5 YR 5/8), wet, loose, poorly sorted and washed, calcareous
			8	20		

ʼmarks Mobile B-57 equipped with 4 1/4" ID X 8 1/4" OD HSA.
Encountered steel storm sewer pipe at 14'.
Abandoned boring, moved 10 feet north to redrill.

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	Former Amphenol (07026.05)	**Boring No.**	MW-29
Date	January 15, 1993	**Driller**	A. Schrader, Env. Drilling Svc.
Logged by	J.A. Duwelius	**Elevation**	734.86
Location	918 N, 1604 E	**Page**	2 of 2

Water Level					Start		Finish	
Time					Time	8:45AM	Time	11:45AM
Date					Date	1/15/93	Date	1/15/93

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	DESCRIPTION
				20		
			11			
			15	1		
				2		
SS	2.0	0.0	50	3		Sandy gravel, fine, as 19.0' above, abrupt contact at 23.7' to loam, pebbly, gray (10 YR 5/1), dry, hard, calcareous
			50	4		
			50			
			50	5		
				6		T.D. 25.0 feet
				7		
				8		
				9		
				30		
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				40		

Remarks Installed monitoring well MW-29 in boring on completion.

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	Former Amphenol (07026.05)	**Boring No.**	MW-30
Date	January 14, 1993	**Driller**	A. Schrader, Env. Drilling Svc.
Logged by	J.A. Duwelius	**Elevation**	732.41
Location	741 N, 1949 E	**Page**	1 **of** 1

Water Level					**Start**		**Finish**	
Time					**Time**	10:45AM	**Time**	1:10PM
Date					**Date**	1/14/93	**Date**	1/14/93

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	DESCRIPTION
				0		
				1		
				2		
				3		
SS	2.0	0.9	2 5 6 6	4 5		Sand, medium to coarse, pebbly, brown (10 YR 5/3), moist, friable, calcareous, poorly washed and sorted
				6		
	2.0	0.9	2 2 3 2	7 8		Sand, medium to coarse, pebbly, as 5.0' above
				9		
SS	2.0	1.0	2 4 9 17	10 1		Sandy gravel, yellowish brown (10 YR 5/8), slightly moist, friable, calcareous, poorly sorted and washed, limonitic staining throughout, contains silt clast and limestone fragments, clear contact at 10.7' to sand, fine to medium, brown (10 YR 5/3), slightly moist, friable, calcareous, moderately sorted and washed
				2		
SS	2.0	2.0	3 8 5 14	3 4		Sand, medium to coarse, grayish brown (10 YR 5/2), wet, loose, calcareous, poorly sorted and washed
				5		
				6		
SS	1.0	1.0	3 58	7		Sand, medium to coarse, brown (10 YR 5/3), wet, loose, calcareous, poorly washed and sorted, clear contact at 17.0' to loam, pebbly, gray (10 YR 5/1), dry, hard, calcareous
SS	0.5	0.4	50			
				8		
				9		
				20		T.D. 19.5 feet

marks Mobile B-57 equipped with 4 1/4" ID X 8 1/4" OD HSA.
Installed monitoring well MW-30 in boring on completion.

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Well Completion Diagram

Well No. MW-20

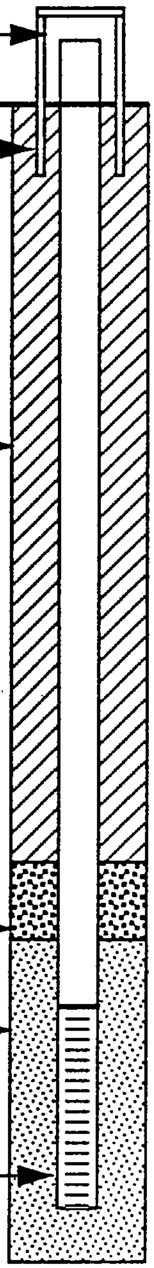
Project: Former Amphenol RFI

Time & Date: Started 15:00 2/5/92

Completed 16:05 2/5/92

Installed By: A. Schrader

Inspected By: J. A. Duwelius



Reference Point (Top of Casing) — 734.03 FT. (MSL)

Ground Surface — 731.84 FT. (MSL)

Guard Pipe

Drilling Method: Mobile B-57 HSA
4 1/4" ID 8 1/4" OD

Screen:
Type 2-Inch PVC Sch. 40
Slot Size 10 slot
Top Blank 0.34'
Bottom Blank 0.56'
Total Screen 9.38'
Total Length 10.28'

Backfill
Cement Grout
3 - Bags

Stand Pipe:
Type 2-Inch PVC Sch. 40
Total Length 19.97'

8.00 FT.

Bentonite Seal — 10.00 FT.
1/2" Pellets

12.10 FT. 719.74 FT. (MSL)

Granular Pack:
#5 Silica Sand &
Natural Cave

Well Screen — 21.48 FT. = 30.25' (Tot. Pipe) - 6.02' (Cut Off) - 0.56' (Bot. Blk.) - 2.19' (Stick)

Bottom of Bore Hole — 22.50 FT.

Not to Scale

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Well Completion Diagram

Well No. MW-21

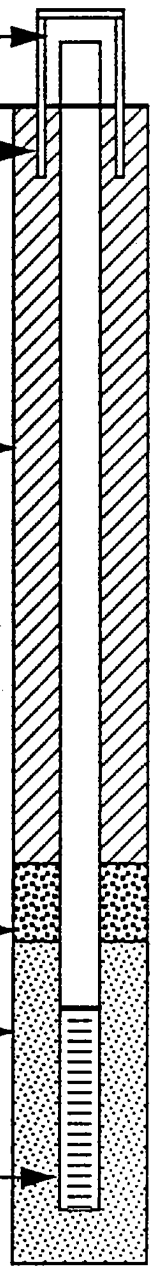
Project: Former Amphenol RFI

Time & Date: Started 14:20 2/20/92

Completed 15:20 2/20/92

Installed By: A. Schrader

Inspected By: J. D. Bryan



Reference Point (Top of Casing) 737.91 FT. (MSL)

Ground Surface 735.11 FT. (MSL)

Guard Pipe

Backfill
Cement Grout

10.00 FT.

Bentonite Seal
1/4" Pellets

12.60 FT.

14.91 FT. 720.20 FT. (MSL)

Granular Pack:
#5 Silica Sand
& Natural Cave

Well Screen

24.28 FT. = 27.76' (Tot. Pipe) - 0.25' (Cut Off) - 0.43' (Bot. Blk.) - 2.80' (Stick)

Bottom of Bore Hole 25.50 FT.

Drilling Method: Mobile B-57 HSA
4 1/4" ID 8 1/4" OD

Screen:
Type 2-Inch PVC Sch. 40
Slot Size 10 slot
Top Blank 0.30'
Bottom Blank 0.43'
Total Screen 9.37'
Total Length 10.10'

Stand Pipe:
Type 2-Inch PVC Sch. 40
Total Length 17.66'

Not to Scale

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Well Completion Diagram

Well No. MW-22

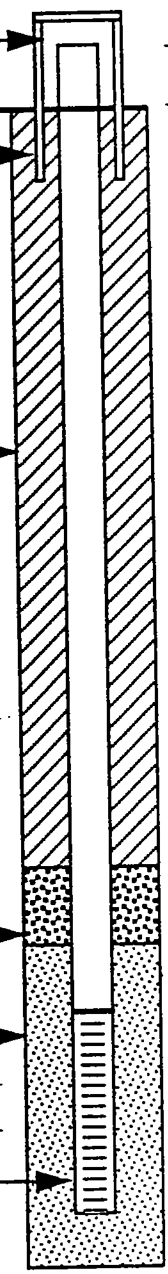
Project: Former Amphenol RFI

Time & Date: Started 15:00 2/11/92

Completed 16:00 2/11/92

Installed By: A. Schrader

Inspected By: M. Lytle



Reference Point (Top of Casing) — 737.64 FT. (MSL)

Ground Surface — 735.03 FT. (MSL)

Guard Pipe

Drilling Method: Mobile B-57 HSA
4 1/4" ID 8 1/4" OD

Screen:
Type 2-Inch PVC Sch. 40
Slot Size 10 slot
Top Blank 0.34'
Bottom Blank 0.52'
Total Screen 9.37'
Total Length 10.23'

Backfill
Cement Grout

Stand Pipe:
Type 2-Inch PVC Sch. 40
Total Length 20.00'

7.20 FT.

Bentonite Seal — 9.20 FT.

11.63 FT. 723.40 FT. (MSL)

Granular Pack:
#5 Silica Sand
& Natural Cave

Well Screen — 21.00 FT. = 30.23' - 6.10' - 0.52' - 2.61'
Tot. Pipe Cut Off Bot. Blk. Stick

Bottom of Bore Hole — 21.50 FT.

Not to Scale

002

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Well Completion Diagram

Well No. MW-23

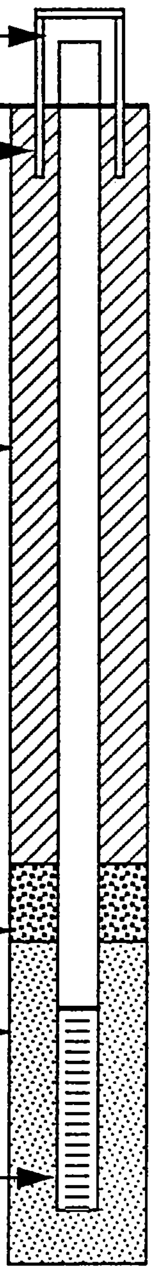
Project: Former Amphenol RFI

Time & Date: Started 16:00 2/14/92

Completed 10:30 2/17/92

Installed By: A. Schrader

Inspected By: J. D. Bryan



Reference Point (Top of Casing) 737.43 FT. (MSL)

Ground Surface 735.07 FT. (MSL)

Guard Pipe

Drilling Method: Mobile B-57 HSA
4 1/4" ID 8 1/4" OD, through
10" diameter steel casing

Screen:

Type 2-Inch PVC Sch. 40

Slot Size 10 slot

Top Blank 0.29'

Bottom Blank 0.44'

Total Screen 9.37'

Total Length 10.10'

Backfill
Cement Grout

Stand Pipe:

Type 2-Inch PVC Sch. 40

Total Length 58.90'

33.10 FT.

Bentonite Seal
3/8" Pellets

37.00 FT.

52.35 FT. 682.72 FT. (MSL)

Granular Pack:
Natural Cave

Well Screen

61.72 FT. = 69.00' - 4.48' - 0.44' - 2.36'

Tot. Pipe	Cut Off	Bot. Blk.	Stick
69.00'	4.48'	0.44'	2.36'

Bottom of Bore Hole 69.00 FT.

Not to Scale

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Well Completion Diagram

Well No. MW-24

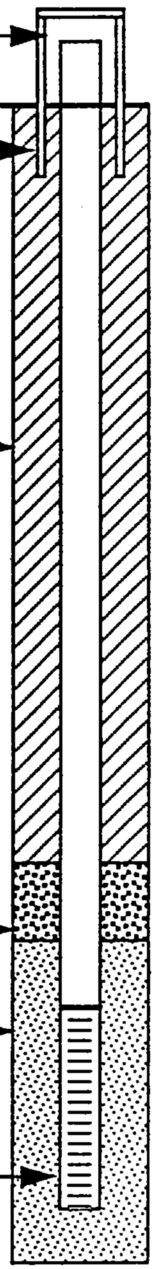
Project: Former Amphenol RFI

Time & Date: Started 13:30 2/6/92

Completed 14:35 2/6/92

Installed By: A. Schrader

Inspected By: M. Lytle



Drilling Method: Mobile B-57 HSA
4 1/4" ID 8 1/4" OD

Screen:

Type 2-Inch PVC Sch. 40

Slot Size 10 slot

Top Blank 0.30'

Bottom Blank 0.45'

Total Screen 9.38'

Total Length 10.13'

Stand Pipe:

Type 2-Inch PVC Sch. 40

Total Length 16.05'

Not to Scale

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Well Completion Diagram

Well No. MW-25

Project: Former Amphenol RFI

Time & Date: Started 15:00 2/19/92

Completed 10:00 2/20/92

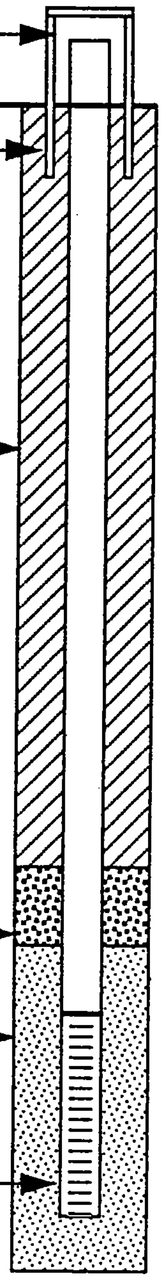
Installed By: A. Schrader

Inspected By: J. D. Bryan

Reference Point (Top of Casing) 736.21 FT. (MSL)

Ground Surface 733.77 FT. (MSL)

Guard Pipe



Drilling Method: Mobile B-57 HSA 4 1/4" ID 8 1/4" OD, through 10" diameter steel casing

Screen:

Type 2-Inch PVC Sch. 40

Slot Size 10 slot

Top Blank 0.35'

Bottom Blank 0.53'

Total Screen 9.37'

Total Length 10.25'

Backfill

Cement Grout

Stand Pipe:

Type 2-Inch PVC Sch. 40

Total Length 59.90'

45.00 FT.

Bentonite Seal 1/2" Pellets

48.80 FT.

57.58 FT. 676.19 FT. (MSL)

Granular Pack: Natural Cave

Well Screen

66.95 FT. = 70.15' (Tot. Pipe) - 0.23' (Cut Off) - 0.53' (Bot. Blk.) - 2.44' (Stick)

Bottom of Bore Hole 67.00 FT.

Not to Scale

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Well Completion Diagram

Well No. MW-26

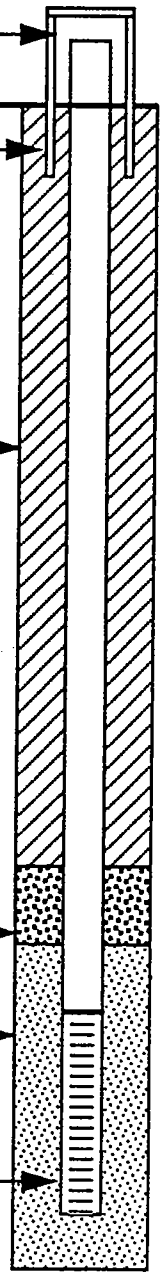
Project: Former Amphenol RFI

Time & Date: Started 9:00 2/5/92

Completed 11:30 2/5/92

Installed By: A. Schrader

Inspected By: J. A. Duwelius



Reference Point (Top of Casing) — 736.39 FT. (MSL)

Ground Surface — 734.04 FT. (MSL)

Guard Pipe

Drilling Method: Mobile B-57 HSA
4 1/4" ID 8 1/4" OD

Screen:

Type 2-Inch PVC Sch. 40

Slot Size 10 slot

Top Blank 0.20'

Middle Blank 0.50'

Bottom Blank 0.40'

Total Screen 4.48' + 4.50' = 8.98'

Total Length 10.08'

Backfill
Cement Grout
3-bags

Stand Pipe:

Type 2-Inch PVC Sch. 40

Total Length 20.07'

12.50 FT.

Bentonite Seal
1/4" Pellets

14.50 FT.

17.92 FT. 716.12 FT. (MSL)

Granular Pack:
Natural Cave

Well Screen

27.40 FT. = 30.15' (Tot. Pipe) - 0.0' (Cut Off) - 0.40' (Bot. Blk.) - 2.35' (Stick)

Bottom of Bore Hole 28.50 FT.

Not to Scale

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Well Completion Diagram

Well No. MW-27

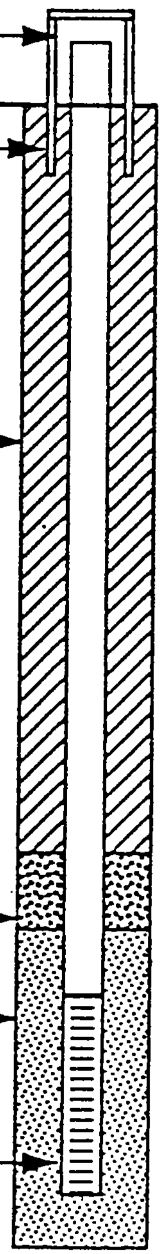
Project: Former Amphenol RFI

Installed By: A. Schrader, Env. Drilling

Time & Date: Started 13:30 1/13/93

Inspected By: J. A. Duwelius

Completed 15:00 1/13/93



Reference Point (Top of Casing) → 736.63 FT. (MSL)

Ground Surface 734.25 FT. (MSL)

Guard Pipe

Drilling Method: Mobile B-57
4 1/4" ID - 8 1/4" OD HSA

Screen:
Type 2-Inch Sch. 40 PVC
Slot Size 10 Slot
Top Blank 0.03'
Bottom Blank 0.26'
Total Screen 9.75'
Total Length 10.04'

Backfill: Cement Grout

Stand Pipe:
Type 2-Inch Sch. 40 PVC
Total Length 20.07'

6.30 FT.

Bentonite Seal: 3/8" Pellets

8.30 FT.

13.17 FT. 721.08 FT. (MSL)

Granular Pack: Natural Soil Collapse

Well Screen

22.92 FT. = 30.11' (Tot. Pipe) - 4.55' (Cut Off) - 0.26' (Bot. Blk.) - 2.38' (Stick)

Bottom of Bore Hole 25.00 FT.

Not to Scale

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Well Completion Diagram

Well No. MW-28

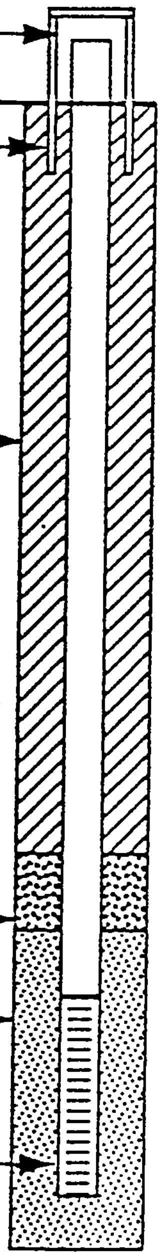
Project: Former Amphenol RFI

Installed By: A. Schrader, Env. Drilling

Time & Date: Started 08:55 1/14/93

Inspected By: J. A. Duwelius

Completed 09:30 1/14/93



Reference Point (Top of Casing) — 738.04 FT. (MSL)

Ground Surface — 735.67 FT. (MSL)

Guard Pipe

Drilling Method: Mobile B-57
4 1/4" ID - 8 1/4" OD HSA

Screen:
- Type 2-Inch Sch. 40 PVC
- Slot Size 10 Slot
- Top Blank 0.06'
- Bottom Blank 0.25'
- Total Screen 9.76'
- Total Length 10.07'

Backfill
Cement Grout

Stand Pipe:
- Type 2-Inch Sch. 40 PVC
- Total Length 20.07'

6.70 FT.

Bentonite Seal — 8.90 FT.

13.69 FT. 721.98 FT. (MSL)

Granular Pack
Natural Soil
Collapse

Well Screen — 23.45 FT. = 30.14' - 4.07' - 0.25' - 2.37'
Tot. Pipe, Cut Off, Bot. Blk., Stick

Bottom of Bore Hole — 24.00 FT.

Not to Scale

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Well Completion Diagram

Well No. MW-29

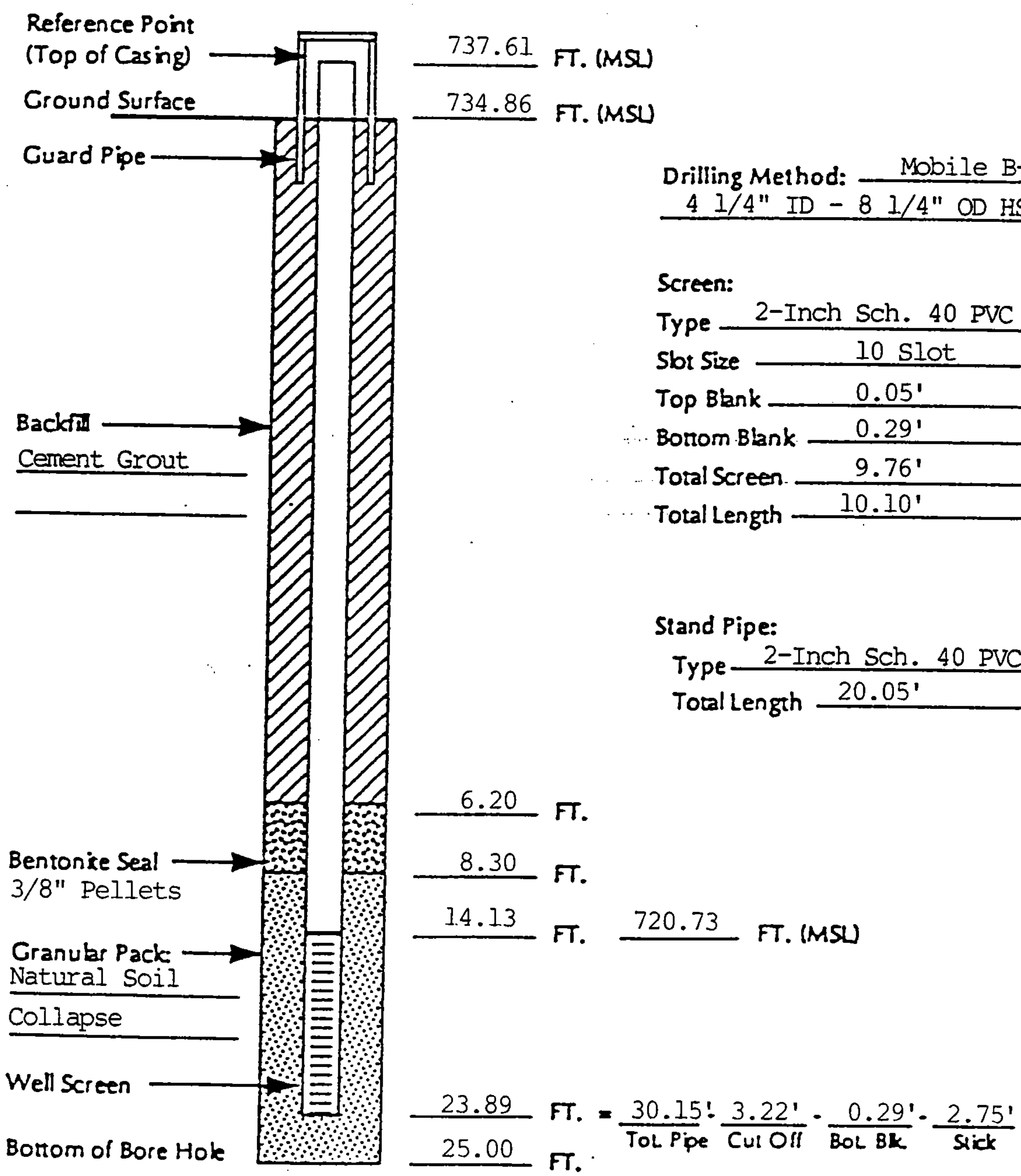
Project: Former Amphenol RFI

Time & Date: Started 11:45 1/15/93

Completed 14:00 1/15/93

Installed By: A. Schrader, Env. Drilling

Inspected By: J. A. Duwelius



Drilling Method: Mobile B-57
4 1/4" ID - 8 1/4" OD HSA

Screen:

Type 2-Inch Sch. 40 PVC

Slot Size 10 Slot

Top Blank 0.05'

Bottom Blank 0.29'

Total Screen 9.76'

Total Length 10.10'

Stand Pipe:

Type 2-Inch Sch. 40 PVC

Total Length 20.05'

Not to Scale

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Well Completion Diagram

Well No. MW-30

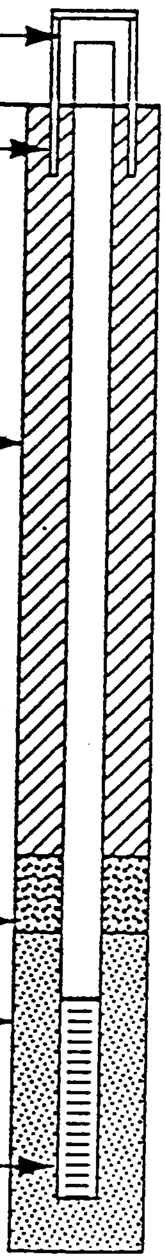
Project: Former Amphenol RFI

Time & Date: Started 13:10 1/14/93

Completed 14:00 1/14/93

Installed By: A. Schrader, Env. Drilling

Inspected By: J. D. Bryan



Reference Point (Top of Casing) 734.84 FT. (MSL)

Ground Surface 732.41 FT. (MSL)

Guard Pipe

Drilling Method: Mobile B-57
4 1/4" ID - 8 1/4" OD HSA

Screen:
Type 2-Inch Sch. 40 PVC
Slot Size 10 Slot
Top Blank 0.21'
Bottom Blank 0.03'
Total Screen 9.76'
Total Length 10.00'

Backfill
Cement Grout

Stand Pipe:
Type 2-Inch Sch. 40 PVC
Total Length 11.60'

6.80 FT.

Bentonite Seal
3/8" Pellets

8.60 FT.

9.41 FT. 723.00 FT. (MSL)

Granular Pack:
Natural Soil
Collapse

Well Screen

19.17 FT. = 21.60' (Tot. Pipe) - 0 (Cut Off) - 0 (Bot. Blk.) - 2.43' (Stick)

Bottom of Bore Hole 19.50 FT.

Not to Scale

E A R T H T E C H

5010 Stone Mill Road, Bloomington, IN 47408, Phone (812) 336-0972, Fax (812) 336-3991

Site	Curtis - Franklin	Boring No.	MW-31
Date	04-05-96	Driller	A. Schrader
Logged by	M. Lytle	Elevation	
Location		Page	1 of 1

Water Level	8.10				Start	Finish
Time	1445				Time 1400	Time 1445
Date	04-05-96				Date 4/5/96	Date 4/5/96

SAMPLE	TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	HNu	DESCRIPTION
SS-1		2.0	1.5	8, 7, 8, 8	0–1		0.0	Silt loam, black (10YR3/1) moist, triable, nonplastic, massive structureless, noncalcareous contact at 0.5' with silt loam, pebbles, dark yellowish brown (10YR3/4), moist, triable, nonplastic, massive, structureless, noncalcareous.
							0.0	
SS-2		2.0	1.8	8, 9, 9, 10	2–3		0.0	Silty clay loam, dark yellowish brown (10YR3/4) moist abrupt sand.
							0.0	
SS-3		2.0	1.3	10, 11, 11, 15	4–5		0.0	Silty clay loam, as 2.0 above, contact at 4.8' with sand, coarse, with gravel, yellowish brown, (10YR5/4) moist-wet, loose, poorly washed and sorted, slightly calcareous.
							0.0	
SS-4		2.0	1.5	11, 14, 13, 15	6–7		0.0	Sand and gravel, yellowish brown (10YR3/4) moist, wet, poorly washed and sorted.
							0.0	
SS-5		2.0	2.0	12, 14, 17, 18	8–9		0.0	Sand and gravel, as 6.0' above, saturated.
							0.0	
SS-6		2.0	2.0	13, 14, 18, 18	10–11		0.0	Sand and gravel, as 8.0' above.
							0.0	
SS-7		2.0	0.8	17, 18, 31, 28	12–13		0.0	Loam, dark gray (10YR4/1) dry-moist, hard, nonplastic, non sticky, massive, structureless, calcareous.
					14		0.0	
					15			T.D. 15.0'
					16–20			

Remarks

EARTH TECH

5010 Stone Mill Road, Bloomington, IN 47408, Phone (812) 336-0972, Fax (812) 336-3991

Site	Curtis - Franklin	Boring No.	MW-32
Date	04-04-96	Driller	A. Schrader
Logged by	M. Lytle	Elevation	
Location		Page	1 of 1

					Start	Finish
Water Level	4.90					
Time	0920				Time 1300	Time 1355
Date	04-05-96				Date 4/4/96	Date 4/4/96

SAMPLE	TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	HNu	DESCRIPTION
SS-1		2.0	2.0	3, 3, 4, 5	0, 1		0.0	Silt loam, black (10YR2/1) wet, very triable, slightly plastic, massive structureless, noncalcareous contact at 1.2' with silt loam, dark brown (10YR3/3), as above.
SS-2		2.0	1.0	3, 4, 4, 6	2, 3		0.0	Silty clay loam, pebbles, dark yellowish brown (10YR4/4) moist, triable, plastic, sticky, massive, structureless, noncalcareous, contact at 2.8' peat, black, (10YR2/1) plant debris.
SS-3		2.0	1.3	6, 12, 20, 30	4, 5		0.0 1.0	Sand and gravel, yellowish brown (10YR5/4) moist, very dense, poorly washed and sorted, slightly calcareous.
SS-4		2.0	1.5	10, 13, 14, 18	6, 7		1.0 0.5	Sand and gravel, as 4.0' above, saturated.
SS-5		2.0	2.0	18, 20, 21, 30	8, 9		0.0	Sand and gravel, as 6.0' above, contact at 8.8' with loam, pebbles, dark gray (10YR4/1) moist-dry, hard, massive, structureless, calcareous.
					10		0.0	T.D. 10.50'
					1, 2, 3, 4, 5, 6, 7, 8, 9, 20			

Remarks

10.0-12.0' Drive 3" spoon for permeability sample, sand heaving in angers, will try again.

E A R T H T E C H

5010 Stone Mill Road, Bloomington, IN 47408, Phone (812) 336-0972, Fax (812) 336-3991

Site	Curtis - Franklin	Boring No.	MW-33
Date	04-04-96	Driller	A. Schrader
Logged by	M. Lytle	Elevation	
Location		Page	1 of 1

Water Level	4.55				Start	Finish
Time	0930				Time 1500	Time 1530
Date	04-05-96				Date 4/4/96	Date 4/4/96

SAMPLE	TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	HNu	DESCRIPTION
SS-1		2.0	1.8	3, 4, 8, 10	0–2		0.0 / 0.0	Silt loam, black (10YR2/1) moist, very friable, nonplastic, nonstructureless, massive structureless, noncalcareous, contact at 0.5' with sandy loam, coarse, pebbles, dark yellowish brown (10YR4/4) moist, triable, nonplastic, nonsticky, massive, noncalcareous.
SS-2		2.0	1.5	8, 7, 9, 11	2–4		0.0 / 0.0	Sand loam, as 0.5' above, abrupt contact at 2.6' with sand and gravel, coarse, yellowish brown (10YR5/4) moist, loose, poorly washed and sorted, slightly calcareous, gradual change in color to dark gray (10YR4/1).
SS-3		2.0	1.6	10, 10, 11, 12	4–6		0.0 / 0.0	Sand and gravel, dark gray (10YR4/1) saturated, as above.
SS-4		2.0	1.0	9, 8, 14, 15	6–8			Sand and gravel, as 4.0' above.
SS-5		2.0	1.5	10, 12, 17, 18	8–10		0.5 / 0.0	Sand and gravel, as 4.0' above, contact at 9.2' with loam, coarse, pebbles, dark gray (10YR4/1) moist-dry, very firm, calcareous.
					10			T.D. - 10.8'

Remarks

BL/mh/h:\07026.08\document\Borlogs\MW-33.xls

E A R T H T E C H

5010 Stone Mill Road, Bloomington, IN 47408, Phone (812) 336-0972, Fax (812) 336-3991

Site	Curtis - Franklin	Boring No.	MW-34
Date	04-05-96	Driller	A. Schrader
Logged by	M. Lytle	Elevation	
Location		Page	1 of 1

Water Level	8.00				Start	Finish
Time	1200				Time 1030	Time 1200
Date	04-05-96				Date 4/5/96	Date 4/5/96

SAMPLE	TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	HNu	DESCRIPTION
SS-1		2.0	1.9	10 15	0			Gravel till, gray, contact at 0.5' with silt loam, pebbles, dark grayish brown (10YR4/2) moist, friable, slightly plastic, slightly sticky, massive, noncalcareous, gradual change in color to dark yellowish brown (10YR3/4).
				20 21	1			
SS-2		2.0	2.0	9 10	2			Silt loam, as 0.5' above, contact at 3.0' with sand, medium to coarse, dark yellowish brown, (10YR3/4) moist, loose, washed and sorted, noncalcareous.
				8 7	3			
SS-3		2.0	1.8	6 7	4			Sand as 3.0' above.
				9 10	5			
SS-4		2.0	1.7	8 10	6		0.6	Sand and gravel, yellowish brown (10YR5/4) moist, loose, poorly washed and sorted.
				12 14	7			
SS-5		2.0	1.5	10 11	8		1.5 1.0	Sand and gravel, as 6.0' above, wet at 9.0'.
				14 13	9		1.0	
SS-6		2.0	2.0	11 12	10			Sand and gravel, as 8.0' above.
				11 10	1		1.0	
SS-7		2.0	1.0	11 10	2		1.5	Sand and gravel, as 8.0' above.
				10 10	3			
					4			
					5			
					6			
SS-8		1.0	1.0	50 50	7			Loam, pebbles, dark gray (10YR4/1) dry, very hard, massive, structureless, calcareous.
					8			
					9			T.D. - 18.0'
					20			

Remarks

Sand heaving in angers 2' at 12'
Due to sand heaving, was forced to anger to 17' to stop it
Tried to sample, but was not successfull from 14 to 17'
till at 15.0'

EARTH TECH

Well Completion Diagram

Well No. MW-31

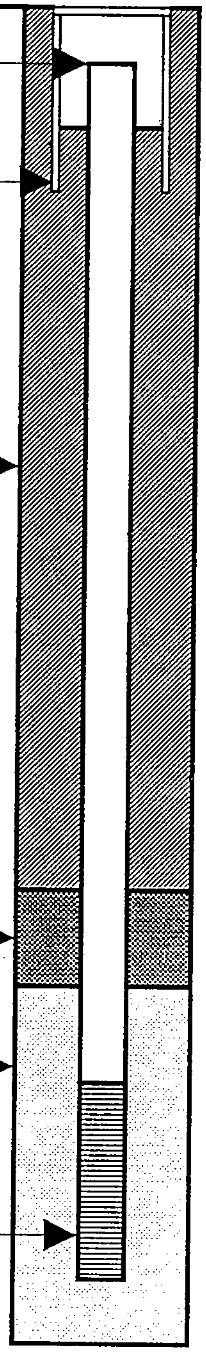
Project Curtis - Franklin

Time & Date: Start 4/8/96 1135

Completed 4/8/96 1430

Installed By A. Schrader

Inspected By M. Lytle



Ground Surface ______ FT. (MSL)

Reference Point (Top of Casing) 727.72 FT. (MSL)

Note: Elevation is 0.76 feet lower than true elevation

Guard Pipe

Drilling Metho 6 1/4" HSA

Mobile B-57

Screen:

Type 4" Threaded PVC

Slot Size 0.010

Top Blank 0.03

Bottom Blank 0.20

Total Screen 4.80

Total Length 5.03

Stand Pipe:

Type 4" Threaded PVC

Total Length 10.01

Backfill

Bentonite

6.00 FT.

Bentonite Seal

6.50 FT.

Granular Pack

#4 Quartz

Sand

7.84 FT.

Well Screen

12.64 FT. = 15.04 Tot. Pipe - 2.70 Cut Off - 0.20 Bot. Blk. - -0.50 Stick

Bottom of Borehole 13.75 FT.

Well-2.xls

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EARTH TECH

Well Completion Diagram

Well No. MW-32

Project Curtis - Franklin

Time & Date: Start 4/4/96 1400

Completed 4/4/96 1450

Installed By A. Schrader

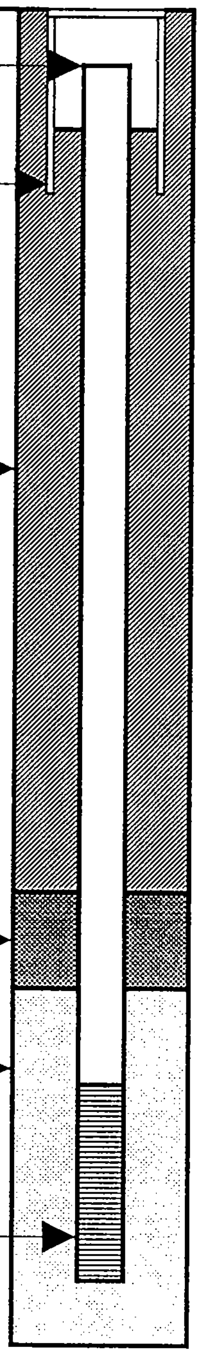
Inspected By M. Lytle

Ground Surface ______ FT. (MSL)

Reference Point (Top of Casing) 721.44 FT. (MSL)

Note: Elevation is 0.76' lower than true elevation

Guard Pipe



Drilling Method 4 1/4" HSA

Mobile B-57

Screen:

Type 2" Threaded PVC

Slot Size 0.01

Top Blank 0.10

Bottom Blank 0.15

Total Screen 4.70

Total Length 4.95

Stand Pipe:

Type 2" Threaded PVC

Total Length 10.00

Backfill

Bentonite chips

2.00 FT.

Bentonite Seal

3.20 FT.

Granular Pack

#4 Quartz

Sand

4.95 FT.

Well Screen

9.65 FT. = 14.95 (Tot. Pipe) - 5.75 (Cut Off) - 0.15 (Bot. Blk.) - -0.60 (Stick)

Bottom of Borehole 10.50 FT.

Well-2.xls

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EARTH TECH

Well Completion Diagram

Well No. MW-33

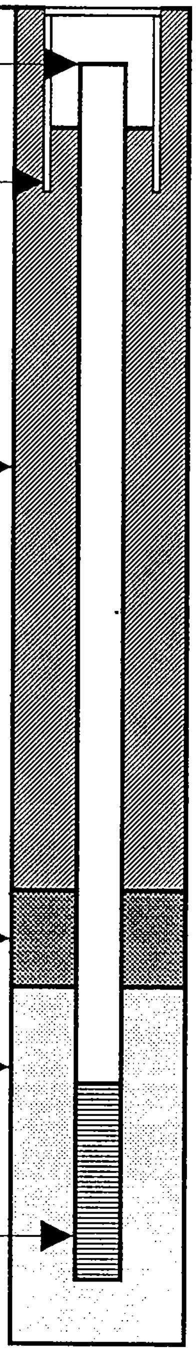
Project Curtis - Franklin

Time & Date: Start 4/4/96 1615

Completed 4/4/96 1650

Installed By A. Schrader

Inspected By M. Lytle



Ground Surface ______ FT. (MSL)

Reference Point (Top of Casing) 723.27 FT. (MSL)

Note: Elevation is 0.76' lower than true elevation

Guard Pipe

Drilling Method 4 1/4" HSA

Mobile B-57

Screen:

Type 2" Threaded PVC

Slot Size 0.010

Top Blank 0.12

Bottom Blank 0.15

Total Screen 4.83

Total Length 5.10

Stand Pipe:

Type 2" Threaded PVC

Total Length 10.00

Backfill

Bentonite chips

3.30 FT.

Bentonite Seal

4.32 FT.

Granular Pack

#4 Quartz

Sand

4.92 FT.

Well Screen

9.75 FT. =	15.10	-	5.50	-	0.15	-	-0.30
	Tot. Pipe		Cut Off		Bot. Blk.		Stick

Bottom of Borehole 10.80 FT.

Well-2.xls

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BL-mh-h:\07026.08\document\wcd\MW-33.xls

EARTH TECH

Well Completion Diagram

Well No. MW-34

Project Curtis - Franklin

Time & Date: Start 4/5/96 1245

Completed 4/5/96 1335

Installed By A. Schrader

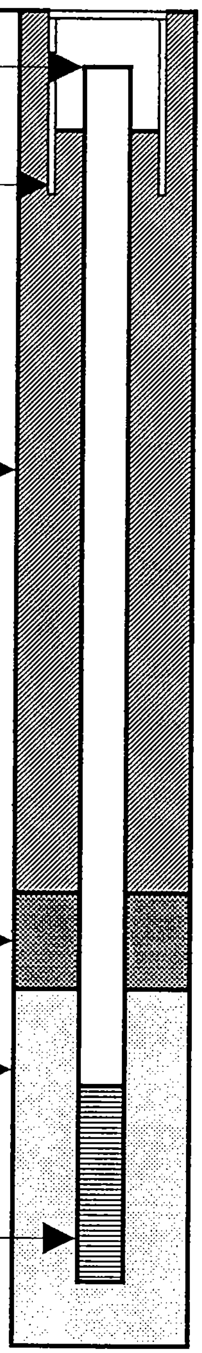
Inspected By M. Lytle

Ground Surface ______ FT. (MSL)

Reference Point (Top of Casing) 728.49 FT. (MSL)

Note: Elevation is 0.76' lower than true elevation

Guard Pipe



Drilling Method 4 1/4" HSA

Mobile B-57

Screen:

Type 2" Threaded PVC

Slot Size 0.010

Top Blank 0.10

Bottom Blank 0.15

Total Screen 4.77

Total Length 5.02

Stand Pipe:

Type 2" Threaded PVC

Total Length 10.00

Backfill

Bentonite

5.00 FT.

Bentonite Seal

8.80 FT.

Granular Pack

#4 Quartz

Sand

10.95 FT.

Well Screen

15.72 FT. = 15.02 (Tot. Pipe) - 0.0 (Cut Off) - 0.15 (Bot. Blk.) - -0.85 (Stick)

Bottom of Borehole 16.0 FT.

Well-2.xls

5010 Stone Mill Road Bloomington, IN 47408 812 /336-0972 Fax 812/336-3991

BL-mh-h:\07026.08\document\wcd\MW-34.xls

EARTH TECH

Well Completion Diagram

Well No. P-1

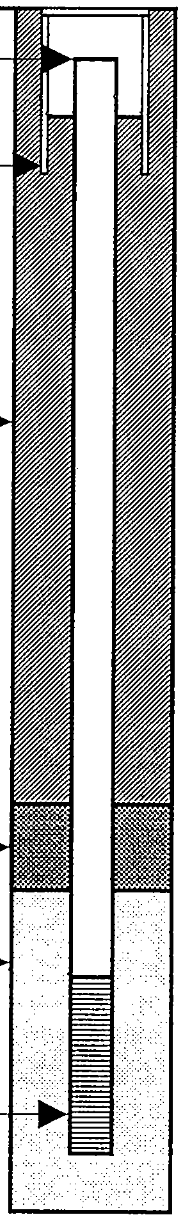
Project Curtis - Franklin

Time & Date: Start 4/5/96 1445

Completed 4/5/96 1539

Installed By A. Schrader

Inspected By M. Lytle



Ground Surface ______ FT. (MSL)

Reference Point (Top of Casing) ______ FT. (MSL)

Guard Pipe

Drilling Method 4 1/4" HSA
Mobile B-57

Screen:

Type	2" Threaded PVC
Slot Size	0.010
Top Blank	0.37
Bottom Blank	0.15
Total Screen	4.53
Total Length	5.05

Stand Pipe:

Type	2" Threaded PVC
Total Length	10.00

Backfill
Bentonite

6.50 FT.

Bentonite Seal

7.70 FT.

Granular Pack
#4 Quartz
Sand

9.97 FT. ______ FT. (MSL)

Well Screen

14.50 FT. = 15.05 (Tot. Pipe) - 1.00 (Cut Off) - 0.15 (Bot. Blk.) - -0.6 (Stick)

Bottom of Borehole 15.00 FT.

Well-2.xls

5010 Stone Mill Road Bloomington, IN 47408 812 /336-0972 Fax 812/336-3991

EARTH TECH

Well Completion Diagram

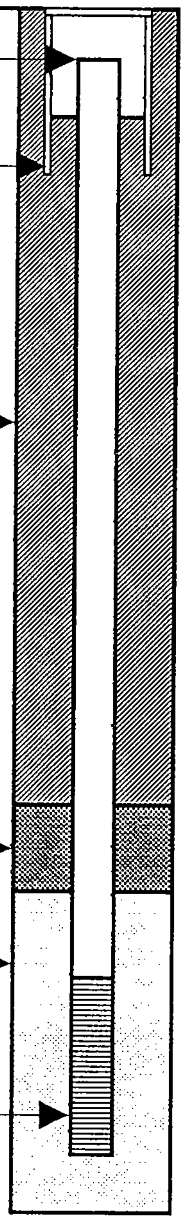
Well No.	P-2
Project	Curtis - Franklin
Time & Date: Start	4/8/96 0950
Completed	4/8/96 1050

Installed By	A. Schrader
Inspected By	M. Lytle

Ground Surface ______ FT. (MSL)

Reference Point (Top of Casing) ______ FT. (MSL)

Guard Pipe



Drilling Method 4 1/4" HSA
Mobile B-57

Screen:

Type	2" Threaded PVC
Slot Size	0.010
Top Blank	0.37
Bottom Blank	0.15
Total Screen	4.48
Total Length	5.00

Stand Pipe:

Type	2" Threaded PVC
Total Length	10.01

Backfill
Bentonite

4.50 FT.

Bentonite Seal

6.98 FT.

Granular Pack
#4 Quartz
Sand

8.93 FT. ______ FT. (MSL)

Well Screen

13.41 FT. = 15.06 (Tot. Pipe) - 2.00 (Cut Off) - 0.15 (Bot. Blk.) - -0.50 (Stick)

Bottom of Borehole

13.50 FT.

Well-2.xls

LOG OF BORING MW-36

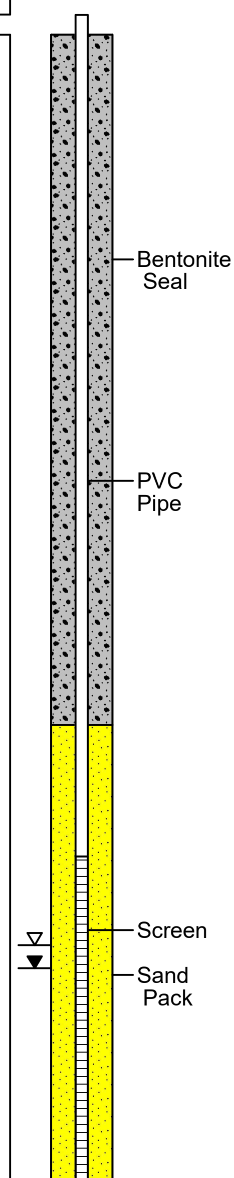
Former Amphenol Corporation
980 Hurricane Road
Franklin, IN
EPA ID # IND 044 587 848

Date Completed	: 11/12/2019	Casing Size	: 2"
Drilling Method	: Direct Push	Initial Water Level	: 14.75'
Sampling Method	: Dual Tube	Final Water Level	: 13.88'
Field/Office Logged	: CN/LL	Selected for Analysis	: NA
Hole Diameter	: 2.25"	Drilling Contractor	: EnviroDynamics

Water Levels
▼ During Drilling - 14.75'
▽ After Completion - 13.88

Temp Well: MW-36
TOC Elev.: 733.70

Depth in feet	USCS	DESCRIPTION	Samples	Total PID (ppm)	Sample Recovery (%)
0	CL	SILTY CLAY, brown, medium stiff, moist			
1			1	0.0	100
3			2	0.0	100
5		SANDY CLAY	3	0.0	100
7			4	0.0	100
7.5	SP	SAND with gravel and fines, brown, coarse to medium grained, poorly sorted, dense, slightly moist			
9			5	0.0	100
11			6	0.0	100
13			7	0.0	100
14		Wet @ 14 feet BGS			
15			8	0.0	100
17			9	0.0	100
19			10	0.0	100
20		Boring completed at 20.0 feet BGS.			



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LOG OF BORING MW-37

IWM CONSULTING GROUP

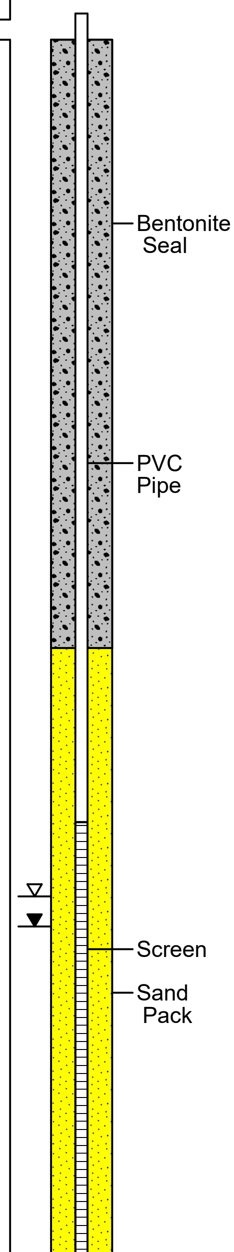
Former Amphenol Corporation
980 Hurricane Road
Franklin, IN
EPA ID # IND 044 587 848

Date Completed	: 11/12/2019	Casing Size	: 2"
Drilling Method	: Direct Push	Initial Water Level	: 10.5'
Sampling Method	: Dual Tube	Final Water Level	: 9.84'
Field/Office Logged	: CN/LL	Selected for Analysis	: NA
Hole Diameter	: 2.25"	Drilling Contractor	: EnviroDynamics

Water Levels
▼ During Drilling - 10.5'
▽ After Completion - 9.84

Depth in feet	USCS	DESCRIPTION	Samples	Total PID (ppm)	Sample Recovery (%)
0	CL	SILTY CLAY, brown, medium stiff, moist			
1			1	0.0	100
3			2	0.0	100
5		SANDY CLAY	3	0.0	100
6.5	SP	SAND with gravel and fines, brown, coarse to medium grained, poorly sorted, dense, slightly moist			
7			4	0.0	100
9			5	0.0	100
10.5		Wet @ 10.5 feet BGS			
11			6	0.0	100
13			7	0.0	100
14.5			8	0.0	100
15		Boring completed at 15.0 feet BGS.			

Temp Well: MW-37
TOC Elev.: 728.66



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LOG OF BORING MW-38

IWM CONSULTING GROUP

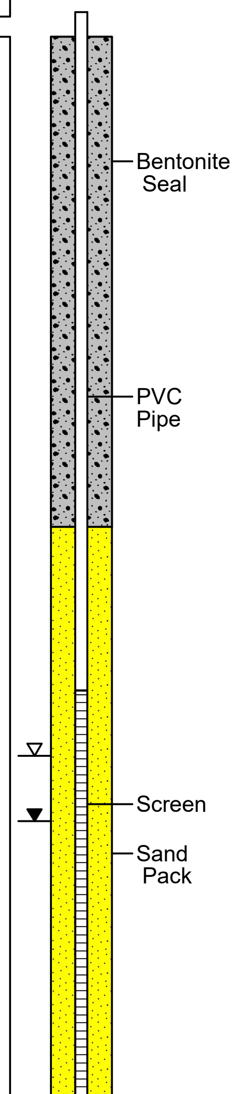
Former Amphenol Corporation
980 Hurricane Road
Franklin, IN
EPA ID # IND 044 587 848

Date Completed	: 11/12/2019	Casing Size	: 2"
Drilling Method	: Direct Push	Initial Water Level	: 9.5'
Sampling Method	: Dual Tube	Final Water Level	: 8.78'
Field/Office Logged	: CN/LL	Selected for Analysis	: NA
Hole Diameter	: 2.25"	Drilling Contractor	: EnviroDynamics

Water Levels
▼ During Drilling - 9.5'
▽ After Completion - 8.78

Depth in feet	USCS	DESCRIPTION	Samples	Total PID (ppm) (0 5 10)	Total PID (ppm)	Sample Recovery (%)
0	CL	SILTY CLAY, brown, medium stiff, moist				
1			1		0.0	100
3			2		0.0	100
4		SANDY CLAY				
5	SP	SAND with gravel and fines, brown, coarse to medium grained, poorly sorted, dense, slightly moist	3		0.0	100
7			4		0.0	100
9			5		0.0	100
9.5		Wet @ 9.5 feet BGS				
11			6		0.0	100
13			7		0.0	100
15			8		0.0	100
16		Boring completed at 16.0 feet BGS.				

Temp Well: MW-38
TOC Elev.: 727.32



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LOG OF BORING MW-39

IWM CONSULTING GROUP

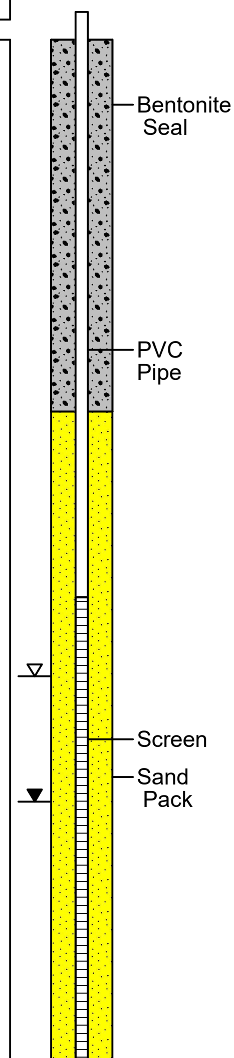
Former Amphenol Corporation
980 Hurricane Road
Franklin, IN
EPA ID # IND 044 587 848

Date Completed	: 11/12/2019	Casing Size	: 2"
Drilling Method	: Direct Push	Initial Water Level	: 9.5'
Sampling Method	: Dual Tube	Final Water Level	: 6.80'
Field/Office Logged	: CN/LL	Selected for Analysis	: *
Hole Diameter	: 2.25"	Drilling Contractor	: EnviroDynamics

Water Levels
▼ During Drilling - 9.5'
▽ After Completion - 6.80

Depth in feet	USCS	DESCRIPTION	Samples	Total PID (ppm)	Sample Recovery (%)
0–6	CL	SILTY CLAY, brown, medium stiff, moist			
1			1	0.0	100
3			2	0.0	100
5			3	0.0	100
6–9.5	SP	SAND with gravel and fines, brown, coarse to medium grained, poorly sorted, dense, slightly moist			
7			4	0.0	100
8		Wet @ 8 feet BGS			
9			5	0.0	100
9.5–14	CL	SILTY CLAY, brown-grey, stiff, slightly moist Grey @ 10.25 feet BGS Soft to medium stiff from 10.5 - 10.75 feet BGS Very Stiff from 10.75 - 14 feet BGS			
11			6	0.0	100
13			7	0.0	100
14		Boring completed at 14.0 feet BGS.			

Temp Well: MW-39
TOC Elev.: 724.42



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LOG OF BORING MW-40

Former Amphenol Corporation
980 Hurricane Road
Franklin, IN
EPA ID # IND 044 587 848

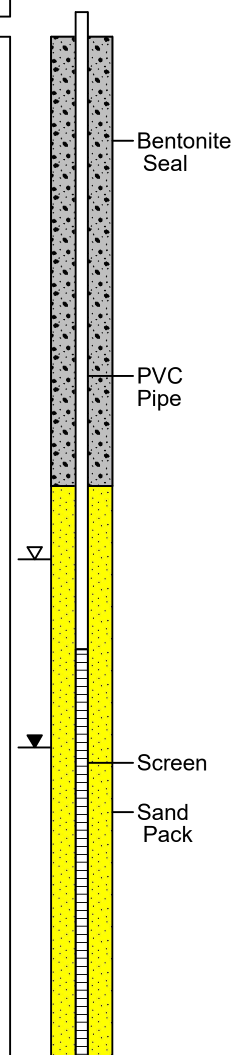
Date Completed	: 11/12/2019	Casing Size	: 2"
Drilling Method	: Direct Push	Initial Water Level	: 8.75'
Sampling Method	: Dual Tube	Final Water Level	: 6.44'
Field/Office Logged	: CN/LL	Selected for Analysis	: *
Hole Diameter	: 2.25"	Drilling Contractor	: EnviroDynamics

Water Levels
▼ During Drilling - 8.75'
▽ After Completion - 6.44

Depth in feet	USCS	DESCRIPTION	Samples	Total PID (ppm)	Sample Recovery (%)
0–0.75	CL	SILTY CLAY, brown, medium stiff, moist			
0.75–9.5	SP	SAND with gravel and fines, brown, coarse to medium grained, poorly sorted, dense, slightly moist	1	0.0	100
			2	0.0	100
			3	0.0	100
			4	0.0	100
		Very moist @ 7.5 feet BGS			
		Wet @ 8.75 feet BGS	5	0.0	100
9.5–10.5	CL	SANDY CLAY, brown-grey, very stiff, dry			
10.5–12	SP	SAND, with gravel and fines, brown, coarse to medium grained, poorly sorted, dense, wet	6	0.0	100
12–16	CL	SILTY CLAY, brown-grey, stiff/very stiff, slightly moist	7	0.0	100
			8	0.0	100

Boring completed at 16.0 feet BGS.

Temp Well: MW-40
TOC Elev.: 723.92



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Wehran EMCON Northeast

BORING/WELL No. RW-1

SHEET 1 of 1

PROJECT: AMPHENOL, FRANKLIN
PROJECT No: 04768.01
CLIENT: AMPHENOL
CONTRACTOR: EEI
RIG:

GS ELEV: 732
N-S COORD: 760.43
E-W COORD: 1934.91
WL REF ELEV: 732
DATE STARTED: 09-07-94
DATE FINISHED: 09-07-94
OPERATOR: R.SMITH
GEOLOGIST: D.KING

GROUNDWATER DATA (feet)

DATE	GW DEPTH	GW ELEV	INTAKE
9-7-94		12.82	

	CASING	SAMPLE	TUBE	CORE
TYPE				
DIAM.				
WEIGHT				
FALL				

WELL CONSTRUCT	DEPTH (feet)	SAMPLE NUMBER	SAMPLE & TYPE	RECOVERY (inches)	N-VALUE	LOG	UNIFIED	FIELD DESCRIPTION	REMARKS
	0–1.5							6" topsoil Brown slightly moist, SILT (ML)	
	1.5–6							Brown slightly moist Clayey SILT (ML-CL)	5.25 bags Global #4 1 bag #7 cement-bentonite mixed to 11.8 #/gal
	6–9.5							Brown slightly moist Sandy CLAY (SC-CL)	#4 sand to 9.1', #7 to 8 cement-bentonite to 1.5'
	9.5–10.5							Brown slightly moist Clayey SAND (SC)	
	10.5–15.5	SS1, SS2, SS3						Brown slightly moist fine SAND (SP-SM) with SAND and little fine Gravel-becomes gray wet with medium coarse GRAVEL (SP-GM) in seams without Gravel at 14'	Casing: 4" Sch. 40 PVC Screen: 0.01 inch wire-wrapped
	15.5–18	SS4						Gray wet so Silty CLAY (CL)	
	18							BOTTOM TEST HOLE at 18'	

Depth scale: 5, 10, 15, 20, 25, 30, 35, 40

Wehran EMCON Northeast

BORING/WELL No. RW-2

PROJECT: 04768.01
CLIENT: AMPHENOL, FRANKLIN
CONTRACTOR: EEI
PROJECT No: AMPHENOL
RIG:

GS ELEV:	734
N-S COORD:	759.92
E-W COORD:	1817.95
WL REF ELEV:	734
DATE STARTED:	09-07-94
DATE FINISHED:	09-07-94
OPERATOR:	R.SMITH
GEOLOGIST:	D.KING

GROUNDWATER DATA (feet)

DATE	GW DEPTH	GW ELEV	INTAKE
9-7-94		14.2	

	CASING	SAMPLE	TUBE	CORE
TYPE				
DIAM.				
WEIGHT				
FALL				

DEPTH (feet)	SAMPLE NUMBER	UNIFIED	FIELD DESCRIPTION	REMARKS
0			6" Topsoil	
		ML	Brown slightly moist SILT (ML)	
		SC	Brown moist Silty CLAY (SC)	
8			Slightly moist with medium GRAVEL at 8.0'	Run set to 20.8' #4 GLOBAL to 11.8', 3.5 bag #7 sand to 11.3, 1 bag 2 bags cement,1 bag bentonite mixed to 11.7#/gal placed to
		SM	Brown slightly moist Silty Clayey SAND (SM) with medium GRAVEL	
	SS1	SM	Brown slightly moist medium density Silty fine to medium SAND (SM) with Gravel	
15	SS2	SC	wet with seams of (SC) 0.1' - 0.2'	Casing:4" Sch. 40PVC
	SS3	GM	Gravel with rust seams wet, hard Silty Sandy GRAVEL (GM)	Screen:0.01 inch wire-wrapped
20	SS4, SS5	CL	Gravel slightly moist, very dense Silty CLAY (CL) with fossil (carbon) vegetation	
21.5			BOTTOM TEST HOLE at 21.5'	

Columns also present on form: WELL CONSTRUCT, SAMPLE & TYPE, RECOVERY (inches), N-VALUE, LOG. Depth scale: 5, 10, 15, 20, 25, 30, 35, 40.

Wehran EMCON Northeast

BORING/WELL No. RW-3

SHEET 1 of 1

PROJECT: 04768.01
CLIENT: AMPHENOL, FRANKLIN
CONTRACTOR: EEI

PROJECT No: 04768.01
RIG:

GS ELEV: 735
N-S COORD: 891.80
E-W COORD: 1812.22
WL REF ELEV: 735
DATE STARTED: 09-07-94
DATE FINISHED: 09-08-94
OPERATOR: R.SMITH
GEOLOGIST: D.KING

GROUNDWATER DATA (feet)

DATE	GW DEPTH	GW ELEV	INTAKE
9-8-94		-15.4'	

	CASING	SAMPLE	TUBE	CORE
TYPE				
DIAM.				
WEIGHT				
FALL				

DEPTH (feet)	SAMPLE NUMBER	UNIFIED	FIELD DESCRIPTION	REMARKS
0			6" Topsoil	
		ML	Brown slightly moist SILT (ML)	
		SC	Brown moist Clayey SAND (SC)	
10		SM	Brown slightly moist Silt fine to medium SAND (SM) very stiff with fine to medium Gravel	RW set at 23.2' #4 Global Sand to 15.5' #7 Sand to 15.0' Cement bentonite mixed to 11#/gal to 1.5' below GSE 4 bags #4 Global 1 bag #7
	SS1			
15	SS2		becomes moist at 15.0'	
	SS3		becomes gray wet medium stiff Silt fine to medium SAND (SM) with Gravel	Casing: 4" Sch. 40 PVC
	SS4	SM SP	Gravel wet stiff fine to medium SAND (SM-SP) with Silt	Screen: 0.01 inch wire-wrapped
20	SS5			
	SS6	CL	Gravel slightly moist very stiff Silty CLAY (CL) with fossil vegetation	
25	SS7			
			BOTTOM TEST HOLE at 26.0'	

Column headings also printed: WELL CONSTRUCT, SAMPLE & TYPE, RECOVERY (inches), N-VALUE, LOG. Depth scale: 5, 10, 15, 20, 25, 30, 35, 40.

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	REPORT OF BORING RW-4
Client: Franklin Power Products, Inc. Proj. Loc: Franklin, Indiana File No.: 21493	Drill Method: ID HSA Sampler: 2-inch Split Spoon Hammer: 140 lbs Fall: 30 inches	Page 1 of 2 Location: Start Date: 02/09/99 End Date: 02/09/99
Boring Company: Earth Exploration, Inc. Foreman: Guy Dixon Drill Rig: CME-75 OBG Geologist: Chawn O'Dell		Screen =, Riser, Steel // \ Grout, Sand Pack, Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing PID (ppm)
0	1	0-2	1-2 2-2	2.0/1.8	4	Dusky brown 5YR 2/2. damp, loose, fine SAND and SILT, little fine to medium gravel (subangular to angular)			
2	2	2-4	2-3 2-1	2.0/2.0	5	Grayish brown 5YR 3/2, damp, loose, SILT, some fine to coarse sand, little fine gravel (angular)			
4	3	4-5	2-2	1.0/1.0	4	Grayish brown 5YR 3/2, damp, loose, fine to medium SAND, little coarse sand, trace fine gravel (subangular)			
5	4	5-7	1-1 2-1	2.0/1.9	3	Grayish brown 5YR 3/2, damp, very loose, fine to medium SAND, little coarse sand, trace fine gravel (subangular)			
7	5	7-9	3-6 5-5	2.0/1.8	11	Pale brown 5YR 5/2, damp, medium dense, medium to coarse SAND, little fine gravel (subangular), trace fine sand			
9	6	9-11	5-7 7-9	2.0/2.0	14	Pale yellowish brown 10YR 6/2, medium dense, damp medium to fine SAND, some coarse sand, little fine gravel (subangular)			
11	7	11-13	4-6 7-8	2.0/1.7	13	Moderate yellowish brown 10YR 5/4, damp, medium dense, coarse SAND, some fine gravel (subangular) little medium to fine sand			
13	8	13-15	6-7 8-9	2.0/1.6	15	moderate yellowish brown 10YR 5/4, medium dense, saturated, coarse SAND, some fine gravel (subangular), little medium to fine sand			
15	9	15-17	6-7 7-9	2.0/1.1	14	moderate yellowish brown 10YR 5/4, medium dense, saturated, coarse to medium SAND, some fine gravel (subangular), little fine sand			
17	10	17-19	5-6 6-7	2.0/1.5	12	Moderate yellowish brown 10YR 5/4, medium dense, saturated, coarse SAND, some fine gravel (subangular), little medium sand			
19	11	19-21	5-7 7-7	2.0/1.9	14	Moderate yellowish brown 10YR 5/4, medium dense, saturated, coarse SAND, some fine to medium gravel (subangular), little medium sand			

Notes:

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING RW-4

Client: Franklin Power Products, Inc.	Drill Method: ID HSA	Page 2 of 2
Proj. Loc: Franklin, Indiana	Sampler: 2-inch Split Spoon	Location:
	Hammer: 140 lbs	Start Date: 02/09/99
File No.: 21493	Fall: 30 inches	End Date: 02/09/99

Boring Company: Earth Exploration, Inc.
Foreman: Guy Dixon
Drill Rig: CME-75
OBG Geologist: Chawn O'Dell

Legend: Screen = ; Riser ; Steel // ; Grout \ ; Sand Pack ; Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing PID (ppm)
21	12	21-23	9-10	2.0/2.0	21	Moderate yellowish brown 10YR 5/4, medium dense, saturated, coarse SAND, some fine to medium gravel (subangular), little medium sand to approximately 22.5 ft, then medium dark gray N4, hard, damp, CLAY, some silt, little fine gravel (subangular)			
			11-12						
23	13	23-25	10-12	2.0/1.6	26	Medium dark gray N4, hard, damp, CLAY, some silt, little fine gravel (subangular)			
			14-15						
25	14	25-27	11-13	2.0/1.5	25	Medium dark gray N4, hard, damp, CLAY, some silt, little fine gravel (subangular)			
			12-14						
27	15	27-29	10-15	2.0/2.0	32	Medium dark gray N4, very hard, damp, CLAY, some silt, little fine gravel (subangular)			
			17-18						

Notes: 6 inch PVC sump: 28-23 ft; bentonite chips: 28-24 ft; 6 inch x 0.010 inch slotted PVC screen (schedule 80): 23-13 ft; sand pack: 24-10 ft; bentonite chips: 10-8 ft; grout: 8-0 ft.
Finished with an above grade protective casing.

7428 Rockville Road
Indianapolis, Indiana 46214

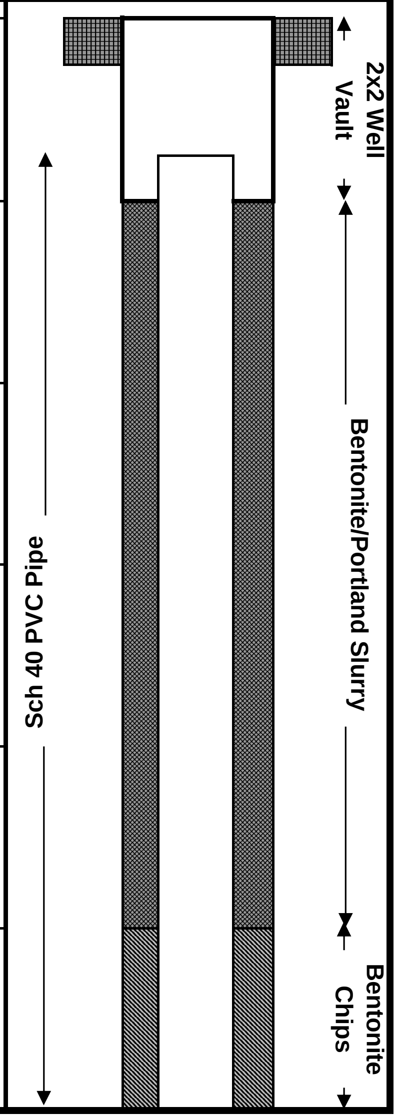
BORING/WELL LOG: RW-5

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC:
Installation Date: June 21, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

SUBSURFACE PROFILE			SAMPLE		
DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)
		Ground Surface			
0–3.5		Moist, medium stiff, brown, sandy CLAY with gravel	0-2	100	1.83/-
			2-4	75	2.32/-
3.5–4		No Recovery			
4–5.5		Moist, loose, brown, clayey SAND with gravel	4-6	75	3.40/-
5.5–6		No Recovery			
6–7.5		Moist, loose, brown, medium SAND with gravel	6-8	75	6.33/-
7.5–8		No Recovery			
8–9		Moist, loose, brown, medium SAND with gravel	8-10	50	6.08/-
9–10		No Recovery			
10–11		Moist, loose, brown, clayey SAND with coarse gravel	10-12*	50	8.80/-
11–12		No Recovery			

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
Boring Diameter: 8.25 inches
Boring Depth: 27 feet
Casing Length: 12.5 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC

- Indicates depth to groundwater.
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Chris Newell

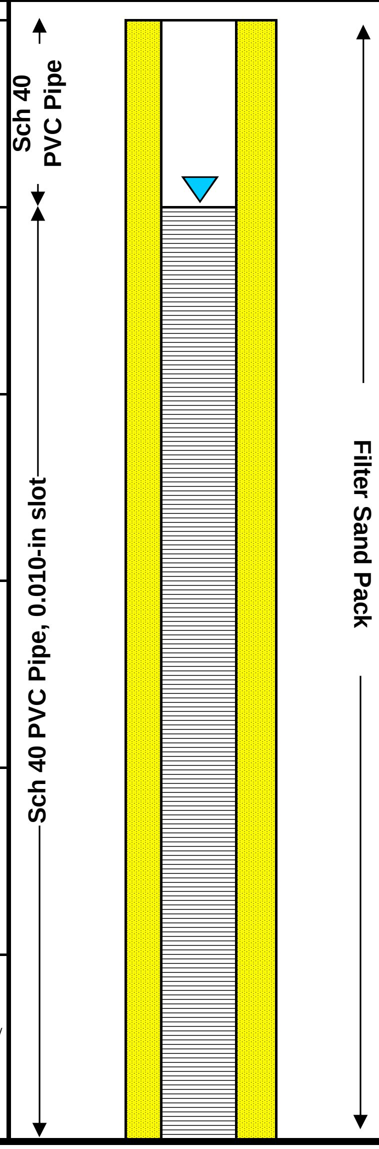
7428 Rockville Road
Indianapolis, Indiana 46214

BORING/WELL LOG: RW-5

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC:
Installation Date: June 21, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

SUBSURFACE PROFILE			SAMPLE			
DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)	Well Completion Details
12		Moist, loose, brown, medium SAND with gravel	12-14	75	8.33/ 12.62	
13		No Recovery				
14		Wet, loose, brown, medium SAND with gravel	14-16*	50	9.36/ 10.78	
15		No Recovery				
16		Wet, loose, brown, coarse SAND with gravel	16-18	50	3.68/ 9.14	
17		No Recovery				
18		Wet, loose, brown, coarse SAND with gravel Wet, loose, brown, gravelly coarse SAND	18-20	75	5.40/ 18.72	
19		No Recovery				
20		Wet, loose, brown, gravelly coarse SAND	20-22	50	12/ 17.60	
21		No Recovery				
22		Wet, loose, brown, gravelly coarse SAND	22-24*	50	12.57/ 5.63	
23		No Recovery				



Note: * Sample Submitted for laboratory analysis.
- Indicates depth to groundwater.
Boring Diameter: 8.25 inches
Boring Depth: 27 feet
Casing Length: 12.5 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Chris Newell

7428 Rockville Road
Indianapolis, Indiana 46214

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

BORING/WELL LOG: RW-5

TOC:
Installation Date: June 21, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

DEPTH (ft)	SYMBOL	SUBSURFACE PROFILE: GEOLOGIC DESCRIPTION	SAMPLE: SAMPLE INTERVAL	SAMPLE: RECOVERY	SAMPLE: FID/PID (ppm)	Well Completion Details
24		Moist, medium stiff, brown, sandy CLAY with gravel	24-26	50	10.62/ 4.80	Sch 40 PVC Pipe; Filter Sand Pack
25		No Recovery				
26		Moist, medium stiff, brown, sandy CLAY with gravel	26-27	100	52.67/ 3.96	
27		End of Boring				
28						
29						
30						
31						
32						
33						
34						
35						

Note: * Sample Submitted for laboratory analysis.
Boring Diameter: 8.25 inches
Boring Depth: 27 feet
Casing Length: 12.5 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC

- Indicates depth to groundwater.
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Chris Newell

7428 Rockville Road
Indianapolis, Indiana 46214

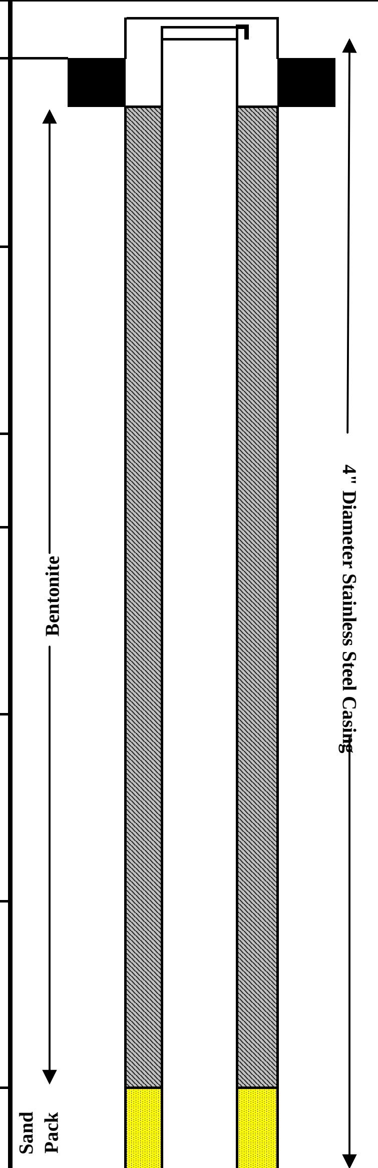
BORING/WELL LOG: IN-1

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

Installation Date: November 21, 2006
Client: Amphenol Corporation
IWM Job No: IWM-AMP-01-02

SUBSURFACE PROFILE		SAMPLE		
DEPTH (ft)	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	PID (ppm)
	Ground Surface			
0	Moist, medium stiff, dark brown, silty CLAY (CL) with sand.	0-2	100	0
3	Moist, medium stiff, brown, sandy silty CLAY (CL).	2-4	100	0
4	Moist, medium dense, poorly sorted, silty medium to coarse SAND (SM).	4-5	100	0
5	Moist, soft, brown, silty CLAY (CL) with trace gravel.	5-7	50	3
6	Moist, loose, brown, poorly sorted coarse SAND (SP).	7-9	50	7
9	Moist, medium dense, brown, poorly sorted medium SAND (SP) with some coarse sand.	9-11	50	7
11	Moist, medium dense, brown, well sorted fine to medium SAND (SW).	11-13	70	7

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
- Indicates depth to groundwater.
Boring Diameter: 6.25 inches
Boring Depth: 23 feet
Casing Length: 15 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Stainless Steel
Screen Material: Stainless Steel, 0.020-in slot
Sampling Method: Split Spoon
Drill Method: Hollow Stem Augers
Drilled By: SCS Environmental
Geologist: Chris Parks

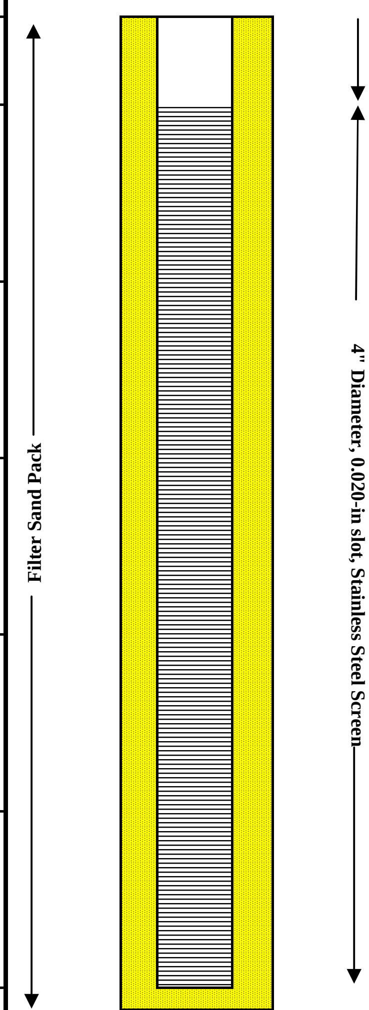
7428 Rockville Road
Indianapolis, Indiana 46214

BORING/WELL LOG: IN-1

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

Installation Date: November 21, 2006
Client: Amphenol Corporation
IWM Job No: IWM-AMP-01-02

SUBSURFACE PROFILE			SAMPLE			
DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	PID (ppm)	Well Completion Details
12		Moist, medium dense, brown, well sorted fine to medium SAND (SW).	11-13	70	7	
13		Moist, medium stiff, brown, silty CLAY (CL) with trace gravel.	13-15*	90	20	
14		Very moist, medium dense, brown, poorly sorted medium SAND (SP).				
15		Saturated, medium dense, brown, well sorted medium SAND (SW).	15-17	50	40	
16						
17			17-19	75	7	
18						
19			19-21	60	35	
20						
21			21-23*	60	80	
22		Moist, hard, gray, silty CLAY (CL) with trace gravel.				
23		End of Boring.				
24						



Note: * Sample Submitted for laboratory analysis.
- Indicates depth to groundwater.
Boring Diameter: 6.25 inches
Boring Depth: 23 feet
Casing Length: 15 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Stainless Steel
Screen Material: Stainless Steel, 0.020-in slot
Sampling Method: Split Spoon
Drill Method: Hollow Stem Augers
Drilled By: SCS Environmental
Geologist: Chris Parks

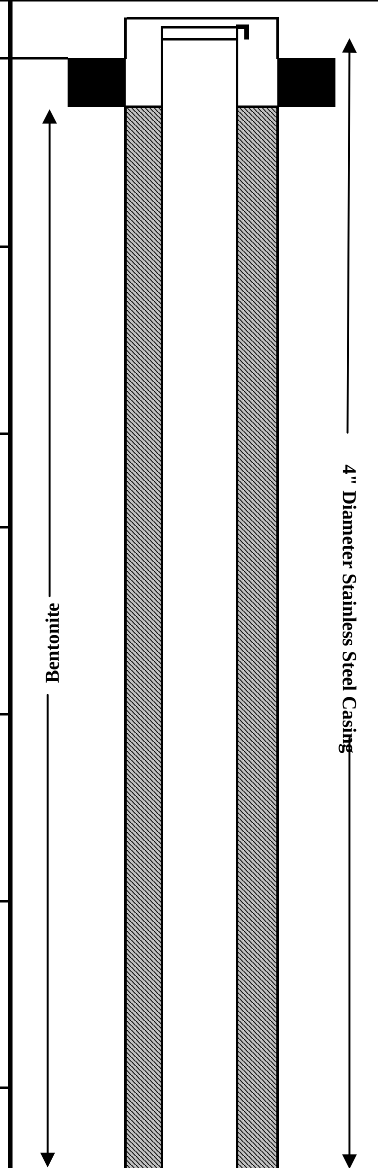
7428 Rockville Road
Indianapolis, Indiana 46214

BORING/WELL LOG: IN-2

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

Installation Date: November 21, 2006
Client: Amphenol Corporation
IWM Job No: IWM-AMP-01-02

SUBSURFACE PROFILE			SAMPLE			Well Completion Details
DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	PID (ppm)	
		Ground Surface				
0		Moist, medium stiff, dark brown, silty CLAY (CL) with sand.	0-2	100	0	
2			2-4	100	0	
3		Moist, medium stiff, brown, sandy silty CLAY (CL).				
4		Moist, very loose, poorly sorted, silty medium to coarse SAND (SM)	4-5	100	0	
5			5-7	20	1	
7		Moist, loose, brown, poorly sorted medium SAND (SP) with some coarse sand and gravel.	7-9	20	3	
9		Moist, loose, brown, well sorted medium SAND (SW).	9-11	50	3	
11			11-13	60	6	



Note: * Sample Submitted for laboratory analysis.
- Indicates depth to groundwater.
Boring Diameter: 6.25 inches
Boring Depth: 25 feet
Casing Length: 15 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Stainless Steel
Screen Material: Stainless Steel, 0.020-in slot
Sampling Method: Split Spoon
Drill Method: Hollow Stem Augers
Drilled By: SCS Environmental
Geologist: Chris Parks

IWM CONSULTING GROUP
7428 Rockville Road
Indianapolis, Indiana 46214

BORING/WELL LOG: IN-2

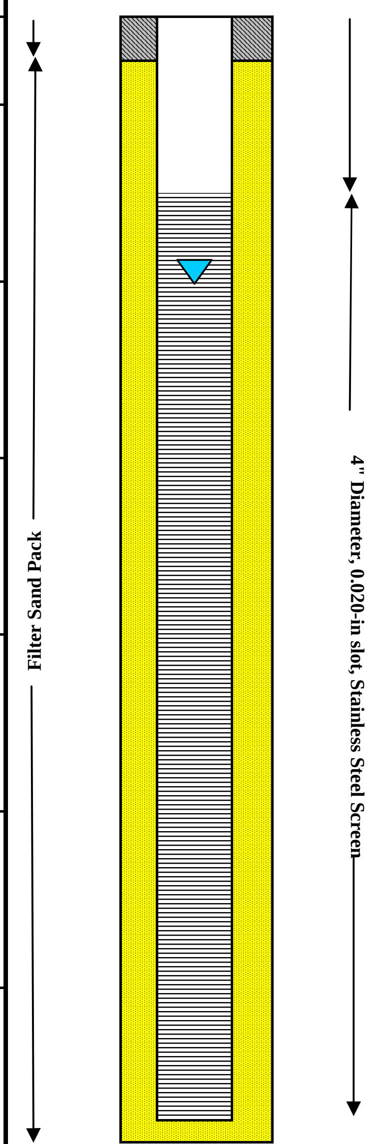
Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

Installation Date: November 21, 2006
Client: Amphenol Corporation
IWM Job No: IWM-AMP-01-02

SUBSURFACE PROFILE / SAMPLE

DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	PID (ppm)
12		Moist, loose, brown, well sorted medium SAND (SW).	11-13	60	6
13		Moist, stiff, brown, silty CLAY (CL) with trace gravel.	13-15*	80	10
14		Very moist to wet, very loose, gray, poorly sorted coarse SAND (SP) with gravel.			
15		Saturated, medium dense, brown, well sorted medium SAND (SW).			
16			15-17	40	17
17					
18			17-19	50	15
19					
20			19-21	75	25
21					
22			21-23	80	30
23					
24		Moist, very stiff, brown, silty CLAY (CL) with trace gravel.	23-25*	80	50

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
Boring Diameter: 6.25 inches
Boring Depth: 25 feet
Casing Length: 15 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Stainless Steel

- Indicates depth to groundwater.
Screen Material: Stainless Steel, 0.020-in slot
Sampling Method: Split Spoon
Drill Method: Hollow Stem Augers
Drilled By: SCS Environmental
Geologist: Chris Parks

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BORING/WELL LOG: IN-3

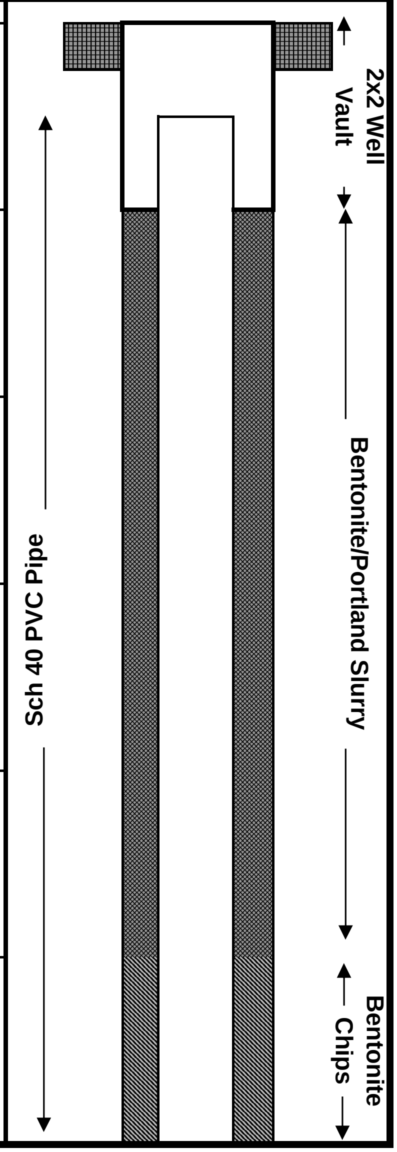
Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC:
Installation Date: June 30, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

SUBSURFACE PROFILE / SAMPLE

DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)
		Ground Surface			
0		Moist, medium stiff, brown, sandy CLAY with gravel	0-2	100	1/2
2			2-4	100	1/2
4			4-6	50	1/3
6			6-8	70	1/4
7		Moist, loose, brown, medium to coarse SAND (SW)			
8			8-10	50	2/14
10			10-12	50	3/48
11					

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
▽ - Indicates depth to groundwater.
Boring Diameter: 8.25 inches
Boring Depth: 23 feet
Casing Length: 13 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Donovan Wilczynski

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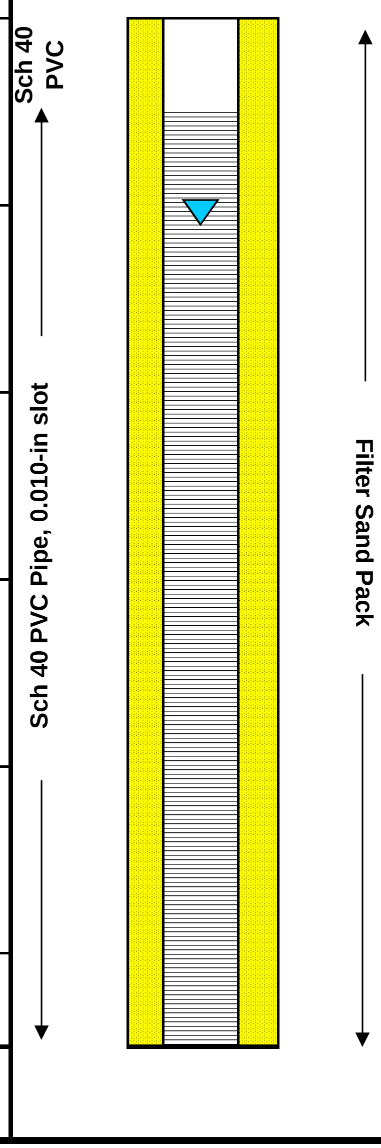
BORING/WELL LOG: IN-3

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC:
Installation Date: June 30, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

SUBSURFACE PROFILE			SAMPLE			
DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)	Well Completion Details
12		Moist, loose, brown, medium to coarse SAND (SW)	12-14*	50	5/50	
14		Wet, loose, brown, coarse SAND (SW) with gravel	14-16*	60	2/7	
16			16-18	50	2/10	
18			18-20	100	2/12	
19		Wet, loose, gray, medium to coarse SAND (SW)				
20			20-22*	100	2/21	
22		Moist, medium stiff, grey sandy CLAY (CL)	22-23	0	NA	
23						



Note: * Sample Submitted for laboratory analysis.
Boring Diameter: 8.25 inches
Boring Depth: 23 feet
Casing Length: 13 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC

▽ - Indicates depth to groundwater.
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Donovan Wilczynski

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7428 Rockville Road
Indianapolis, Indiana 46214

BORING/WELL LOG: IN-4

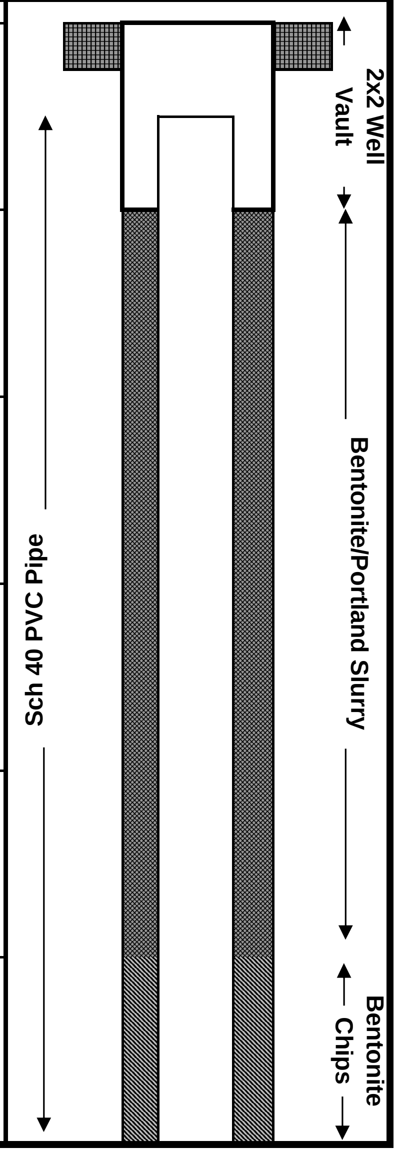
Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC:
Installation Date: June 30, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

SUBSURFACE PROFILE / SAMPLE

DEPTH (ft)	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)
	Ground Surface			
0	Moist, medium stiff, brown, sandy CLAY with gravel			
1		0-2	90	2/1
3		2-4	10	2/1
5		4-6	0	NA
7	Moist, loose, brown, medium to coarse SAND (SW)	6-8	4/8	20/1
9		8-10	2/8	6/12
11		10-12	3/9	4/16

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
- Indicates depth to groundwater.

Boring Diameter: 8.25 inches
Boring Depth: 23 feet
Casing Length: 13 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC

Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Donovan Wilczynski

IWM CONSULTING GROUP

7428 Rockville Road
Indianapolis, Indiana 46214

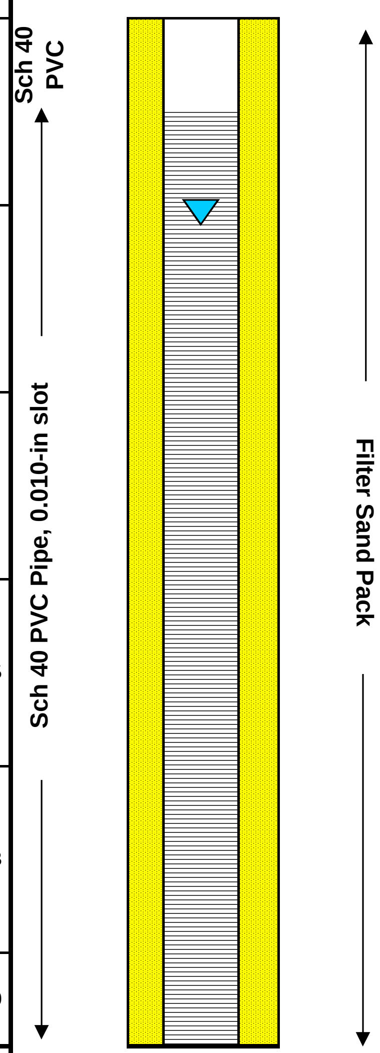
BORING/WELL LOG: IN-4

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC:
Installation Date: June 30, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

SUBSURFACE PROFILE			SAMPLE		
DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)
12		Moist, loose, brown, medium to coarse SAND (SW)	12-14*	40	3/10
13					
14		Wet, loose, brown, coarse SAND (SW) with gravel	14-16*	30	3/10
15					
16			16-18	20	3/10
17					
18			18-20	100	17/55
19		Wet, loose, gray, medium to coarse SAND (SW)			
20			20-22*	100	20/93
21					
22		Moist, medium stiff, grey sandy CLAY (CL)	22-23	100	16/50
23					

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
Boring Diameter: 8.25 inches
Boring Depth: 23 feet
Casing Length: 13 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC

▽ - Indicates depth to groundwater.
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Donovan Wilczynski

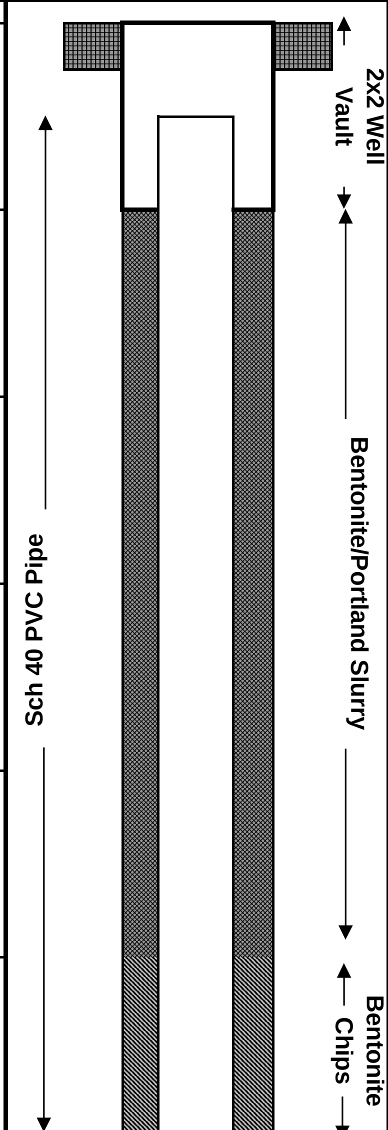
7428 Rockville Road
Indianapolis, Indiana 46214

BORING/WELL LOG: IN-5

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC:
Installation Date: June 30, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

SUBSURFACE PROFILE			SAMPLE			
DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)	Well Completion Details
		Ground Surface				
0		Moist, medium stiff, brown, sandy CLAY with gravel				
1			0-2	100	1/1	
2						
3			2-4	100	1/2	
4						
5			4-6	10	1/1	
6						
7		Moist, loose, brown, medium to coarse SAND (SW)	6-8	50	2/6	
8						
9			8-10	70	3/9	
10						
11			10-12	100	3/8	



Note: * Sample Submitted for laboratory analysis.
- Indicates depth to groundwater.
Boring Diameter: 8.25 inches
Boring Depth: 23 feet
Casing Length: 13 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Donovan Wilczynski

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7428 Rockville Road
Indianapolis, Indiana 46214

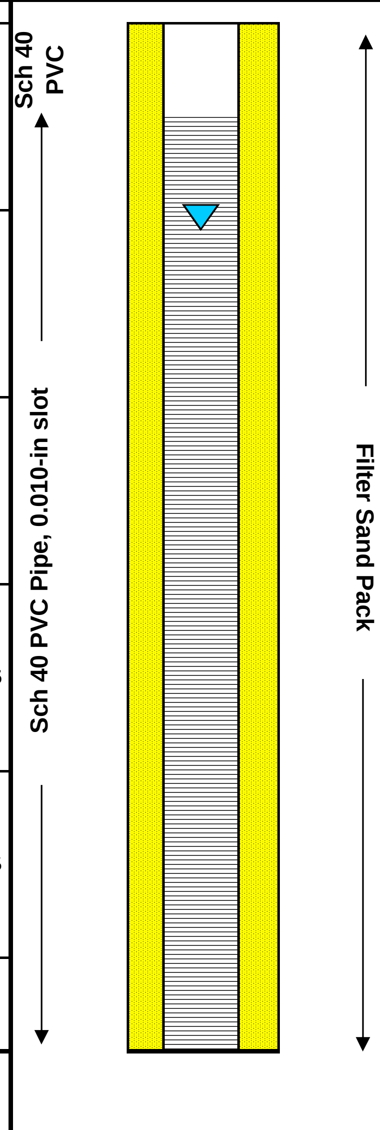
BORING/WELL LOG: IN-5

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC:
Installation Date: June 30, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

SUBSURFACE PROFILE			SAMPLE		
DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)
12		Moist, loose, brown, medium to coarse SAND (SW)	12-14*	60	3/13
14		Wet, loose, brown, coarse SAND (SW) with gravel	14-16*	60	3/17
16			16-18	80	7/41
18			18-20	80	10/46
19		Wet, loose, gray, medium to coarse SAND (SW)			
20			20-22*	60	15/55
22		Moist, medium stiff, grey sandy CLAY (CL)	22-23	100	7/50
23					

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
Boring Diameter: 8.25 inches
Boring Depth: 23 feet
Casing Length: 13 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC

▽ - Indicates depth to groundwater.
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Donovan Wilczynski

IWM CONSULTING GROUP
7428 Rockville Road
Indianapolis, Indiana 46214

BORING/WELL LOG: IN-6

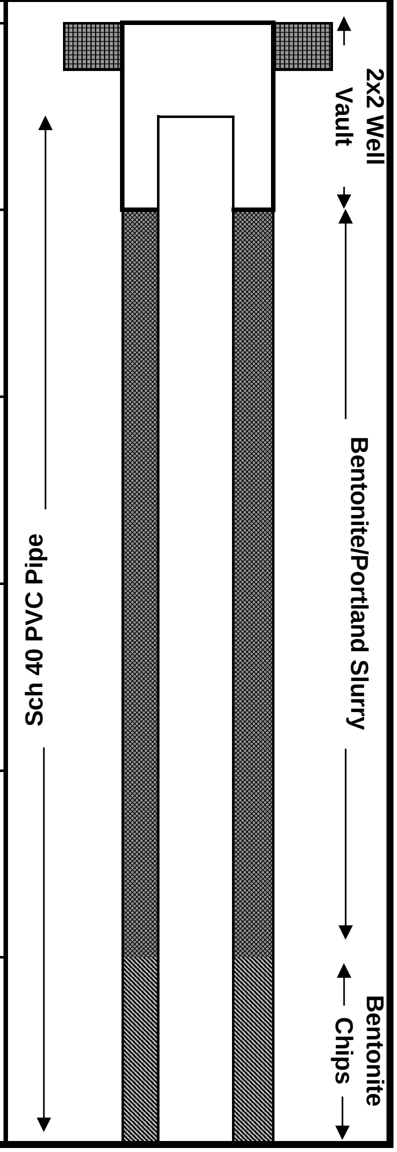
Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC:
Installation Date: June 30, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

SUBSURFACE PROFILE / SAMPLE

DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)
		Ground Surface			
0		Moist, medium stiff, brown, sandy CLAY with gravel	0-2	100	23/1
1					
2			2-4	50	13/1
3					
4			4-6	25	15/1
5					
6			6-8	90	20/1
7		Moist, loose, brown, medium to coarse SAND (SW)			
8			8-10	90	6/12
9					
10			10-12	50	4/16
11					

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
Boring Diameter: 8.25 inches
Boring Depth: 23 feet
Casing Length: 13 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC

- Indicates depth to groundwater.
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Donovan Wilczynski

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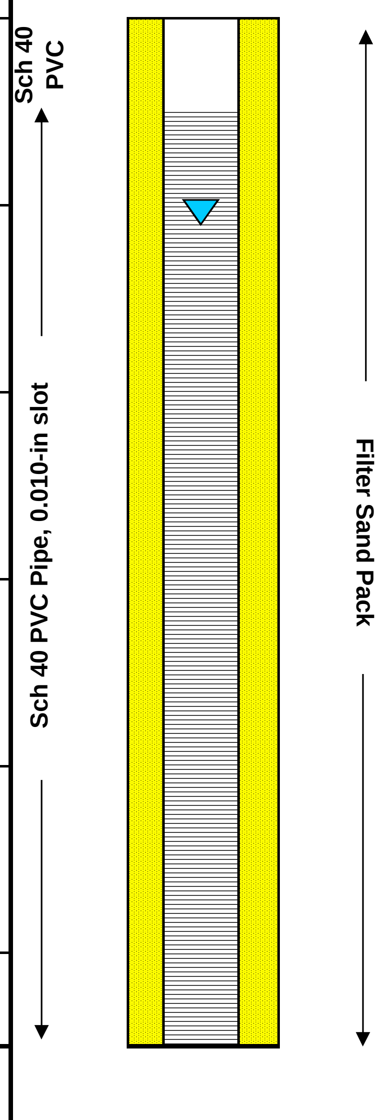
Indianapolis, Indiana 46214

BORING/WELL LOG: IN-6

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC:
Installation Date: June 30, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

SUBSURFACE PROFILE			SAMPLE			
DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)	Well Completion Details
12		Moist, loose, brown, medium to coarse SAND (SW)	12-14*	60	3/21	
13						
14		Wet, loose, brown, coarse SAND (SW) with gravel	14-16*	70	2/14	
15						
16			16-18	70	2/14	
17						
18			18-20	50	3/26	
19		Wet, loose, gray, medium to coarse SAND (SW)				
20			20-22*	50	3/33	
21						
22		Moist, medium stiff, grey sandy CLAY (CL)	22-23	100	3/30	
23						



Note: * Sample Submitted for laboratory analysis.
Boring Diameter: 8.25 inches
Boring Depth: 23 feet
Casing Length: 13 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC

▽ - Indicates depth to groundwater.
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Donovan Wilczynski

7428 Rockville Road
Indianapolis, Indiana 46214

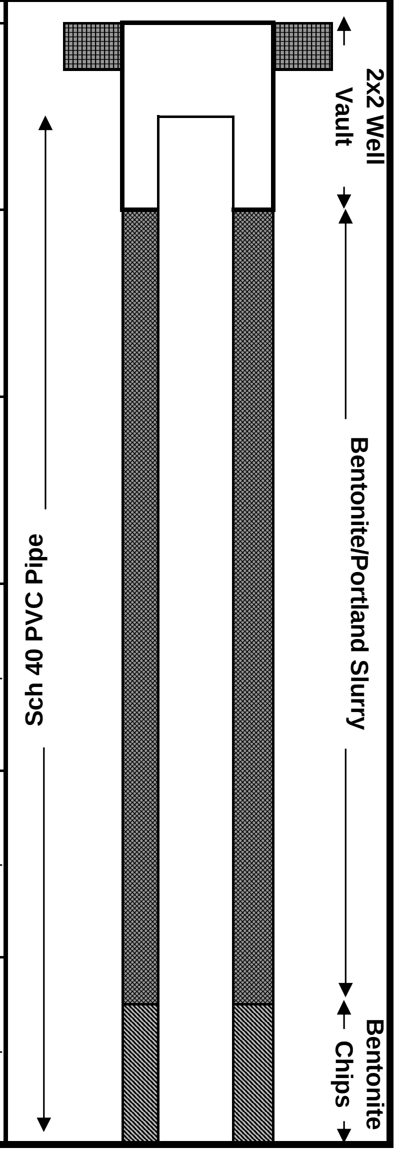
BORING/WELL LOG: IN-7

TOC:
Installation Date: June 21, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

SUBSURFACE PROFILE			SAMPLE		
DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)
		Ground Surface			
0–3		Moist, medium stiff, brown, sandy CLAY with gravel	0-2	100	1.59/-
3–6		No Recovery	2-4	50	4.47/-
			4-6	0	-/-
6–8.5		Moist, medium stiff, brown, sandy CLAY with gravel	6-8	100	16.10/-
8.5–10		No Recovery	8-10	25	10.04/-
10–11.25		Moist, medium stiff, brown, sandy CLAY with gravel	10-12*	100	18.40/-
11.25–		Moist, loose, brown, medium SAND with gravel			

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
- Indicates depth to groundwater.
Boring Diameter: 8.25 inches
Boring Depth: 24.5 feet
Casing Length: 13.5 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Chris Newell

7428 Rockville Road
Indianapolis, Indiana 46214

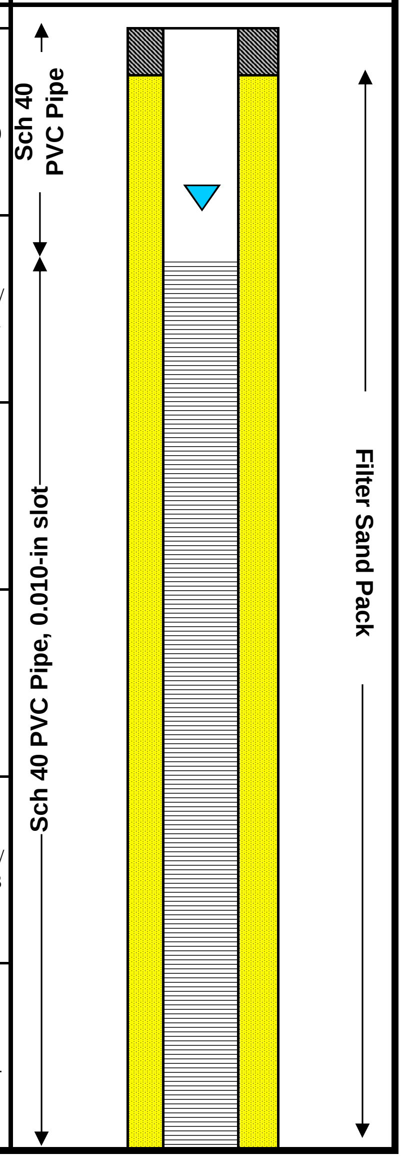
BORING/WELL LOG: IN-7

TOC:
Installation Date: June 21, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

SUBSURFACE PROFILE		SAMPLE		
DEPTH (ft)	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)
12	Moist, loose, brown, coarse SAND with gravel	12-14	50	8.67/ 17.60
13	No Recovery			
14	Wet, loose, brown, coarse SAND with gravel	14-16*	25	11.41/ 11.01
	No Recovery			
15				
16		16-18	0	-/-
17				
18	Wet, loose, brown, gravelly coarse SAND	18-20	12.5	4.97/ 11
	No Recovery			
19				
20	Wet, loose, light brown-grey, gravelly coarse SAND	20-22	25	18.69/ 15.83
	No Recovery			
21				
22	Wet, loose, light brown-grey, gravelly coarse SAND Wet, loose, grey, gravelly clayey SAND	22-24*	100	322/ 11.84
23				
	Moist, stiff, grey, sandy CLAY with gravel			

Well Completion Details



Note: * Sample Submitted for laboratory analysis.
▽ - Indicates depth to groundwater.
Boring Diameter: 8.25 inches
Boring Depth: 24.5 feet
Casing Length: 13.5 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Chris Newell

7428 Rockville Road
Indianapolis, Indiana 46214

BORING/WELL LOG: IN-7

Client Location No.: Former Amphenol Facility
Site Address: 980 B Hurricane Road
City, State, Zip Code: Franklin, IN 46131

TOC:
Installation Date: June 21, 2010
Client: Amphenol Corporation
IWM Job No: IN-AMP-03-01

SUBSURFACE PROFILE			SAMPLE			
DEPTH (ft)	SYMBOL	GEOLOGIC DESCRIPTION	SAMPLE INTERVAL	RECOVERY	FID/PID (ppm)	Well Completion Details
24		Moist, stiff, grey, sandy CLAY with gravel	24-24.5	100	87/ 10.56	
		End of Boring				
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						

Note: * Sample Submitted for laboratory analysis.
Boring Diameter: 8.25 inches
Boring Depth: 24.5 feet
Casing Length: 13.5 feet
Screen Length: 10 feet
Well Diameter: 4 inches
Casing Material: Sch 40 PVC

- Indicates depth to groundwater.
Screen Material: Sch 40 PVC, 0.010-in slot
Sampling Method: Split-spoon
Drill Method: Hollow-stem auger
Drilled By: SCS Environmental
Geologist: Chris Newell

Attachment D

Laboratory Analytical Reports

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

October 28, 2019

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol
Pace Project No.: 50239194

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on October 18, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chris Boyle
chris.boyle@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Brad Gentry, IWM Consulting Group, LLC
Mr. Chris Parks, IWM Consulting Group

Pace Analytical Services, LLC
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Indianapolis, IN 46268
(317)228-3100

CERTIFICATIONS

Project:	Amphenol
Pace Project No.:	50239194

Indiana Certification IDs

7726 Moller Road, Indianapolis, IN 46268
Illinois Certification #: 200074
Indiana Certification #: C-49-06
Kansas/NELAP Certification #: E-10177
Kentucky UST Certification #: 80226
Kentucky WW Certification #: 98019
Michigan Department of Environmental Quality, Laboratory #9050
Ohio VAP Certification #: CL0065
Oklahoma Certification #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Certification #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services, LLC
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(317)228-3100

SAMPLE SUMMARY

Project: Amphenol
Pace Project No.: 50239194

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50239194001	**MW-31**	Water	10/18/19 14:15	10/18/19 17:36
50239194002	**MW-35**	Water	10/18/19 11:45	10/18/19 17:36
50239194003	**FD-1 GW**	Water	10/18/19 08:00	10/18/19 17:36
50239194004	**TB-1 GW**	Water	10/18/19 15:45	10/18/19 17:36
50239194005	**EB-1 GW**	Water	10/18/19 12:20	10/18/19 17:36

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SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50239194

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50239194001	**MW-31**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	LKC	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	ZM	1	PASI-I
		EPA 353.2	DAC1	2	PASI-I
50239194002	**MW-35**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	LKC	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	ZM	1	PASI-I
		EPA 353.2	DAC1	2	PASI-I
50239194003	**FD-1 GW**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	LKC	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	ZM	1	PASI-I
		EPA 353.2	DAC1	2	PASI-I
50239194004	**TB-1 GW**	EPA 8260	LKC	12	PASI-I
50239194005	**EB-1 GW**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	LKC	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	ZM	1	PASI-I
		EPA 353.2	DAC1	2	PASI-I

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SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50239194

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50239194001	**MW-31**					
EPA 6010	Iron	726	ug/L	100	10/25/19 01:10	
EPA 6010	Manganese	23.8	ug/L	10.0	10/25/19 01:10	
EPA 8260	Tetrachloroethene	57.5	ug/L	5.0	10/23/19 18:52	
EPA 8260	1,1,1-Trichloroethane	8.0	ug/L	5.0	10/23/19 18:52	
EPA 8260	Trichloroethene	51.4	ug/L	5.0	10/23/19 18:52	
EPA 9038	Sulfate	31.2	mg/L	10.0	10/25/19 09:30	
EPA 353.2	Nitrogen, NO2 plus NO3	4.2	mg/L	0.10	10/22/19 12:39	H1
EPA 353.2	Nitrogen, Nitrate	4.2	mg/L	0.10	10/22/19 12:39	H1
50239194002	**MW-35**					
RSK 175 Modified	Ethane	15.8	ug/L	10.0	10/23/19 05:35	
RSK 175 Modified	Ethene	12.3	ug/L	10.0	10/23/19 05:35	
RSK 175 Modified	Methane	19.1	ug/L	10.0	10/23/19 05:35	
EPA 6010	Iron	472	ug/L	100	10/25/19 01:25	
EPA 6010	Manganese	25.8	ug/L	10.0	10/25/19 01:25	
EPA 6010	Manganese, Dissolved	15.3	ug/L	10.0	10/26/19 00:23	
EPA 8260	1,1,1-Trichloroethane	17.8	ug/L	5.0	10/23/19 20:33	
EPA 8260	Trichloroethene	85.3	ug/L	5.0	10/23/19 20:33	
EPA 9038	Sulfate	37.7	mg/L	10.0	10/25/19 09:32	
EPA 353.2	Nitrogen, NO2 plus NO3	4.6	mg/L	0.10	10/22/19 12:37	H1
EPA 353.2	Nitrogen, Nitrate	4.6	mg/L	0.10	10/22/19 12:37	H1
50239194003	**FD-1 GW**					
EPA 6010	Iron	556	ug/L	100	10/25/19 01:28	
EPA 6010	Manganese	27.3	ug/L	10.0	10/25/19 01:28	
EPA 6010	Manganese, Dissolved	14.2	ug/L	10.0	10/26/19 00:25	
EPA 8260	1,1,1-Trichloroethane	17.9	ug/L	5.0	10/23/19 21:07	
EPA 8260	Trichloroethene	86.3	ug/L	5.0	10/23/19 21:07	
EPA 9038	Sulfate	27.3	mg/L	20.0	10/25/19 09:37	
EPA 353.2	Nitrogen, NO2 plus NO3	4.7	mg/L	0.10	10/22/19 12:36	H1
EPA 353.2	Nitrogen, Nitrate	4.7	mg/L	0.10	10/22/19 12:36	H1

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(317)228-3100

ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50239194

Sample: MW-31 **Lab ID: 50239194001** Collected: 10/18/19 14:15 Received: 10/18/19 17:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		10/23/19 04:56	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		10/23/19 04:56	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		10/23/19 04:56	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**726**	ug/L	100	21.2	1	10/24/19 17:05	10/25/19 01:10	7439-89-6	
Manganese	**23.8**	ug/L	10.0	0.62	1	10/24/19 17:05	10/25/19 01:10	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	21.2	1	10/25/19 13:05	10/26/19 00:09	7439-89-6	
Manganese, Dissolved	ND	ug/L	10.0	0.62	1	10/25/19 13:05	10/26/19 00:09	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.43	1		10/23/19 18:52	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	3.2	1		10/23/19 18:52	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.7	1		10/23/19 18:52	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.3	1		10/23/19 18:52	156-60-5	
Methylene Chloride	ND	ug/L	5.0	5.0	1		10/23/19 18:52	75-09-2	
Tetrachloroethene	**57.5**	ug/L	5.0	0.43	1		10/23/19 18:52	127-18-4	
1,1,1-Trichloroethane	**8.0**	ug/L	5.0	3.6	1		10/23/19 18:52	71-55-6	
Trichloroethene	**51.4**	ug/L	5.0	3.3	1		10/23/19 18:52	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.31	1		10/23/19 18:52	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	80-122		1		10/23/19 18:52	1868-53-7	
4-Bromofluorobenzene (S)	111	%.	85-114		1		10/23/19 18:52	460-00-4	
Toluene-d8 (S)	107	%.	85-114		1		10/23/19 18:52	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		10/22/19 12:32	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**31.2**	mg/L	10.0	3.8	1		10/25/19 09:30	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.2**	mg/L	0.10	0.020	1		10/22/19 12:39		H1
Nitrogen, Nitrate	**4.2**	mg/L	0.10	0.020	1		10/22/19 12:39	14797-55-8	H1

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50239194

Sample: MW-35 **Lab ID: 50239194002** Collected: 10/18/19 11:45 Received: 10/18/19 17:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	**15.8**	ug/L	10.0	5.0	1		10/23/19 05:35	74-84-0	
Ethene	**12.3**	ug/L	10.0	4.1	1		10/23/19 05:35	74-85-1	
Methane	**19.1**	ug/L	10.0	6.4	1		10/23/19 05:35	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**472**	ug/L	100	21.2	1	10/24/19 17:05	10/25/19 01:25	7439-89-6	
Manganese	**25.8**	ug/L	10.0	0.62	1	10/24/19 17:05	10/25/19 01:25	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	21.2	1	10/25/19 13:05	10/26/19 00:23	7439-89-6	
Manganese, Dissolved	**15.3**	ug/L	10.0	0.62	1	10/25/19 13:05	10/26/19 00:23	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.43	1		10/23/19 20:33	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	3.2	1		10/23/19 20:33	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.7	1		10/23/19 20:33	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.3	1		10/23/19 20:33	156-60-5	
Methylene Chloride	ND	ug/L	5.0	5.0	1		10/23/19 20:33	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.43	1		10/23/19 20:33	127-18-4	
1,1,1-Trichloroethane	**17.8**	ug/L	5.0	3.6	1		10/23/19 20:33	71-55-6	
Trichloroethene	**85.3**	ug/L	5.0	3.3	1		10/23/19 20:33	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.31	1		10/23/19 20:33	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	80-122		1		10/23/19 20:33	1868-53-7	
4-Bromofluorobenzene (S)	109	%.	85-114		1		10/23/19 20:33	460-00-4	
Toluene-d8 (S)	106	%.	85-114		1		10/23/19 20:33	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		10/22/19 12:32	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**37.7**	mg/L	10.0	3.8	1		10/25/19 09:32	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.6**	mg/L	0.10	0.020	1		10/22/19 12:37		H1
Nitrogen, Nitrate	**4.6**	mg/L	0.10	0.020	1		10/22/19 12:37	14797-55-8	H1

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ANALYTICAL RESULTS

Project: Amphenol

Pace Project No.: 50239194

Sample: FD-1 GW **Lab ID: 50239194003** Collected: 10/18/19 08:00 Received: 10/18/19 17:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		10/23/19 14:43	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		10/23/19 14:43	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		10/23/19 14:43	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**556**	ug/L	100	21.2	1	10/24/19 17:05	10/25/19 01:28	7439-89-6	
Manganese	**27.3**	ug/L	10.0	0.62	1	10/24/19 17:05	10/25/19 01:28	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	21.2	1	10/25/19 13:05	10/26/19 00:25	7439-89-6	
Manganese, Dissolved	**14.2**	ug/L	10.0	0.62	1	10/25/19 13:05	10/26/19 00:25	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.43	1		10/23/19 21:07	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	3.2	1		10/23/19 21:07	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.7	1		10/23/19 21:07	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.3	1		10/23/19 21:07	156-60-5	
Methylene Chloride	ND	ug/L	5.0	5.0	1		10/23/19 21:07	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.43	1		10/23/19 21:07	127-18-4	
1,1,1-Trichloroethane	**17.9**	ug/L	5.0	3.6	1		10/23/19 21:07	71-55-6	
Trichloroethene	**86.3**	ug/L	5.0	3.3	1		10/23/19 21:07	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.31	1		10/23/19 21:07	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	80-122		1		10/23/19 21:07	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-114		1		10/23/19 21:07	460-00-4	
Toluene-d8 (S)	106	%.	85-114		1		10/23/19 21:07	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		10/22/19 12:32	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**27.3**	mg/L	20.0	7.6	2		10/25/19 09:37	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.7**	mg/L	0.10	0.020	1		10/22/19 12:36		H1
Nitrogen, Nitrate	**4.7**	mg/L	0.10	0.020	1		10/22/19 12:36	14797-55-8	H1

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(317)228-3100

ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50239194

Sample: TB-1 GW **Lab ID: 50239194004** Collected: 10/18/19 15:45 Received: 10/18/19 17:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.43	1		10/23/19 21:40	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	3.2	1		10/23/19 21:40	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.7	1		10/23/19 21:40	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.3	1		10/23/19 21:40	156-60-5	
Methylene Chloride	ND	ug/L	5.0	5.0	1		10/23/19 21:40	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.43	1		10/23/19 21:40	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.6	1		10/23/19 21:40	71-55-6	
Trichloroethene	ND	ug/L	5.0	3.3	1		10/23/19 21:40	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.31	1		10/23/19 21:40	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	80-122		1		10/23/19 21:40	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-114		1		10/23/19 21:40	460-00-4	
Toluene-d8 (S)	105	%.	85-114		1		10/23/19 21:40	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50239194

Sample: EB-1 GW **Lab ID: 50239194005** Collected: 10/18/19 12:20 Received: 10/18/19 17:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		10/23/19 15:02	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		10/23/19 15:02	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		10/23/19 15:02	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	ND	ug/L	100	21.2	1	10/24/19 17:05	10/25/19 01:30	7439-89-6	
Manganese	ND	ug/L	10.0	0.62	1	10/24/19 17:05	10/25/19 01:30	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	21.2	1	10/25/19 13:05	10/26/19 00:28	7439-89-6	
Manganese, Dissolved	ND	ug/L	10.0	0.62	1	10/25/19 13:05	10/26/19 00:28	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.43	1		10/23/19 22:14	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	3.2	1		10/23/19 22:14	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.7	1		10/23/19 22:14	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.3	1		10/23/19 22:14	156-60-5	
Methylene Chloride	ND	ug/L	5.0	5.0	1		10/23/19 22:14	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.43	1		10/23/19 22:14	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.6	1		10/23/19 22:14	71-55-6	
Trichloroethene	ND	ug/L	5.0	3.3	1		10/23/19 22:14	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.31	1		10/23/19 22:14	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	80-122		1		10/23/19 22:14	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-114		1		10/23/19 22:14	460-00-4	
Toluene-d8 (S)	106	%.	85-114		1		10/23/19 22:14	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		10/22/19 12:32	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	ND	mg/L	10.0	3.8	1		10/25/19 09:37	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.020	1		10/22/19 12:38		H1
Nitrogen, Nitrate	ND	mg/L	0.10	0.020	1		10/22/19 12:38	14797-55-8	H1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50239194

QC Batch: 528437 Analysis Method: RSK 175 Modified
QC Batch Method: RSK 175 Modified Analysis Description: RSK 175 HEADSPACE
Associated Lab Samples: 50239194001, 50239194002

METHOD BLANK: 2438262 Matrix: Water
Associated Lab Samples: 50239194001, 50239194002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	5.0	10/23/19 01:43	
Ethene	ug/L	ND	10.0	4.1	10/23/19 01:43	
Methane	ug/L	ND	10.0	6.4	10/23/19 01:43	

LABORATORY CONTROL SAMPLE: 2438263

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	1980	1690	86	78-135	
Ethene	ug/L	2250	2410	107	83-133	
Methane	ug/L	1980	1620	82	67-135	

SAMPLE DUPLICATE: 2438264

Parameter	Units	50239194001 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	ND	15.1		20	
Ethene	ug/L	ND	18.4		20	
Methane	ug/L	ND	14.9		20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50239194

QC Batch: 528696 Analysis Method: RSK 175 Modified
QC Batch Method: RSK 175 Modified Analysis Description: RSK 175 HEADSPACE
Associated Lab Samples: 50239194003, 50239194005

METHOD BLANK: 2439258 Matrix: Water
Associated Lab Samples: 50239194003, 50239194005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	5.0	10/23/19 14:24	
Ethene	ug/L	ND	10.0	4.1	10/23/19 14:24	
Methane	ug/L	ND	10.0	6.4	10/23/19 14:24	

LABORATORY CONTROL SAMPLE: 2439259

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	1980	2120	108	78-135	
Ethene	ug/L	2250	2530	113	83-133	
Methane	ug/L	1980	1940	98	67-135	

SAMPLE DUPLICATE: 2439260

Parameter	Units	50239152006 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	ND	8.4J		20	
Ethene	ug/L	ND	4.8J		20	
Methane	ug/L	ND	8.7J		20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50239194

QC Batch: 528472 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET
Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194005

METHOD BLANK: 2438415 | Matrix: Water
Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron	ug/L	ND	100	21.2	10/25/19 01:06	
Manganese	ug/L	ND	10.0	0.62	10/25/19 01:06	

LABORATORY CONTROL SAMPLE: 2438416

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	9060	91	80-120	
Manganese	ug/L	1000	885	88	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2438417 2438418

Parameter	Units	50239194001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	726	10000	10000	9920	9800	92	91	75-125	1	20	
Manganese	ug/L	23.8	1000	1000	922	912	90	89	75-125	1	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50239194

QC Batch: 528608 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194005

METHOD BLANK: 2438941 Matrix: Water
Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	100	21.2	10/25/19 23:20	
Manganese, Dissolved	ug/L	ND	10.0	0.62	10/25/19 23:20	

LABORATORY CONTROL SAMPLE: 2438942

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	10000	10100	101	80-120	
Manganese, Dissolved	ug/L	1000	996	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2438945 2438946

Parameter	Units	50239194001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	8900	9120	89	91	75-125	2	20	
Manganese, Dissolved	ug/L	ND	1000	1000	884	905	88	90	75-125	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2439762 2439763

Parameter	Units	50238930004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	207	10000	10000	9380	9240	92	90	75-125	2	20	
Manganese, Dissolved	ug/L	1110	1000	1000	2020	2010	92	90	75-125	1	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50239194

QC Batch: 528732 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194004, 50239194005

METHOD BLANK: 2439464 Matrix: Water
Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194004, 50239194005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	3.6	10/23/19 14:22	
1,1-Dichloroethane	ug/L	ND	5.0	0.43	10/23/19 14:22	
1,2-Dichloroethane	ug/L	ND	5.0	3.2	10/23/19 14:22	
cis-1,2-Dichloroethene	ug/L	ND	5.0	3.7	10/23/19 14:22	
Methylene Chloride	ug/L	ND	5.0	5.0	10/23/19 14:22	
Tetrachloroethene	ug/L	ND	5.0	0.43	10/23/19 14:22	
trans-1,2-Dichloroethene	ug/L	ND	5.0	3.3	10/23/19 14:22	
Trichloroethene	ug/L	ND	5.0	3.3	10/23/19 14:22	
Vinyl chloride	ug/L	ND	2.0	0.31	10/23/19 14:22	
4-Bromofluorobenzene (S)	%.	107	85-114		10/23/19 14:22	
Dibromofluoromethane (S)	%.	107	80-122		10/23/19 14:22	
Toluene-d8 (S)	%.	106	85-114		10/23/19 14:22	

LABORATORY CONTROL SAMPLE: 2439465

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	47.9	96	72-127	
1,1-Dichloroethane	ug/L	50	42.9	86	70-119	
1,2-Dichloroethane	ug/L	50	43.3	87	68-119	
cis-1,2-Dichloroethene	ug/L	50	48.3	97	74-122	
Methylene Chloride	ug/L	50	47.9	96	70-121	
Tetrachloroethene	ug/L	50	53.1	106	76-124	
trans-1,2-Dichloroethene	ug/L	50	49.5	99	73-121	
Trichloroethene	ug/L	50	50.8	102	76-120	
Vinyl chloride	ug/L	50	36.8	74	70-136	
4-Bromofluorobenzene (S)	%.			103	85-114	
Dibromofluoromethane (S)	%.			96	80-122	
Toluene-d8 (S)	%.			108	85-114	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2439466 2439467

Parameter	Units	50239194001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	8.0	50	50	53.2	54.1	90	92	48-145	2	20	
1,1-Dichloroethane	ug/L	ND	50	50	43.0	43.6	86	87	38-142	1	20	
1,2-Dichloroethane	ug/L	ND	50	50	44.8	44.6	90	89	44-138	1	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	46.5	47.9	93	96	46-143	3	20	
Methylene Chloride	ug/L	ND	50	50	43.7	44.0	87	88	33-140	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50239194

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2439466 2439467

Parameter	Units	50239194001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Tetrachloroethene	ug/L	57.5	50	50	96.6	99.8	78	85	41-145	3	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	45.4	46.3	91	93	46-140	2	20	
Trichloroethene	ug/L	51.4	50	50	96.2	96.8	90	91	43-147	1	20	
Vinyl chloride	ug/L	ND	50	50	33.8	34.2	68	68	49-153	1	20	
4-Bromofluorobenzene (S)	%.						103	103	85-114			
Dibromofluoromethane (S)	%.						99	99	80-122			
Toluene-d8 (S)	%.						108	107	85-114			

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50239194

QC Batch: 528410 | Analysis Method: SM 4500-S2-D
QC Batch Method: SM 4500-S2-D | Analysis Description: 4500S2D Sulfide Water
Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194005

METHOD BLANK: 2438192 Matrix: Water
Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.017	10/22/19 12:32	

LABORATORY CONTROL SAMPLE: 2438193

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.48	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2438194 2438195

Parameter	Units	50239194001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.45	0.45	87	86	90-110	0	20	M3

MATRIX SPIKE SAMPLE: 2438196

Parameter	Units	50239051001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	ND	0.5	0.51	101	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50239194

QC Batch: 529119 | Analysis Method: EPA 9038
QC Batch Method: EPA 9038 | Analysis Description: 9038 Sulfate Water
Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194005

METHOD BLANK: 2441558 Matrix: Water
Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	3.8	10/25/19 09:11	

LABORATORY CONTROL SAMPLE: 2441559

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	20	18.5	93	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2441560 2441561

Parameter	Units	50239194001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	31.2	50	50	87.5	85.1	113	108	90-110	3	20	M0

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50239194

QC Batch:	528411	Analysis Method:	EPA 353.2
QC Batch Method:	EPA 353.2	Analysis Description:	353.2 Nitrate + Nitrite, Unpres.

Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194005

METHOD BLANK: 2438198 Matrix: Water

Associated Lab Samples: 50239194001, 50239194002, 50239194003, 50239194005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	ND	0.10	0.020	10/22/19 12:33	
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.020	10/22/19 12:33	

LABORATORY CONTROL SAMPLE: 2438199

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	1	1.1	113	90-110	
Nitrogen, NO2 plus NO3	mg/L	2	2.1	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2438200 2438201

Parameter	Units	50239194001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Nitrate	mg/L	4.2	2	2	6.6	6.8	120	127	90-110	2	20	H1
Nitrogen, NO2 plus NO3	mg/L	4.2	4	4	8.6	8.8	109	113	90-110	2	20	H1,M0

MATRIX SPIKE SAMPLE: 2438202

Parameter	Units	50239261004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	0.17	1	1.3	118	90-110	
Nitrogen, NO2 plus NO3	mg/L	0.17	2	2.3	108	90-110	

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QUALIFIERS

Project:	Amphenol
Pace Project No.:	50239194

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-I	Pace Analytical Services - Indianapolis

ANALYTE QUALIFIERS

H1	Analysis conducted outside the recognized method holding time.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M3	Matrix spike recovery was outside laboratory control limits due to matrix interferences.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50239194

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50239194001	**MW-31**	RSK 175 Modified	528437		
50239194002	**MW-35**	RSK 175 Modified	528437		
50239194003	**FD-1 GW**	RSK 175 Modified	528696		
50239194005	**EB-1 GW**	RSK 175 Modified	528696		
50239194001	**MW-31**	EPA 3010	528472	EPA 6010	529082
50239194002	**MW-35**	EPA 3010	528472	EPA 6010	529082
50239194003	**FD-1 GW**	EPA 3010	528472	EPA 6010	529082
50239194005	**EB-1 GW**	EPA 3010	528472	EPA 6010	529082
50239194001	**MW-31**	EPA 3010	528608	EPA 6010	529303
50239194002	**MW-35**	EPA 3010	528608	EPA 6010	529303
50239194003	**FD-1 GW**	EPA 3010	528608	EPA 6010	529303
50239194005	**EB-1 GW**	EPA 3010	528608	EPA 6010	529303
50239194001	**MW-31**	EPA 8260	528732		
50239194002	**MW-35**	EPA 8260	528732		
50239194003	**FD-1 GW**	EPA 8260	528732		
50239194004	**TB-1 GW**	EPA 8260	528732		
50239194005	**EB-1 GW**	EPA 8260	528732		
50239194001	**MW-31**	SM 4500-S2-D	528410		
50239194002	**MW-35**	SM 4500-S2-D	528410		
50239194003	**FD-1 GW**	SM 4500-S2-D	528410		
50239194005	**EB-1 GW**	SM 4500-S2-D	528410		
50239194001	**MW-31**	EPA 9038	529119		
50239194002	**MW-35**	EPA 9038	529119		
50239194003	**FD-1 GW**	EPA 9038	529119		
50239194005	**EB-1 GW**	EPA 9038	529119		
50239194001	**MW-31**	EPA 353.2	528411		
50239194002	**MW-35**	EPA 353.2	528411		
50239194003	**FD-1 GW**	EPA 353.2	528411		
50239194005	**EB-1 GW**	EPA 353.2	528411		

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

50239194

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Company: IWM Consulting Group

Address: 7428 Rockville Road Indpls, IN

Billing Information:

Report To: Brad Gentry

Email To: bgentry@iwmconsult.com

Copy To: cparks@iwmconsult.com

Site Collection Info/Address: 980 South Hurricane Road

Customer Project Name/Number: Amphenol

State: IN County/City: Johnson/Franklin Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET

Phone: 317-347-1111
Email:

Site/Facility ID #:

Compliance Monitoring? [ ] Yes [ ] No

Collected By (print): Luke Lohrstorfer

Purchase Order #:
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Luke Lohrstorfer

Turnaround Date Required: Standard TAT; Level IV QA/QC

Immediately Packed on Ice: [✓] Yes [ ] No

Sample Disposal:
[ ] Dispose as appropriate [ ] Return
[ ] Archive: ______
[ ] Hold: ______

Rush:
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day
(Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [✓] No

Analysis: ______

Container Preservative Type **: 3 | 1 | U | U | 4/5 | 3

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Analyses

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	VOCs SL	Total Iron / Total Manganese 6010	Dissolved Iron / Dissolved Manganese 6010	Sulfate 9038 / Nitrate 353.1	Sulfide 376.1	Ethene / Ethane / Methane RSK 175	Lab Sample # / Comments
MW-31 (ms/msd)	GW	Grab	10/18/19	14:15				30	X	X	X	X	X	X	001
MW-35	GW	Grab	10/18/19	11:45				10	X	X	X	X	X	X	002
FD-1 GW	GW	Grab	10/18/19	—				10	X	X	X	X	X	X	003
TB-1 GW	GW	Grab	10/18/19	15:45				3	X						004
EB-1 GW	GW	Grab	10/18/19	12:20				10	X	X	X	X	X	X	005

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips: ______	
Sample pH Acceptable	Y N NA
pH Strips: ______	
Sulfide Present	Y N NA
Lead Acetate Strips: ______	

LAB USE ONLY: See SCUR

Customer Remarks / Special Conditions / Possible Hazards:
Shortlist includes:
-TCE -trans-1,2-DCE -1,2-DCA
-PCE -1,1-DCA -methylene chloride
-Vinyl chloride -cis-1,2-DCE -1,1,1-TCA

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2384992

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: E
Cooler 1 Temp Upon Receipt: 1.3 oC
Cooler 1 Therm Corr. Factor: +0.2 oC
Cooler 1 Corrected Temp: 1.5 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Luke Lohrstorfer /IWM	10/18/19 17:36	[signature]	10/18/19 1736

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: ___ of: ___

Pace Analytical

SAMPLE CONDITION UPON RECEIPT FORM

Project #: 50239194

Date/Time and Initials of person examining contents: LWG 1800 10/18/19

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Other ______

Tracking #: ______

Custody Seal on Cooler/Box Present: ☐ Yes ☒ No **Seals Intact:** ☐ Yes ☒ No

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other ______

CT 10/18/19

Thermometer: 1 2 3 4 5 6 A B C D E F Ice Type: ☒ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☒ Yes ☐ No ~~☒ N/A~~

Cooler Temperature: 1.3/1.5 Ice Visible in Sample Containers? ☐ Yes ☒ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C If temp. is Over 6°C or under 0°C, was the PM Notified? ☐ Yes ☐ No ☒ N/A

All discrepancies will be written out in the comments section below.

	Yes	No
Are samples from West Virginia? Document any containers out of temp.		✓
USDA Regulated Soils? (ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		✓
Chain of Custody Present:	✓	
Chain of Custody Filled Out:	✓	
Short Hold Time Analysis (<72hr)?: Analysis:		✓
Time 5035A TC placed in Freezer or Short Holds To Lab:		
Rush TAT Requested:		✓
Containers Intact?:	✓	
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	✓	
Extra labels on Terracore Vials (soils only)?		NA

	Yes	No	N/A
All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted. Circle: HNO3 H2SO4 NaOH NaOH/ZnAc	✓		
Dissolved Metals field filtered?:			✓
Headspace Wisconsin Sulfide			✓
	Present	Absent	N/A
Residual Chlorine Check (SVOC 625 Pest/PCB 608)			✓
Residual Chlorine Check (Total/Amenable/Free Cyanide)			✓
Headspace in VOA Vials (>6mm):		✓	
Trip Blank Present?:	✓		
Trip Blank Custody Seals?:	✓		

Comments:

F-IN-Q-290-rev 18,22Apr2019

COC PAGE 1 of 1

Sample Container Count

WO# : 50239194

50239194

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			18												6	3				3						WT	✓	✓	
2			6												2	1				1									
3			6												1	1				1									
4			3																										
5			6												2	1				1									
6																													
7																													
8																													
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

F-IN-Q-270-rev.11,26Sep2019

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

December 09, 2019

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol
Pace Project No.: 50242801

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on November 26, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chris Boyle
chris.boyle@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Brad Gentry, IWM Consulting Group, LLC
Mr. Chris Parks, IWM Consulting Group

CERTIFICATIONS

Project:	Amphenol
Pace Project No.:	50242801

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Certification #: 200074
Indiana Certification #: C-49-06
Kansas/NELAP Certification #: E-10177
Kentucky UST Certification #: 80226
Kentucky WW Certification #: 98019
Michigan Department of Environmental Quality, Laboratory #9050
Ohio VAP Certification #: CL0065
Oklahoma Certification #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Certification #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services, LLC
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SAMPLE SUMMARY

Project: Amphenol
Pace Project No.: 50242801

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50242801001	**MW-31**	Water	11/25/19 15:35	11/26/19 08:35
50242801002	**MW-35**	Water	11/25/19 11:48	11/26/19 08:35
50242801003	**MW-38**	Water	11/25/19 13:50	11/26/19 08:35
50242801004	**DUP**	Water	11/25/19 08:00	11/26/19 08:35
50242801006	**EQ Blank**	Water	11/25/19 15:35	11/26/19 08:35

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SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50242801

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50242801001	**MW-31**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	TMW	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	DAC1	2	PASI-I
50242801002	**MW-35**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	CAP	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	DAC1	2	PASI-I
50242801003	**MW-38**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	CAP	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	DAC1	2	PASI-I
50242801004	**DUP**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	CAP	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	DAC1	2	PASI-I
50242801006	**EQ Blank**	EPA 8260	TMW	12	PASI-I

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50242801

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50242801001	**MW-31**					
EPA 6010	Manganese	24.7	ug/L	10.0	12/06/19 04:44	
EPA 6010	Manganese, Dissolved	18.8	ug/L	10.0	12/07/19 22:28	
EPA 8260	Tetrachloroethene	44.3	ug/L	5.0	12/04/19 20:38	
EPA 8260	1,1,1-Trichloroethane	5.8	ug/L	5.0	12/04/19 20:38	
EPA 8260	Trichloroethene	35.0	ug/L	5.0	12/04/19 20:38	
EPA 9038	Sulfate	54.1	mg/L	20.0	12/03/19 09:00	
EPA 353.2	Nitrogen, NO2 plus NO3	3.1	mg/L	0.10	11/26/19 16:09	
EPA 353.2	Nitrogen, Nitrate	3.1	mg/L	0.10	11/26/19 16:09	
50242801002	**MW-35**					
RSK 175 Modified	Ethane	63.1	ug/L	10.0	12/03/19 19:36	
RSK 175 Modified	Ethene	45.8	ug/L	10.0	12/03/19 19:36	
RSK 175 Modified	Methane	117	ug/L	10.0	12/03/19 19:36	
EPA 6010	Iron	14900	ug/L	100	12/06/19 04:47	
EPA 6010	Manganese	580	ug/L	10.0	12/06/19 04:47	
EPA 6010	Iron, Dissolved	168	ug/L	100	12/07/19 22:30	
EPA 6010	Manganese, Dissolved	378	ug/L	10.0	12/07/19 22:30	
EPA 353.2	Nitrogen, NO2 plus NO3	0.11	mg/L	0.10	11/26/19 15:58	
50242801003	**MW-38**					
EPA 6010	Iron	164	ug/L	100	12/06/19 04:53	
EPA 8260	Tetrachloroethene	25.9	ug/L	5.0	12/06/19 05:56	
EPA 8260	1,1,1-Trichloroethane	20.6	ug/L	5.0	12/06/19 05:56	M1
EPA 8260	Trichloroethene	99.1	ug/L	5.0	12/06/19 05:56	
EPA 9038	Sulfate	23.8	mg/L	10.0	12/03/19 09:10	
EPA 353.2	Nitrogen, NO2 plus NO3	4.7	mg/L	0.10	11/26/19 15:59	
EPA 353.2	Nitrogen, Nitrate	4.7	mg/L	0.10	11/26/19 15:59	
50242801004	**DUP**					
RSK 175 Modified	Ethane	76.7	ug/L	10.0	12/03/19 20:34	
RSK 175 Modified	Ethene	54.1	ug/L	10.0	12/03/19 20:34	
RSK 175 Modified	Methane	133	ug/L	10.0	12/03/19 20:34	
EPA 6010	Iron	15800	ug/L	100	12/06/19 05:00	
EPA 6010	Manganese	581	ug/L	10.0	12/06/19 05:00	
EPA 6010	Iron, Dissolved	167	ug/L	100	12/07/19 22:43	
EPA 6010	Manganese, Dissolved	370	ug/L	10.0	12/07/19 22:43	
EPA 353.2	Nitrogen, NO2 plus NO3	0.11	mg/L	0.10	11/26/19 15:57	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50242801

Sample: MW-31 **Lab ID: 50242801001** Collected: 11/25/19 15:35 Received: 11/26/19 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		12/03/19 19:17	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		12/03/19 19:17	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		12/03/19 19:17	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	ND	ug/L	100	21.2	1	12/03/19 06:09	12/06/19 04:44	7439-89-6	
Manganese	**24.7**	ug/L	10.0	0.62	1	12/03/19 06:09	12/06/19 04:44	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	32.4	1	12/06/19 15:45	12/07/19 22:28	7439-89-6	
Manganese, Dissolved	**18.8**	ug/L	10.0	1.1	1	12/06/19 15:45	12/07/19 22:28	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.22	1		12/04/19 20:38	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/04/19 20:38	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.40	1		12/04/19 20:38	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.37	1		12/04/19 20:38	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.27	1		12/04/19 20:38	75-09-2	
Tetrachloroethene	**44.3**	ug/L	5.0	0.25	1		12/04/19 20:38	127-18-4	
1,1,1-Trichloroethane	**5.8**	ug/L	5.0	1.3	1		12/04/19 20:38	71-55-6	
Trichloroethene	**35.0**	ug/L	5.0	1.2	1		12/04/19 20:38	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.46	1		12/04/19 20:38	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	80-122		1		12/04/19 20:38	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-114		1		12/04/19 20:38	460-00-4	
Toluene-d8 (S)	100	%.	85-114		1		12/04/19 20:38	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		11/26/19 14:09	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**54.1**	mg/L	20.0	7.6	2		12/03/19 09:00	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**3.1**	mg/L	0.10	0.020	1		11/26/19 16:09		
Nitrogen, Nitrate	**3.1**	mg/L	0.10	0.020	1		11/26/19 16:09	14797-55-8	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50242801

Sample: MW-35 **Lab ID: 50242801002** Collected: 11/25/19 11:48 Received: 11/26/19 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	**63.1**	ug/L	10.0	5.0	1		12/03/19 19:36	74-84-0	
Ethene	**45.8**	ug/L	10.0	4.1	1		12/03/19 19:36	74-85-1	
Methane	**117**	ug/L	10.0	6.4	1		12/03/19 19:36	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**14900**	ug/L	100	21.2	1	12/03/19 06:09	12/06/19 04:47	7439-89-6	
Manganese	**580**	ug/L	10.0	0.62	1	12/03/19 06:09	12/06/19 04:47	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	**168**	ug/L	100	32.4	1	12/06/19 15:45	12/07/19 22:30	7439-89-6	
Manganese, Dissolved	**378**	ug/L	10.0	1.1	1	12/06/19 15:45	12/07/19 22:30	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.26	1		12/06/19 05:31	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		12/06/19 05:31	107-06-2	L1
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		12/06/19 05:31	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		12/06/19 05:31	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		12/06/19 05:31	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.22	1		12/06/19 05:31	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.25	1		12/06/19 05:31	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.26	1		12/06/19 05:31	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		12/06/19 05:31	75-01-4	
Surrogates									
Dibromofluoromethane (S)	109	%.	80-122		1		12/06/19 05:31	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-114		1		12/06/19 05:31	460-00-4	
Toluene-d8 (S)	97	%.	85-114		1		12/06/19 05:31	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.50	0.085	1		11/26/19 14:09	18496-25-8	D3
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	ND	mg/L	10.0	3.8	1		12/03/19 09:00	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**0.11**	mg/L	0.10	0.020	1		11/26/19 15:58		
Nitrogen, Nitrate	ND	mg/L	0.10	0.020	1		11/26/19 15:58	14797-55-8	

REPORT OF LABORATORY ANALYSIS

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7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50242801

Sample: MW-38 **Lab ID: 50242801003** Collected: 11/25/19 13:50 Received: 11/26/19 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		12/03/19 19:55	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		12/03/19 19:55	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		12/03/19 19:55	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**164**	ug/L	100	21.2	1	12/03/19 06:09	12/06/19 04:53	7439-89-6	
Manganese	ND	ug/L	10.0	0.62	1	12/03/19 06:09	12/06/19 04:53	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	32.4	1	12/06/19 15:45	12/07/19 22:32	7439-89-6	
Manganese, Dissolved	ND	ug/L	10.0	1.1	1	12/06/19 15:45	12/07/19 22:32	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.26	1		12/06/19 05:56	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		12/06/19 05:56	107-06-2	L1,M0
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		12/06/19 05:56	156-59-2	M1
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		12/06/19 05:56	156-60-5	M1
Methylene Chloride	ND	ug/L	5.0	2.4	1		12/06/19 05:56	75-09-2	
Tetrachloroethene	**25.9**	ug/L	5.0	0.22	1		12/06/19 05:56	127-18-4	
1,1,1-Trichloroethane	**20.6**	ug/L	5.0	0.25	1		12/06/19 05:56	71-55-6	M1
Trichloroethene	**99.1**	ug/L	5.0	0.26	1		12/06/19 05:56	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		12/06/19 05:56	75-01-4	M1
Surrogates									
Dibromofluoromethane (S)	109	%.	80-122		1		12/06/19 05:56	1868-53-7	
4-Bromofluorobenzene (S)	94	%.	85-114		1		12/06/19 05:56	460-00-4	
Toluene-d8 (S)	96	%.	85-114		1		12/06/19 05:56	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		11/26/19 14:09	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**23.8**	mg/L	10.0	3.8	1		12/03/19 09:10	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.7**	mg/L	0.10	0.020	1		11/26/19 15:59		
Nitrogen, Nitrate	**4.7**	mg/L	0.10	0.020	1		11/26/19 15:59	14797-55-8	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50242801

Sample: DUP **Lab ID: 50242801004** Collected: 11/25/19 08:00 Received: 11/26/19 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	**76.7**	ug/L	10.0	5.0	1		12/03/19 20:34	74-84-0	
Ethene	**54.1**	ug/L	10.0	4.1	1		12/03/19 20:34	74-85-1	
Methane	**133**	ug/L	10.0	6.4	1		12/03/19 20:34	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**15800**	ug/L	100	21.2	1	12/03/19 06:09	12/06/19 05:00	7439-89-6	
Manganese	**581**	ug/L	10.0	0.62	1	12/03/19 06:09	12/06/19 05:00	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	**167**	ug/L	100	32.4	1	12/06/19 15:45	12/07/19 22:43	7439-89-6	
Manganese, Dissolved	**370**	ug/L	10.0	1.1	1	12/06/19 15:45	12/07/19 22:43	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.26	1		12/06/19 06:20	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		12/06/19 06:20	107-06-2	L1
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		12/06/19 06:20	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		12/06/19 06:20	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		12/06/19 06:20	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.22	1		12/06/19 06:20	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.25	1		12/06/19 06:20	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.26	1		12/06/19 06:20	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		12/06/19 06:20	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	80-122		1		12/06/19 06:20	1868-53-7	
4-Bromofluorobenzene (S)	92	%.	85-114		1		12/06/19 06:20	460-00-4	
Toluene-d8 (S)	93	%.	85-114		1		12/06/19 06:20	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.50	0.085	1		11/26/19 14:09	18496-25-8	D3
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	ND	mg/L	10.0	3.8	1		12/03/19 09:10	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**0.11**	mg/L	0.10	0.020	1		11/26/19 15:57		
Nitrogen, Nitrate	ND	mg/L	0.10	0.020	1		11/26/19 15:57	14797-55-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50242801

Sample: EQ Blank **Lab ID: 50242801006** Collected: 11/25/19 15:35 Received: 11/26/19 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.22	1		12/05/19 00:07	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/05/19 00:07	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.40	1		12/05/19 00:07	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.37	1		12/05/19 00:07	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.27	1		12/05/19 00:07	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.25	1		12/05/19 00:07	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.3	1		12/05/19 00:07	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.2	1		12/05/19 00:07	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.46	1		12/05/19 00:07	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	80-122		1		12/05/19 00:07	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-114		1		12/05/19 00:07	460-00-4	
Toluene-d8 (S)	98	%.	85-114		1		12/05/19 00:07	2037-26-5	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50242801

QC Batch: 536119 Analysis Method: RSK 175 Modified
QC Batch Method: RSK 175 Modified Analysis Description: RSK 175 HEADSPACE
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

METHOD BLANK: 2473890 Matrix: Water
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	5.0	12/03/19 18:00	
Ethene	ug/L	ND	10.0	4.1	12/03/19 18:00	
Methane	ug/L	ND	10.0	6.4	12/03/19 18:00	

LABORATORY CONTROL SAMPLE: 2473891

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	1980	2380	121	78-135	
Ethene	ug/L	2250	2470	110	83-133	
Methane	ug/L	1980	2180	110	67-135	

SAMPLE DUPLICATE: 2473892

Parameter	Units	50242801003 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	ND	ND		20	
Ethene	ug/L	ND	ND		20	
Methane	ug/L	ND	ND		20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50242801

QC Batch: 535780 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

METHOD BLANK: 2472489 Matrix: Water
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron	ug/L	ND	100	21.2	12/06/19 03:48	
Manganese	ug/L	ND	10.0	0.62	12/06/19 03:48	

LABORATORY CONTROL SAMPLE: 2472490

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	9860	99	80-120	
Manganese	ug/L	1000	974	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2472493 2472494

Parameter	Units	50242801003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	164	10000	10000	9860	9840	97	97	75-125	0	20	
Manganese	ug/L	ND	1000	1000	976	972	97	96	75-125	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2472495 2472496

Parameter	Units	50242784001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	5670	10000	10000	15400	15200	98	95	75-125	2	20	
Manganese	ug/L	596	1000	1000	1580	1550	98	96	75-125	2	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50242801

QC Batch: 536992 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

METHOD BLANK: 2477808 Matrix: Water
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	100	32.4	12/07/19 22:03	
Manganese, Dissolved	ug/L	ND	10.0	1.1	12/07/19 22:03	

LABORATORY CONTROL SAMPLE: 2477809

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	20000	18500	92	80-120	
Manganese, Dissolved	ug/L	2000	1830	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2477810 2477811

Parameter	Units	50242801003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	9540	9350	95	93	75-125	2	20	
Manganese, Dissolved	ug/L	ND	1000	1000	948	925	95	92	75-125	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2477812 2477813

Parameter	Units	50242365002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	2.1 mg/L	10000	10000	11600	11500	95	94	75-125	1	20	
Manganese, Dissolved	ug/L	2.9 mg/L	1000	1000	3860	3840	93	91	75-125	0	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50242801

QC Batch: 536641 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 50242801001, 50242801006

METHOD BLANK: 2475961 Matrix: Water
Associated Lab Samples: 50242801001, 50242801006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	1.3	12/04/19 18:19	
1,1-Dichloroethane	ug/L	ND	5.0	0.22	12/04/19 18:19	
1,2-Dichloroethane	ug/L	ND	5.0	0.74	12/04/19 18:19	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.40	12/04/19 18:19	
Methylene Chloride	ug/L	ND	5.0	0.27	12/04/19 18:19	
Tetrachloroethene	ug/L	ND	5.0	0.25	12/04/19 18:19	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.37	12/04/19 18:19	
Trichloroethene	ug/L	ND	5.0	1.2	12/04/19 18:19	
Vinyl chloride	ug/L	ND	2.0	0.46	12/04/19 18:19	
4-Bromofluorobenzene (S)	%.	100	85-114		12/04/19 18:19	
Dibromofluoromethane (S)	%.	102	80-122		12/04/19 18:19	
Toluene-d8 (S)	%.	97	85-114		12/04/19 18:19	

LABORATORY CONTROL SAMPLE: 2475962

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	53.5	107	72-127	
1,1-Dichloroethane	ug/L	50	50.1	100	70-119	
1,2-Dichloroethane	ug/L	50	46.4	93	68-119	
cis-1,2-Dichloroethene	ug/L	50	52.3	105	74-122	
Methylene Chloride	ug/L	50	50.4	101	70-121	
Tetrachloroethene	ug/L	50	51.4	103	76-124	
trans-1,2-Dichloroethene	ug/L	50	54.3	109	73-121	
Trichloroethene	ug/L	50	51.5	103	76-120	
Vinyl chloride	ug/L	50	49.7	99	70-136	
4-Bromofluorobenzene (S)	%.			99	85-114	
Dibromofluoromethane (S)	%.			96	80-122	
Toluene-d8 (S)	%.			100	85-114	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50242801

QC Batch: 536921 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 50242801002, 50242801003, 50242801004

METHOD BLANK: 2477384 Matrix: Water
Associated Lab Samples: 50242801002, 50242801003, 50242801004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.25	12/06/19 03:01	
1,1-Dichloroethane	ug/L	ND	5.0	0.26	12/06/19 03:01	
1,2-Dichloroethane	ug/L	ND	5.0	0.27	12/06/19 03:01	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.16	12/06/19 03:01	
Methylene Chloride	ug/L	ND	5.0	2.4	12/06/19 03:01	
Tetrachloroethene	ug/L	ND	5.0	0.22	12/06/19 03:01	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.23	12/06/19 03:01	
Trichloroethene	ug/L	ND	5.0	0.26	12/06/19 03:01	
Vinyl chloride	ug/L	ND	2.0	0.13	12/06/19 03:01	
4-Bromofluorobenzene (S)	%.	96	85-114		12/06/19 03:01	
Dibromofluoromethane (S)	%.	106	80-122		12/06/19 03:01	
Toluene-d8 (S)	%.	98	85-114		12/06/19 03:01	

LABORATORY CONTROL SAMPLE: 2477385

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	60.5	121	72-127	
1,2-Dichloroethane	ug/L	50	60.7	121	68-119	L1
cis-1,2-Dichloroethene	ug/L	50	55.3	111	74-122	
Tetrachloroethene	ug/L	50	51.5	103	76-124	
trans-1,2-Dichloroethene	ug/L	50	56.1	112	73-121	
Trichloroethene	ug/L	50	55.8	112	76-120	
Vinyl chloride	ug/L	50	53.4	107	70-136	
4-Bromofluorobenzene (S)	%.			99	85-114	
Dibromofluoromethane (S)	%.			110	80-122	
Toluene-d8 (S)	%.			93	85-114	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2477386 2477387

Parameter	Units	50242801003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	20.6	50	50	102	112	162	182	48-145	9	20	M1
1,2-Dichloroethane	ug/L	ND	50	50	97.7	106	195	212	44-138	8	20	M0
cis-1,2-Dichloroethene	ug/L	ND	50	50	85.6	91.3	171	183	46-143	6	20	M1
Tetrachloroethene	ug/L	25.9	50	50	60.2	61.7	69	72	41-145	2	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	78.6	83.8	157	168	46-140	6	20	M1
Trichloroethene	ug/L	99.1	50	50	126	133	53	69	43-147	6	20	
Vinyl chloride	ug/L	ND	50	50	89.1	94.3	178	189	49-153	6	20	M1

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50242801

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2477386 2477387

Parameter	Units	50242801003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
4-Bromofluorobenzene (S)	%.						99	97	85-114			
Dibromofluoromethane (S)	%.						107	110	80-122			
Toluene-d8 (S)	%.						93	95	85-114			

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50242801

QC Batch: 535608 | Analysis Method: SM 4500-S2-D
QC Batch Method: SM 4500-S2-D | Analysis Description: 4500S2D Sulfide Water
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

METHOD BLANK: 2471758 | Matrix: Water
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.017	11/26/19 14:09	

LABORATORY CONTROL SAMPLE: 2471759

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.47	93	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2471760 2471761

Parameter	Units	50242801003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.48	0.48	95	97	90-110	2	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50242801

QC Batch: 536218 | Analysis Method: EPA 9038
QC Batch Method: EPA 9038 | Analysis Description: 9038 Sulfate Water
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

METHOD BLANK: 2474114 Matrix: Water
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	3.8	12/03/19 08:59	

LABORATORY CONTROL SAMPLE: 2474115

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	20	19.6	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2474116 2474117

Parameter	Units	50242801003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	23.8	40	40	71.6	71.6	119	119	90-110	0	20	M3

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2474172 2474173

Parameter	Units	50242287001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	37.2	100	100	150	154	113	116	90-110	2	20	M3

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50242801

QC Batch: 535623 Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

METHOD BLANK: 2471858 Matrix: Water
Associated Lab Samples: 50242801001, 50242801002, 50242801003, 50242801004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	ND	0.10	0.020	11/26/19 15:54	
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.020	11/26/19 15:54	

LABORATORY CONTROL SAMPLE: 2471859

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	1	0.94	94	90-110	
Nitrogen, NO2 plus NO3	mg/L	2	1.9	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2471860 2471861

Parameter	Units	50242801003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Nitrate	mg/L	4.7	2	2	6.9	6.9	107	111	90-110	1	20	
Nitrogen, NO2 plus NO3	mg/L	4.7	4	4	9.0	9.1	107	110	90-110	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project:	Amphenol
Pace Project No.:	50242801

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-I	Pace Analytical Services - Indianapolis

ANALYTE QUALIFIERS

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
L1	Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M3	Matrix spike recovery was outside laboratory control limits due to matrix interferences.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50242801

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50242801001	**MW-31**	RSK 175 Modified	536119		
50242801002	**MW-35**	RSK 175 Modified	536119		
50242801003	**MW-38**	RSK 175 Modified	536119		
50242801004	**DUP**	RSK 175 Modified	536119		
50242801001	**MW-31**	EPA 3010	535780	EPA 6010	536971
50242801002	**MW-35**	EPA 3010	535780	EPA 6010	536971
50242801003	**MW-38**	EPA 3010	535780	EPA 6010	536971
50242801004	**DUP**	EPA 3010	535780	EPA 6010	536971
50242801001	**MW-31**	EPA 3010	536992	EPA 6010	537275
50242801002	**MW-35**	EPA 3010	536992	EPA 6010	537275
50242801003	**MW-38**	EPA 3010	536992	EPA 6010	537275
50242801004	**DUP**	EPA 3010	536992	EPA 6010	537275
50242801001	**MW-31**	EPA 8260	536641		
50242801002	**MW-35**	EPA 8260	536921		
50242801003	**MW-38**	EPA 8260	536921		
50242801004	**DUP**	EPA 8260	536921		
50242801006	**EQ Blank**	EPA 8260	536641		
50242801001	**MW-31**	SM 4500-S2-D	535608		
50242801002	**MW-35**	SM 4500-S2-D	535608		
50242801003	**MW-38**	SM 4500-S2-D	535608		
50242801004	**DUP**	SM 4500-S2-D	535608		
50242801001	**MW-31**	EPA 9038	536218		
50242801002	**MW-35**	EPA 9038	536218		
50242801003	**MW-38**	EPA 9038	536218		
50242801004	**DUP**	EPA 9038	536218		
50242801001	**MW-31**	EPA 353.2	535623		
50242801002	**MW-35**	EPA 353.2	535623		
50242801003	**MW-38**	EPA 353.2	535623		
50242801004	**DUP**	EPA 353.2	535623		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	IWM	Report To:	Parks, Chris	Attention:	
Address:	7428 Rockville Road	Copy To:	Brad Gentry	Company Name:	
	Indianapolis, IN 46214			Address:	
Email:	cparks@iwmconsult.com	Purchase Order #:		Pace Quote:	
Phone:	(317)968-9260 Fax:	Project Name:	Amphenol	Pace Project Manager:	chris.boyle@pacelabs.com,
Requested Due Date:	7 DAY	Project #:		Pace Profile #:	658

Regulatory Agency:

State / Location: IN

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

SAMPLE ID — One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	START DATE	START TIME	END DATE	END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	VOC by 8260	Dissolved Gases, RSK-175	Metals, Total	Metals, Lab Filtered	Sulfide	Nitrate (wet), Sulfate	Residual Chlorine (Y/N)	5024280
1	MW-31			11/25	15:35				10	2		1	6	1					3	3	1	1	1	1		001
2	MW-35			↓	11:48				↓	2		1	6	1					↓	↓	↓	↓	↓	↓		002
3	MW-38				13:50					2		1	6	1												003
4	Dup-				—					2		1	6	1												004
5	MS				13:50					2		1	6	1												003
6	MSD				13:50					2		1	6	1												003
7	Trip Bl.				—				3				3						X							005
8	Eq. Blank			↓	15:35				3				3						X							006
9																										
10																										
11																										
12																										

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Level IV QA QC	[signature]	11/26	8:32	[signature]	11-29-19	0835	2.8	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Dewey White

SIGNATURE of SAMPLER: [signature] DATE Signed: 11/25/19

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

Pace Analytical

SAMPLE CONDITION UPON RECEIPT FORM

0850

Project #: 50242801

Date/Time and Initials of person examining contents: MP 11/26/19

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Other

Tracking #:

Custody Seal on Cooler/Box Present: ☐ Yes ☒ No   Seals Intact: ☐ Yes ☐ No

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other

Thermometer: 1 2 3 4 5 6 A B C D E F (5 circled)   Ice Type: ☒ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☐ Yes ☐ No ☒ N/A

Cooler Temperature: 2.7/2.8   Ice Visible in Sample Containers?: ☐ Yes ☒ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C   If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☒ N/A

All discrepancies will be written out in the comments section below.

	Yes	No
Are samples from West Virginia? Document any containers out of temp.		✓
USDA Regulated Soils? (ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		✓
Chain of Custody Present:	✓	
Chain of Custody Filled Out:	✓	
Short Hold Time Analysis (<72hr)?: Analysis: Nitrate	✓	
Time 5035A TC placed in Freezer or Short Holds To Lab:		
Rush TAT Requested:		✓
Containers Intact?:	✓	
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	✓	
Extra labels on Terracore Vials (soils only)?:		✓

	Yes	No	N/A
All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted. Circle: HNO3 H2SO4 NaOH NaOH/ZnAc	✓		
Dissolved Metals field filtered?:			✓
Headspace Wisconsin Sulfide			✓
	Present	Absent	N/A
Residual Chlorine Check (SVOC 625 Pest/PCB 608)			✓
Residual Chlorine Check (Total/Amenable/Free Cyanide)		✓	
Headspace in VOA Vials (>6mm):		✓	
Trip Blank Present?:		✓	
Trip Blank Custody Seals?:		✓	

Comments:

Trip Blank on COC but no TB found in Cooler -MP 11/25

F-IN-Q-290-rev.18,22Apr2019

COC PAGE 1 of 1

Sample Container Count

WO#: 50242801
50242801

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			6											2		1				1						WT	✓		
2																													
3																													
4																													
5																													
6																													
7																													
8			3																										
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved amber vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved clear vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

May 26, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol SA Event
Pace Project No.: 50246438

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on December 05, 2019. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Indianapolis

Revised Report: This revision replaces previous report dated January 10, 2020. Volatile parameter list shortened and "J" flags added per client request. SAB 05/26/20

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Chris Parks, IWM Consulting Group

CERTIFICATIONS

Project:	Amphenol SA Event
Pace Project No.:	50246438

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Accreditation #: 200074
Indiana Drinking Water Laboratory #: C-49-06
Kansas/TNI Certification #: E-10177
Kentucky UST Agency Interest #: 80226
Kentucky WW Laboratory ID #: 98019
Michigan Drinking Water Laboratory #9050
Ohio VAP Certified Laboratory #: CL0065
Oklahoma Laboratory #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Laboratory #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services, LLC
7726 Moller Road
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(317)228-3100

SAMPLE SUMMARY

Project: Amphenol SA Event
Pace Project No.: 50246438

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50243650001	**IT-2**	Water	12/04/19 12:05	12/05/19 17:05
50243650003	**MW-12R**	Water	12/04/19 16:00	12/05/19 17:05
50243650014	**MW-31**	Water	12/05/19 14:55	12/05/19 17:05
50243650015	**MW-32**	Water	12/02/19 11:15	12/05/19 17:05
50243650016	**MW-33**	Water	12/04/19 09:40	12/05/19 17:05
50243650017	**MW-34**	Water	12/02/19 15:00	12/05/19 17:05
50243650018	**MW-35**	Water	12/03/19 11:30	12/05/19 17:05
50243650019	**MW-36**	Water	12/02/19 16:35	12/05/19 17:05
50243650020	**MW-37**	Water	12/02/19 14:05	12/05/19 17:05
50243650021	**MW-38**	Water	12/05/19 13:55	12/05/19 17:05
50243650022	**MW-39**	Water	12/03/19 09:55	12/05/19 17:05
50243650023	**MW-40**	Water	12/02/19 12:40	12/05/19 17:05
50243650025	**EB-1**	Water	12/02/19 17:00	12/05/19 17:05
50243650026	**EB-2**	Water	12/03/19 16:55	12/05/19 17:05
50243650027	**EB-3**	Water	12/04/19 17:15	12/05/19 17:05
50243650028	**EB-4**	Water	12/05/19 15:00	12/05/19 17:05
50243650029	**DUP-1**	Water	12/02/19 08:00	12/05/19 17:05
50243650030	**DUP-2**	Water	12/04/19 08:00	12/05/19 17:05
50243650031	**DUP-3**	Water	12/05/19 08:00	12/05/19 17:05
50243650032	**Trip Blank**	Water	12/02/19 08:00	12/05/19 17:05

Pace Analytical Services, LLC
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(317)228-3100

SAMPLE ANALYTE COUNT

Project: Amphenol SA Event
Pace Project No.: 50246438

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50243650001	**IT-2**	EPA 8260	RSW	12	PASI-I
50243650003	**MW-12R**	EPA 8260	RSW	12	PASI-I
50243650014	**MW-31**	EPA 8260	RSW	12	PASI-I
50243650015	**MW-32**	EPA 8260	RSW	12	PASI-I
50243650016	**MW-33**	EPA 8260	RSW	12	PASI-I
50243650017	**MW-34**	EPA 8260	RSW	12	PASI-I
50243650018	**MW-35**	EPA 8260	RSW	12	PASI-I
50243650019	**MW-36**	EPA 8260	RSW	12	PASI-I
50243650020	**MW-37**	EPA 8260	RSW	12	PASI-I
50243650021	**MW-38**	EPA 8260	RSW	12	PASI-I
50243650022	**MW-39**	EPA 8260	RSW	12	PASI-I
50243650023	**MW-40**	EPA 8260	RSW	12	PASI-I
50243650025	**EB-1**	EPA 8260	RSW	12	PASI-I
50243650026	**EB-2**	EPA 8260	RSW	12	PASI-I
50243650027	**EB-3**	EPA 8260	RSW	12	PASI-I
50243650028	**EB-4**	EPA 8260	RSW	12	PASI-I
50243650029	**DUP-1**	EPA 8260	RSW	12	PASI-I
50243650030	**DUP-2**	EPA 8260	RSW	12	PASI-I
50243650031	**DUP-3**	EPA 8260	RSW	12	PASI-I
50243650032	**Trip Blank**	EPA 8260	RSW	12	PASI-I

PASI-I = Pace Analytical Services - Indianapolis

Pace Analytical Services, LLC
7726 Moller Road
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(317)228-3100

SUMMARY OF DETECTION

Project: Amphenol SA Event
Pace Project No.: 50246438

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50243650001	**IT-2**					
EPA 8260	cis-1,2-Dichloroethene	16.9	ug/L	5.0	12/11/19 08:36	
EPA 8260	1,1,1-Trichloroethane	1.5J	ug/L	5.0	12/11/19 08:36	
EPA 8260	Trichloroethene	4.0J	ug/L	5.0	12/11/19 08:36	
50243650003	**MW-12R**					
EPA 8260	cis-1,2-Dichloroethene	41.8J	ug/L	50.0	12/12/19 21:46	
EPA 8260	Tetrachloroethene	697	ug/L	50.0	12/12/19 21:46	
EPA 8260	1,1,1-Trichloroethane	25.4J	ug/L	50.0	12/12/19 21:46	
EPA 8260	Trichloroethene	174	ug/L	50.0	12/12/19 21:46	
50243650014	**MW-31**					
EPA 8260	Tetrachloroethene	45.4	ug/L	5.0	12/10/19 19:39	
EPA 8260	1,1,1-Trichloroethane	6.8	ug/L	5.0	12/10/19 19:39	
EPA 8260	Trichloroethene	42.1	ug/L	5.0	12/10/19 19:39	
50243650015	**MW-32**					
EPA 8260	Trichloroethene	1.5J	ug/L	5.0	12/10/19 20:11	
50243650017	**MW-34**					
EPA 8260	Tetrachloroethene	38.2	ug/L	5.0	12/10/19 21:15	
EPA 8260	1,1,1-Trichloroethane	3.0J	ug/L	5.0	12/10/19 21:15	
EPA 8260	Trichloroethene	14.9	ug/L	5.0	12/10/19 21:15	
50243650018	**MW-35**					
EPA 8260	Trichloroethene	0.99J	ug/L	5.0	12/10/19 21:47	
50243650019	**MW-36**					
EPA 8260	Tetrachloroethene	52.6	ug/L	5.0	12/12/19 18:19	
EPA 8260	Trichloroethene	6.1	ug/L	5.0	12/12/19 18:19	
50243650020	**MW-37**					
EPA 8260	Tetrachloroethene	48.4	ug/L	5.0	12/10/19 20:59	
EPA 8260	1,1,1-Trichloroethane	4.0J	ug/L	5.0	12/10/19 20:59	
EPA 8260	Trichloroethene	27.7	ug/L	5.0	12/10/19 20:59	
50243650021	**MW-38**					
EPA 8260	Tetrachloroethene	31.3	ug/L	5.0	12/10/19 12:06	
EPA 8260	1,1,1-Trichloroethane	16.1	ug/L	5.0	12/10/19 12:06	
EPA 8260	Trichloroethene	88.0	ug/L	5.0	12/10/19 12:06	
50243650022	**MW-39**					
EPA 8260	Trichloroethene	10.3	ug/L	5.0	12/10/19 13:42	
50243650023	**MW-40**					
EPA 8260	Tetrachloroethene	20.2	ug/L	5.0	12/10/19 19:23	
EPA 8260	1,1,1-Trichloroethane	9.6	ug/L	5.0	12/10/19 19:23	
EPA 8260	Trichloroethene	61.0	ug/L	5.0	12/10/19 19:23	
50243650029	**DUP-1**					
EPA 8260	Tetrachloroethene	39.4	ug/L	5.0	12/12/19 18:51	
EPA 8260	1,1,1-Trichloroethane	3.1J	ug/L	5.0	12/12/19 18:51	

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SUMMARY OF DETECTION

Project: Amphenol SA Event
Pace Project No.: 50246438

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50243650029	**DUP-1**					
EPA 8260	Trichloroethene	15.5	ug/L	5.0	12/12/19 18:51	
50243650030	**DUP-2**					
EPA 8260	1,1,1-Trichloroethane	7.1	ug/L	5.0	12/12/19 19:23	
EPA 8260	Trichloroethene	1.5J	ug/L	5.0	12/12/19 19:23	
50243650031	**DUP-3**					
EPA 8260	Tetrachloroethene	4.6J	ug/L	5.0	12/12/19 19:54	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: IT-2 **Lab ID: 50243650001** Collected: 12/04/19 12:05 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.75	1		12/11/19 08:36	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.72	1		12/11/19 08:36	107-06-2	
cis-1,2-Dichloroethene	**16.9**	ug/L	5.0	0.82	1		12/11/19 08:36	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.91	1		12/11/19 08:36	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.1	1		12/11/19 08:36	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	1.1	1		12/11/19 08:36	127-18-4	
1,1,1-Trichloroethane	**1.5J**	ug/L	5.0	1.1	1		12/11/19 08:36	71-55-6	
Trichloroethene	**4.0J**	ug/L	5.0	0.75	1		12/11/19 08:36	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1.2	1		12/11/19 08:36	75-01-4	
Surrogates									
Dibromofluoromethane (S)	107	%.	80-122		1		12/11/19 08:36	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-114		1		12/11/19 08:36	460-00-4	
Toluene-d8 (S)	93	%.	85-114		1		12/11/19 08:36	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: MW-12R **Lab ID: 50243650003** Collected: 12/04/19 16:00 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	50.0	12.1	10		12/12/19 21:46	75-34-3	
1,2-Dichloroethane	ND	ug/L	50.0	7.4	10		12/12/19 21:46	107-06-2	
cis-1,2-Dichloroethene	**41.8J**	ug/L	50.0	7.1	10		12/12/19 21:46	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	50.0	8.8	10		12/12/19 21:46	156-60-5	
Methylene Chloride	ND	ug/L	50.0	29.6	10		12/12/19 21:46	75-09-2	
Tetrachloroethene	**697**	ug/L	50.0	9.6	10		12/12/19 21:46	127-18-4	
1,1,1-Trichloroethane	**25.4J**	ug/L	50.0	8.7	10		12/12/19 21:46	71-55-6	
Trichloroethene	**174**	ug/L	50.0	5.7	10		12/12/19 21:46	79-01-6	
Vinyl chloride	ND	ug/L	20.0	6.4	10		12/12/19 21:46	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	80-122		10		12/12/19 21:46	1868-53-7	D4
4-Bromofluorobenzene (S)	96	%.	85-114		10		12/12/19 21:46	460-00-4	
Toluene-d8 (S)	98	%.	85-114		10		12/12/19 21:46	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: MW-31 **Lab ID: 50243650014** Collected: 12/05/19 14:55 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	1.2	1		12/10/19 19:39	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/10/19 19:39	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.71	1		12/10/19 19:39	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.88	1		12/10/19 19:39	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		12/10/19 19:39	75-09-2	
Tetrachloroethene	**45.4**	ug/L	5.0	0.96	1		12/10/19 19:39	127-18-4	
1,1,1-Trichloroethane	**6.8**	ug/L	5.0	0.87	1		12/10/19 19:39	71-55-6	
Trichloroethene	**42.1**	ug/L	5.0	0.57	1		12/10/19 19:39	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.64	1		12/10/19 19:39	75-01-4	
Surrogates									
Dibromofluoromethane (S)	96	%.	80-122		1		12/10/19 19:39	1868-53-7	
4-Bromofluorobenzene (S)	112	%.	85-114		1		12/10/19 19:39	460-00-4	
Toluene-d8 (S)	82	%.	85-114		1		12/10/19 19:39	2037-26-5	S2

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: MW-32 **Lab ID: 50243650015** Collected: 12/02/19 11:15 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	1.2	1		12/10/19 20:11	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/10/19 20:11	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.71	1		12/10/19 20:11	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.88	1		12/10/19 20:11	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		12/10/19 20:11	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.96	1		12/10/19 20:11	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.87	1		12/10/19 20:11	71-55-6	
Trichloroethene	**1.5J**	ug/L	5.0	0.57	1		12/10/19 20:11	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.64	1		12/10/19 20:11	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	80-122		1		12/10/19 20:11	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-114		1		12/10/19 20:11	460-00-4	
Toluene-d8 (S)	97	%.	85-114		1		12/10/19 20:11	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: MW-33 **Lab ID: 50243650016** Collected: 12/04/19 09:40 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	1.2	1		12/10/19 20:43	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/10/19 20:43	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.71	1		12/10/19 20:43	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.88	1		12/10/19 20:43	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		12/10/19 20:43	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.96	1		12/10/19 20:43	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.87	1		12/10/19 20:43	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.57	1		12/10/19 20:43	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.64	1		12/10/19 20:43	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	80-122		1		12/10/19 20:43	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-114		1		12/10/19 20:43	460-00-4	
Toluene-d8 (S)	98	%.	85-114		1		12/10/19 20:43	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: MW-34 **Lab ID: 50243650017** Collected: 12/02/19 15:00 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	1.2	1		12/10/19 21:15	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/10/19 21:15	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.71	1		12/10/19 21:15	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.88	1		12/10/19 21:15	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		12/10/19 21:15	75-09-2	
Tetrachloroethene	**38.2**	ug/L	5.0	0.96	1		12/10/19 21:15	127-18-4	
1,1,1-Trichloroethane	**3.0J**	ug/L	5.0	0.87	1		12/10/19 21:15	71-55-6	
Trichloroethene	**14.9**	ug/L	5.0	0.57	1		12/10/19 21:15	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.64	1		12/10/19 21:15	75-01-4	
Surrogates									
Dibromofluoromethane (S)	101	%.	80-122		1		12/10/19 21:15	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-114		1		12/10/19 21:15	460-00-4	
Toluene-d8 (S)	98	%.	85-114		1		12/10/19 21:15	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: MW-35 **Lab ID: 50243650018** Collected: 12/03/19 11:30 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	1.2	1		12/10/19 21:47	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/10/19 21:47	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.71	1		12/10/19 21:47	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.88	1		12/10/19 21:47	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		12/10/19 21:47	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.96	1		12/10/19 21:47	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.87	1		12/10/19 21:47	71-55-6	
Trichloroethene	**0.99J**	ug/L	5.0	0.57	1		12/10/19 21:47	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.64	1		12/10/19 21:47	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	80-122		1		12/10/19 21:47	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-114		1		12/10/19 21:47	460-00-4	
Toluene-d8 (S)	95	%.	85-114		1		12/10/19 21:47	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: MW-36 **Lab ID: 50243650019** Collected: 12/02/19 16:35 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.75	1		12/12/19 18:19	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.72	1		12/12/19 18:19	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.82	1		12/12/19 18:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.91	1		12/12/19 18:19	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.1	1		12/12/19 18:19	75-09-2	
Tetrachloroethene	**52.6**	ug/L	5.0	1.1	1		12/12/19 18:19	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.1	1		12/12/19 18:19	71-55-6	
Trichloroethene	**6.1**	ug/L	5.0	0.75	1		12/12/19 18:19	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1.2	1		12/12/19 18:19	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	80-122		1		12/12/19 18:19	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-114		1		12/12/19 18:19	460-00-4	
Toluene-d8 (S)	91	%.	85-114		1		12/12/19 18:19	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: MW-37 **Lab ID: 50243650020** Collected: 12/02/19 14:05 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.75	1		12/10/19 20:59	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.72	1		12/10/19 20:59	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.82	1		12/10/19 20:59	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.91	1		12/10/19 20:59	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.1	1		12/10/19 20:59	75-09-2	
Tetrachloroethene	**48.4**	ug/L	5.0	1.1	1		12/10/19 20:59	127-18-4	
1,1,1-Trichloroethane	**4.0J**	ug/L	5.0	1.1	1		12/10/19 20:59	71-55-6	
Trichloroethene	**27.7**	ug/L	5.0	0.75	1		12/10/19 20:59	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1.2	1		12/10/19 20:59	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	80-122		1		12/10/19 20:59	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-114		1		12/10/19 20:59	460-00-4	
Toluene-d8 (S)	93	%.	85-114		1		12/10/19 20:59	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: MW-38 **Lab ID: 50243650021** Collected: 12/05/19 13:55 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	1.2	1		12/10/19 12:06	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/10/19 12:06	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.71	1		12/10/19 12:06	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.88	1		12/10/19 12:06	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		12/10/19 12:06	75-09-2	
Tetrachloroethene	**31.3**	ug/L	5.0	0.96	1		12/10/19 12:06	127-18-4	
1,1,1-Trichloroethane	**16.1**	ug/L	5.0	0.87	1		12/10/19 12:06	71-55-6	
Trichloroethene	**88.0**	ug/L	5.0	0.57	1		12/10/19 12:06	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.64	1		12/10/19 12:06	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	80-122		1		12/10/19 12:06	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-114		1		12/10/19 12:06	460-00-4	
Toluene-d8 (S)	100	%.	85-114		1		12/10/19 12:06	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: MW-39 **Lab ID: 50243650022** Collected: 12/03/19 09:55 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	1.2	1		12/10/19 13:42	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/10/19 13:42	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.71	1		12/10/19 13:42	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.88	1		12/10/19 13:42	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		12/10/19 13:42	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.96	1		12/10/19 13:42	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.87	1		12/10/19 13:42	71-55-6	
Trichloroethene	**10.3**	ug/L	5.0	0.57	1		12/10/19 13:42	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.64	1		12/10/19 13:42	75-01-4	
Surrogates									
Dibromofluoromethane (S)	101	%.	80-122		1		12/10/19 13:42	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-114		1		12/10/19 13:42	460-00-4	
Toluene-d8 (S)	98	%.	85-114		1		12/10/19 13:42	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: MW-40 **Lab ID: 50243650023** Collected: 12/02/19 12:40 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.75	1		12/10/19 19:23	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.72	1		12/10/19 19:23	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.82	1		12/10/19 19:23	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.91	1		12/10/19 19:23	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.1	1		12/10/19 19:23	75-09-2	
Tetrachloroethene	**20.2**	ug/L	5.0	1.1	1		12/10/19 19:23	127-18-4	
1,1,1-Trichloroethane	**9.6**	ug/L	5.0	1.1	1		12/10/19 19:23	71-55-6	
Trichloroethene	**61.0**	ug/L	5.0	0.75	1		12/10/19 19:23	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1.2	1		12/10/19 19:23	75-01-4	
Surrogates									
Dibromofluoromethane (S)	107	%.	80-122		1		12/10/19 19:23	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-114		1		12/10/19 19:23	460-00-4	
Toluene-d8 (S)	95	%.	85-114		1		12/10/19 19:23	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: EB-1 **Lab ID: 50243650025** Collected: 12/02/19 17:00 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	1.2	1		12/10/19 14:46	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/10/19 14:46	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.71	1		12/10/19 14:46	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.88	1		12/10/19 14:46	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		12/10/19 14:46	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.96	1		12/10/19 14:46	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.87	1		12/10/19 14:46	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.57	1		12/10/19 14:46	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.64	1		12/10/19 14:46	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	80-122		1		12/10/19 14:46	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-114		1		12/10/19 14:46	460-00-4	
Toluene-d8 (S)	98	%.	85-114		1		12/10/19 14:46	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: EB-2 **Lab ID: 50243650026** Collected: 12/03/19 16:55 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	1.2	1		12/10/19 15:24	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/10/19 15:24	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.71	1		12/10/19 15:24	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.88	1		12/10/19 15:24	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		12/10/19 15:24	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.96	1		12/10/19 15:24	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.87	1		12/10/19 15:24	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.57	1		12/10/19 15:24	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.64	1		12/10/19 15:24	75-01-4	
Surrogates									
Dibromofluoromethane (S)	101	%.	80-122		1		12/10/19 15:24	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-114		1		12/10/19 15:24	460-00-4	
Toluene-d8 (S)	100	%.	85-114		1		12/10/19 15:24	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: EB-3 **Lab ID: 50243650027** Collected: 12/04/19 17:15 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	1.2	1		12/10/19 15:56	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		12/10/19 15:56	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.71	1		12/10/19 15:56	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.88	1		12/10/19 15:56	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		12/10/19 15:56	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.96	1		12/10/19 15:56	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.87	1		12/10/19 15:56	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.57	1		12/10/19 15:56	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.64	1		12/10/19 15:56	75-01-4	
Surrogates									
Dibromofluoromethane (S)	100	%.	80-122		1		12/10/19 15:56	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-114		1		12/10/19 15:56	460-00-4	
Toluene-d8 (S)	99	%.	85-114		1		12/10/19 15:56	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event

Pace Project No.: 50246438

Sample: EB-4 **Lab ID: 50243650028** Collected: 12/05/19 15:00 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.75	1		12/10/19 21:31	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.72	1		12/10/19 21:31	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.82	1		12/10/19 21:31	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.91	1		12/10/19 21:31	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.1	1		12/10/19 21:31	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	1.1	1		12/10/19 21:31	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.1	1		12/10/19 21:31	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.75	1		12/10/19 21:31	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1.2	1		12/10/19 21:31	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	80-122		1		12/10/19 21:31	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	85-114		1		12/10/19 21:31	460-00-4	
Toluene-d8 (S)	94	%.	85-114		1		12/10/19 21:31	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: DUP-1 **Lab ID: 50243650029** Collected: 12/02/19 08:00 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.75	1		12/12/19 18:51	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.72	1		12/12/19 18:51	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.82	1		12/12/19 18:51	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.91	1		12/12/19 18:51	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.1	1		12/12/19 18:51	75-09-2	
Tetrachloroethene	**39.4**	ug/L	5.0	1.1	1		12/12/19 18:51	127-18-4	
1,1,1-Trichloroethane	**3.1J**	ug/L	5.0	1.1	1		12/12/19 18:51	71-55-6	
Trichloroethene	**15.5**	ug/L	5.0	0.75	1		12/12/19 18:51	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1.2	1		12/12/19 18:51	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	80-122		1		12/12/19 18:51	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-114		1		12/12/19 18:51	460-00-4	
Toluene-d8 (S)	92	%.	85-114		1		12/12/19 18:51	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: DUP-2 **Lab ID: 50243650030** Collected: 12/04/19 08:00 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.75	1		12/12/19 19:23	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.72	1		12/12/19 19:23	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.82	1		12/12/19 19:23	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.91	1		12/12/19 19:23	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.1	1		12/12/19 19:23	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	1.1	1		12/12/19 19:23	127-18-4	
1,1,1-Trichloroethane	**7.1**	ug/L	5.0	1.1	1		12/12/19 19:23	71-55-6	
Trichloroethene	**1.5J**	ug/L	5.0	0.75	1		12/12/19 19:23	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1.2	1		12/12/19 19:23	75-01-4	
Surrogates									
Dibromofluoromethane (S)	107	%.	80-122		1		12/12/19 19:23	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-114		1		12/12/19 19:23	460-00-4	
Toluene-d8 (S)	92	%.	85-114		1		12/12/19 19:23	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: DUP-3 **Lab ID: 50243650031** Collected: 12/05/19 08:00 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.75	1		12/12/19 19:54	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.72	1		12/12/19 19:54	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.82	1		12/12/19 19:54	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.91	1		12/12/19 19:54	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.1	1		12/12/19 19:54	75-09-2	
Tetrachloroethene	**4.6J**	ug/L	5.0	1.1	1		12/12/19 19:54	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.1	1		12/12/19 19:54	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.75	1		12/12/19 19:54	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1.2	1		12/12/19 19:54	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	80-122		1		12/12/19 19:54	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-114		1		12/12/19 19:54	460-00-4	
Toluene-d8 (S)	93	%.	85-114		1		12/12/19 19:54	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol SA Event
Pace Project No.: 50246438

Sample: Trip Blank **Lab ID: 50243650032** Collected: 12/02/19 08:00 Received: 12/05/19 17:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.75	1		12/12/19 21:30	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.72	1		12/12/19 21:30	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.82	1		12/12/19 21:30	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.91	1		12/12/19 21:30	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.1	1		12/12/19 21:30	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	1.1	1		12/12/19 21:30	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.1	1		12/12/19 21:30	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.75	1		12/12/19 21:30	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1.2	1		12/12/19 21:30	75-01-4	
Surrogates									
Dibromofluoromethane (S)	110	%.	80-122		1		12/12/19 21:30	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	85-114		1		12/12/19 21:30	460-00-4	
Toluene-d8 (S)	92	%.	85-114		1		12/12/19 21:30	2037-26-5	

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QUALITY CONTROL DATA

Project: Amphenol SA Event
Pace Project No.: 50246438

QC Batch: 537732 | Analysis Method: EPA 8260
QC Batch Method: EPA 8260 | Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50243650020, 50243650023, 50243650028

METHOD BLANK: 2481518 Matrix: Water
Associated Lab Samples: 50243650020, 50243650023, 50243650028

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	1.1	12/10/19 11:49	
1,1-Dichloroethane	ug/L	ND	5.0	0.75	12/10/19 11:49	
1,2-Dichloroethane	ug/L	ND	5.0	0.72	12/10/19 11:49	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.82	12/10/19 11:49	
Methylene Chloride	ug/L	ND	5.0	2.1	12/10/19 11:49	
Tetrachloroethene	ug/L	ND	5.0	1.1	12/10/19 11:49	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.91	12/10/19 11:49	
Trichloroethene	ug/L	ND	5.0	0.75	12/10/19 11:49	
Vinyl chloride	ug/L	ND	2.0	1.2	12/10/19 11:49	
4-Bromofluorobenzene (S)	%.	98	85-114		12/10/19 11:49	
Dibromofluoromethane (S)	%.	105	80-122		12/10/19 11:49	
Toluene-d8 (S)	%.	95	85-114		12/10/19 11:49	

LABORATORY CONTROL SAMPLE: 2481519

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	55.2	110	72-127	
1,1-Dichloroethane	ug/L	50	52.2	104	70-119	
1,2-Dichloroethane	ug/L	50	48.0	96	68-119	
cis-1,2-Dichloroethene	ug/L	50	51.6	103	74-122	
Methylene Chloride	ug/L	50	50.5	101	70-121	
Tetrachloroethene	ug/L	50	49.8	100	76-124	
trans-1,2-Dichloroethene	ug/L	50	54.0	108	73-121	
Trichloroethene	ug/L	50	51.6	103	76-120	
Vinyl chloride	ug/L	50	49.2	98	70-136	
4-Bromofluorobenzene (S)	%.			102	85-114	
Dibromofluoromethane (S)	%.			99	80-122	
Toluene-d8 (S)	%.			96	85-114	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2481520 2481521

Parameter	Units	50243650023 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	9.6	50	50	62.7	60.5	106	102	48-145	4	20	
1,1-Dichloroethane	ug/L	ND	50	50	51.6	50.9	103	102	38-142	1	20	
1,2-Dichloroethane	ug/L	ND	50	50	49.1	48.8	98	98	44-138	1	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	51.2	51.0	102	102	46-143	0	20	

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QUALITY CONTROL DATA

Project: Amphenol SA Event
Pace Project No.: 50246438

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2481520 2481521

Parameter	Units	50243650023 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methylene Chloride	ug/L	ND	50	50	50.3	49.9	101	100	33-140	1	20	
Tetrachloroethene	ug/L	20.2	50	50	65.7	62.8	91	85	41-145	4	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	51.6	50.7	103	101	46-140	2	20	
Trichloroethene	ug/L	61.0	50	50	101	99.9	80	78	43-147	1	20	
Vinyl chloride	ug/L	ND	50	50	48.2	47.4	96	95	49-153	2	20	
4-Bromofluorobenzene (S)	%.						101	101	85-114			
Dibromofluoromethane (S)	%.						100	100	80-122			
Toluene-d8 (S)	%.						94	93	85-114			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: Amphenol SA Event
Pace Project No.: 50246438

QC Batch: 537734 — Analysis Method: EPA 8260
QC Batch Method: EPA 8260 — Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50243650014, 50243650015, 50243650016, 50243650017, 50243650018, 50243650021, 50243650022, 50243650025, 50243650026, 50243650027

METHOD BLANK: 2481526 — Matrix: Water
Associated Lab Samples: 50243650014, 50243650015, 50243650016, 50243650017, 50243650018, 50243650021, 50243650022, 50243650025, 50243650026, 50243650027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.87	12/10/19 11:33	
1,1-Dichloroethane	ug/L	ND	5.0	1.2	12/10/19 11:33	
1,2-Dichloroethane	ug/L	ND	5.0	0.74	12/10/19 11:33	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.71	12/10/19 11:33	
Methylene Chloride	ug/L	ND	5.0	3.0	12/10/19 11:33	
Tetrachloroethene	ug/L	ND	5.0	0.96	12/10/19 11:33	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.88	12/10/19 11:33	
Trichloroethene	ug/L	ND	5.0	0.57	12/10/19 11:33	
Vinyl chloride	ug/L	ND	2.0	0.64	12/10/19 11:33	
4-Bromofluorobenzene (S)	%.	99	85-114		12/10/19 11:33	
Dibromofluoromethane (S)	%.	100	80-122		12/10/19 11:33	
Toluene-d8 (S)	%.	100	85-114		12/10/19 11:33	

LABORATORY CONTROL SAMPLE: 2481527

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	58.2	116	72-127	
1,1-Dichloroethane	ug/L	50	54.2	108	70-119	
1,2-Dichloroethane	ug/L	50	49.0	98	68-119	
cis-1,2-Dichloroethene	ug/L	50	52.3	105	74-122	
Methylene Chloride	ug/L	50	59.8	120	70-121	
Tetrachloroethene	ug/L	50	48.0	96	76-124	
trans-1,2-Dichloroethene	ug/L	50	54.1	108	73-121	
Trichloroethene	ug/L	50	54.8	110	76-120	
Vinyl chloride	ug/L	50	60.9	122	70-136	
4-Bromofluorobenzene (S)	%.			121	85-114	S0
Dibromofluoromethane (S)	%.			98	80-122	
Toluene-d8 (S)	%.			83	85-114	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2481528 — 2481529

Parameter	Units	50243650021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	16.1	50	50	68.3	69.5	104	107	48-145	2	20	
1,1-Dichloroethane	ug/L	ND	50	50	53.2	55.7	106	111	38-142	5	20	
1,2-Dichloroethane	ug/L	ND	50	50	48.6	48.8	97	98	44-138	1	20	

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QUALITY CONTROL DATA

Project: Amphenol SA Event

Pace Project No.: 50246438

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2481528 2481529

Parameter	Units	50243650021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	50	50	51.3	52.4	102	104	46-143	2	20	
Methylene Chloride	ug/L	ND	50	50	49.9	51.3	100	103	33-140	3	20	
Tetrachloroethene	ug/L	31.3	50	50	75.4	75.2	88	88	41-145	0	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	52.9	53.7	106	107	46-140	2	20	
Trichloroethene	ug/L	88.0	50	50	124	124	73	72	43-147	0	20	
Vinyl chloride	ug/L	ND	50	50	57.0	59.4	114	119	49-153	4	20	
4-Bromofluorobenzene (S)	%.						102	101	85-114			
Dibromofluoromethane (S)	%.						103	100	80-122			
Toluene-d8 (S)	%.						99	99	85-114			

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QUALITY CONTROL DATA

Project: Amphenol SA Event
Pace Project No.: 50246438

QC Batch: 537740
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50243650001

METHOD BLANK: 2481546 Matrix: Water
Associated Lab Samples: 50243650001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	1.1	12/11/19 00:43	
1,1-Dichloroethane	ug/L	ND	5.0	0.75	12/11/19 00:43	
1,2-Dichloroethane	ug/L	ND	5.0	0.72	12/11/19 00:43	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.82	12/11/19 00:43	
Methylene Chloride	ug/L	ND	5.0	2.1	12/11/19 00:43	
Tetrachloroethene	ug/L	ND	5.0	1.1	12/11/19 00:43	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.91	12/11/19 00:43	
Trichloroethene	ug/L	ND	5.0	0.75	12/11/19 00:43	
Vinyl chloride	ug/L	ND	2.0	1.2	12/11/19 00:43	
4-Bromofluorobenzene (S)	%.	99	85-114		12/11/19 00:43	
Dibromofluoromethane (S)	%.	104	80-122		12/11/19 00:43	
Toluene-d8 (S)	%.	94	85-114		12/11/19 00:43	

LABORATORY CONTROL SAMPLE: 2481547

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	52.6	105	72-127	
1,1-Dichloroethane	ug/L	50	50.7	101	70-119	
1,2-Dichloroethane	ug/L	50	49.0	98	68-119	
cis-1,2-Dichloroethene	ug/L	50	50.2	100	74-122	
Methylene Chloride	ug/L	50	52.2	104	70-121	
Tetrachloroethene	ug/L	50	45.2	90	76-124	
trans-1,2-Dichloroethene	ug/L	50	48.3	97	73-121	
Trichloroethene	ug/L	50	48.2	96	76-120	
Vinyl chloride	ug/L	50	47.2	94	70-136	
4-Bromofluorobenzene (S)	%.			104	85-114	
Dibromofluoromethane (S)	%.			101	80-122	
Toluene-d8 (S)	%.			93	85-114	

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QUALITY CONTROL DATA

Project: Amphenol SA Event
Pace Project No.: 50246438

QC Batch: 538242 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50243650019, 50243650029, 50243650030, 50243650031, 50243650032

METHOD BLANK: 2484224 Matrix: Water
Associated Lab Samples: 50243650019, 50243650029, 50243650030, 50243650031, 50243650032

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	1.1	12/12/19 12:29	
1,1-Dichloroethane	ug/L	ND	5.0	0.75	12/12/19 12:29	
1,2-Dichloroethane	ug/L	ND	5.0	0.72	12/12/19 12:29	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.82	12/12/19 12:29	
Methylene Chloride	ug/L	ND	5.0	2.1	12/12/19 12:29	
Tetrachloroethene	ug/L	ND	5.0	1.1	12/12/19 12:29	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.91	12/12/19 12:29	
Trichloroethene	ug/L	ND	5.0	0.75	12/12/19 12:29	
Vinyl chloride	ug/L	ND	2.0	1.2	12/12/19 12:29	
4-Bromofluorobenzene (S)	%.	100	85-114		12/12/19 12:29	
Dibromofluoromethane (S)	%.	106	80-122		12/12/19 12:29	
Toluene-d8 (S)	%.	95	85-114		12/12/19 12:29	

LABORATORY CONTROL SAMPLE: 2484225

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	54.1	108	72-127	
1,1-Dichloroethane	ug/L	50	50.4	101	70-119	
1,2-Dichloroethane	ug/L	50	48.5	97	68-119	
cis-1,2-Dichloroethene	ug/L	50	49.9	100	74-122	
Methylene Chloride	ug/L	50	49.4	99	70-121	
Tetrachloroethene	ug/L	50	49.2	98	76-124	
trans-1,2-Dichloroethene	ug/L	50	51.1	102	73-121	
Trichloroethene	ug/L	50	49.4	99	76-120	
Vinyl chloride	ug/L	50	48.4	97	70-136	
4-Bromofluorobenzene (S)	%.			102	85-114	
Dibromofluoromethane (S)	%.			101	80-122	
Toluene-d8 (S)	%.			94	85-114	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2484226 2484227

Parameter	Units	50243650031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	53.7	56.1	107	111	48-145	4	20	
1,1-Dichloroethane	ug/L	ND	50	50	51.0	52.6	102	105	38-142	3	20	
1,2-Dichloroethane	ug/L	ND	50	50	50.1	51.0	100	102	44-138	2	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	51.2	52.8	102	106	46-143	3	20	

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QUALITY CONTROL DATA

Project: Amphenol SA Event
Pace Project No.: 50246438

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2484226 2484227

Parameter	Units	50243650031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methylene Chloride	ug/L	ND	50	50	50.9	51.9	102	104	33-140	2	20	
Tetrachloroethene	ug/L	4.6J	50	50	51.6	53.2	94	97	41-145	3	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	50.9	52.3	102	105	46-140	3	20	
Trichloroethene	ug/L	ND	50	50	49.8	51.4	100	103	43-147	3	20	
Vinyl chloride	ug/L	ND	50	50	46.8	48.3	94	97	49-153	3	20	
4-Bromofluorobenzene (S)	%.						102	100	85-114			
Dibromofluoromethane (S)	%.						102	102	80-122			
Toluene-d8 (S)	%.						93	92	85-114			

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QUALITY CONTROL DATA

Project: Amphenol SA Event
Pace Project No.: 50246438

QC Batch: 538243
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50243650003

METHOD BLANK: 2484228 Matrix: Water
Associated Lab Samples: 50243650003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.87	12/12/19 22:49	
1,1-Dichloroethane	ug/L	ND	5.0	1.2	12/12/19 22:49	
1,2-Dichloroethane	ug/L	ND	5.0	0.74	12/12/19 22:49	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.71	12/12/19 22:49	
Methylene Chloride	ug/L	ND	5.0	3.0	12/12/19 22:49	
Tetrachloroethene	ug/L	ND	5.0	0.96	12/12/19 22:49	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.88	12/12/19 22:49	
Trichloroethene	ug/L	ND	5.0	0.57	12/12/19 22:49	
Vinyl chloride	ug/L	ND	2.0	0.64	12/12/19 22:49	
4-Bromofluorobenzene (S)	%.	99	85-114		12/12/19 22:49	
Dibromofluoromethane (S)	%.	103	80-122		12/12/19 22:49	
Toluene-d8 (S)	%.	96	85-114		12/12/19 22:49	

LABORATORY CONTROL SAMPLE: 2484229

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	56.4	113	72-127	
1,2-Dichloroethane	ug/L	50	48.8	98	68-119	
cis-1,2-Dichloroethene	ug/L	50	52.8	106	74-122	
Tetrachloroethene	ug/L	50	51.2	102	76-124	
trans-1,2-Dichloroethene	ug/L	50	56.1	112	73-121	
Trichloroethene	ug/L	50	51.0	102	76-120	
Vinyl chloride	ug/L	50	58.0	116	70-136	
4-Bromofluorobenzene (S)	%.			101	85-114	
Dibromofluoromethane (S)	%.			104	80-122	
Toluene-d8 (S)	%.			99	85-114	

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QUALIFIERS

Project:	Amphenol SA Event
Pace Project No.:	50246438

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

D4	Sample was diluted due to the presence of high levels of target analytes.
S0	Surrogate recovery outside laboratory control limits.
S2	Surrogate recovery outside laboratory control limits due to matrix interferences (confirmed by similar results from sample re-analysis).

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol SA Event
Pace Project No.: 50246438

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50243650001	**IT-2**	EPA 8260	537740		
50243650003	**MW-12R**	EPA 8260	538243		
50243650014	**MW-31**	EPA 8260	537734		
50243650015	**MW-32**	EPA 8260	537734		
50243650016	**MW-33**	EPA 8260	537734		
50243650017	**MW-34**	EPA 8260	537734		
50243650018	**MW-35**	EPA 8260	537734		
50243650019	**MW-36**	EPA 8260	538242		
50243650020	**MW-37**	EPA 8260	537732		
50243650021	**MW-38**	EPA 8260	537734		
50243650022	**MW-39**	EPA 8260	537734		
50243650023	**MW-40**	EPA 8260	537732		
50243650025	**EB-1**	EPA 8260	537734		
50243650026	**EB-2**	EPA 8260	537734		
50243650027	**EB-3**	EPA 8260	537734		
50243650028	**EB-4**	EPA 8260	537732		
50243650029	**DUP-1**	EPA 8260	538242		
50243650030	**DUP-2**	EPA 8260	538242		
50243650031	**DUP-3**	EPA 8260	538242		
50243650032	**Trip Blank**	EPA 8260	538242		

50243650

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 3

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	IWM	Report To:	Parks, Chris	Attention:	
Address:	7428 Rockville Road Indianapolis, IN 46214	Copy To:	Brad Gentry	Company Name:	
				Address:	
Email:	cparks@iwmconsult.com	Purchase Order #:		Pace Quote:	
Phone:	(317)968-9260 Fax:	Project Name:	Amphenol	Pace Project Manager:	chris.boyle@pacelabs.com,
Requested Due Date:	Standard TAT; Level IV QA/QC	Project #:		Pace Profile #:	658

Regulatory Agency:

State / Location: IN

Requested Analysis Filtered (Y/N)

MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

SAMPLE ID — One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	START TIME	END DATE	END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	VOC by 8260	[redacted]	Residual Chlorine (Y/N)	
1	IT-2	WT	G			12/4/19	12:05		3				3						X			001
2	IT-3	WT	G			12/4/19	10:52		3				3						X			002
3	MW-12R	WT	G			12/4/19	16:00		3				3						X			003
4	MW-20	WT	G			12/5/19	10:05		3				3						X			004
5	MW-21	WT	G			12/3/19	13:20		3				3						X			005
6	MW-22	WT	G			12/3/19	15:00		3				3						Y			006
7	MW-24	WT	G			12/4/19	14:26		3				3						X			007
8	MW-26	WT	G			12/4/19	16:45		3				3						X			008
9	MW-27	WT	G			12/5/19	12:35		3				3						X			009
10	MW-28	WT	G			12/3/19	16:15		3				3						X			010
11	MW-29	WT	G			12/5/19	11:50		3				3						Y			011
12	MW-3	WT	G			12/3/19	14:20		3				3						Y			012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Luke Lohrstorfer / IWM	12/5/19	17:05	[signature]	12/5/19	1705	0.5	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Luke Lohrstorfer

SIGNATURE of SAMPLER: Luke Lohrstorfer DATE Signed: 12/5/19

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

50243650

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

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Page : 2 Of 3

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	IWM	Report To:	Parks, Chris	Attention:	
Address:	7428 Rockville Road	Copy To:	Brad Gentry	Company Name:	
	Indianapolis, IN 46214			Address:	
Email:	cparks@iwmconsult.com	Purchase Order #:		Pace Quote:	
Phone:	(317)968-9260 Fax:	Project Name:	Amphenol	Pace Project Manager:	chris.boyle@pacelabs.com,
Requested Due Date:	Standard TAT ; Level IV QA/QC	Project #:		Pace Profile #:	658

Regulatory Agency	
State / Location	IN

Requested Analysis Filtered (Y/N)

SAMPLE ID — One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique

MATRIX	CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Other	OT
Tissue	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	START TIME	END DATE	END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	VOC by 8260	[redacted]	Residual Chlorine (Y/N)	
1	MW-30	WT	G			12/4/19	13:05		3				3						X			013
2	MW-31	WT	G			12/5/19	14:55		3				3						X			014
3	MW-32	WT	G			12/2/19	11:15		3				3						X			015
4	MW-33	WT	G			12/4/19	9:40		3				3						X			016
5	MW-34	WT	G			12/2/19	15:00		3				3						X			017
6	MW-35	WT	G			12/3/19	11:30		3				3						X			018
7	MW-36	WT	G			12/2/19	16:35		3				3						X			019
8	MW-37	WT	G			12/2/19	14:05		3				3						X			020
9	MW-38 (ms/msd 2)	WT	G			12/5/19	13:55		9				9						X			021
10	MW-39	WT	G			12/3/19	9:35		3				3						X			022
11	MW-40	WT	G			12/2/19	12:40		9				9						X			023
12	MW-9	WT	G			12/5/19	8:40		3				3						X			024

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Luke Lohrstorfer / IWM	12/5/19	17:05	[signature]	12/5/19	1705	0.5	Y	N	X
							TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Luke Lohrstorfer

SIGNATURE of SAMPLER: Luke Lohrstorfer

DATE Signed: 12/5/19

50243650

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Pace Analytical

Page : 3 Of 3

Section A Required Client Information:

Company:	IWM
Address:	7428 Rockville Road, Indianapolis, IN 46214
Email:	cparks@iwmconsult.com
Phone:	(317)968-9260
Fax:	
Requested Due Date:	Standard TAT; Level IV QA/QC

Section B Required Project Information:

Report To:	Parks, Chris
Copy To:	Brad Gentry
Purchase Order #:	
Project Name:	Amphenol
Project #:	

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote:	
Pace Project Manager:	chris.boyle@pacelabs.com,
Pace Profile #:	658

Regulatory Agency	
State / Location	IN

MATRIX / CODE: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Other OT, Tissue TS

SAMPLE ID — One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	START TIME	END DATE	END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	VOC by 8260	[redacted]	Residual Chlorine (Y/N)	
1	EB-1	WT	G			12/2/19	17:00		3				3						X			025
2	EB-2	WT	G			12/3/19	16:55		3				3						X			026
3	EB-3	WT	G			12/4/19	17:15		3				3						X			027
4	EB-4	WT	G			12/5/19	15:00		3				3						X			028
5	DUP-1	WT	G			12/2/19	/		3				3						X			029
6	DUP-2	WT	G			12/4/19	/		3				3						X			030
7	DUP-3	WT	G			12/5/19	/		3				3						X			031
8	Trip Blank	WT	G			12/2/19	/		3				3						Y			032
9																						
10																						
11																						
12																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Luke Lohrstorfer / IWM	12/5/19	17:05	[signature]	12/5/19	1705	0.5	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Luke Lohrstorfer

SIGNATURE of SAMPLER: Luke Lohrstorfer DATE Signed: 12/5/19

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

SAMPLE CONDITION UPON RECEIPT FORM

Pace Analytical

Project #: 50243650

Date/Time and Initials of person examining contents: LWG 1750 12/5/19

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Other ______

Tracking #: ______

Custody Seal on Cooler/Box Present: ☐ Yes ☒ No | Seals Intact: ☐ Yes ☒ No

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other ______

Thermometer: 1 2 3 4 5 6 A B C D E F (5 circled) | Ice Type: ☒ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☐ Yes ☐ No ☒ N/A

Cooler Temperature: 0.4/0.5 | Ice Visible in Sample Containers?: ☐ Yes ☒ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C | If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☒ N/A

All discrepancies will be written out in the comments section below.

	Yes	No
Are samples from West Virginia? Document any containers out of temp.		✓
USDA Regulated Soils? (ID, NY, WA, OR, CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		✓
Chain of Custody Present:	✓	
Chain of Custody Filled Out:	✓	
Short Hold Time Analysis (<72hr)?: Analysis:		✓
Time 5035A TC placed in Freezer or Short Holds To Lab:		
Rush TAT Requested:		✓
Containers Intact?:	✓	
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	✓	
Extra labels on Terracore Vials (soils only)?		N/A

	Yes	No	N/A
All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted. Circle: HNO3 H2SO4 NaOH NaOH/ZnAc			✓
Dissolved Metals field filtered?:			✓
Headspace Wisconsin Sulfide			✓
	Present	Absent	N/A
Residual Chlorine Check (SVOC 625 Pest/PCB 608)			✓
Residual Chlorine Check (Total/Amenable/Free Cyanide)			✓
Headspace in VOA Vials (>6mm):		✓	
Trip Blank Present?:	✓		
Trip Blank Custody Seals?:	✓		

Comments:

COC PAGE 1 of 3

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H				Matrix	pH <2	pH >9	pH>12
1			3																						WT			
2																												
3																												
4																												
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved amber vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved clear vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							WT			
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9			9																										
10			3																										
11			9																										
12			3																										

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DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved amber vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved clear vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
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JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

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BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

COC PAGE 3 of 3

Sample Container Count

WO# : 50243650

50243650

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							WT			
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Container Codes

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DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved amber vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved clear vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
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BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

January 17, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol
Pace Project No.: 50246259

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on January 08, 2020. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Revised Report: This revision replaces previous report dated January 15, 2020. Dilution factor for sample 003 corrected to 10 due to client request for data review. SAB 01/17/2020

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Brad Gentry, IWM Consulting Group, LLC
Mr. Chris Parks, IWM Consulting Group

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

CERTIFICATIONS

Project: Amphenol
Pace Project No.: 50246259

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Certification #: 200074
Indiana Certification #: C-49-06
Kansas/NELAP Certification #: E-10177
Kentucky UST Certification #: 80226
Kentucky WW Certification #: 98019
Michigan Department of Environmental Quality, Laboratory #9050
Ohio VAP Certification #: CL0065
Oklahoma Certification #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Certification #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE SUMMARY

Project: Amphenol
Pace Project No.: 50246259

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50246259001	**MW-31**	Water	01/08/20 10:10	01/08/20 15:37
50246259002	**MW-35**	Water	01/08/20 12:40	01/08/20 15:37
50246259003	**MW-12R**	Water	01/08/20 11:33	01/08/20 15:37
50246259004	**Dup#2**	Water	01/08/20 08:00	01/08/20 15:37
50246259005	**Trip Blank**	Water	01/08/20 08:00	01/08/20 15:37
50246259006	**E.Q #3**	Water	01/08/20 10:50	01/08/20 15:37

Pace Analytical
www.pacelabs.com

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50246259

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50246259001	**MW-31**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 8260	CAP	12	PASI-I
		SM 4500-S2-D	ZM	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50246259002	**MW-35**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 8260	CAP	12	PASI-I
		SM 4500-S2-D	ZM	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50246259003	**MW-12R**	EPA 8260	CAP	12	PASI-I
50246259004	**Dup#2**	EPA 8260	CAP	12	PASI-I
50246259005	**Trip Blank**	EPA 8260	CAP	12	PASI-I
50246259006	**E.Q #3**	EPA 8260	CAP	12	PASI-I

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50246259

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50246259001	**MW-31**					
EPA 8260	Tetrachloroethene	44.7	ug/L	5.0	01/10/20 16:17	
EPA 8260	1,1,1-Trichloroethane	10.3	ug/L	5.0	01/10/20 16:17	
EPA 8260	Trichloroethene	51.7	ug/L	5.0	01/10/20 16:17	
EPA 9038	Sulfate	63.2	mg/L	50.0	01/09/20 10:28	
EPA 353.2	Nitrogen, NO2 plus NO3	4.6	mg/L	0.50	01/09/20 13:49	
EPA 353.2	Nitrogen, Nitrate	4.6	mg/L	0.50	01/09/20 13:49	
50246259002	**MW-35**					
RSK 175 Modified	Ethane	17.1	ug/L	10.0	01/09/20 18:58	
RSK 175 Modified	Methane	88.9	ug/L	10.0	01/09/20 18:58	
EPA 6010	Iron	10800	ug/L	100	01/13/20 23:38	
EPA 6010	Manganese	564	ug/L	10.0	01/13/20 23:38	
EPA 6010	Manganese, Dissolved	503	ug/L	10.0	01/12/20 12:19	
EPA 9038	Sulfate	13.7	mg/L	10.0	01/09/20 10:29	
EPA 353.2	Nitrogen, NO2 plus NO3	0.32	mg/L	0.10	01/09/20 13:52	
EPA 353.2	Nitrogen, Nitrate	0.29	mg/L	0.10	01/09/20 13:52	
50246259003	**MW-12R**					
EPA 8260	Tetrachloroethene	429	ug/L	50.0	01/10/20 17:22	
EPA 8260	Trichloroethene	125	ug/L	50.0	01/10/20 17:22	
50246259004	**Dup#2**					
EPA 8260	cis-1,2-Dichloroethene	13.3	ug/L	5.0	01/10/20 17:55	
EPA 8260	Tetrachloroethene	456	ug/L	25.0	01/14/20 14:30	
EPA 8260	1,1,1-Trichloroethane	25.1	ug/L	5.0	01/10/20 17:55	
EPA 8260	Trichloroethene	158	ug/L	5.0	01/10/20 17:55	

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246259

Sample: MW-31 **Lab ID: 50246259001** Collected: 01/08/20 10:10 Received: 01/08/20 15:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		01/09/20 18:38	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		01/09/20 18:38	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		01/09/20 18:38	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	ND	ug/L	100	21.2	1	01/13/20 13:32	01/13/20 23:36	7439-89-6	
Manganese	ND	ug/L	10.0	0.62	1	01/13/20 13:32	01/13/20 23:36	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	32.4	1	01/11/20 09:15	01/12/20 12:16	7439-89-6	
Manganese, Dissolved	ND	ug/L	10.0	1.1	1	01/11/20 09:15	01/12/20 12:16	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		01/10/20 16:17	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		01/10/20 16:17	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		01/10/20 16:17	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		01/10/20 16:17	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.92	1		01/10/20 16:17	75-09-2	
Tetrachloroethene	**44.7**	ug/L	5.0	0.55	1		01/10/20 16:17	127-18-4	
1,1,1-Trichloroethane	**10.3**	ug/L	5.0	0.42	1		01/10/20 16:17	71-55-6	
Trichloroethene	**51.7**	ug/L	5.0	0.52	1		01/10/20 16:17	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.77	1		01/10/20 16:17	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	80-122		1		01/10/20 16:17	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	85-114		1		01/10/20 16:17	460-00-4	
Toluene-d8 (S)	96	%.	85-114		1		01/10/20 16:17	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		01/09/20 10:24	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**63.2**	mg/L	50.0	18.9	5		01/09/20 10:28	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.6**	mg/L	0.50	0.10	5		01/09/20 13:49		
Nitrogen, Nitrate	**4.6**	mg/L	0.50	0.099	5		01/09/20 13:49	14797-55-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246259

Sample: MW-35 **Lab ID: 50246259002** Collected: 01/08/20 12:40 Received: 01/08/20 15:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	**17.1**	ug/L	10.0	5.0	1		01/09/20 18:58	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		01/09/20 18:58	74-85-1	
Methane	**88.9**	ug/L	10.0	6.4	1		01/09/20 18:58	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**10800**	ug/L	100	21.2	1	01/13/20 13:32	01/13/20 23:38	7439-89-6	
Manganese	**564**	ug/L	10.0	0.62	1	01/13/20 13:32	01/13/20 23:38	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	32.4	1	01/11/20 09:15	01/12/20 12:19	7439-89-6	
Manganese, Dissolved	**503**	ug/L	10.0	1.1	1	01/11/20 09:15	01/12/20 12:19	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		01/10/20 16:50	75-34-3	R1
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		01/10/20 16:50	107-06-2	R1
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		01/10/20 16:50	156-59-2	R1
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		01/10/20 16:50	156-60-5	R1
Methylene Chloride	ND	ug/L	5.0	0.92	1		01/10/20 16:50	75-09-2	R1
Tetrachloroethene	ND	ug/L	5.0	0.55	1		01/10/20 16:50	127-18-4	R1
1,1,1-Trichloroethane	ND	ug/L	5.0	0.42	1		01/10/20 16:50	71-55-6	R1
Trichloroethene	ND	ug/L	5.0	0.52	1		01/10/20 16:50	79-01-6	R1
Vinyl chloride	ND	ug/L	2.0	0.77	1		01/10/20 16:50	75-01-4	R1
Surrogates									
Dibromofluoromethane (S)	102	%.	80-122		1		01/10/20 16:50	1868-53-7	
4-Bromofluorobenzene (S)	85	%.	85-114		1		01/10/20 16:50	460-00-4	
Toluene-d8 (S)	100	%.	85-114		1		01/10/20 16:50	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.50	0.085	1		01/09/20 10:24	18496-25-8	D3
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**13.7**	mg/L	10.0	3.8	1		01/09/20 10:29	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**0.32**	mg/L	0.10	0.020	1		01/09/20 13:52		
Nitrogen, Nitrate	**0.29**	mg/L	0.10	0.020	1		01/09/20 13:52	14797-55-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246259

Sample: MW-12R **Lab ID: 50246259003** Collected: 01/08/20 11:33 Received: 01/08/20 15:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	50.0	4.4	10		01/10/20 17:22	75-34-3	
1,2-Dichloroethane	ND	ug/L	50.0	5.4	10		01/10/20 17:22	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	50.0	4.9	10		01/10/20 17:22	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	50.0	5.9	10		01/10/20 17:22	156-60-5	
Methylene Chloride	ND	ug/L	50.0	9.2	10		01/10/20 17:22	75-09-2	
Tetrachloroethene	**429**	ug/L	50.0	5.5	10		01/10/20 17:22	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	50.0	4.2	10		01/10/20 17:22	71-55-6	
Trichloroethene	**125**	ug/L	50.0	5.2	10		01/10/20 17:22	79-01-6	
Vinyl chloride	ND	ug/L	20.0	7.7	10		01/10/20 17:22	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	80-122		10		01/10/20 17:22	1868-53-7	D4
4-Bromofluorobenzene (S)	99	%.	85-114		10		01/10/20 17:22	460-00-4	
Toluene-d8 (S)	98	%.	85-114		10		01/10/20 17:22	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246259

Sample: Dup#2 **Lab ID: 50246259004** Collected: 01/08/20 08:00 Received: 01/08/20 15:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		01/10/20 17:55	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		01/10/20 17:55	107-06-2	
cis-1,2-Dichloroethene	**13.3**	ug/L	5.0	0.49	1		01/10/20 17:55	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		01/10/20 17:55	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.92	1		01/10/20 17:55	75-09-2	
Tetrachloroethene	**456**	ug/L	25.0	2.8	5		01/14/20 14:30	127-18-4	
1,1,1-Trichloroethane	**25.1**	ug/L	5.0	0.42	1		01/10/20 17:55	71-55-6	
Trichloroethene	**158**	ug/L	5.0	0.52	1		01/10/20 17:55	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.77	1		01/10/20 17:55	75-01-4	
Surrogates									
Dibromofluoromethane (S)	101	%.	80-122		1		01/10/20 17:55	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	85-114		1		01/10/20 17:55	460-00-4	
Toluene-d8 (S)	99	%.	85-114		1		01/10/20 17:55	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246259

Sample: Trip Blank **Lab ID: 50246259005** Collected: 01/08/20 08:00 Received: 01/08/20 15:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		01/10/20 18:28	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		01/10/20 18:28	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		01/10/20 18:28	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		01/10/20 18:28	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.92	1		01/10/20 18:28	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.55	1		01/10/20 18:28	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.42	1		01/10/20 18:28	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.52	1		01/10/20 18:28	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.77	1		01/10/20 18:28	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	80-122		1		01/10/20 18:28	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-114		1		01/10/20 18:28	460-00-4	
Toluene-d8 (S)	98	%.	85-114		1		01/10/20 18:28	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246259

Sample: E.Q #3 **Lab ID: 50246259006** Collected: 01/08/20 10:50 Received: 01/08/20 15:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		01/10/20 19:01	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		01/10/20 19:01	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		01/10/20 19:01	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		01/10/20 19:01	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.92	1		01/10/20 19:01	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.55	1		01/10/20 19:01	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.42	1		01/10/20 19:01	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.52	1		01/10/20 19:01	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.77	1		01/10/20 19:01	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	80-122		1		01/10/20 19:01	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-114		1		01/10/20 19:01	460-00-4	
Toluene-d8 (S)	96	%.	85-114		1		01/10/20 19:01	2037-26-5	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246259

QC Batch: 541934 | Analysis Method: RSK 175 Modified
QC Batch Method: RSK 175 Modified | Analysis Description: RSK 175 HEADSPACE
Associated Lab Samples: 50246259001, 50246259002

METHOD BLANK: 2499901 | Matrix: Water
Associated Lab Samples: 50246259001, 50246259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	5.0	01/09/20 17:41	
Ethene	ug/L	ND	10.0	4.1	01/09/20 17:41	
Methane	ug/L	ND	10.0	6.4	01/09/20 17:41	

LABORATORY CONTROL SAMPLE: 2499902

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	1980	1830	93	78-135	
Ethene	ug/L	2250	2330	104	83-133	
Methane	ug/L	1980	2040	103	67-135	

SAMPLE DUPLICATE: 2501661

Parameter	Units	50246259002 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	17.1	16.0	7	20	
Ethene	ug/L	ND	6.3J		20	
Methane	ug/L	88.9	94.5	6	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246259

QC Batch: 542286 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET
Associated Lab Samples: 50246259001, 50246259002

METHOD BLANK: 2501569 | Matrix: Water
Associated Lab Samples: 50246259001, 50246259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron	ug/L	ND	100	21.2	01/13/20 23:06	
Manganese	ug/L	ND	10.0	0.62	01/13/20 23:06	

LABORATORY CONTROL SAMPLE: 2501570

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	8990	90	80-120	
Manganese	ug/L	1000	920	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2501571 2501572

Parameter	Units	50246134013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	1040	10000	10000	9740	9800	87	88	75-125	1	20	
Manganese	ug/L	480	1000	1000	1370	1350	89	87	75-125	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2501573 2501574

Parameter	Units	50246259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	10800	10000	10000	18500	18800	77	80	75-125	2	20	
Manganese	ug/L	564	1000	1000	1400	1420	83	85	75-125	1	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246259

QC Batch: 542370 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 50246259001, 50246259002

METHOD BLANK: 2501999 Matrix: Water
Associated Lab Samples: 50246259001, 50246259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	100	32.4	01/12/20 11:47	
Manganese, Dissolved	ug/L	ND	10.0	1.1	01/12/20 11:47	

LABORATORY CONTROL SAMPLE: 2502000

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	10000	9540	95	80-120	
Manganese, Dissolved	ug/L	1000	958	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2502001 2502002

Parameter	Units	50246259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	9480	9630	95	96	75-125	2	20	
Manganese, Dissolved	ug/L	503	1000	1000	1460	1460	96	96	75-125	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2502003 2502004

Parameter	Units	50246410001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	9660	9780	96	97	75-125	1	20	
Manganese, Dissolved	ug/L	12700	1000	1000	13900	13800	118	112	75-125	0	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246259

QC Batch: 542372 — Analysis Method: EPA 8260
QC Batch Method: EPA 8260 — Analysis Description: 8260 MSV
Associated Lab Samples: 50246259001, 50246259002, 50246259003, 50246259004, 50246259005, 50246259006

METHOD BLANK: 2502009 — Matrix: Water
Associated Lab Samples: 50246259001, 50246259002, 50246259003, 50246259004, 50246259005, 50246259006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.42	01/10/20 13:00	
1,1-Dichloroethane	ug/L	ND	5.0	0.44	01/10/20 13:00	
1,2-Dichloroethane	ug/L	ND	5.0	0.54	01/10/20 13:00	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.49	01/10/20 13:00	
Methylene Chloride	ug/L	ND	5.0	0.92	01/10/20 13:00	
Tetrachloroethene	ug/L	ND	5.0	0.55	01/10/20 13:00	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.59	01/10/20 13:00	
Trichloroethene	ug/L	ND	5.0	0.52	01/10/20 13:00	
Vinyl chloride	ug/L	ND	2.0	0.77	01/10/20 13:00	
4-Bromofluorobenzene (S)	%.	103	85-114		01/10/20 13:00	
Dibromofluoromethane (S)	%.	102	80-122		01/10/20 13:00	
Toluene-d8 (S)	%.	100	85-114		01/10/20 13:00	

LABORATORY CONTROL SAMPLE: 2502010

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	52.6	105	72-127	
1,1-Dichloroethane	ug/L	50	48.5	97	70-119	
1,2-Dichloroethane	ug/L	50	48.8	98	68-119	
cis-1,2-Dichloroethene	ug/L	50	50.6	101	74-122	
Methylene Chloride	ug/L	50	46.7	93	70-121	
Tetrachloroethene	ug/L	50	49.7	99	76-124	
trans-1,2-Dichloroethene	ug/L	50	50.4	101	73-121	
Trichloroethene	ug/L	50	43.9	88	76-120	
Vinyl chloride	ug/L	50	43.3	87	70-136	
4-Bromofluorobenzene (S)	%.			101	85-114	
Dibromofluoromethane (S)	%.			99	80-122	
Toluene-d8 (S)	%.			101	85-114	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2502011 2502012

Parameter	Units	50246259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	44.7	60.0	89	120	48-145	29	20	R1
1,1-Dichloroethane	ug/L	ND	50	50	40.2	53.2	80	106	38-142	28	20	R1
1,2-Dichloroethane	ug/L	ND	50	50	39.2	53.2	78	106	44-138	30	20	R1
cis-1,2-Dichloroethene	ug/L	ND	50	50	42.4	56.1	85	112	46-143	28	20	R1
Methylene Chloride	ug/L	ND	50	50	38.9	50.1	78	100	33-140	25	20	R1

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246259

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2502011 2502012

Parameter	Units	50246259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Tetrachloroethene	ug/L	ND	50	50	37.8	50.6	76	101	41-145	29	20	R1
trans-1,2-Dichloroethene	ug/L	ND	50	50	41.7	55.5	83	111	46-140	28	20	R1
Trichloroethene	ug/L	ND	50	50	38.3	48.9	76	97	43-147	24	20	R1
Vinyl chloride	ug/L	ND	50	50	37.5	48.1	75	96	49-153	25	20	R1
4-Bromofluorobenzene (S)	%.						101	100	85-114			
Dibromofluoromethane (S)	%.						102	102	80-122			
Toluene-d8 (S)	%.						100	99	85-114			

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246259

QC Batch: 542078 | Analysis Method: SM 4500-S2-D
QC Batch Method: SM 4500-S2-D | Analysis Description: 4500S2D Sulfide Water
Associated Lab Samples: 50246259001, 50246259002

METHOD BLANK: 2500554 | Matrix: Water
Associated Lab Samples: 50246259001, 50246259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.017	01/09/20 10:24	

LABORATORY CONTROL SAMPLE: 2500555

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.51	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2500556 2500557

Parameter	Units	50246259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	2.5	2.5	2.6	2.6	98	100	90-110	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246259

QC Batch: 542087 | Analysis Method: EPA 9038
QC Batch Method: EPA 9038 | Analysis Description: 9038 Sulfate Water
Associated Lab Samples: 50246259001, 50246259002

METHOD BLANK: 2500584 | Matrix: Water
Associated Lab Samples: 50246259001, 50246259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	3.8	01/09/20 10:27	

LABORATORY CONTROL SAMPLE: 2500585

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	20	20.4	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2500586 2500587

Parameter	Units	50246259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	13.7	20	20	35.4	35.4	108	109	90-110	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246259

QC Batch: 542161 | Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 | Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
Associated Lab Samples: 50246259001, 50246259002

METHOD BLANK: 2500925 | Matrix: Water
Associated Lab Samples: 50246259001, 50246259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	ND	0.10	0.020	01/09/20 11:18	
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.020	01/09/20 11:18	

LABORATORY CONTROL SAMPLE: 2500926

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	1	1.1	107	90-110	
Nitrogen, NO2 plus NO3	mg/L	2	2.0	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2500927 2500928

Parameter	Units	50246259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Nitrate	mg/L	0.29	1	1	1.7	1.8	145	147	90-110	2	20	
Nitrogen, NO2 plus NO3	mg/L	0.32	2	2	2.9	2.9	127	128	90-110	1	20	M3

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2500929 2500930

Parameter	Units	50246289011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Nitrate	mg/L	ND	1	1	1.3	1.2	126	123	90-110	2	20	
Nitrogen, NO2 plus NO3	mg/L	ND	2	2	2.3	2.3	117	115	90-110	1	20	M3

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project:	Amphenol
Pace Project No.:	50246259

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-I	Pace Analytical Services - Indianapolis

ANALYTE QUALIFIERS

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
D4	Sample was diluted due to the presence of high levels of target analytes.
M3	Matrix spike recovery was outside laboratory control limits due to matrix interferences.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50246259

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50246259001	**MW-31**	RSK 175 Modified	541934		
50246259002	**MW-35**	RSK 175 Modified	541934		
50246259001	**MW-31**	EPA 3010	542286	EPA 6010	542653
50246259002	**MW-35**	EPA 3010	542286	EPA 6010	542653
50246259001	**MW-31**	EPA 3010	542370	EPA 6010	542476
50246259002	**MW-35**	EPA 3010	542370	EPA 6010	542476
50246259001	**MW-31**	EPA 8260	542372		
50246259002	**MW-35**	EPA 8260	542372		
50246259003	**MW-12R**	EPA 8260	542372		
50246259004	**Dup#2**	EPA 8260	542372		
50246259005	**Trip Blank**	EPA 8260	542372		
50246259006	**E.Q #3**	EPA 8260	542372		
50246259001	**MW-31**	SM 4500-S2-D	542078		
50246259002	**MW-35**	SM 4500-S2-D	542078		
50246259001	**MW-31**	EPA 9038	542087		
50246259002	**MW-35**	EPA 9038	542087		
50246259001	**MW-31**	EPA 353.2	542161		
50246259002	**MW-35**	EPA 353.2	542161		

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

50246259

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM consulting
Billing Information: SAME
Address: 7428 Rockville RD.
Report To: C. Parks, B. gentry
Email To:
Copy To: B. gentry IWM consulting
Site Collection Info/Address:
Customer Project Name/Number: Amphenol
State: IN County/City: Johnson/Franklin Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET
Phone: 317-347-1111
Email:
Site/Facility ID #:
Compliance Monitoring? [ ] Yes [✓] No
Collected By (print): D.E. White
Purchase Order #:
Quote #:
DW PWS ID #:
DW Location Code:
Collected By (signature):
Turnaround Date Required:
Immediately Packed on Ice: [ ] Yes [ ] No
Sample Disposal: [✓] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______
Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)
Field Filtered (if applicable): [ ] Yes [ ] No
Analysis: ______

Container Preservative Type **: 3 3 3 1 U U 9

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

Lab Project Manager:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	VOC 8260	RSK 175	IN metals total	IN metals LF	IN sulfide	IN sulfate Nitrate	Lab Sample # / Comments
MW-31	GW	G	1-8-20	10:10				10	3	3	1	1	1	1	001
MW-38				12:40				10	3	3	1	1	1	1	002
MS #2 MW35				12:40				10	3	3	1	1	1	1	
MSD #2 MW35				12:40				10	3	3	1	1	1	1	
MW 12R				11:39				3	3						003
Dup #2				—				3	3						004
Trip Blank				—				3	3						005
E.Q #3				10:50				3	3						006

Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present Y N NA
Cl Strips: ______
Sample pH Acceptable Y N NA
pH Strips: ______
Sulfide Present Y N NA
Lead Acetate Strips: ______

LAB USE ONLY:
Lab Sample # / Comments:
SEE SCUR

Customer Remarks / Special Conditions / Possible Hazards: Level IV QA/QC

Type of Ice Used: Wet Blue Dry None
Packing Material Used:
Radchem sample(s) screened (<500 cpm): Y N NA
SHORT HOLDS PRESENT (<72 hours): Y N N/A
Lab Tracking #: 2467533
Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: E
Cooler 1 Temp Upon Receipt: 2.4 oC
Cooler 1 Therm Corr. Factor: 0.1 oC
Cooler 1 Corrected Temp: 2.5 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
[signature]	1/8/20 15:37	[signature]	1/8/20 1537	Table #: Acctnum:
				Template: Prelogin:
				PM: PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO
Page: ______ of: ______

SAMPLE CONDITION UPON RECEIPT FORM

Pace Analytical

Project #: 50246259

Date/Time and Initials of person examining contents: MD 01/08/2020 1551

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other

Tracking #: N/A

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No **Seals Intact:** ☐ Yes ☑ No

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Thermometer: 1 2 3 4 5 6 A B C D E F Ice Type: ☑ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☑ Yes ☐ No ☐ N/A

Cooler Temperature: 2.4 / 2.5 Ice Visible in Sample Containers?: ☐ Yes ☑ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☑ N/A

All discrepancies will be written out in the comments section below.

	Yes	No		Yes	No	N/A
Are samples from West Virginia? Document any containers out of temp.		✓	All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted. Circle: HNO3 H2SO4 NaOH NaOH/ZnAc	✓		
USDA Regulated Soils? (ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		✓				
Chain of Custody Present:	✓					
Chain of Custody Filled Out:	✓		Dissolved Metals field filtered?:		✓	~~✓~~ MD
Short Hold Time Analysis (<72hr)?: Analysis: Nitrate	✓	~~✓~~ MD	Headspace Wisconsin Sulfide			✓
Time 5035A TC placed in Freezer or Short Holds To Lab:				Present	Absent	N/A
			Residual Chlorine Check (SVOC 625 Pest/PCB 608)			✓
			Residual Chlorine Check (Total/Amenable/Free Cyanide)			✓
Rush TAT Requested:		✓	Headspace in VOA Vials (>6mm):		✓	
Containers Intact?:	✓		Trip Blank Present?:	✓		
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	✓		Trip Blank Custody Seals?:	✓		
Extra labels on Terracore Vials (soils only)?		N/A				

Comments:

F-IN-Q-290-rev.18,22Apr2019

COC PAGE 1 of 1

Sample Container Count

WO#: 50246259

50246259

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H				Matrix	pH <2	pH >9	pH>12
1			6											2		1				1					WT	✓	✓	
2																												
3																												
4			↓											↓		↓				↓						↓	↓	
5			3																									
6																												
7					Tripblank																							
8			↓																						↓			
9																												
10																												
11																												
12																												

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Pace Analytical Services, LLC
7726 Moller Road
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(317)228-3100

January 14, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol
Pace Project No.: 50246129

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on January 07, 2020. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Brad Gentry, IWM Consulting Group, LLC
Mr. Chris Parks, IWM Consulting Group

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CERTIFICATIONS

Project:	Amphenol
Pace Project No.:	50246129

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Certification #: 200074
Indiana Certification #: C-49-06
Kansas/NELAP Certification #: E-10177
Kentucky UST Certification #: 80226
Kentucky WW Certification #: 98019
Michigan Department of Environmental Quality, Laboratory #9050
Ohio VAP Certification #: CL0065
Oklahoma Certification #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Certification #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services, LLC
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SAMPLE SUMMARY

Project: Amphenol
Pace Project No.: 50246129

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50246129001	**MW-38**	Water	01/06/20 15:52	01/07/20 16:36
50246129002	**Dup#1**	Water	01/06/20 15:52	01/07/20 16:36
50246129003	**MW-33**	Water	01/06/20 14:59	01/07/20 16:36
50246129004	**MW-39**	Water	01/06/20 13:57	01/07/20 16:36
50246129005	**EQ Blank #1**	Water	01/06/20 13:57	01/07/20 16:36
50246129006	**MW-40**	Water	01/06/20 12:34	01/07/20 16:36
50246129007	**MW-32**	Water	01/06/20 11:31	01/07/20 16:36
50246129008	**EQ #2**	Water	01/07/20 11:02	01/07/20 16:36
50246129009	**It-2**	Water	01/07/20 15:10	01/07/20 16:36
50246129010	**MW-36**	Water	01/07/20 14:05	01/07/20 16:36
50246129011	**MW-37**	Water	01/07/20 11:56	01/07/20 16:36
50246129012	**MW-34**	Water	01/07/20 12:57	01/07/20 16:36
50246129013	**Trip Blank**	Water	01/06/20 08:00	01/07/20 16:36

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SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50246129

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50246129001	**MW-38**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 8260	TMW	12	PASI-I
		SM 4500-S2-D	ZM	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50246129002	**Dup#1**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 8260	TMW	12	PASI-I
		SM 4500-S2-D	ZM	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50246129003	**MW-33**	EPA 8260	TMW	12	PASI-I
50246129004	**MW-39**	EPA 8260	TMW	12	PASI-I
50246129005	**EQ Blank #1**	EPA 8260	TMW	12	PASI-I
50246129006	**MW-40**	EPA 8260	TMW	12	PASI-I
50246129007	**MW-32**	EPA 8260	TMW	12	PASI-I
50246129008	**EQ #2**	EPA 8260	TMW	12	PASI-I
50246129009	**It-2**	EPA 8260	TMW	12	PASI-I
50246129010	**MW-36**	EPA 8260	TMW	12	PASI-I
50246129011	**MW-37**	EPA 8260	TMW	12	PASI-I
50246129012	**MW-34**	EPA 8260	TMW	12	PASI-I
50246129013	**Trip Blank**	EPA 8260	TMW	12	PASI-I

Pace Analytical Services, LLC
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SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50246129

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50246129001	**MW-38**					
EPA 6010	Iron	7290	ug/L	100	01/13/20 23:09	
EPA 6010	Manganese	276	ug/L	10.0	01/13/20 23:09	
EPA 6010	Manganese, Dissolved	28.4	ug/L	10.0	01/12/20 11:52	
EPA 8260	Tetrachloroethene	25.4	ug/L	5.0	01/09/20 02:53	
EPA 8260	1,1,1-Trichloroethane	10.0	ug/L	5.0	01/09/20 02:53	
EPA 8260	Trichloroethene	54.6	ug/L	5.0	01/09/20 02:53	
EPA 9038	Sulfate	35.6	mg/L	20.0	01/09/20 10:27	
EPA 353.2	Nitrogen, NO2 plus NO3	3.9	mg/L	0.20	01/08/20 13:53	
EPA 353.2	Nitrogen, Nitrate	3.9	mg/L	0.20	01/08/20 13:53	
50246129002	**Dup#1**					
EPA 6010	Iron	6180	ug/L	100	01/13/20 23:11	
EPA 6010	Manganese	242	ug/L	10.0	01/13/20 23:11	
EPA 6010	Manganese, Dissolved	26.1	ug/L	10.0	01/12/20 11:54	
EPA 8260	Tetrachloroethene	26.0	ug/L	5.0	01/09/20 03:27	
EPA 8260	1,1,1-Trichloroethane	10.3	ug/L	5.0	01/09/20 03:27	
EPA 8260	Trichloroethene	56.7	ug/L	5.0	01/09/20 03:27	
EPA 9038	Sulfate	36.8	mg/L	20.0	01/09/20 10:27	
EPA 353.2	Nitrogen, NO2 plus NO3	3.9	mg/L	0.10	01/08/20 13:52	
EPA 353.2	Nitrogen, Nitrate	3.8	mg/L	0.10	01/08/20 13:52	
50246129004	**MW-39**					
EPA 8260	Trichloroethene	8.6	ug/L	5.0	01/09/20 04:37	
50246129006	**MW-40**					
EPA 8260	Tetrachloroethene	22.2	ug/L	5.0	01/08/20 17:57	
EPA 8260	1,1,1-Trichloroethane	8.2	ug/L	5.0	01/08/20 17:57	
EPA 8260	Trichloroethene	58.2	ug/L	5.0	01/08/20 17:57	
50246129009	**It-2**					
EPA 8260	cis-1,2-Dichloroethene	12.6	ug/L	5.0	01/09/20 06:55	
50246129010	**MW-36**					
EPA 8260	Tetrachloroethene	53.2	ug/L	5.0	01/09/20 07:30	
50246129011	**MW-37**					
EPA 8260	Tetrachloroethene	47.1	ug/L	5.0	01/08/20 19:41	
EPA 8260	Trichloroethene	27.1	ug/L	5.0	01/08/20 19:41	
50246129012	**MW-34**					
EPA 8260	Tetrachloroethene	35.0	ug/L	5.0	01/08/20 20:15	
EPA 8260	Trichloroethene	12.6	ug/L	5.0	01/08/20 20:15	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: MW-38 **Lab ID: 50246129001** Collected: 01/06/20 15:52 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		01/09/20 18:00	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		01/09/20 18:00	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		01/09/20 18:00	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**7290**	ug/L	100	21.2	1	01/13/20 13:32	01/13/20 23:09	7439-89-6	
Manganese	**276**	ug/L	10.0	0.62	1	01/13/20 13:32	01/13/20 23:09	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	32.4	1	01/11/20 09:15	01/12/20 11:52	7439-89-6	
Manganese, Dissolved	**28.4**	ug/L	10.0	1.1	1	01/11/20 09:15	01/12/20 11:52	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		01/09/20 02:53	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		01/09/20 02:53	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		01/09/20 02:53	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		01/09/20 02:53	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		01/09/20 02:53	75-09-2	
Tetrachloroethene	**25.4**	ug/L	5.0	0.21	1		01/09/20 02:53	127-18-4	
1,1,1-Trichloroethane	**10.0**	ug/L	5.0	0.44	1		01/09/20 02:53	71-55-6	
Trichloroethene	**54.6**	ug/L	5.0	1.4	1		01/09/20 02:53	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		01/09/20 02:53	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	80-122		1		01/09/20 02:53	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-114		1		01/09/20 02:53	460-00-4	
Toluene-d8 (S)	95	%.	85-114		1		01/09/20 02:53	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		01/09/20 10:24	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**35.6**	mg/L	20.0	7.6	2		01/09/20 10:27	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**3.9**	mg/L	0.20	0.040	2		01/08/20 13:53		
Nitrogen, Nitrate	**3.9**	mg/L	0.20	0.040	2		01/08/20 13:53	14797-55-8	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: Dup#1 **Lab ID: 50246129002** Collected: 01/06/20 15:52 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		01/09/20 18:19	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		01/09/20 18:19	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		01/09/20 18:19	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**6180**	ug/L	100	21.2	1	01/13/20 13:32	01/13/20 23:11	7439-89-6	
Manganese	**242**	ug/L	10.0	0.62	1	01/13/20 13:32	01/13/20 23:11	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	32.4	1	01/11/20 09:15	01/12/20 11:54	7439-89-6	
Manganese, Dissolved	**26.1**	ug/L	10.0	1.1	1	01/11/20 09:15	01/12/20 11:54	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		01/09/20 03:27	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		01/09/20 03:27	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		01/09/20 03:27	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		01/09/20 03:27	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		01/09/20 03:27	75-09-2	
Tetrachloroethene	**26.0**	ug/L	5.0	0.21	1		01/09/20 03:27	127-18-4	
1,1,1-Trichloroethane	**10.3**	ug/L	5.0	0.44	1		01/09/20 03:27	71-55-6	
Trichloroethene	**56.7**	ug/L	5.0	1.4	1		01/09/20 03:27	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		01/09/20 03:27	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	80-122		1		01/09/20 03:27	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-114		1		01/09/20 03:27	460-00-4	
Toluene-d8 (S)	95	%.	85-114		1		01/09/20 03:27	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		01/09/20 10:24	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**36.8**	mg/L	20.0	7.6	2		01/09/20 10:27	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**3.9**	mg/L	0.10	0.020	1		01/08/20 13:52		
Nitrogen, Nitrate	**3.8**	mg/L	0.10	0.020	1		01/08/20 13:52	14797-55-8	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: MW-33 **Lab ID: 50246129003** Collected: 01/06/20 14:59 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		01/09/20 04:02	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		01/09/20 04:02	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		01/09/20 04:02	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		01/09/20 04:02	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		01/09/20 04:02	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		01/09/20 04:02	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		01/09/20 04:02	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		01/09/20 04:02	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		01/09/20 04:02	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	80-122		1		01/09/20 04:02	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-114		1		01/09/20 04:02	460-00-4	
Toluene-d8 (S)	95	%.	85-114		1		01/09/20 04:02	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: MW-39 **Lab ID: 50246129004** Collected: 01/06/20 13:57 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		01/09/20 04:37	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		01/09/20 04:37	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		01/09/20 04:37	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		01/09/20 04:37	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		01/09/20 04:37	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		01/09/20 04:37	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		01/09/20 04:37	71-55-6	
Trichloroethene	**8.6**	ug/L	5.0	1.4	1		01/09/20 04:37	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		01/09/20 04:37	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	80-122		1		01/09/20 04:37	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-114		1		01/09/20 04:37	460-00-4	
Toluene-d8 (S)	94	%.	85-114		1		01/09/20 04:37	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: EQ Blank #1 **Lab ID: 50246129005** Collected: 01/06/20 13:57 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		01/09/20 05:12	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		01/09/20 05:12	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		01/09/20 05:12	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		01/09/20 05:12	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		01/09/20 05:12	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		01/09/20 05:12	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		01/09/20 05:12	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		01/09/20 05:12	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		01/09/20 05:12	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	80-122		1		01/09/20 05:12	1868-53-7	
4-Bromofluorobenzene (S)	94	%.	85-114		1		01/09/20 05:12	460-00-4	
Toluene-d8 (S)	93	%.	85-114		1		01/09/20 05:12	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: MW-40 **Lab ID: 50246129006** Collected: 01/06/20 12:34 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.22	1		01/08/20 17:57	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		01/08/20 17:57	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.40	1		01/08/20 17:57	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.37	1		01/08/20 17:57	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.27	1		01/08/20 17:57	75-09-2	
Tetrachloroethene	**22.2**	ug/L	5.0	0.25	1		01/08/20 17:57	127-18-4	
1,1,1-Trichloroethane	**8.2**	ug/L	5.0	1.3	1		01/08/20 17:57	71-55-6	
Trichloroethene	**58.2**	ug/L	5.0	1.2	1		01/08/20 17:57	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.46	1		01/08/20 17:57	75-01-4	
Surrogates									
Dibromofluoromethane (S)	107	%.	80-122		1		01/08/20 17:57	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-114		1		01/08/20 17:57	460-00-4	
Toluene-d8 (S)	94	%.	85-114		1		01/08/20 17:57	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: MW-32 **Lab ID: 50246129007** Collected: 01/06/20 11:31 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		01/09/20 05:46	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		01/09/20 05:46	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		01/09/20 05:46	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		01/09/20 05:46	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		01/09/20 05:46	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		01/09/20 05:46	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		01/09/20 05:46	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		01/09/20 05:46	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		01/09/20 05:46	75-01-4	
Surrogates									
Dibromofluoromethane (S)	109	%.	80-122		1		01/09/20 05:46	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-114		1		01/09/20 05:46	460-00-4	
Toluene-d8 (S)	93	%.	85-114		1		01/09/20 05:46	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: EQ #2 **Lab ID: 50246129008** Collected: 01/07/20 11:02 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		01/09/20 06:21	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		01/09/20 06:21	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		01/09/20 06:21	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		01/09/20 06:21	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		01/09/20 06:21	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		01/09/20 06:21	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		01/09/20 06:21	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		01/09/20 06:21	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		01/09/20 06:21	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	80-122		1		01/09/20 06:21	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-114		1		01/09/20 06:21	460-00-4	
Toluene-d8 (S)	93	%.	85-114		1		01/09/20 06:21	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: It-2 **Lab ID: 50246129009** Collected: 01/07/20 15:10 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		01/09/20 06:55	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		01/09/20 06:55	107-06-2	
cis-1,2-Dichloroethene	**12.6**	ug/L	5.0	1.1	1		01/09/20 06:55	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		01/09/20 06:55	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		01/09/20 06:55	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		01/09/20 06:55	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		01/09/20 06:55	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		01/09/20 06:55	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		01/09/20 06:55	75-01-4	
Surrogates									
Dibromofluoromethane (S)	108	%.	80-122		1		01/09/20 06:55	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-114		1		01/09/20 06:55	460-00-4	
Toluene-d8 (S)	95	%.	85-114		1		01/09/20 06:55	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: MW-36 **Lab ID: 50246129010** Collected: 01/07/20 14:05 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		01/09/20 07:30	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		01/09/20 07:30	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		01/09/20 07:30	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		01/09/20 07:30	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		01/09/20 07:30	75-09-2	
Tetrachloroethene	**53.2**	ug/L	5.0	0.21	1		01/09/20 07:30	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		01/09/20 07:30	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		01/09/20 07:30	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		01/09/20 07:30	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	80-122		1		01/09/20 07:30	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-114		1		01/09/20 07:30	460-00-4	
Toluene-d8 (S)	95	%.	85-114		1		01/09/20 07:30	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: MW-37 **Lab ID: 50246129011** Collected: 01/07/20 11:56 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.22	1		01/08/20 19:41	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		01/08/20 19:41	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.40	1		01/08/20 19:41	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.37	1		01/08/20 19:41	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.27	1		01/08/20 19:41	75-09-2	
Tetrachloroethene	**47.1**	ug/L	5.0	0.25	1		01/08/20 19:41	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.3	1		01/08/20 19:41	71-55-6	
Trichloroethene	**27.1**	ug/L	5.0	1.2	1		01/08/20 19:41	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.46	1		01/08/20 19:41	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	80-122		1		01/08/20 19:41	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	85-114		1		01/08/20 19:41	460-00-4	
Toluene-d8 (S)	97	%.	85-114		1		01/08/20 19:41	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: MW-34 **Lab ID: 50246129012** Collected: 01/07/20 12:57 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.22	1		01/08/20 20:15	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		01/08/20 20:15	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.40	1		01/08/20 20:15	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.37	1		01/08/20 20:15	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.27	1		01/08/20 20:15	75-09-2	
Tetrachloroethene	**35.0**	ug/L	5.0	0.25	1		01/08/20 20:15	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.3	1		01/08/20 20:15	71-55-6	
Trichloroethene	**12.6**	ug/L	5.0	1.2	1		01/08/20 20:15	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.46	1		01/08/20 20:15	75-01-4	
Surrogates									
Dibromofluoromethane (S)	108	%.	80-122		1		01/08/20 20:15	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-114		1		01/08/20 20:15	460-00-4	
Toluene-d8 (S)	97	%.	85-114		1		01/08/20 20:15	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50246129

Sample: Trip Blank **Lab ID: 50246129013** Collected: 01/06/20 08:00 Received: 01/07/20 16:36 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.22	1		01/08/20 20:50	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		01/08/20 20:50	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.40	1		01/08/20 20:50	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.37	1		01/08/20 20:50	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.27	1		01/08/20 20:50	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.25	1		01/08/20 20:50	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.3	1		01/08/20 20:50	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.2	1		01/08/20 20:50	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.46	1		01/08/20 20:50	75-01-4	
Surrogates									
Dibromofluoromethane (S)	109	%.	80-122		1		01/08/20 20:50	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	85-114		1		01/08/20 20:50	460-00-4	
Toluene-d8 (S)	96	%.	85-114		1		01/08/20 20:50	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246129

QC Batch: 541934 Analysis Method: RSK 175 Modified
QC Batch Method: RSK 175 Modified Analysis Description: RSK 175 HEADSPACE
Associated Lab Samples: 50246129001, 50246129002

METHOD BLANK: 2499901 Matrix: Water
Associated Lab Samples: 50246129001, 50246129002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	5.0	01/09/20 17:41	
Ethene	ug/L	ND	10.0	4.1	01/09/20 17:41	
Methane	ug/L	ND	10.0	6.4	01/09/20 17:41	

LABORATORY CONTROL SAMPLE: 2499902

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	1980	1830	93	78-135	
Ethene	ug/L	2250	2330	104	83-133	
Methane	ug/L	1980	2040	103	67-135	

SAMPLE DUPLICATE: 2501661

Parameter	Units	50246259002 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	17.1	16.0	7	20	
Ethene	ug/L	ND	6.3J		20	
Methane	ug/L	88.9	94.5	6	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246129

QC Batch: 542286 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 50246129001, 50246129002

METHOD BLANK: 2501569 Matrix: Water
Associated Lab Samples: 50246129001, 50246129002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron	ug/L	ND	100	21.2	01/13/20 23:06	
Manganese	ug/L	ND	10.0	0.62	01/13/20 23:06	

LABORATORY CONTROL SAMPLE: 2501570

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	8990	90	80-120	
Manganese	ug/L	1000	920	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2501571 2501572

Parameter	Units	50246134013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	1040	10000	10000	9740	9800	87	88	75-125	1	20	
Manganese	ug/L	480	1000	1000	1370	1350	89	87	75-125	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2501573 2501574

Parameter	Units	50246259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	10800	10000	10000	18500	18800	77	80	75-125	2	20	
Manganese	ug/L	564	1000	1000	1400	1420	83	85	75-125	1	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246129

QC Batch: 542370 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 50246129001, 50246129002

METHOD BLANK: 2501999 | Matrix: Water
Associated Lab Samples: 50246129001, 50246129002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	100	32.4	01/12/20 11:47	
Manganese, Dissolved	ug/L	ND	10.0	1.1	01/12/20 11:47	

LABORATORY CONTROL SAMPLE: 2502000

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	10000	9540	95	80-120	
Manganese, Dissolved	ug/L	1000	958	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2502001 2502002

Parameter	Units	50246259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	9480	9630	95	96	75-125	2	20	
Manganese, Dissolved	ug/L	503	1000	1000	1460	1460	96	96	75-125	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2502003 2502004

Parameter	Units	50246410001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	9660	9780	96	97	75-125	1	20	
Manganese, Dissolved	ug/L	12700	1000	1000	13900	13800	118	112	75-125	0	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246129

QC Batch: 541975 | Analysis Method: EPA 8260
QC Batch Method: EPA 8260 | Analysis Description: 8260 MSV
Associated Lab Samples: 50246129006, 50246129011, 50246129012, 50246129013

METHOD BLANK: 2500101 | Matrix: Water
Associated Lab Samples: 50246129006, 50246129011, 50246129012, 50246129013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	1.3	01/08/20 11:37	
1,1-Dichloroethane	ug/L	ND	5.0	0.22	01/08/20 11:37	
1,2-Dichloroethane	ug/L	ND	5.0	0.74	01/08/20 11:37	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.40	01/08/20 11:37	
Methylene Chloride	ug/L	ND	5.0	0.27	01/08/20 11:37	
Tetrachloroethene	ug/L	ND	5.0	0.25	01/08/20 11:37	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.37	01/08/20 11:37	
Trichloroethene	ug/L	ND	5.0	1.2	01/08/20 11:37	
Vinyl chloride	ug/L	ND	2.0	0.46	01/08/20 11:37	
4-Bromofluorobenzene (S)	%.	97	85-114		01/08/20 11:37	
Dibromofluoromethane (S)	%.	107	80-122		01/08/20 11:37	
Toluene-d8 (S)	%.	95	85-114		01/08/20 11:37	

LABORATORY CONTROL SAMPLE: 2500102

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	50.0	100	72-127	
1,1-Dichloroethane	ug/L	50	47.1	94	70-119	
1,2-Dichloroethane	ug/L	50	44.0	88	68-119	
cis-1,2-Dichloroethene	ug/L	50	48.8	98	74-122	
Methylene Chloride	ug/L	50	51.2	102	70-121	
Tetrachloroethene	ug/L	50	51.3	103	76-124	
trans-1,2-Dichloroethene	ug/L	50	52.0	104	73-121	
Trichloroethene	ug/L	50	49.5	99	76-120	
Vinyl chloride	ug/L	50	51.1	102	70-136	
4-Bromofluorobenzene (S)	%.			97	85-114	
Dibromofluoromethane (S)	%.			99	80-122	
Toluene-d8 (S)	%.			98	85-114	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2500103 2500104

Parameter	Units	50246129006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	8.2	50	50	53.7	56.6	91	97	48-145	5	20	
1,1-Dichloroethane	ug/L	ND	50	50	46.4	48.9	93	98	38-142	5	20	
1,2-Dichloroethane	ug/L	ND	50	50	46.0	48.3	92	97	44-138	5	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	46.5	48.9	93	98	46-143	5	20	
Methylene Chloride	ug/L	ND	50	50	49.6	50.6	99	101	33-140	2	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246129

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2500103 2500104

Parameter	Units	50246129006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Tetrachloroethene	ug/L	22.2	50	50	64.5	66.1	85	88	41-145	2	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	46.7	51.6	93	103	46-140	10	20	
Trichloroethene	ug/L	58.2	50	50	99.2	99.6	82	83	43-147	0	20	
Vinyl chloride	ug/L	ND	50	50	50.9	52.8	102	106	49-153	4	20	
4-Bromofluorobenzene (S)	%.						99	101	85-114			
Dibromofluoromethane (S)	%.						102	100	80-122			
Toluene-d8 (S)	%.						99	98	85-114			

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246129

QC Batch: 542005 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 50246129001, 50246129002, 50246129003, 50246129004, 50246129005, 50246129007, 50246129008, 50246129009, 50246129010

METHOD BLANK: 2500300 Matrix: Water
Associated Lab Samples: 50246129001, 50246129002, 50246129003, 50246129004, 50246129005, 50246129007, 50246129008, 50246129009, 50246129010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.44	01/08/20 23:25	
1,1-Dichloroethane	ug/L	ND	5.0	0.21	01/08/20 23:25	
1,2-Dichloroethane	ug/L	ND	5.0	0.27	01/08/20 23:25	
cis-1,2-Dichloroethene	ug/L	ND	5.0	1.1	01/08/20 23:25	
Methylene Chloride	ug/L	ND	5.0	0.29	01/08/20 23:25	
Tetrachloroethene	ug/L	ND	5.0	0.21	01/08/20 23:25	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.51	01/08/20 23:25	
Trichloroethene	ug/L	ND	5.0	1.4	01/08/20 23:25	
Vinyl chloride	ug/L	ND	2.0	0.44	01/08/20 23:25	
4-Bromofluorobenzene (S)	%.	101	85-114		01/08/20 23:25	
Dibromofluoromethane (S)	%.	107	80-122		01/08/20 23:25	
Toluene-d8 (S)	%.	95	85-114		01/08/20 23:25	

LABORATORY CONTROL SAMPLE: 2500301

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	50.3	101	72-127	
1,1-Dichloroethane	ug/L	50	48.7	97	70-119	
1,2-Dichloroethane	ug/L	50	49.3	99	68-119	
cis-1,2-Dichloroethene	ug/L	50	45.0	90	74-122	
Methylene Chloride	ug/L	50	49.4	99	70-121	
Tetrachloroethene	ug/L	50	49.0	98	76-124	
trans-1,2-Dichloroethene	ug/L	50	51.5	103	73-121	
Trichloroethene	ug/L	50	46.4	93	76-120	
Vinyl chloride	ug/L	50	49.9	100	70-136	
4-Bromofluorobenzene (S)	%.			99	85-114	
Dibromofluoromethane (S)	%.			101	80-122	
Toluene-d8 (S)	%.			99	85-114	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2500302 2500303

Parameter	Units	50246134013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	54.0	53.3	108	107	48-145	1	20	
1,1-Dichloroethane	ug/L	ND	50	50	51.3	51.2	103	102	38-142	0	20	
1,2-Dichloroethane	ug/L	ND	50	50	52.9	52.3	106	105	44-138	1	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	48.1	46.8	96	94	46-143	3	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246129

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2500302 2500303

Parameter	Units	50246134013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methylene Chloride	ug/L	ND	50	50	52.4	50.9	105	102	33-140	3	20	
Tetrachloroethene	ug/L	ND	50	50	51.1	50.5	102	101	41-145	1	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	52.2	51.3	104	103	46-140	2	20	
Trichloroethene	ug/L	ND	50	50	48.9	47.3	98	95	43-147	3	20	
Vinyl chloride	ug/L	ND	50	50	53.2	50.3	106	101	49-153	6	20	
4-Bromofluorobenzene (S)	%.						100	99	85-114			
Dibromofluoromethane (S)	%.						100	102	80-122			
Toluene-d8 (S)	%.						97	97	85-114			

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246129

QC Batch: 542078 | Analysis Method: SM 4500-S2-D
QC Batch Method: SM 4500-S2-D | Analysis Description: 4500S2D Sulfide Water
Associated Lab Samples: 50246129001, 50246129002

METHOD BLANK: 2500554 | Matrix: Water
Associated Lab Samples: 50246129001, 50246129002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.017	01/09/20 10:24	

LABORATORY CONTROL SAMPLE: 2500555

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.51	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2500556 2500557

Parameter	Units	50246259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	2.5	2.5	2.6	2.6	98	100	90-110	1	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246129

QC Batch: 542087
QC Batch Method: EPA 9038
Analysis Method: EPA 9038
Analysis Description: 9038 Sulfate Water
Associated Lab Samples: 50246129001, 50246129002

METHOD BLANK: 2500584
Matrix: Water
Associated Lab Samples: 50246129001, 50246129002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	3.8	01/09/20 10:27	

LABORATORY CONTROL SAMPLE: 2500585

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	20	20.4	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2500586 2500587

Parameter	Units	50246259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	13.7	20	20	35.4	35.4	108	109	90-110	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50246129

QC Batch: 541951 Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
Associated Lab Samples: 50246129001, 50246129002

METHOD BLANK: 2499967 Matrix: Water
Associated Lab Samples: 50246129001, 50246129002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	ND	0.10	0.020	01/08/20 13:49	
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.020	01/08/20 13:49	

LABORATORY CONTROL SAMPLE: 2499968

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	1	1.1	108	90-110	
Nitrogen, NO2 plus NO3	mg/L	2	2.0	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2499969 2499970

Parameter	Units	50246129001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Nitrate	mg/L	3.9	2	2	6.2	6.3	112	118	90-110	2	20	
Nitrogen, NO2 plus NO3	mg/L	3.9	4	4	8.1	8.3	104	108	90-110	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALIFIERS

Project:	Amphenol
Pace Project No.:	50246129

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-I	Pace Analytical Services - Indianapolis

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50246129

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50246129001	**MW-38**	RSK 175 Modified	541934		
50246129002	**Dup#1**	RSK 175 Modified	541934		
50246129001	**MW-38**	EPA 3010	542286	EPA 6010	542653
50246129002	**Dup#1**	EPA 3010	542286	EPA 6010	542653
50246129001	**MW-38**	EPA 3010	542370	EPA 6010	542476
50246129002	**Dup#1**	EPA 3010	542370	EPA 6010	542476
50246129001	**MW-38**	EPA 8260	542005		
50246129002	**Dup#1**	EPA 8260	542005		
50246129003	**MW-33**	EPA 8260	542005		
50246129004	**MW-39**	EPA 8260	542005		
50246129005	**EQ Blank #1**	EPA 8260	542005		
50246129006	**MW-40**	EPA 8260	541975		
50246129007	**MW-32**	EPA 8260	542005		
50246129008	**EQ #2**	EPA 8260	542005		
50246129009	**It-2**	EPA 8260	542005		
50246129010	**MW-36**	EPA 8260	542005		
50246129011	**MW-37**	EPA 8260	541975		
50246129012	**MW-34**	EPA 8260	541975		
50246129013	**Trip Blank**	EPA 8260	541975		
50246129001	**MW-38**	SM 4500-S2-D	542078		
50246129002	**Dup#1**	SM 4500-S2-D	542078		
50246129001	**MW-38**	EPA 9038	542087		
50246129002	**Dup#1**	EPA 9038	542087		
50246129001	**MW-38**	EPA 353.2	541951		
50246129002	**Dup#1**	EPA 353.2	541951		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: IWM	Report To: Parks, Chris	Attention:
Address: 7428 Rockville Road	Copy To:	Company Name:
Indianapolis, IN 46214		Address:
Email: cparks@iwmconsult.com	Purchase Order #:	Pace Quote:
Phone: (317)968-9260 Fax:	Project Name: Amphenol	Pace Project Manager: chris.boyle@pacelabs.com,
Requested Due Date:	Project #:	Pace Profile #: 658

Regulatory Agency:

State / Location: IN

Requested Analysis Filtered (Y/N)

SAMPLE ID — One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique

MATRIX	CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Other	OT
Tissue	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	START TIME	END DATE	END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	IN VOC by 8260	IN Dissolved Gases, RSK-175	IN Metals, Total	IN Metals, Lab Filtered	IN Sulfide	IN Sulfate, Nitrate	IN Trip Blank	Residual Chlorine (Y/N)	50246129
1	mw-38	WT	G	1-6	15:52					2		1	6	1					X	X	1	1	1	1			001
2	Dup#1			1-6						2		1	6	1					X	X	1	1	1	1			002
3	mw-33			1-6	14:59								3						X								003
4	mw-39			1-6	13:57								3						X								004
5	E.Q. Blank #1			1-6	13:57								3						X								005
6	mw-40 MS/MSD			1-6	12:34								9						X								006
7	mw-32			1-6	11:31								3						X								007
8	EQ#2			1-7	11:02								3						X								008
9	It-2			1-7	15:10								3						X								009
10	mw-36			1-7	14:05								3						X								010
11	mw-37			1-7	11:56								3						X								011
12	mw-34			1-7	12:57								3						X								012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Rush on mw-38 And Dup#1	[signature]	1-7-20	16:31	[signature]	1/7/20	1636	0.2	Y	Y	Y
							TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Deeroy Whitt

SIGNATURE of SAMPLER: [signature]

DATE Signed: 1-7-20

2 of 2

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

50246129

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM consulting

Address: 9428 Rockville Rd

Billing Information:

Report To: Sparks

Email To:

Copy To: bgentry@iwm consulting

Site Collection Info/Address:

Customer Project Name/Number:

State: / County/City:

Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Phone: 317-347-1111

Email:

Site/Facility ID #:

Compliance Monitoring? [ ] Yes [ ] No

Collected By (print): D.E. White

Purchase Order #:

Quote #:

DW PWS ID #:

DW Location Code:

Collected By (signature):

Turnaround Date Required:

Immediately Packed on Ice: [ ] Yes [ ] No

Sample Disposal:
[ ] Dispose as appropriate [ ] Return
[ ] Archive: ______
[ ] Hold: ______

Rush:
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day
(Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [ ] No

Analysis: ______

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type **

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

Lab Project Manager:

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	Analyses: VOCs 8260	Lab Profile/Line: Lab Sample # / Comments
Trip Blank	WT	G	1-6-20					3	X	013

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips: ______	
Sample pH Acceptable	Y N NA
pH Strips: ______	
Sulfide Present	Y N NA
Lead Acetate Strips: ______	

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Packing Material Used:

Lab Tracking #: 2334553

Radchem sample(s) screened (<500 cpm): Y N NA

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: E
Cooler 1 Temp Upon Receipt: 0.1 oC
Cooler 1 Therm Corr. Factor: +0.1 oC
Cooler 1 Corrected Temp: 0.2 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
	1/7/20 1636		1/7/20 1636

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: ______ of: ______

SAMPLE CONDITION UPON RECEIPT FORM

Face Analytical

Project #: 50246129

Date/Time and Initials of person examining contents: MS 1/6/20 1645

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Other

Tracking #:

Custody Seal on Cooler/Box Present: ☐ Yes ☒ No **Seals Intact:** ☐ Yes ☒ No

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other

Thermometer: 1 2 3 4 5 6 A B C D E F Ice Type: ☒ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☒ Yes ☐ No ☐ N/A

Cooler Temperature: 0.1/0.2 Ice Visible in Sample Containers?: ☐ Yes ☒ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☒ N/A

All discrepancies will be written out in the comments section below.

	Yes	No		Yes	No	N/A
Are samples from West Virginia? Document any containers out of temp.		X	All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted. Circle: HNO3 H2SO4 NaOH NaOH/ZnAc	X		X
USDA Regulated Soils? (ID, NY, WA, OR, CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		X				
Chain of Custody Present:	X					
Chain of Custody Filled Out:	X		Dissolved Metals field filtered?:			X
Short Hold Time Analysis (<72hr)?: Analysis: Nitrate	X		Headspace Wisconsin Sulfide			X
Time 5035A TC placed in Freezer or Short Holds To Lab: 1720				Present	Absent	N/A
			Residual Chlorine Check (SVOC 625 Pest/PCB 608)			X
			Residual Chlorine Check (Total/Amenable/Free Cyanide)			X
Rush TAT Requested:		X	Headspace in VOA Vials (>6mm):		X	
Containers Intact?:	X		Trip Blank Present?:	X		
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	X		Trip Blank Custody Seals?:	X		
Extra labels on Terracore Vials (soils only)?		X				

Comments:

F-IN-Q-290-rev.18,22Apr2019

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			6												2	1			1							wt	✓	✓	
2			↓												↓	↓			↓							↓	↓	↓	
3			3																							wt			
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

F-IN-Q-270-rev.11,26Sep2019

COC PAGE 2 of 2

Sample Container Count

WO#:50246129

50246129

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H				Matrix	pH <2	pH >9	pH>12
1			3																						WT			
2																												
3																												
4																												
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

February 11, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Former Amphenol Facility
Pace Project No.: 50248752

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on February 05, 2020. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Brad Gentry, IWM Consulting Group, LLC
Mr. Chris Parks, IWM Consulting Group

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

CERTIFICATIONS

Project:	Former Amphenol Facility
Pace Project No.:	50248752

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Certification #: 200074
Indiana Certification #: C-49-06
Kansas/NELAP Certification #: E-10177
Kentucky UST Certification #: 80226
Kentucky WW Certification #: 98019
Michigan Department of Environmental Quality, Laboratory #9050
Ohio VAP Certification #: CL0065
Oklahoma Certification #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Certification #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE SUMMARY

Project: Former Amphenol Facility
Pace Project No.: 50248752

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50248752001	**MW-31**	Water	02/05/20 14:12	02/05/20 16:10
50248752002	**MW-38**	Water	02/05/20 13:04	02/05/20 16:10
50248752003	**MW-35**	Water	02/05/20 10:45	02/05/20 16:10
50248752004	**DUP-1**	Water	02/05/20 08:00	02/05/20 16:10
50248752005	**EQ BLANK #1**	Water	02/05/20 12:00	02/05/20 16:10
50248752006	**TRIP BLANK**	Water	02/05/20 12:25	02/05/20 16:10

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE ANALYTE COUNT

Project: Former Amphenol Facility
Pace Project No.: 50248752

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50248752001	**MW-31**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	RAM	2	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 8260	TMW	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50248752002	**MW-38**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	RAM	2	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 8260	TMW	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50248752003	**MW-35**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	RAM	2	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 8260	TMW	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50248752004	**DUP-1**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	RAM	2	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 8260	TMW	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50248752005	**EQ BLANK #1**	EPA 8260	TMW	12	PASI-I
50248752006	**TRIP BLANK**	EPA 8260	TMW	12	PASI-I

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SUMMARY OF DETECTION

Project: Former Amphenol Facility
Pace Project No.: 50248752

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50248752001	**MW-31**					
EPA 6010	Iron	125	ug/L	100	02/07/20 10:25	
EPA 6010	Iron, Dissolved	241	ug/L	100	02/10/20 09:59	
EPA 8260	Tetrachloroethene	32.2	ug/L	5.0	02/10/20 06:08	
EPA 8260	1,1,1-Trichloroethane	10.0	ug/L	5.0	02/10/20 06:08	
EPA 8260	Trichloroethene	49.7	ug/L	5.0	02/10/20 06:08	
EPA 9038	Sulfate	50.9	mg/L	20.0	02/07/20 15:40	
EPA 353.2	Nitrogen, NO2 plus NO3	4.3	mg/L	0.10	02/06/20 14:29	
EPA 353.2	Nitrogen, Nitrate	4.3	mg/L	0.10	02/06/20 14:29	
50248752002	**MW-38**					
EPA 6010	Iron	4870	ug/L	100	02/07/20 10:28	
EPA 6010	Manganese	186	ug/L	10.0	02/07/20 10:28	
EPA 8260	Tetrachloroethene	10.8	ug/L	5.0	02/10/20 06:42	
EPA 8260	Trichloroethene	19.1	ug/L	5.0	02/10/20 06:42	
EPA 9038	Sulfate	77.5	mg/L	20.0	02/07/20 15:40	
EPA 353.2	Nitrogen, NO2 plus NO3	4.8	mg/L	0.10	02/06/20 14:30	
EPA 353.2	Nitrogen, Nitrate	4.8	mg/L	0.10	02/06/20 14:30	
50248752003	**MW-35**					
RSK 175 Modified	Methane	18.4	ug/L	10.0	02/07/20 19:22	
EPA 6010	Iron	11800	ug/L	100	02/07/20 10:30	
EPA 6010	Manganese	406	ug/L	10.0	02/07/20 10:30	
EPA 6010	Manganese, Dissolved	364	ug/L	10.0	02/10/20 10:04	
EPA 9038	Sulfate	25.9	mg/L	10.0	02/07/20 15:41	
EPA 353.2	Nitrogen, NO2 plus NO3	0.22	mg/L	0.10	02/06/20 14:31	
EPA 353.2	Nitrogen, Nitrate	0.19	mg/L	0.10	02/06/20 14:31	
50248752004	**DUP-1**					
EPA 6010	Iron	4800	ug/L	100	02/07/20 10:44	
EPA 6010	Manganese	178	ug/L	10.0	02/07/20 10:44	
EPA 8260	Tetrachloroethene	9.2	ug/L	5.0	02/10/20 00:39	
EPA 8260	Trichloroethene	17.7	ug/L	5.0	02/10/20 00:39	
EPA 9038	Sulfate	27.9	mg/L	10.0	02/07/20 15:41	
EPA 353.2	Nitrogen, NO2 plus NO3	4.6	mg/L	0.10	02/06/20 14:34	
EPA 353.2	Nitrogen, Nitrate	4.6	mg/L	0.10	02/06/20 14:34	

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ANALYTICAL RESULTS

Project: Former Amphenol Facility
Pace Project No.: 50248752

Sample: MW-31 **Lab ID: 50248752001** Collected: 02/05/20 14:12 Received: 02/05/20 16:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		02/07/20 18:43	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		02/07/20 18:43	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		02/07/20 18:43	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**125**	ug/L	100	21.2	1	02/06/20 13:34	02/07/20 10:25	7439-89-6	
Manganese	ND	ug/L	10.0	0.62	1	02/06/20 13:34	02/07/20 10:25	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	**241**	ug/L	100	32.4	1	02/09/20 13:26	02/10/20 09:59	7439-89-6	
Manganese, Dissolved	ND	ug/L	10.0	1.1	1	02/09/20 13:26	02/10/20 09:59	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/10/20 06:08	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/10/20 06:08	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/10/20 06:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/10/20 06:08	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/10/20 06:08	75-09-2	
Tetrachloroethene	**32.2**	ug/L	5.0	0.21	1		02/10/20 06:08	127-18-4	
1,1,1-Trichloroethane	**10.0**	ug/L	5.0	0.44	1		02/10/20 06:08	71-55-6	
Trichloroethene	**49.7**	ug/L	5.0	1.4	1		02/10/20 06:08	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/10/20 06:08	75-01-4	
Surrogates									
Dibromofluoromethane (S)	107	%.	80-122		1		02/10/20 06:08	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	85-114		1		02/10/20 06:08	460-00-4	
Toluene-d8 (S)	100	%.	85-114		1		02/10/20 06:08	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		02/10/20 12:58	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**50.9**	mg/L	20.0	7.6	2		02/07/20 15:40	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.3**	mg/L	0.10	0.020	1		02/06/20 14:29		
Nitrogen, Nitrate	**4.3**	mg/L	0.10	0.020	1		02/06/20 14:29	14797-55-8	

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ANALYTICAL RESULTS

Project: Former Amphenol Facility
Pace Project No.: 50248752

Sample: MW-38 **Lab ID: 50248752002** Collected: 02/05/20 13:04 Received: 02/05/20 16:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		02/07/20 19:03	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		02/07/20 19:03	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		02/07/20 19:03	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**4870**	ug/L	100	21.2	1	02/06/20 13:34	02/07/20 10:28	7439-89-6	
Manganese	**186**	ug/L	10.0	0.62	1	02/06/20 13:34	02/07/20 10:28	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	32.4	1	02/09/20 13:26	02/10/20 10:01	7439-89-6	
Manganese, Dissolved	ND	ug/L	10.0	1.1	1	02/09/20 13:26	02/10/20 10:01	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/10/20 06:42	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/10/20 06:42	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/10/20 06:42	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/10/20 06:42	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/10/20 06:42	75-09-2	
Tetrachloroethene	**10.8**	ug/L	5.0	0.21	1		02/10/20 06:42	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		02/10/20 06:42	71-55-6	
Trichloroethene	**19.1**	ug/L	5.0	1.4	1		02/10/20 06:42	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/10/20 06:42	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	80-122		1		02/10/20 06:42	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	85-114		1		02/10/20 06:42	460-00-4	
Toluene-d8 (S)	99	%.	85-114		1		02/10/20 06:42	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		02/10/20 12:58	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**77.5**	mg/L	20.0	7.6	2		02/07/20 15:40	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.8**	mg/L	0.10	0.020	1		02/06/20 14:30		
Nitrogen, Nitrate	**4.8**	mg/L	0.10	0.020	1		02/06/20 14:30	14797-55-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Former Amphenol Facility
Pace Project No.: 50248752

Sample: MW-35 **Lab ID: 50248752003** Collected: 02/05/20 10:45 Received: 02/05/20 16:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		02/07/20 19:22	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		02/07/20 19:22	74-85-1	
Methane	**18.4**	ug/L	10.0	6.4	1		02/07/20 19:22	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**11800**	ug/L	100	21.2	1	02/06/20 13:34	02/07/20 10:30	7439-89-6	
Manganese	**406**	ug/L	10.0	0.62	1	02/06/20 13:34	02/07/20 10:30	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	32.4	1	02/09/20 13:26	02/10/20 10:04	7439-89-6	
Manganese, Dissolved	**364**	ug/L	10.0	1.1	1	02/09/20 13:26	02/10/20 10:04	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/10/20 07:17	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/10/20 07:17	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/10/20 07:17	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/10/20 07:17	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/10/20 07:17	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		02/10/20 07:17	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		02/10/20 07:17	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		02/10/20 07:17	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/10/20 07:17	75-01-4	
Surrogates									
Dibromofluoromethane (S)	107	%.	80-122		1		02/10/20 07:17	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	85-114		1		02/10/20 07:17	460-00-4	
Toluene-d8 (S)	100	%.	85-114		1		02/10/20 07:17	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		02/10/20 12:58	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**25.9**	mg/L	10.0	3.8	1		02/07/20 15:41	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**0.22**	mg/L	0.10	0.020	1		02/06/20 14:31		
Nitrogen, Nitrate	**0.19**	mg/L	0.10	0.020	1		02/06/20 14:31	14797-55-8	

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ANALYTICAL RESULTS

Project: Former Amphenol Facility
Pace Project No.: 50248752

Sample: DUP-1 **Lab ID: 50248752004** Collected: 02/05/20 08:00 Received: 02/05/20 16:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		02/07/20 20:00	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		02/07/20 20:00	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		02/07/20 20:00	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**4800**	ug/L	100	21.2	1	02/06/20 13:34	02/07/20 10:44	7439-89-6	
Manganese	**178**	ug/L	10.0	0.62	1	02/06/20 13:34	02/07/20 10:44	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	32.4	1	02/09/20 13:26	02/10/20 10:10	7439-89-6	
Manganese, Dissolved	ND	ug/L	10.0	1.1	1	02/09/20 13:26	02/10/20 10:10	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.22	1		02/10/20 00:39	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		02/10/20 00:39	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.40	1		02/10/20 00:39	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.37	1		02/10/20 00:39	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.27	1		02/10/20 00:39	75-09-2	
Tetrachloroethene	**9.2**	ug/L	5.0	0.25	1		02/10/20 00:39	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.3	1		02/10/20 00:39	71-55-6	
Trichloroethene	**17.7**	ug/L	5.0	1.2	1		02/10/20 00:39	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.46	1		02/10/20 00:39	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	80-122		1		02/10/20 00:39	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	85-114		1		02/10/20 00:39	460-00-4	
Toluene-d8 (S)	100	%.	85-114		1		02/10/20 00:39	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		02/10/20 12:58	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**27.9**	mg/L	10.0	3.8	1		02/07/20 15:41	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.6**	mg/L	0.10	0.020	1		02/06/20 14:34		
Nitrogen, Nitrate	**4.6**	mg/L	0.10	0.020	1		02/06/20 14:34	14797-55-8	

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ANALYTICAL RESULTS

Project: Former Amphenol Facility
Pace Project No.: 50248752

Sample: EQ BLANK #1 **Lab ID: 50248752005** Collected: 02/05/20 12:00 Received: 02/05/20 16:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.22	1		02/10/20 01:14	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		02/10/20 01:14	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.40	1		02/10/20 01:14	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.37	1		02/10/20 01:14	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.27	1		02/10/20 01:14	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.25	1		02/10/20 01:14	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.3	1		02/10/20 01:14	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.2	1		02/10/20 01:14	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.46	1		02/10/20 01:14	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	80-122		1		02/10/20 01:14	1868-53-7	
4-Bromofluorobenzene (S)	106	%.	85-114		1		02/10/20 01:14	460-00-4	
Toluene-d8 (S)	100	%.	85-114		1		02/10/20 01:14	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Former Amphenol Facility
Pace Project No.: 50248752

Sample: TRIP BLANK **Lab ID: 50248752006** Collected: 02/05/20 12:25 Received: 02/05/20 16:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.22	1		02/10/20 01:49	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		02/10/20 01:49	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.40	1		02/10/20 01:49	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.37	1		02/10/20 01:49	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.27	1		02/10/20 01:49	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.25	1		02/10/20 01:49	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.3	1		02/10/20 01:49	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.2	1		02/10/20 01:49	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.46	1		02/10/20 01:49	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	80-122		1		02/10/20 01:49	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	85-114		1		02/10/20 01:49	460-00-4	
Toluene-d8 (S)	100	%.	85-114		1		02/10/20 01:49	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Former Amphenol Facility
Pace Project No.: 50248752

QC Batch: 546275 — Analysis Method: RSK 175 Modified
QC Batch Method: RSK 175 Modified — Analysis Description: RSK 175 HEADSPACE
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

METHOD BLANK: 2519256 — Matrix: Water
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	5.0	02/07/20 18:24	
Ethene	ug/L	ND	10.0	4.1	02/07/20 18:24	
Methane	ug/L	ND	10.0	6.4	02/07/20 18:24	

LABORATORY CONTROL SAMPLE: 2519257

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	1980	2030	103	78-135	
Ethene	ug/L	2250	2450	109	83-133	
Methane	ug/L	1980	1590	80	67-135	

SAMPLE DUPLICATE: 2519259

Parameter	Units	50248752003 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	ND	ND		20	
Ethene	ug/L	ND	ND		20	
Methane	ug/L	18.4	15.7	16	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: Former Amphenol Facility
Pace Project No.: 50248752

QC Batch: 546157 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

METHOD BLANK: 2518855 Matrix: Water
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron	ug/L	ND	100	21.2	02/07/20 10:17	
Manganese	ug/L	ND	10.0	0.62	02/07/20 10:17	

LABORATORY CONTROL SAMPLE: 2518856

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	8890	89	80-120	
Manganese	ug/L	1000	876	88	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2518857 2518858

Parameter	Units	50248752003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	11800	10000	10000	19200	19700	74	78	75-125	2	20	M0
Manganese	ug/L	406	1000	1000	1200	1230	79	82	75-125	2	20	

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QUALITY CONTROL DATA

Project: Former Amphenol Facility
Pace Project No.: 50248752

QC Batch: 546377 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

METHOD BLANK: 2519939 | Matrix: Water
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	100	32.4	02/10/20 09:30	
Manganese, Dissolved	ug/L	ND	10.0	1.1	02/10/20 09:30	

LABORATORY CONTROL SAMPLE: 2519940

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	10000	9500	95	80-120	
Manganese, Dissolved	ug/L	1000	931	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2519941 2519942

Parameter	Units	50248500003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	8860	8310	88	83	75-125	6	20	
Manganese, Dissolved	ug/L	ND	1000	1000	881	825	88	82	75-125	7	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2519943 2519944

Parameter	Units	50248752003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	8520	8640	85	86	75-125	2	20	
Manganese, Dissolved	ug/L	364	1000	1000	1180	1190	81	83	75-125	1	20	

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QUALITY CONTROL DATA

Project: Former Amphenol Facility
Pace Project No.: 50248752

QC Batch: 546613 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 50248752001, 50248752002, 50248752003

METHOD BLANK: 2521150 Matrix: Water
Associated Lab Samples: 50248752001, 50248752002, 50248752003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.44	02/09/20 23:47	
1,1-Dichloroethane	ug/L	ND	5.0	0.21	02/09/20 23:47	
1,2-Dichloroethane	ug/L	ND	5.0	0.27	02/09/20 23:47	
cis-1,2-Dichloroethene	ug/L	ND	5.0	1.1	02/09/20 23:47	
Methylene Chloride	ug/L	ND	5.0	0.29	02/09/20 23:47	
Tetrachloroethene	ug/L	ND	5.0	0.21	02/09/20 23:47	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.51	02/09/20 23:47	
Trichloroethene	ug/L	ND	5.0	1.4	02/09/20 23:47	
Vinyl chloride	ug/L	ND	2.0	0.44	02/09/20 23:47	
4-Bromofluorobenzene (S)	%.	104	85-114		02/09/20 23:47	
Dibromofluoromethane (S)	%.	103	80-122		02/09/20 23:47	
Toluene-d8 (S)	%.	99	85-114		02/09/20 23:47	

LABORATORY CONTROL SAMPLE: 2521151

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	47.5	95	72-127	
1,1-Dichloroethane	ug/L	50	46.7	93	70-119	
1,2-Dichloroethane	ug/L	50	43.0	86	68-119	
cis-1,2-Dichloroethene	ug/L	50	44.2	88	74-122	
Methylene Chloride	ug/L	50	45.2	90	70-121	
Tetrachloroethene	ug/L	50	43.8	88	76-124	
trans-1,2-Dichloroethene	ug/L	50	46.8	94	73-121	
Trichloroethene	ug/L	50	43.6	87	76-120	
Vinyl chloride	ug/L	50	39.4	79	70-136	
4-Bromofluorobenzene (S)	%.			99	85-114	
Dibromofluoromethane (S)	%.			95	80-122	
Toluene-d8 (S)	%.			104	85-114	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2521152 2521153

Parameter	Units	50248752003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	52.6	51.9	105	104	48-145	1	20	
1,1-Dichloroethane	ug/L	ND	50	50	56.2	52.7	112	105	38-142	6	20	
1,2-Dichloroethane	ug/L	ND	50	50	54.0	50.8	108	102	44-138	6	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	51.5	50.7	103	101	46-143	1	20	
Methylene Chloride	ug/L	ND	50	50	54.7	52.1	109	104	33-140	5	20	

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QUALITY CONTROL DATA

Project: Former Amphenol Facility
Pace Project No.: 50248752

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2521152 2521153

Parameter	Units	50248752003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Tetrachloroethene	ug/L	ND	50	50	45.9	47.9	92	96	41-145	4	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	52.1	50.5	104	101	46-140	3	20	
Trichloroethene	ug/L	ND	50	50	50.8	49.9	102	100	43-147	2	20	
Vinyl chloride	ug/L	ND	50	50	43.2	40.5	86	81	49-153	7	20	
4-Bromofluorobenzene (S)	%.						105	103	85-114			
Dibromofluoromethane (S)	%.						97	95	80-122			
Toluene-d8 (S)	%.						103	102	85-114			

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QUALITY CONTROL DATA

Project: Former Amphenol Facility
Pace Project No.: 50248752

QC Batch: 546615   Analysis Method: EPA 8260
QC Batch Method: EPA 8260   Analysis Description: 8260 MSV
Associated Lab Samples: 50248752004, 50248752005, 50248752006

METHOD BLANK: 2521156   Matrix: Water
Associated Lab Samples: 50248752004, 50248752005, 50248752006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	1.3	02/10/20 00:04	
1,1-Dichloroethane	ug/L	ND	5.0	0.22	02/10/20 00:04	
1,2-Dichloroethane	ug/L	ND	5.0	0.74	02/10/20 00:04	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.40	02/10/20 00:04	
Methylene Chloride	ug/L	ND	5.0	0.27	02/10/20 00:04	
Tetrachloroethene	ug/L	ND	5.0	0.25	02/10/20 00:04	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.37	02/10/20 00:04	
Trichloroethene	ug/L	ND	5.0	1.2	02/10/20 00:04	
Vinyl chloride	ug/L	ND	2.0	0.46	02/10/20 00:04	
4-Bromofluorobenzene (S)	%.	104	85-114		02/10/20 00:04	
Dibromofluoromethane (S)	%.	103	80-122		02/10/20 00:04	
Toluene-d8 (S)	%.	100	85-114		02/10/20 00:04	

LABORATORY CONTROL SAMPLE: 2521157

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	49.5	99	72-127	
1,1-Dichloroethane	ug/L	50	49.3	99	70-119	
1,2-Dichloroethane	ug/L	50	45.9	92	68-119	
cis-1,2-Dichloroethene	ug/L	50	47.1	94	74-122	
Methylene Chloride	ug/L	50	48.6	97	70-121	
Tetrachloroethene	ug/L	50	44.4	89	76-124	
trans-1,2-Dichloroethene	ug/L	50	49.2	98	73-121	
Trichloroethene	ug/L	50	46.3	93	76-120	
Vinyl chloride	ug/L	50	39.3	79	70-136	
4-Bromofluorobenzene (S)	%.			102	85-114	
Dibromofluoromethane (S)	%.			95	80-122	
Toluene-d8 (S)	%.			102	85-114	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2521158   2521159

Parameter	Units	50248368006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	49.1	49.3	98	99	48-145	0	20	
1,1-Dichloroethane	ug/L	ND	50	50	51.6	51.6	103	103	38-142	0	20	
1,2-Dichloroethane	ug/L	ND	50	50	48.6	50.6	97	101	44-138	4	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	46.8	47.4	94	95	46-143	1	20	
Methylene Chloride	ug/L	ND	50	50	49.2	49.5	98	99	33-140	1	20	

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QUALITY CONTROL DATA

Project: Former Amphenol Facility
Pace Project No.: 50248752

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2521158 2521159

Parameter	Units	50248368006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Tetrachloroethene	ug/L	ND	50	50	42.8	42.8	86	86	41-145	0	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	48.3	49.0	97	98	46-140	1	20	
Trichloroethene	ug/L	ND	50	50	45.6	45.6	91	91	43-147	0	20	
Vinyl chloride	ug/L	ND	50	50	41.0	42.5	82	85	49-153	4	20	
4-Bromofluorobenzene (S)	%.						104	103	85-114			
Dibromofluoromethane (S)	%.						97	97	80-122			
Toluene-d8 (S)	%.						103	103	85-114			

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QUALITY CONTROL DATA

Project: Former Amphenol Facility
Pace Project No.: 50248752

QC Batch: 546727 Analysis Method: SM 4500-S2-D
QC Batch Method: SM 4500-S2-D Analysis Description: 4500S2D Sulfide Water
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

METHOD BLANK: 2521448 Matrix: Water
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.017	02/10/20 12:58	

LABORATORY CONTROL SAMPLE: 2521449

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.53	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2521450 2521451

Parameter	Units	50248752003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.51	0.50	89	86	90-110	3	20	M3

MATRIX SPIKE SAMPLE: 2521452

Parameter	Units	50248998001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.48	0.5	0.95	93	90-110	

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QUALITY CONTROL DATA

Project: Former Amphenol Facility
Pace Project No.: 50248752

QC Batch: 546537 | Analysis Method: EPA 9038
QC Batch Method: EPA 9038 | Analysis Description: 9038 Sulfate Water
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

METHOD BLANK: 2520727 | Matrix: Water
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	3.8	02/07/20 15:39	

LABORATORY CONTROL SAMPLE: 2520728

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	20	18.3	91	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2520737 2520738

Parameter	Units	50248752003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	25.9	100	100	128	124	102	98	90-110	3	20	

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QUALITY CONTROL DATA

Project: Former Amphenol Facility
Pace Project No.: 50248752

QC Batch: 546264 Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

METHOD BLANK: 2519197 Matrix: Water
Associated Lab Samples: 50248752001, 50248752002, 50248752003, 50248752004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	ND	0.10	0.020	02/06/20 14:27	
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.020	02/06/20 14:27	

LABORATORY CONTROL SAMPLE: 2519198

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	1	1.1	114	90-110	
Nitrogen, NO2 plus NO3	mg/L	2	2.2	109	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2519199 2519200

Parameter	Units	50248752003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Nitrate	mg/L	0.19	1	1	1.4	1.4	121	122	90-110	1	20	
Nitrogen, NO2 plus NO3	mg/L	0.22	2	2	2.5	2.5	114	114	90-110	0	20	M3

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QUALIFIERS

Project: Former Amphenol Facility
Pace Project No.: 50248752

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-I	Pace Analytical Services - Indianapolis

ANALYTE QUALIFIERS

M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M3	Matrix spike recovery was outside laboratory control limits due to matrix interferences.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Former Amphenol Facility
Pace Project No.: 50248752

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50248752001	**MW-31**	RSK 175 Modified	546275		
50248752002	**MW-38**	RSK 175 Modified	546275		
50248752003	**MW-35**	RSK 175 Modified	546275		
50248752004	**DUP-1**	RSK 175 Modified	546275		
50248752001	**MW-31**	EPA 3010	546157	EPA 6010	546403
50248752002	**MW-38**	EPA 3010	546157	EPA 6010	546403
50248752003	**MW-35**	EPA 3010	546157	EPA 6010	546403
50248752004	**DUP-1**	EPA 3010	546157	EPA 6010	546403
50248752001	**MW-31**	EPA 3010	546377	EPA 6010	546671
50248752002	**MW-38**	EPA 3010	546377	EPA 6010	546671
50248752003	**MW-35**	EPA 3010	546377	EPA 6010	546671
50248752004	**DUP-1**	EPA 3010	546377	EPA 6010	546671
50248752001	**MW-31**	EPA 8260	546613		
50248752002	**MW-38**	EPA 8260	546613		
50248752003	**MW-35**	EPA 8260	546613		
50248752004	**DUP-1**	EPA 8260	546615		
50248752005	**EQ BLANK #1**	EPA 8260	546615		
50248752006	**TRIP BLANK**	EPA 8260	546615		
50248752001	**MW-31**	SM 4500-S2-D	546727		
50248752002	**MW-38**	SM 4500-S2-D	546727		
50248752003	**MW-35**	SM 4500-S2-D	546727		
50248752004	**DUP-1**	SM 4500-S2-D	546727		
50248752001	**MW-31**	EPA 9038	546537		
50248752002	**MW-38**	EPA 9038	546537		
50248752003	**MW-35**	EPA 9038	546537		
50248752004	**DUP-1**	EPA 9038	546537		
50248752001	**MW-31**	EPA 353.2	546264		
50248752002	**MW-38**	EPA 353.2	546264		
50248752003	**MW-35**	EPA 353.2	546264		
50248752004	**DUP-1**	EPA 353.2	546264		

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

WO#: 50248752

50248752

LAB USE ONLY

Company: IWM Consulting
Address: 7428 Rockville RD.
Billing Information: Same
Report To: Chris Parks
Email To: Same
Copy To: Brad Gentry
Site Collection Info/Address: 980 Hurricane Rd
Customer Project Name/Number: Amphenol
State: IN / County/City: Johnson / Franklin / Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET
Phone: 317-347-1111
Email: cparks@iwm
Site/Facility ID #: Former Amphenol Facility
Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): D.E. White
Purchase Order #:
Quote #: Amphenol
DW PWS ID #:
DW Location Code:
Collected By (signature): [signature]
Turnaround Date Required: 1-week
Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______
Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [✓] 5 Day (Expedite Charges Apply)
Field Filtered (if applicable): [ ] Yes [X] No
Analysis: ______

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type: 3 | U | 1 | U | 4 | U

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

Analyses: VOCs 8260 | RSK 175 (Ethane/Ethene/Methane) | 6010 Metals Total - Iron + Manganese | 6010 Metals Iron + Manganese Lab Filtered | Sulfide 4500S2D | 9038 Sulfate / Nitrate 353.2

Customer Sample ID	Matrix *	Comp / Grab	Collected Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	VOCs 8260	RSK 175	Metals Total	Metals Lab Filtered	Sulfide	Sulfate/Nitrate	Lab Sample # / Comments
MW-31		G	2/5	14:12				10	3	3	1	1	1	1	001
MW-38		↓	↓	13:04				↓	↓	↓	↓	↓	↓	↓	002
MW-35				10:45											003
MS #2				10:45											004
MSD #2				10:45											005
Dup-1				—											006
E.Q. BLANK #1				12:00				3	X						007
Trip BLANK				12:25				3	X						008

See Scr

Lab Profile/Line:
Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present Y N NA
Cl Strips: ______
Sample pH Acceptable Y N NA
pH Strips: ______
Sulfide Present Y N NA
Lead Acetate Strips: ______

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None
Packing Material Used:
Radchem sample(s) screened (<500 cpm): Y N NA
SHORT HOLDS PRESENT (<72 hours): Y N N/A
Lab Tracking #: 2315904
Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y (N) NA
Therm ID#: 5
Cooler 1 Temp Upon Receipt: 4.9 oC
Cooler 1 Therm Corr. Factor: -0.6 oC
Cooler 1 Corrected Temp: 4.3 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time	Received by/Company: (Signature)	Date/Time
[signature]	2/5/20 14:50	[signature] / IWM	2/5/20 14:50
[signature] / IWM	2/5/20 16:10	[signature]	2-5-20 1610

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: ____ of: ____

Pace Analytical

SAMPLE CONDITION UPON RECEIPT FORM

Project #: 50248752

Date/Time and Initials of person examining contents: MS 2/5/20 1630

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other

Tracking #: N/A

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No **Seals Intact:** ☐ Yes ☑ No

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other

Thermometer: 1 2 3 4 5 6 A B C D E F Ice Type: ☑ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☑ Yes ☐ No ☐ N/A

Cooler Temperature: 4.9/4.6 Ice Visible in Sample Containers?: ☐ Yes ☑ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☑ N/A

All discrepancies will be written out in the comments section below.

	Yes	No
Are samples from West Virginia? Document any containers out of temp.		X
USDA Regulated Soils? (ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		X
Chain of Custody Present:	X	
Chain of Custody Filled Out:	X	
Short Hold Time Analysis (<72hr)?: Analysis:	/	
Time 5035A TC placed in Freezer or Short Holds To Lab: Nitrate		
Rush TAT Requested: 2/12	X	
Containers Intact?:	X	
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	X	
Extra labels on Terracore Vials (soils only)?		X

	Yes	No	N/A
All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted. Circle: HNO3 H2SO4 NaOH NaOH/ZnAc	X		
Dissolved Metals field filtered?:			X
Headspace Wisconsin Sulfide			X
	Present	Absent	N/A
Residual Chlorine Check (SVOC 625 Pest/PCB 608)			X
Residual Chlorine Check (Total/Amenable/Free Cyanide)			X
Headspace in VOA Vials (>6mm):		X	X
Trip Blank Present?:	X	~~X~~ MS	
Trip Blank Custody Seals?:	X		

Comments:

F-IN-Q-290-rev.18,22Apr2019

COC PAGE ____ of ____

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H				Matrix	pH <2	pH >9	pH>12
1			3		3										2	1				1					wt	✓	✓	
2			↓		↓										↓	↓				↓					↓	↓	↓	
3			9		9										6	3				3								
4			–		–										–	–				–								
5			–		–										–	–				–								
6			3		3										2	1				1								
7			↓																									
8																												
9																												
10																												
11																												
12																												

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Pace Analytical Services, LLC
7726 Moller Road
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February 12, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol
Pace Project No.: 50249018

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on February 07, 2020. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Brad Gentry, IWM Consulting Group, LLC
Mr. Chris Parks, IWM Consulting Group

CERTIFICATIONS

Project:	Amphenol
Pace Project No.:	50249018

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Certification #: 200074
Indiana Certification #: C-49-06
Kansas/NELAP Certification #: E-10177
Kentucky UST Certification #: 80226
Kentucky WW Certification #: 98019
Michigan Department of Environmental Quality, Laboratory #9050
Ohio VAP Certification #: CL0065
Oklahoma Certification #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Certification #: 999788130
USDA Soil Permit #: P330-19-00257

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SAMPLE SUMMARY

Project: Amphenol
Pace Project No.: 50249018

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50249018001	**MW-39**	Water	02/05/20 15:46	02/07/20 12:37
50249018002	**MW-33**	Water	02/06/20 09:51	02/07/20 12:37
50249018003	**MW-32**	Water	02/06/20 10:38	02/07/20 12:37
50249018004	**EQ #2 BLANK**	Water	02/06/20 10:40	02/07/20 12:37
50249018005	**MW-40**	Water	02/06/20 11:45	02/07/20 12:37
50249018006	**MW-37**	Water	02/06/20 13:04	02/07/20 12:37
50249018007	**MW-34**	Water	02/06/20 14:09	02/07/20 12:37
50249018008	**MW-36**	Water	02/06/20 15:10	02/07/20 12:37
50249018009	**Trip Blank**	Water	02/06/20 09:59	02/07/20 12:37
50249018010	**It-2**	Water	02/07/20 10:01	02/07/20 12:37
50249018011	**MW-12R**	Water	02/07/20 11:29	02/07/20 12:37
50249018012	**DUP #2**	Water	02/07/20 08:00	02/07/20 12:37
50249018013	**EQ #3**	Water	02/07/20 10:05	02/07/20 12:37

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SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50249018

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50249018001	**MW-39**	EPA 8260	TMW	12	PASI-I
50249018002	**MW-33**	EPA 8260	TMW	12	PASI-I
50249018003	**MW-32**	EPA 8260	TMW	12	PASI-I
50249018004	**EQ #2 BLANK**	EPA 8260	TMW	12	PASI-I
50249018005	**MW-40**	EPA 8260	TMW	12	PASI-I
50249018006	**MW-37**	EPA 8260	TMW	12	PASI-I
50249018007	**MW-34**	EPA 8260	TMW	12	PASI-I
50249018008	**MW-36**	EPA 8260	TMW	12	PASI-I
50249018009	**Trip Blank**	EPA 8260	TMW	12	PASI-I
50249018010	**It-2**	EPA 8260	TMW	12	PASI-I
50249018011	**MW-12R**	EPA 8260	TMW	12	PASI-I
50249018012	**DUP #2**	EPA 8260	TMW	12	PASI-I
50249018013	**EQ #3**	EPA 8260	TMW	12	PASI-I

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SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50249018

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50249018001	**MW-39**					
EPA 8260	Trichloroethene	7.8	ug/L	5.0	02/10/20 22:09	
50249018005	**MW-40**					
EPA 8260	Tetrachloroethene	17.8	ug/L	5.0	02/11/20 02:28	
EPA 8260	1,1,1-Trichloroethane	8.4	ug/L	5.0	02/11/20 02:28	
EPA 8260	Trichloroethene	56.6	ug/L	5.0	02/11/20 02:28	
50249018006	**MW-37**					
EPA 8260	Tetrachloroethene	39.4	ug/L	5.0	02/11/20 04:12	
EPA 8260	Trichloroethene	26.5	ug/L	5.0	02/11/20 04:12	
50249018007	**MW-34**					
EPA 8260	Tetrachloroethene	32.8	ug/L	5.0	02/11/20 04:46	
EPA 8260	Trichloroethene	15.3	ug/L	5.0	02/11/20 04:46	
50249018008	**MW-36**					
EPA 8260	Tetrachloroethene	50.2	ug/L	5.0	02/11/20 05:21	
EPA 8260	Trichloroethene	5.1	ug/L	5.0	02/11/20 05:21	
50249018010	**It-2**					
EPA 8260	cis-1,2-Dichloroethene	9.4	ug/L	5.0	02/11/20 06:30	
50249018011	**MW-12R**					
EPA 8260	cis-1,2-Dichloroethene	6.0	ug/L	5.0	02/11/20 07:05	
EPA 8260	Tetrachloroethene	373	ug/L	50.0	02/11/20 18:15	
EPA 8260	1,1,1-Trichloroethane	22.3	ug/L	5.0	02/11/20 07:05	
EPA 8260	Trichloroethene	132	ug/L	5.0	02/11/20 07:05	
50249018012	**DUP #2**					
EPA 8260	cis-1,2-Dichloroethene	6.0	ug/L	5.0	02/11/20 07:39	
EPA 8260	Tetrachloroethene	373	ug/L	50.0	02/11/20 18:50	
EPA 8260	1,1,1-Trichloroethane	23.1	ug/L	5.0	02/11/20 07:39	
EPA 8260	Trichloroethene	134	ug/L	5.0	02/11/20 07:39	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: MW-39 **Lab ID: 50249018001** Collected: 02/05/20 15:46 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.22	1		02/10/20 22:09	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.74	1		02/10/20 22:09	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.40	1		02/10/20 22:09	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.37	1		02/10/20 22:09	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.27	1		02/10/20 22:09	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.25	1		02/10/20 22:09	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	1.3	1		02/10/20 22:09	71-55-6	
Trichloroethene	**7.8**	ug/L	5.0	1.2	1		02/10/20 22:09	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.46	1		02/10/20 22:09	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	80-122		1		02/10/20 22:09	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	85-114		1		02/10/20 22:09	460-00-4	
Toluene-d8 (S)	100	%.	85-114		1		02/10/20 22:09	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: MW-33 **Lab ID: 50249018002** Collected: 02/06/20 09:51 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 00:45	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 00:45	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/11/20 00:45	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 00:45	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 00:45	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		02/11/20 00:45	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		02/11/20 00:45	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		02/11/20 00:45	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 00:45	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	80-122		1		02/11/20 00:45	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	85-114		1		02/11/20 00:45	460-00-4	
Toluene-d8 (S)	99	%.	85-114		1		02/11/20 00:45	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: MW-32 **Lab ID: 50249018003** Collected: 02/06/20 10:38 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 01:19	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 01:19	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/11/20 01:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 01:19	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 01:19	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		02/11/20 01:19	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		02/11/20 01:19	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		02/11/20 01:19	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 01:19	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	80-122		1		02/11/20 01:19	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	85-114		1		02/11/20 01:19	460-00-4	
Toluene-d8 (S)	98	%.	85-114		1		02/11/20 01:19	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: EQ #2 BLANK **Lab ID: 50249018004** Collected: 02/06/20 10:40 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 01:54	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 01:54	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/11/20 01:54	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 01:54	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 01:54	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		02/11/20 01:54	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		02/11/20 01:54	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		02/11/20 01:54	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 01:54	75-01-4	
Surrogates									
Dibromofluoromethane (S)	107	%.	80-122		1		02/11/20 01:54	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-114		1		02/11/20 01:54	460-00-4	
Toluene-d8 (S)	99	%.	85-114		1		02/11/20 01:54	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: MW-40 **Lab ID: 50249018005** Collected: 02/06/20 11:45 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 02:28	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 02:28	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/11/20 02:28	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 02:28	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 02:28	75-09-2	
Tetrachloroethene	**17.8**	ug/L	5.0	0.21	1		02/11/20 02:28	127-18-4	
1,1,1-Trichloroethane	**8.4**	ug/L	5.0	0.44	1		02/11/20 02:28	71-55-6	
Trichloroethene	**56.6**	ug/L	5.0	1.4	1		02/11/20 02:28	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 02:28	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	80-122		1		02/11/20 02:28	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	85-114		1		02/11/20 02:28	460-00-4	
Toluene-d8 (S)	99	%.	85-114		1		02/11/20 02:28	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: MW-37 **Lab ID: 50249018006** Collected: 02/06/20 13:04 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 04:12	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 04:12	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/11/20 04:12	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 04:12	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 04:12	75-09-2	
Tetrachloroethene	**39.4**	ug/L	5.0	0.21	1		02/11/20 04:12	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		02/11/20 04:12	71-55-6	
Trichloroethene	**26.5**	ug/L	5.0	1.4	1		02/11/20 04:12	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 04:12	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	80-122		1		02/11/20 04:12	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	85-114		1		02/11/20 04:12	460-00-4	
Toluene-d8 (S)	98	%.	85-114		1		02/11/20 04:12	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: MW-34 **Lab ID: 50249018007** Collected: 02/06/20 14:09 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 04:46	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 04:46	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/11/20 04:46	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 04:46	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 04:46	75-09-2	
Tetrachloroethene	**32.8**	ug/L	5.0	0.21	1		02/11/20 04:46	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		02/11/20 04:46	71-55-6	
Trichloroethene	**15.3**	ug/L	5.0	1.4	1		02/11/20 04:46	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 04:46	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	80-122		1		02/11/20 04:46	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-114		1		02/11/20 04:46	460-00-4	
Toluene-d8 (S)	97	%.	85-114		1		02/11/20 04:46	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: MW-36 **Lab ID: 50249018008** Collected: 02/06/20 15:10 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 05:21	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 05:21	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/11/20 05:21	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 05:21	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 05:21	75-09-2	
Tetrachloroethene	**50.2**	ug/L	5.0	0.21	1		02/11/20 05:21	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		02/11/20 05:21	71-55-6	
Trichloroethene	**5.1**	ug/L	5.0	1.4	1		02/11/20 05:21	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 05:21	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	80-122		1		02/11/20 05:21	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	85-114		1		02/11/20 05:21	460-00-4	
Toluene-d8 (S)	98	%.	85-114		1		02/11/20 05:21	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: Trip Blank **Lab ID: 50249018009** Collected: 02/06/20 09:59 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 05:56	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 05:56	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/11/20 05:56	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 05:56	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 05:56	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		02/11/20 05:56	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		02/11/20 05:56	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		02/11/20 05:56	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 05:56	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	80-122		1		02/11/20 05:56	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	85-114		1		02/11/20 05:56	460-00-4	
Toluene-d8 (S)	99	%.	85-114		1		02/11/20 05:56	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: It-2 **Lab ID: 50249018010** Collected: 02/07/20 10:01 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 06:30	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 06:30	107-06-2	
cis-1,2-Dichloroethene	**9.4**	ug/L	5.0	1.1	1		02/11/20 06:30	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 06:30	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 06:30	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		02/11/20 06:30	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		02/11/20 06:30	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		02/11/20 06:30	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 06:30	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	80-122		1		02/11/20 06:30	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	85-114		1		02/11/20 06:30	460-00-4	
Toluene-d8 (S)	98	%.	85-114		1		02/11/20 06:30	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: MW-12R **Lab ID: 50249018011** Collected: 02/07/20 11:29 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 07:05	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 07:05	107-06-2	
cis-1,2-Dichloroethene	**6.0**	ug/L	5.0	1.1	1		02/11/20 07:05	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 07:05	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 07:05	75-09-2	
Tetrachloroethene	**373**	ug/L	50.0	2.1	10		02/11/20 18:15	127-18-4	
1,1,1-Trichloroethane	**22.3**	ug/L	5.0	0.44	1		02/11/20 07:05	71-55-6	
Trichloroethene	**132**	ug/L	5.0	1.4	1		02/11/20 07:05	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 07:05	75-01-4	
Surrogates									
Dibromofluoromethane (S)	100	%.	80-122		1		02/11/20 07:05	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	85-114		1		02/11/20 07:05	460-00-4	
Toluene-d8 (S)	99	%.	85-114		1		02/11/20 07:05	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: DUP #2 **Lab ID: 50249018012** Collected: 02/07/20 08:00 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 07:39	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 07:39	107-06-2	
cis-1,2-Dichloroethene	**6.0**	ug/L	5.0	1.1	1		02/11/20 07:39	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 07:39	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 07:39	75-09-2	
Tetrachloroethene	**373**	ug/L	50.0	2.1	10		02/11/20 18:50	127-18-4	
1,1,1-Trichloroethane	**23.1**	ug/L	5.0	0.44	1		02/11/20 07:39	71-55-6	
Trichloroethene	**134**	ug/L	5.0	1.4	1		02/11/20 07:39	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 07:39	75-01-4	
Surrogates									
Dibromofluoromethane (S)	99	%.	80-122		1		02/11/20 07:39	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	85-114		1		02/11/20 07:39	460-00-4	
Toluene-d8 (S)	99	%.	85-114		1		02/11/20 07:39	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50249018

Sample: EQ #3 **Lab ID: 50249018013** Collected: 02/07/20 10:05 Received: 02/07/20 12:37 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.21	1		02/11/20 08:14	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		02/11/20 08:14	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		02/11/20 08:14	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.51	1		02/11/20 08:14	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.29	1		02/11/20 08:14	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.21	1		02/11/20 08:14	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.44	1		02/11/20 08:14	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.4	1		02/11/20 08:14	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.44	1		02/11/20 08:14	75-01-4	
Surrogates									
Dibromofluoromethane (S)	109	%.	80-122		1		02/11/20 08:14	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	85-114		1		02/11/20 08:14	460-00-4	
Toluene-d8 (S)	99	%.	85-114		1		02/11/20 08:14	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50249018

QC Batch: 546788 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 50249018001

METHOD BLANK: 2521644 Matrix: Water
Associated Lab Samples: 50249018001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	1.3	02/10/20 12:21	
1,1-Dichloroethane	ug/L	ND	5.0	0.22	02/10/20 12:21	
1,2-Dichloroethane	ug/L	ND	5.0	0.74	02/10/20 12:21	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.40	02/10/20 12:21	
Methylene Chloride	ug/L	ND	5.0	0.27	02/10/20 12:21	
Tetrachloroethene	ug/L	ND	5.0	0.25	02/10/20 12:21	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.37	02/10/20 12:21	
Trichloroethene	ug/L	ND	5.0	1.2	02/10/20 12:21	
Vinyl chloride	ug/L	ND	2.0	0.46	02/10/20 12:21	
4-Bromofluorobenzene (S)	%.	104	85-114		02/10/20 12:21	
Dibromofluoromethane (S)	%.	102	80-122		02/10/20 12:21	
Toluene-d8 (S)	%.	100	85-114		02/10/20 12:21	

LABORATORY CONTROL SAMPLE: 2521645

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	50.9	102	72-127	
1,1-Dichloroethane	ug/L	50	52.3	105	70-119	
1,2-Dichloroethane	ug/L	50	50.0	100	68-119	
cis-1,2-Dichloroethene	ug/L	50	48.0	96	74-122	
Methylene Chloride	ug/L	50	51.5	103	70-121	
Tetrachloroethene	ug/L	50	44.9	90	76-124	
trans-1,2-Dichloroethene	ug/L	50	52.0	104	73-121	
Trichloroethene	ug/L	50	47.7	95	76-120	
Vinyl chloride	ug/L	50	44.3	89	70-136	
4-Bromofluorobenzene (S)	%.			102	85-114	
Dibromofluoromethane (S)	%.			96	80-122	
Toluene-d8 (S)	%.			103	85-114	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50249018

QC Batch: 546799 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 50249018002, 50249018003, 50249018004, 50249018005, 50249018006, 50249018007, 50249018008, 50249018009, 50249018010, 50249018011, 50249018012, 50249018013

METHOD BLANK: 2521660 Matrix: Water
Associated Lab Samples: 50249018002, 50249018003, 50249018004, 50249018005, 50249018006, 50249018007, 50249018008, 50249018009, 50249018010, 50249018011, 50249018012, 50249018013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.44	02/11/20 00:10	
1,1-Dichloroethane	ug/L	ND	5.0	0.21	02/11/20 00:10	
1,2-Dichloroethane	ug/L	ND	5.0	0.27	02/11/20 00:10	
cis-1,2-Dichloroethene	ug/L	ND	5.0	1.1	02/11/20 00:10	
Methylene Chloride	ug/L	ND	5.0	0.29	02/11/20 00:10	
Tetrachloroethene	ug/L	ND	5.0	0.21	02/11/20 00:10	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.51	02/11/20 00:10	
Trichloroethene	ug/L	ND	5.0	1.4	02/11/20 00:10	
Vinyl chloride	ug/L	ND	2.0	0.44	02/11/20 00:10	
4-Bromofluorobenzene (S)	%.	103	85-114		02/11/20 00:10	
Dibromofluoromethane (S)	%.	104	80-122		02/11/20 00:10	
Toluene-d8 (S)	%.	101	85-114		02/11/20 00:10	

LABORATORY CONTROL SAMPLE: 2521661

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	49.3	99	72-127	
1,1-Dichloroethane	ug/L	50	52.4	105	70-119	
1,2-Dichloroethane	ug/L	50	50.3	101	68-119	
cis-1,2-Dichloroethene	ug/L	50	48.3	97	74-122	
Methylene Chloride	ug/L	50	52.8	106	70-121	
Tetrachloroethene	ug/L	50	44.3	89	76-124	
trans-1,2-Dichloroethene	ug/L	50	49.9	100	73-121	
Trichloroethene	ug/L	50	48.3	97	76-120	
Vinyl chloride	ug/L	50	39.5	79	70-136	
4-Bromofluorobenzene (S)	%.			103	85-114	
Dibromofluoromethane (S)	%.			96	80-122	
Toluene-d8 (S)	%.			101	85-114	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2521662 2521663

Parameter	Units	50249018005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	8.4	50	50	58.4	55.8	100	95	48-145	4	20	
1,1-Dichloroethane	ug/L	ND	50	50	55.2	52.2	110	104	38-142	6	20	
1,2-Dichloroethane	ug/L	ND	50	50	52.6	50.5	105	101	44-138	4	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	55.0	52.2	103	98	46-143	5	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50249018

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2521662 2521663

Parameter	Units	50249018005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methylene Chloride	ug/L	ND	50	50	54.7	52.3	109	105	33-140	5	20	
Tetrachloroethene	ug/L	17.8	50	50	62.2	62.0	89	88	41-145	0	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	51.6	49.5	103	99	46-140	4	20	
Trichloroethene	ug/L	56.6	50	50	99.9	95.8	87	78	43-147	4	20	
Vinyl chloride	ug/L	ND	50	50	41.6	38.8	83	78	49-153	7	20	
4-Bromofluorobenzene (S)	%.						105	103	85-114			
Dibromofluoromethane (S)	%.						97	97	80-122			
Toluene-d8 (S)	%.						103	102	85-114			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALIFIERS

Project: Amphenol
Pace Project No.: 50249018

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-I Pace Analytical Services - Indianapolis

Pace Analytical www.pacelabs.com

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50249018

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50249018001	**MW-39**	EPA 8260	546788		
50249018002	**MW-33**	EPA 8260	546799		
50249018003	**MW-32**	EPA 8260	546799		
50249018004	**EQ #2 BLANK**	EPA 8260	546799		
50249018005	**MW-40**	EPA 8260	546799		
50249018006	**MW-37**	EPA 8260	546799		
50249018007	**MW-34**	EPA 8260	546799		
50249018008	**MW-36**	EPA 8260	546799		
50249018009	**Trip Blank**	EPA 8260	546799		
50249018010	**It-2**	EPA 8260	546799		
50249018011	**MW-12R**	EPA 8260	546799		
50249018012	**DUP #2**	EPA 8260	546799		
50249018013	**EQ #3**	EPA 8260	546799		

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ... umber or

WO#:50249018

50249018

Company: IWM Consulting

Address: 7428 Rockville RD.

Report To: Chris Parks

Copy To: Brad Gentry

Customer Project Name/Number: Amphenol

Phone: 317-347-1111

Email: cparks@iwm

Collected By (print): D.E. White

Collected By (signature):

Billing Information:

Email To:

Site Collection Info/Address:

State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Site/Facility ID #:

Compliance Monitoring? [ ] Yes [ ] No

Purchase Order #:

Quote #:

DW PWS ID #:

DW Location Code:

Turnaround Date Required:

Immediately Packed on Ice: [X] Yes [ ] No

Sample Disposal:
[ ] Dispose as appropriate [ ] Return
[ ] Archive: ____________
[ ] Hold: ____________

Rush:
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day
(Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [X] No

Analysis: ____________

Container ... Type: 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ____________

Lab Project Manager:

Analyses: VOC's 8260

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips: ____________	
Sample pH Acceptable	Y N NA
pH Strips: ____________	
Sulfide Present	Y N NA
Lead Acetate Strips: ____________	

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	VOC's 8260	LAB USE ONLY: Lab Sample # / Comments: SEE SCUR
MW-39		G	2/5/20	15:46				3	X	001
MW-33		G	2/6/20	9:51				3	X	002
MW-32		G	2/6/20	10:30				3	X	003
EQ#2 BLANK		G	2/6/20	10:40				3	X	004
MW-40		G	2/6/20	11:45				3	X	005
MS/MSD#1 (MW-40)		G	2/6/20	11:45				6	X	~~006~~
MW-37		G	2/6/20	13:04				3	X	~~007~~ 006
MW-34		G	2/6/20	14:09				3	X	~~008~~ 007
MW-36		G	2/6/20	15:10				3	X	~~009~~ 008
Trip BLANK		G	2/6/20	9:59				3	X	~~010~~ 009

ST 2/7/20

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2478592

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: F
Cooler 1 Temp Upon Receipt: 0.9 oC
Cooler 1 Therm Corr. Factor: 0.0 oC
Cooler 1 Corrected Temp: 0.9 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
[signature]	2/7/20 12:37	[signature]	2-7-20 1237

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: ______ of: ______

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM Consulting
Address: 7428 Rockville Rd.
Report To: Chris Parks
Copy To: Brad Gentry
Customer Project Name/Number: Amphenol
Phone: 317-347-1111
Email: cparks@IWM

Billing Information:
Email To:
Site Collection Info/Address:
State: / County/City:
Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Site/Facility ID #:
Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): D. E. White
Purchase Order #:
Quote #:
DW PWS ID #:
DW Location Code:
Collected By (signature): [signature]
Turnaround Date Required:
Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______
Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)
Field Filtered (if applicable): [ ] Yes [X] No
Analysis: ______

Container Preservative Type **

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

Analyses: VOCS 8260

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	VOCS 8260	Lab Sample # / Comments
IT-2		G	2/6/20	10:01	2/7			3	X	~~011~~ 010
MW-12R		G	2/6/20	11:29	2/7			3	X	~~012~~ 011
Dup #2		G	2/6/20	—	2/7			3	X	~~013~~ 012
EQ. #3		G	2/7	10:05	2/7			3	X	~~014~~ 013

C+ 2/7/20

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

LAB USE ONLY:
Lab Sample # / Comments: SEE SCUR

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None
Packing Material Used:
Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A
Lab Tracking #: 2478589
Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: (Y) N NA
Therm ID#: F
Cooler 1 Temp Upon Receipt: 0.9 oC
Cooler 1 Therm Corr. Factor: 0.0 oC
Cooler 1 Corrected Temp: 0.9 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
[signature]	2/7/20 12:30	[signature]	2-7-20 1237

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO
Page: ______ of: ______

Pace Analytical

SAMPLE CONDITION UPON RECEIPT FORM

Project #: 50249018

Date/Time and Initials of person examining contents: JLK 2-7-20 1330

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Other ______

Tracking #: N/A

Custody Seal on Cooler/Box Present: ☐ Yes ☒ No   **Seals Intact:** ☐ Yes ☒ No

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other ______

Thermometer: 1 2 3 4 5 6 A B C D E F (F circled)   Ice Type: ☒ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☐ Yes ☐ No ☒ N/A

Cooler Temperature: 0.9-0.9   Ice Visible in Sample Containers?: ☐ Yes ☒ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C   If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☒ N/A

All discrepancies will be written out in the comments section below.

	Yes	No		Yes	No	N/A
Are samples from West Virginia? Document any containers out of temp.		X	All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted.			X
USDA Regulated Soils? (ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		X				
Chain of Custody Present:	X		Circle: HNO3 H2SO4 NaOH NaOH/ZnAc			
Chain of Custody Filled Out:	X		Dissolved Metals field filtered?:			X
Short Hold Time Analysis (<72hr)?: Analysis:		X	Headspace Wisconsin Sulfide			X
Time 5035A TC placed in Freezer or Short Holds To Lab:				Present	Absent	N/A
			Residual Chlorine Check (SVOC 625 Pest/PCB 608)			X
			Residual Chlorine Check (Total/Amenable/Free Cyanide)			X
Rush TAT Requested:		X	Headspace in VOA Vials (>6mm):		X	
Containers Intact?:	X		Trip Blank Present?:	X		
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	X		Trip Blank Custody Seals?:	X		
Extra labels on Terracore Vials (soils only)?		X				

Comments:

COC PAGE ____ of ____

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							WT			
2																													
3																													
4																													
5			9																										
6																													
7			3																										
8																													
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

COC PAGE ____ of ____

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							WT			
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

March 18, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol
Pace Project No.: 50251736

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on March 11, 2020. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Chris Parks, IWM Consulting Group

CERTIFICATIONS

Project:	Amphenol
Pace Project No.:	50251736

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Accreditation #: 200074
Indiana Drinking Water Laboratory #: C-49-06
Kansas/TNI Certification #: E-10177
Kentucky UST Agency Interest #: 80226
Kentucky WW Laboratory ID #: 98019
Michigan Drinking Water Laboratory #9050
Ohio VAP Certified Laboratory #: CL0065
Oklahoma Laboratory #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Laboratory #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE SUMMARY

Project: Amphenol
Pace Project No.: 50251736

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50251736001	**MW-31**	Water	03/11/20 11:16	03/11/20 14:25
50251736002	**MW-35**	Water	03/11/20 12:40	03/11/20 14:25
50251736003	**MW-38**	Water	03/11/20 09:50	03/11/20 14:25
50251736004	**FD-1 WT**	Water	03/11/20 08:00	03/11/20 14:25
50251736005	**TB-1 WT**	Water	03/11/20 08:40	03/11/20 14:25
50251736006	**EQ-3 WT**	Water	03/11/20 10:10	03/11/20 14:25

Pace Analytical
www.pacelabs.com

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50251736

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50251736001	**MW-31**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	RAM	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	ALA	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50251736002	**MW-35**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	RAM	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	ALA	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50251736003	**MW-38**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	RAM	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	ALA	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50251736004	**FD-1 WT**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	RAM	2	PASI-I
		EPA 6010	JPK	2	PASI-I
		EPA 8260	ALA	12	PASI-I
		SM 4500-S2-D	TPD	1	PASI-I
		EPA 9038	SWJ	1	PASI-I
		EPA 353.2	ZM	2	PASI-I
50251736005	**TB-1 WT**	EPA 8260	ALA	12	PASI-I
50251736006	**EQ-3 WT**	EPA 8260	ALA	12	PASI-I

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50251736

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50251736001	**MW-31**					
RSK 175 Modified	Methane	24.8	ug/L	10.0	03/13/20 20:56	
EPA 6010	Iron	168	ug/L	100	03/16/20 16:12	
EPA 6010	Manganese	4.2J	ug/L	10.0	03/16/20 16:12	
EPA 6010	Manganese, Dissolved	0.82J	ug/L	10.0	03/16/20 23:48	
EPA 8260	Tetrachloroethene	29.8	ug/L	5.0	03/13/20 08:58	
EPA 8260	1,1,1-Trichloroethane	6.8	ug/L	5.0	03/13/20 08:58	
EPA 8260	Trichloroethene	38.2	ug/L	5.0	03/13/20 08:58	
EPA 9038	Sulfate	39.2	mg/L	20.0	03/14/20 10:39	
EPA 353.2	Nitrogen, NO2 plus NO3	4.0	mg/L	0.10	03/11/20 16:12	
EPA 353.2	Nitrogen, Nitrate	4.0	mg/L	0.10	03/11/20 16:12	
50251736002	**MW-35**					
RSK 175 Modified	Ethane	8.1J	ug/L	10.0	03/13/20 21:35	
RSK 175 Modified	Ethene	6.3J	ug/L	10.0	03/13/20 21:35	
RSK 175 Modified	Methane	44.2	ug/L	10.0	03/13/20 21:35	
EPA 6010	Iron	10800	ug/L	100	03/16/20 16:14	
EPA 6010	Manganese	252	ug/L	10.0	03/16/20 16:14	
EPA 6010	Manganese, Dissolved	232	ug/L	10.0	03/16/20 23:51	
EPA 9038	Sulfate	30.8	mg/L	20.0	03/14/20 10:49	
EPA 353.2	Nitrogen, NO2 plus NO3	0.63	mg/L	0.10	03/11/20 16:13	
EPA 353.2	Nitrogen, Nitrate	0.56	mg/L	0.10	03/11/20 16:13	
50251736003	**MW-38**					
EPA 6010	Iron	4690	ug/L	100	03/16/20 16:24	
EPA 6010	Manganese	184	ug/L	10.0	03/16/20 16:24	
EPA 6010	Manganese, Dissolved	1.8J	ug/L	10.0	03/16/20 23:57	
EPA 8260	Tetrachloroethene	21.6	ug/L	5.0	03/13/20 11:29	
EPA 8260	1,1,1-Trichloroethane	4.1J	ug/L	5.0	03/13/20 11:29	
EPA 8260	Trichloroethene	28.7	ug/L	5.0	03/13/20 11:29	
EPA 9038	Sulfate	43.6	mg/L	20.0	03/14/20 10:50	
EPA 353.2	Nitrogen, NO2 plus NO3	3.0	mg/L	0.10	03/11/20 16:18	
EPA 353.2	Nitrogen, Nitrate	3.0	mg/L	0.10	03/11/20 16:18	
50251736004	**FD-1 WT**					
EPA 6010	Iron	3730	ug/L	100	03/16/20 16:26	
EPA 6010	Manganese	140	ug/L	10.0	03/16/20 16:26	
EPA 6010	Manganese, Dissolved	1.7J	ug/L	10.0	03/17/20 00:00	
EPA 8260	Tetrachloroethene	22.2	ug/L	5.0	03/13/20 12:07	
EPA 8260	1,1,1-Trichloroethane	4.1J	ug/L	5.0	03/13/20 12:07	
EPA 8260	Trichloroethene	29.9	ug/L	5.0	03/13/20 12:07	
EPA 9038	Sulfate	45.2	mg/L	20.0	03/14/20 10:50	
EPA 353.2	Nitrogen, NO2 plus NO3	3.1	mg/L	0.10	03/11/20 16:19	
EPA 353.2	Nitrogen, Nitrate	3.0	mg/L	0.10	03/11/20 16:19	
50251736005	**TB-1 WT**					
EPA 8260	Methylene Chloride	2.0J	ug/L	5.0	03/13/20 12:45	
50251736006	**EQ-3 WT**					
EPA 8260	Methylene Chloride	1.7J	ug/L	5.0	03/17/20 08:45	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251736

Sample: MW-31 **Lab ID: 50251736001** Collected: 03/11/20 11:16 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		03/13/20 20:56	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		03/13/20 20:56	74-85-1	
Methane	**24.8**	ug/L	10.0	6.4	1		03/13/20 20:56	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**168**	ug/L	100	21.2	1	03/16/20 06:03	03/16/20 16:12	7439-89-6	
Manganese	**4.2J**	ug/L	10.0	0.62	1	03/16/20 06:03	03/16/20 16:12	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	21.2	1	03/16/20 06:03	03/16/20 23:48	7439-89-6	
Manganese, Dissolved	**0.82J**	ug/L	10.0	0.62	1	03/16/20 06:03	03/16/20 23:48	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.42	1		03/13/20 08:58	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.49	1		03/13/20 08:58	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.42	1		03/13/20 08:58	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.44	1		03/13/20 08:58	156-60-5	
Methylene Chloride	ND	ug/L	5.0	1.4	1		03/13/20 08:58	75-09-2	
Tetrachloroethene	**29.8**	ug/L	5.0	0.30	1		03/13/20 08:58	127-18-4	
1,1,1-Trichloroethane	**6.8**	ug/L	5.0	0.31	1		03/13/20 08:58	71-55-6	
Trichloroethene	**38.2**	ug/L	5.0	0.47	1		03/13/20 08:58	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		03/13/20 08:58	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		03/13/20 08:58	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-116		1		03/13/20 08:58	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		03/13/20 08:58	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		03/12/20 15:09	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**39.2**	mg/L	20.0	7.6	2		03/14/20 10:39	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.0**	mg/L	0.10	0.020	1		03/11/20 16:12		
Nitrogen, Nitrate	**4.0**	mg/L	0.10	0.020	1		03/11/20 16:12	14797-55-8	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251736

Sample: MW-35 **Lab ID: 50251736002** Collected: 03/11/20 12:40 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	**8.1J**	ug/L	10.0	5.0	1		03/13/20 21:35	74-84-0	
Ethene	**6.3J**	ug/L	10.0	4.1	1		03/13/20 21:35	74-85-1	
Methane	**44.2**	ug/L	10.0	6.4	1		03/13/20 21:35	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**10800**	ug/L	100	21.2	1	03/16/20 06:03	03/16/20 16:14	7439-89-6	
Manganese	**252**	ug/L	10.0	0.62	1	03/16/20 06:03	03/16/20 16:14	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	21.2	1	03/16/20 06:03	03/16/20 23:51	7439-89-6	
Manganese, Dissolved	**232**	ug/L	10.0	0.62	1	03/16/20 06:03	03/16/20 23:51	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.42	1		03/13/20 09:36	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.49	1		03/13/20 09:36	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.42	1		03/13/20 09:36	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.44	1		03/13/20 09:36	156-60-5	
Methylene Chloride	ND	ug/L	5.0	1.4	1		03/13/20 09:36	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.30	1		03/13/20 09:36	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.31	1		03/13/20 09:36	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.47	1		03/13/20 09:36	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		03/13/20 09:36	75-01-4	
Surrogates									
Dibromofluoromethane (S)	99	%.	75-120		1		03/13/20 09:36	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-116		1		03/13/20 09:36	460-00-4	
Toluene-d8 (S)	101	%.	83-111		1		03/13/20 09:36	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		03/12/20 15:09	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**30.8**	mg/L	20.0	7.6	2		03/14/20 10:49	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**0.63**	mg/L	0.10	0.020	1		03/11/20 16:13		
Nitrogen, Nitrate	**0.56**	mg/L	0.10	0.020	1		03/11/20 16:13	14797-55-8	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251736

Sample: MW-38 | **Lab ID: 50251736003** | Collected: 03/11/20 09:50 | Received: 03/11/20 14:25 | Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		03/13/20 22:13	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		03/13/20 22:13	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		03/13/20 22:13	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**4690**	ug/L	100	21.2	1	03/16/20 06:03	03/16/20 16:24	7439-89-6	
Manganese	**184**	ug/L	10.0	0.62	1	03/16/20 06:03	03/16/20 16:24	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	21.2	1	03/16/20 06:03	03/16/20 23:57	7439-89-6	
Manganese, Dissolved	**1.8J**	ug/L	10.0	0.62	1	03/16/20 06:03	03/16/20 23:57	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.42	1		03/13/20 11:29	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.49	1		03/13/20 11:29	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.42	1		03/13/20 11:29	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.44	1		03/13/20 11:29	156-60-5	
Methylene Chloride	ND	ug/L	5.0	1.4	1		03/13/20 11:29	75-09-2	
Tetrachloroethene	**21.6**	ug/L	5.0	0.30	1		03/13/20 11:29	127-18-4	
1,1,1-Trichloroethane	**4.1J**	ug/L	5.0	0.31	1		03/13/20 11:29	71-55-6	
Trichloroethene	**28.7**	ug/L	5.0	0.47	1		03/13/20 11:29	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		03/13/20 11:29	75-01-4	
Surrogates									
Dibromofluoromethane (S)	101	%.	75-120		1		03/13/20 11:29	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-116		1		03/13/20 11:29	460-00-4	
Toluene-d8 (S)	102	%.	83-111		1		03/13/20 11:29	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		03/12/20 15:09	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**43.6**	mg/L	20.0	7.6	2		03/14/20 10:50	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**3.0**	mg/L	0.10	0.020	1		03/11/20 16:18		
Nitrogen, Nitrate	**3.0**	mg/L	0.10	0.020	1		03/11/20 16:18	14797-55-8	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251736

Sample: FD-1 WT **Lab ID: 50251736004** Collected: 03/11/20 08:00 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified								
Ethane	ND	ug/L	10.0	5.0	1		03/13/20 22:33	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		03/13/20 22:33	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		03/13/20 22:33	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**3730**	ug/L	100	21.2	1	03/16/20 06:03	03/16/20 16:26	7439-89-6	
Manganese	**140**	ug/L	10.0	0.62	1	03/16/20 06:03	03/16/20 16:26	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron, Dissolved	ND	ug/L	100	21.2	1	03/16/20 06:03	03/17/20 00:00	7439-89-6	
Manganese, Dissolved	**1.7J**	ug/L	10.0	0.62	1	03/16/20 06:03	03/17/20 00:00	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.42	1		03/13/20 12:07	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.49	1		03/13/20 12:07	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.42	1		03/13/20 12:07	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.44	1		03/13/20 12:07	156-60-5	
Methylene Chloride	ND	ug/L	5.0	1.4	1		03/13/20 12:07	75-09-2	
Tetrachloroethene	**22.2**	ug/L	5.0	0.30	1		03/13/20 12:07	127-18-4	
1,1,1-Trichloroethane	**4.1J**	ug/L	5.0	0.31	1		03/13/20 12:07	71-55-6	
Trichloroethene	**29.9**	ug/L	5.0	0.47	1		03/13/20 12:07	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		03/13/20 12:07	75-01-4	
Surrogates									
Dibromofluoromethane (S)	98	%.	75-120		1		03/13/20 12:07	1868-53-7	
4-Bromofluorobenzene (S)	94	%.	85-116		1		03/13/20 12:07	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		03/13/20 12:07	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D								
Sulfide	ND	mg/L	0.10	0.017	1		03/12/20 15:09	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038								
Sulfate	**45.2**	mg/L	20.0	7.6	2		03/14/20 10:50	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**3.1**	mg/L	0.10	0.020	1		03/11/20 16:19		
Nitrogen, Nitrate	**3.0**	mg/L	0.10	0.020	1		03/11/20 16:19	14797-55-8	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251736

Sample: TB-1 WT **Lab ID: 50251736005** Collected: 03/11/20 08:40 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.42	1		03/13/20 12:45	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.49	1		03/13/20 12:45	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.42	1		03/13/20 12:45	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.44	1		03/13/20 12:45	156-60-5	
Methylene Chloride	**2.0J**	ug/L	5.0	1.4	1		03/13/20 12:45	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.30	1		03/13/20 12:45	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.31	1		03/13/20 12:45	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.47	1		03/13/20 12:45	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		03/13/20 12:45	75-01-4	
Surrogates									
Dibromofluoromethane (S)	100	%.	75-120		1		03/13/20 12:45	1868-53-7	
4-Bromofluorobenzene (S)	94	%.	85-116		1		03/13/20 12:45	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		03/13/20 12:45	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251736

Sample: EQ-3 WT **Lab ID: 50251736006** Collected: 03/11/20 10:10 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.42	1		03/17/20 08:45	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.49	1		03/17/20 08:45	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.42	1		03/17/20 08:45	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.44	1		03/17/20 08:45	156-60-5	
Methylene Chloride	**1.7J**	ug/L	5.0	1.4	1		03/17/20 08:45	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.30	1		03/17/20 08:45	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.31	1		03/17/20 08:45	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.47	1		03/17/20 08:45	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		03/17/20 08:45	75-01-4	
Surrogates									
Dibromofluoromethane (S)	98	%.	75-120		1		03/17/20 08:45	1868-53-7	
4-Bromofluorobenzene (S)	92	%.	85-116		1		03/17/20 08:45	460-00-4	
Toluene-d8 (S)	97	%.	83-111		1		03/17/20 08:45	2037-26-5	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251736

QC Batch: 551760 Analysis Method: RSK 175 Modified
QC Batch Method: RSK 175 Modified Analysis Description: RSK 175 HEADSPACE
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

METHOD BLANK: 2544968 Matrix: Water
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	5.0	03/13/20 17:44	
Ethene	ug/L	ND	10.0	4.1	03/13/20 17:44	
Methane	ug/L	ND	10.0	6.4	03/13/20 17:44	

LABORATORY CONTROL SAMPLE: 2544969

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	1980	2220	113	67-148	
Ethene	ug/L	2250	2590	115	79-140	
Methane	ug/L	1980	1820	92	59-135	

SAMPLE DUPLICATE: 2544970

Parameter	Units	50251736002 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	8.1J	ND		20	
Ethene	ug/L	6.3J	ND		20	
Methane	ug/L	44.2	38.0	15	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251736

QC Batch: 551457 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

METHOD BLANK: 2543352 Matrix: Water
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron	ug/L	ND	100	21.2	03/16/20 15:49	
Manganese	ug/L	0.80J	10.0	0.62	03/16/20 15:49	

LABORATORY CONTROL SAMPLE: 2543353

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	9070	91	80-120	
Manganese	ug/L	1000	933	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2543354 2543355

Parameter	Units	50251736002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	10800	10000	10000	19500	19600	88	88	75-125	0	20	
Manganese	ug/L	252	1000	1000	1180	1180	92	92	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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(317)228-3100

QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251736

QC Batch: 551738 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

METHOD BLANK: 2544814 Matrix: Water
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	100	21.2	03/16/20 23:17	
Manganese, Dissolved	ug/L	ND	10.0	0.62	03/16/20 23:17	

LABORATORY CONTROL SAMPLE: 2544815

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	10000	9080	91	80-120	
Manganese, Dissolved	ug/L	1000	920	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2544816 2544817

Parameter	Units	50251647006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	15300	10000	10000	25500	24500	102	92	75-125	4	20	
Manganese, Dissolved	ug/L	190	1000	1000	1150	1130	96	94	75-125	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2544818 2544819

Parameter	Units	50251736002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	9410	9450	94	95	75-125	0	20	
Manganese, Dissolved	ug/L	232	1000	1000	1180	1180	95	95	75-125	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2544820 2544821

Parameter	Units	50251661004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	100	10000	10000	9540	9630	94	95	75-125	1	20	
Manganese, Dissolved	ug/L	45.3	1000	1000	988	1000	94	96	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251736

QC Batch: 551629 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004, 50251736005

METHOD BLANK: 2544327 Matrix: Water
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004, 50251736005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.31	03/13/20 03:56	
1,1-Dichloroethane	ug/L	ND	5.0	0.42	03/13/20 03:56	
1,2-Dichloroethane	ug/L	ND	5.0	0.49	03/13/20 03:56	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.42	03/13/20 03:56	
Methylene Chloride	ug/L	2.7J	5.0	1.4	03/13/20 03:56	
Tetrachloroethene	ug/L	ND	5.0	0.30	03/13/20 03:56	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.44	03/13/20 03:56	
Trichloroethene	ug/L	ND	5.0	0.47	03/13/20 03:56	
Vinyl chloride	ug/L	ND	2.0	0.23	03/13/20 03:56	
4-Bromofluorobenzene (S)	%.	96	85-116		03/13/20 03:56	
Dibromofluoromethane (S)	%.	99	75-120		03/13/20 03:56	
Toluene-d8 (S)	%.	100	83-111		03/13/20 03:56	

LABORATORY CONTROL SAMPLE: 2544328

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	54.3	109	78-130	
1,1-Dichloroethane	ug/L	50	52.9	106	77-123	
1,2-Dichloroethane	ug/L	50	45.4	91	66-127	
cis-1,2-Dichloroethene	ug/L	50	45.8	92	76-120	
Methylene Chloride	ug/L	50	43.1	86	68-126	
Tetrachloroethene	ug/L	50	42.3	85	70-123	
trans-1,2-Dichloroethene	ug/L	50	49.4	99	79-126	
Trichloroethene	ug/L	50	44.5	89	78-120	
Vinyl chloride	ug/L	50	50.0	100	55-122	
4-Bromofluorobenzene (S)	%.			98	85-116	
Dibromofluoromethane (S)	%.			100	75-120	
Toluene-d8 (S)	%.			99	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2544329 2544330

Parameter	Units	50251736002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	57.5	57.9	115	116	56-144	1	20	
1,1-Dichloroethane	ug/L	ND	50	50	58.0	56.7	116	113	53-140	2	20	
1,2-Dichloroethane	ug/L	ND	50	50	47.7	48.4	95	97	46-145	2	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	48.2	49.4	96	99	53-134	3	20	
Methylene Chloride	ug/L	ND	50	50	49.5	48.9	96	95	46-138	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251736

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2544329 2544330

Parameter	Units	50251736002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Tetrachloroethene	ug/L	ND	50	50	44.9	44.7	90	89	32-140	0	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	55.4	56.0	111	112	57-138	1	20	
Trichloroethene	ug/L	ND	50	50	46.7	46.7	93	93	47-137	0	20	
Vinyl chloride	ug/L	ND	50	50	61.0	60.5	122	121	36-136	1	20	
4-Bromofluorobenzene (S)	%.						102	99	85-116			
Dibromofluoromethane (S)	%.						103	102	75-120			
Toluene-d8 (S)	%.						102	98	83-111			

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251736

QC Batch: 552120 | Analysis Method: EPA 8260
QC Batch Method: EPA 8260 | Analysis Description: 8260 MSV
Associated Lab Samples: 50251736006

METHOD BLANK: 2546440 | Matrix: Water
Associated Lab Samples: 50251736006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.31	03/16/20 23:58	
1,1-Dichloroethane	ug/L	ND	5.0	0.42	03/16/20 23:58	
1,2-Dichloroethane	ug/L	ND	5.0	0.49	03/16/20 23:58	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.42	03/16/20 23:58	
Methylene Chloride	ug/L	2.7J	5.0	1.4	03/16/20 23:58	
Tetrachloroethene	ug/L	ND	5.0	0.30	03/16/20 23:58	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.44	03/16/20 23:58	
Trichloroethene	ug/L	ND	5.0	0.47	03/16/20 23:58	
Vinyl chloride	ug/L	ND	2.0	0.23	03/16/20 23:58	
4-Bromofluorobenzene (S)	%.	96	85-116		03/16/20 23:58	
Dibromofluoromethane (S)	%.	99	75-120		03/16/20 23:58	
Toluene-d8 (S)	%.	101	83-111		03/16/20 23:58	

LABORATORY CONTROL SAMPLE: 2546441

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	59.7	119	78-130	
1,1-Dichloroethane	ug/L	50	60.1	120	77-123	
1,2-Dichloroethane	ug/L	50	56.6	113	66-127	
cis-1,2-Dichloroethene	ug/L	50	44.5	89	76-120	
Methylene Chloride	ug/L	50	51.4	103	68-126	
Tetrachloroethene	ug/L	50	50.8	102	70-123	
trans-1,2-Dichloroethene	ug/L	50	62.1	124	79-126	
Trichloroethene	ug/L	50	55.0	110	78-120	
Vinyl chloride	ug/L	50	48.2	96	55-122	
4-Bromofluorobenzene (S)	%.			101	85-116	
Dibromofluoromethane (S)	%.			100	75-120	
Toluene-d8 (S)	%.			98	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2546442 | 2546443

Parameter	Units	50251647006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	57.9	60.1	116	120	56-144	4	20	
1,1-Dichloroethane	ug/L	ND	50	50	61.8	58.9	124	118	53-140	5	20	
1,2-Dichloroethane	ug/L	ND	50	50	56.0	58.1	112	116	46-145	4	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	43.6	44.4	87	89	53-134	2	20	
Methylene Chloride	ug/L	ND	50	50	53.3	50.3	107	101	46-138	6	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251736

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2546442 2546443

Parameter	Units	50251647006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Tetrachloroethene	ug/L	ND	50	50	47.8	48.8	96	98	32-140	2	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	58.8	55.8	118	112	57-138	5	20	
Trichloroethene	ug/L	ND	50	50	53.2	54.6	106	109	47-137	3	20	
Vinyl chloride	ug/L	ND	50	50	49.4	47.8	99	96	36-136	3	20	
4-Bromofluorobenzene (S)	%.						103	104	85-116			
Dibromofluoromethane (S)	%.						100	100	75-120			
Toluene-d8 (S)	%.						97	96	83-111			

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251736

QC Batch: 551594 | Analysis Method: SM 4500-S2-D
QC Batch Method: SM 4500-S2-D | Analysis Description: 4500S2D Sulfide Water
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

METHOD BLANK: 2544047 | Matrix: Water
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.017	03/12/20 15:09	

LABORATORY CONTROL SAMPLE: 2544048

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.48	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2544049 2544050

Parameter	Units	50251661004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.46	0.44	91	89	90-110	3	20	M0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2544051 2544052

Parameter	Units	50251736002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.45	0.45	91	90	90-110	1	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251736

QC Batch: 551891 Analysis Method: EPA 9038
QC Batch Method: EPA 9038 Analysis Description: 9038 Sulfate Water
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

METHOD BLANK: 2545670 Matrix: Water
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	4.3J	10.0	3.8	03/14/20 10:34	

LABORATORY CONTROL SAMPLE: 2545671

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	20	18.4	92	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2545672 2545673

Parameter	Units	50251736002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	30.8	100	100	156	158	125	128	90-110	2	20	M3

MATRIX SPIKE SAMPLE: 2545674

Parameter	Units	50251763002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	23.7	100	126	103	90-110	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251736

QC Batch: 551394 Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

METHOD BLANK: 2543046 Matrix: Water
Associated Lab Samples: 50251736001, 50251736002, 50251736003, 50251736004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	ND	0.10	0.020	03/11/20 16:10	
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.020	03/11/20 16:10	

LABORATORY CONTROL SAMPLE: 2543047

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	1	1.1	105	90-110	
Nitrogen, NO2 plus NO3	mg/L	2	2.1	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2543048 2543049

Parameter	Units	50251736002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Nitrate	mg/L	0.56	1	1	1.7	1.6	114	107	90-110	4	20	
Nitrogen, NO2 plus NO3	mg/L	0.63	2	2	2.7	2.6	102	99	90-110	2	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(317)228-3100

QUALIFIERS

Project: Amphenol
Pace Project No.: 50251736

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-I	Pace Analytical Services - Indianapolis

ANALYTE QUALIFIERS

M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M3	Matrix spike recovery was outside laboratory control limits due to matrix interferences.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50251736

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50251736001	**MW-31**	RSK 175 Modified	551760		
50251736002	**MW-35**	RSK 175 Modified	551760		
50251736003	**MW-38**	RSK 175 Modified	551760		
50251736004	**FD-1 WT**	RSK 175 Modified	551760		
50251736001	**MW-31**	EPA 3010	551457	EPA 6010	552093
50251736002	**MW-35**	EPA 3010	551457	EPA 6010	552093
50251736003	**MW-38**	EPA 3010	551457	EPA 6010	552093
50251736004	**FD-1 WT**	EPA 3010	551457	EPA 6010	552093
50251736001	**MW-31**	EPA 3010	551738	EPA 6010	552150
50251736002	**MW-35**	EPA 3010	551738	EPA 6010	552150
50251736003	**MW-38**	EPA 3010	551738	EPA 6010	552150
50251736004	**FD-1 WT**	EPA 3010	551738	EPA 6010	552150
50251736001	**MW-31**	EPA 8260	551629		
50251736002	**MW-35**	EPA 8260	551629		
50251736003	**MW-38**	EPA 8260	551629		
50251736004	**FD-1 WT**	EPA 8260	551629		
50251736005	**TB-1 WT**	EPA 8260	551629		
50251736006	**EQ-3 WT**	EPA 8260	552120		
50251736001	**MW-31**	SM 4500-S2-D	551594		
50251736002	**MW-35**	SM 4500-S2-D	551594		
50251736003	**MW-38**	SM 4500-S2-D	551594		
50251736004	**FD-1 WT**	SM 4500-S2-D	551594		
50251736001	**MW-31**	EPA 9038	551891		
50251736002	**MW-35**	EPA 9038	551891		
50251736003	**MW-38**	EPA 9038	551891		
50251736004	**FD-1 WT**	EPA 9038	551891		
50251736001	**MW-31**	EPA 353.2	551394		
50251736002	**MW-35**	EPA 353.2	551394		
50251736003	**MW-38**	EPA 353.2	551394		
50251736004	**FD-1 WT**	EPA 353.2	551394		

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

WO#: 50251736

50251736

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM Consulting Group LLC
Billing Information: Same
Address: 7428 Rockville Rd, Indianapolis, IN 46214
Report To: Chris Parks
Email To: Same
Copy To: Brad Gentry
Site Collection Info/Address: 980 Hurricane Rd
Customer Project Name/Number: AMPHENOL
State: IN / County/City: Franklin / Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET
Phone: 317-347-1111
Email: cparks@iwmconsult.com
Site/Facility ID #: Former Amphenol Facility
Compliance Monitoring? [ ] Yes [✓] No
Collected By (print): D.E. White
Purchase Order #:
Quote#: IN. Amp 18.01
DW PWS ID #:
DW Location Code:
Collected By (signature):
Turnaround Date Required: 1-Week
Immediately Packed on Ice: [✓] Yes [ ] No
Sample Disposal: [✓] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:
Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)
Field Filtered (if applicable): [ ] Yes [✓] No
Analysis:

Container Preservative Type **: 3 | 1 | U | U | U | U | 4/5

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Analyses:

Customer Sample ID	Matrix *	Comp / Grab	Collected Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Short List VOCs 8260	Total Iron/Manganese 6010	DISSOLVED IRON/MANGANESE (lab filtered) 6010	Ethane/Ethene/Methane RSK 175	Nitrate 353.2	Sulfate 9038	Sulfide 4500S2D	Lab Sample # / Comments: Se Sum
MW-31	GW	G	3/11	11:16	—	—	—	10	X	X	X	X	X	X	X	001
MW-35 MS/MSD	GW	G	3/11	12:40	—	—	—	30	X	X	X	X	X	X	X	002
MW-38	GW	G	3/11	9:50	—	—	—	10	X	X	X	X	X	X	X	003
FD-1 ~~A~~ WT	GW	G	3/11	—	—	—	—	10	X	X	X	X	X	X	X	004
TB-1 WT	GW	G	3/11	8:46	—	—	—	3	X							005
EQ-3 WT	GW	G	3/11	10:10	—	—	—	3	X							006

Lab Profile/Line:

```
Lab Sample Receipt Checklist:
Custody Seals Present/Intact  Y N NA
Custody Signatures Present    Y N NA
Collector Signature Present   Y N NA
Bottles Intact                Y N NA
Correct Bottles               Y N NA
Sufficient Volume             Y N NA
Samples Received on Ice       Y N NA
VOA - Headspace Acceptable    Y N NA
USDA Regulated Soils          Y N NA
Samples in Holding Time       Y N NA
Residual Chlorine Present     Y N NA
Cl Strips:
Sample pH Acceptable          Y N NA
pH Strips:
Sulfide Present               Y N NA
Lead Acetate Strips:
```

LAB USE ONLY:

Customer Remarks / Special Conditions / Possible Hazards: Short List Includes: PCE, TCE, Vinyl Chloride, Methylene Chloride, 111-TCA, Cis/trans-1,2-DCE, 11 DCA, 12DCA
LEVEL IV QA/QC

Type of Ice Used: Wet Blue Dry None
Packing Material Used:
Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A
Lab Tracking #: 2478773
Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: (Y) N NA
Therm ID#: F
Cooler 1 Temp Upon Receipt: 2.3 oC
Cooler 1 Therm Corr. Factor: 0.1 oC
Cooler 1 Corrected Temp: 2.4 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
[signature]	3/11/20 14:25	[signature]	3-11-20 1425

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO
Page: 1 of: 1

Pace Analytical

SAMPLE CONDITION UPON RECEIPT FORM

Project #: 50251736 **Date/Time and Initials of person examining contents:** JH 3-11 1453

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Other ________

Tracking #: ________

Custody Seal on Cooler/Box Present: ☐ Yes ☒ No **Seals Intact:** ☐ Yes ☒ No

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other ________

Thermometer: 1 2 3 4 5 6 A B C D E F Ice Type: ☒ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☒ Yes ☐ No ☐ N/A

Cooler Temperature: 2.3 / 2.4 Ice Visible in Sample Containers?: ☐ Yes ☒ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☒ N/A

All discrepancies will be written out in the comments section below.

	Yes	No		Yes	No	N/A
Are samples from West Virginia? Document any containers out of temp.		/	All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted.	X		
USDA Regulated Soils? (ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		X				
Chain of Custody Present:	X		Circle: HNO3 H2SO4 NaOH NaOH/ZnAc			JH 3-11
Chain of Custody Filled Out:	X		Dissolved Metals field filtered?:		X	~~X~~
Short Hold Time Analysis (<72hr)?: Analysis:	/		Headspace Wisconsin Sulfide			X
Time 5035A TC placed in Freezer or Short Holds To Lab: 1500 NO2/NO3				Present	Absent	N/A
			Residual Chlorine Check (SVOC 625 Pest/PCB 608)			X
			Residual Chlorine Check (Total/Amenable/Free Cyanide)			X
Rush TAT Requested:		/	Headspace in VOA Vials (>6mm):	X		
Containers Intact?:	X		Trip Blank Present?:	X		
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	X		Trip Blank Custody Seals?:	X		
Extra labels on Terracore Vials (soils only)?		X				

Comments:

F-IN-Q-290-rev.18,22Apr2019

COC PAGE 1 of 1

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3		3										2	1				1						Wt	x	x	
2			9		9										6	3				3						Wt	x	x	
3			3		3										2	1				1						Wt	x	x	
4			3		3										2	1				1						Wt	x	x	
5			3																							Wt			
6			3																							Wt			
7																													
8																													
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Pace Analytical Services, LLC
7726 Moller Road
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March 16, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol
Pace Project No.: 50251737

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on March 11, 2020. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Chris Parks, IWM Consulting Group

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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CERTIFICATIONS

Project:	Amphenol
Pace Project No.:	50251737

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Accreditation #: 200074
Indiana Drinking Water Laboratory #: C-49-06
Kansas/TNI Certification #: E-10177
Kentucky UST Agency Interest #: 80226
Kentucky WW Laboratory ID #: 98019
Michigan Drinking Water Laboratory #9050
Ohio VAP Certified Laboratory #: CL0065
Oklahoma Laboratory #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Laboratory #: 999788130
USDA Soil Permit #: P330-19-00257

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SAMPLE SUMMARY

Project: Amphenol
Pace Project No.: 50251737

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50251737001	**IT-2**	Water	03/10/20 13:21	03/11/20 14:25
50251737002	**MW-12R**	Water	03/10/20 14:20	03/11/20 14:25
50251737003	**MW-32**	Water	03/09/20 10:30	03/11/20 14:25
50251737004	**MW-33**	Water	03/09/20 14:17	03/11/20 14:25
50251737005	**MW-34**	Water	03/10/20 10:44	03/11/20 14:25
50251737006	**MW-36**	Water	03/10/20 11:47	03/11/20 14:25
50251737007	**MW-37**	Water	03/10/20 09:37	03/11/20 14:25
50251737008	**MW-39**	Water	03/09/20 12:53	03/11/20 14:25
50251737009	**MW-40**	Water	03/09/20 11:39	03/11/20 14:25
50251737010	**FD-2 WT**	Water	03/10/20 08:00	03/11/20 14:25
50251737011	**TB-2 WT**	Water	03/09/20 10:30	03/11/20 14:25
50251737012	**EQ-2 WT**	Water	03/10/20 09:40	03/11/20 14:25
50251737013	**EQ-1 WT**	Water	03/09/20 10:44	03/11/20 14:25

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SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50251737

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50251737001	**IT-2**	EPA 8260	TMW	12	PASI-I
50251737002	**MW-12R**	EPA 8260	TMW	12	PASI-I
50251737003	**MW-32**	EPA 8260	TMW	12	PASI-I
50251737004	**MW-33**	EPA 8260	TMW	12	PASI-I
50251737005	**MW-34**	EPA 8260	TMW	12	PASI-I
50251737006	**MW-36**	EPA 8260	TMW	12	PASI-I
50251737007	**MW-37**	EPA 8260	TMW	12	PASI-I
50251737008	**MW-39**	EPA 8260	TMW	12	PASI-I
50251737009	**MW-40**	EPA 8260	TMW	12	PASI-I
50251737010	**FD-2 WT**	EPA 8260	TMW	12	PASI-I
50251737011	**TB-2 WT**	EPA 8260	TMW	12	PASI-I
50251737012	**EQ-2 WT**	EPA 8260	TMW	12	PASI-I
50251737013	**EQ-1 WT**	EPA 8260	TMW	12	PASI-I

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SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50251737

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50251737001	**IT-2**					
EPA 8260	1,1-Dichloroethane	1.0J	ug/L	5.0	03/14/20 03:02	
EPA 8260	cis-1,2-Dichloroethene	5.4	ug/L	5.0	03/14/20 03:02	
EPA 8260	Tetrachloroethene	0.50J	ug/L	5.0	03/14/20 03:02	
EPA 8260	1,1,1-Trichloroethane	0.67J	ug/L	5.0	03/14/20 03:02	
EPA 8260	Trichloroethene	3.0J	ug/L	5.0	03/14/20 03:02	
50251737002	**MW-12R**					
EPA 8260	1,1-Dichloroethane	2.9J	ug/L	5.0	03/14/20 03:27	
EPA 8260	cis-1,2-Dichloroethene	3.6J	ug/L	5.0	03/14/20 03:27	
EPA 8260	Tetrachloroethene	323	ug/L	50.0	03/14/20 03:52	
EPA 8260	1,1,1-Trichloroethane	27.0	ug/L	5.0	03/14/20 03:27	
EPA 8260	Trichloroethene	121	ug/L	5.0	03/14/20 03:27	
50251737003	**MW-32**					
EPA 8260	1,1,1-Trichloroethane	0.80J	ug/L	5.0	03/14/20 04:17	
EPA 8260	Trichloroethene	1.3J	ug/L	5.0	03/14/20 04:17	
50251737005	**MW-34**					
EPA 8260	1,1-Dichloroethane	0.33J	ug/L	5.0	03/15/20 13:37	
EPA 8260	Tetrachloroethene	31.1	ug/L	5.0	03/15/20 13:37	
EPA 8260	1,1,1-Trichloroethane	2.9J	ug/L	5.0	03/15/20 13:37	
EPA 8260	Trichloroethene	11.9	ug/L	5.0	03/15/20 13:37	
50251737006	**MW-36**					
EPA 8260	Tetrachloroethene	44.7	ug/L	5.0	03/15/20 14:02	
EPA 8260	1,1,1-Trichloroethane	0.92J	ug/L	5.0	03/15/20 14:02	
EPA 8260	Trichloroethene	4.1J	ug/L	5.0	03/15/20 14:02	
50251737007	**MW-37**					
EPA 8260	Tetrachloroethene	34.8	ug/L	5.0	03/15/20 14:26	
EPA 8260	1,1,1-Trichloroethane	2.7J	ug/L	5.0	03/15/20 14:26	
EPA 8260	Trichloroethene	18.0	ug/L	5.0	03/15/20 14:26	
50251737008	**MW-39**					
EPA 8260	1,1-Dichloroethane	1.5J	ug/L	5.0	03/15/20 14:51	
EPA 8260	1,1,1-Trichloroethane	2.2J	ug/L	5.0	03/15/20 14:51	
EPA 8260	Trichloroethene	6.6	ug/L	5.0	03/15/20 14:51	
50251737009	**MW-40**					
EPA 8260	1,1-Dichloroethane	0.46J	ug/L	5.0	03/15/20 15:16	
EPA 8260	cis-1,2-Dichloroethene	4.9J	ug/L	5.0	03/15/20 15:16	
EPA 8260	Tetrachloroethene	18.0	ug/L	5.0	03/15/20 15:16	M1,R1
EPA 8260	1,1,1-Trichloroethane	8.2	ug/L	5.0	03/15/20 15:16	
EPA 8260	Trichloroethene	46.1	ug/L	5.0	03/15/20 15:16	M1
50251737010	**FD-2 WT**					
EPA 8260	1,1-Dichloroethane	2.9J	ug/L	5.0	03/15/20 15:41	
EPA 8260	cis-1,2-Dichloroethene	3.4J	ug/L	5.0	03/15/20 15:41	
EPA 8260	Tetrachloroethene	293	ug/L	5.0	03/15/20 15:41	
EPA 8260	1,1,1-Trichloroethane	27.7	ug/L	5.0	03/15/20 15:41	

Pace Analytical Services, LLC
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SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50251737

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50251737010	**FD-2 WT**					
EPA 8260	Trichloroethene	116	ug/L	5.0	03/15/20 15:41	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: IT-2 **Lab ID: 50251737001** Collected: 03/10/20 13:21 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	**1.0J**	ug/L	5.0	0.26	1		03/14/20 03:02	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/14/20 03:02	107-06-2	
cis-1,2-Dichloroethene	**5.4**	ug/L	5.0	0.16	1		03/14/20 03:02	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/14/20 03:02	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/14/20 03:02	75-09-2	
Tetrachloroethene	**0.50J**	ug/L	5.0	0.22	1		03/14/20 03:02	127-18-4	
1,1,1-Trichloroethane	**0.67J**	ug/L	5.0	0.25	1		03/14/20 03:02	71-55-6	
Trichloroethene	**3.0J**	ug/L	5.0	0.26	1		03/14/20 03:02	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/14/20 03:02	75-01-4	
Surrogates									
Dibromofluoromethane (S)	109	%.	75-120		1		03/14/20 03:02	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	85-116		1		03/14/20 03:02	460-00-4	
Toluene-d8 (S)	106	%.	83-111		1		03/14/20 03:02	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: MW-12R **Lab ID: 50251737002** Collected: 03/10/20 14:20 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	**2.9J**	ug/L	5.0	0.26	1		03/14/20 03:27	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/14/20 03:27	107-06-2	
cis-1,2-Dichloroethene	**3.6J**	ug/L	5.0	0.16	1		03/14/20 03:27	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/14/20 03:27	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/14/20 03:27	75-09-2	
Tetrachloroethene	**323**	ug/L	50.0	2.2	10		03/14/20 03:52	127-18-4	
1,1,1-Trichloroethane	**27.0**	ug/L	5.0	0.25	1		03/14/20 03:27	71-55-6	
Trichloroethene	**121**	ug/L	5.0	0.26	1		03/14/20 03:27	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/14/20 03:27	75-01-4	
Surrogates									
Dibromofluoromethane (S)	109	%.	75-120		1		03/14/20 03:27	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-116		1		03/14/20 03:27	460-00-4	
Toluene-d8 (S)	104	%.	83-111		1		03/14/20 03:27	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: MW-32 **Lab ID: 50251737003** Collected: 03/09/20 10:30 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.26	1		03/14/20 04:17	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/14/20 04:17	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		03/14/20 04:17	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/14/20 04:17	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/14/20 04:17	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.22	1		03/14/20 04:17	127-18-4	
1,1,1-Trichloroethane	**0.80J**	ug/L	5.0	0.25	1		03/14/20 04:17	71-55-6	
Trichloroethene	**1.3J**	ug/L	5.0	0.26	1		03/14/20 04:17	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/14/20 04:17	75-01-4	
Surrogates									
Dibromofluoromethane (S)	108	%.	75-120		1		03/14/20 04:17	1868-53-7	
4-Bromofluorobenzene (S)	107	%.	85-116		1		03/14/20 04:17	460-00-4	
Toluene-d8 (S)	104	%.	83-111		1		03/14/20 04:17	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: MW-33 **Lab ID: 50251737004** Collected: 03/09/20 14:17 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.26	1		03/15/20 13:12	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/15/20 13:12	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		03/15/20 13:12	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/15/20 13:12	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/15/20 13:12	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.22	1		03/15/20 13:12	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.25	1		03/15/20 13:12	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.26	1		03/15/20 13:12	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/15/20 13:12	75-01-4	
Surrogates									
Dibromofluoromethane (S)	112	%.	75-120		1		03/15/20 13:12	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	85-116		1		03/15/20 13:12	460-00-4	
Toluene-d8 (S)	102	%.	83-111		1		03/15/20 13:12	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: MW-34 **Lab ID: 50251737005** Collected: 03/10/20 10:44 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	**0.33J**	ug/L	5.0	0.26	1		03/15/20 13:37	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/15/20 13:37	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		03/15/20 13:37	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/15/20 13:37	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/15/20 13:37	75-09-2	
Tetrachloroethene	**31.1**	ug/L	5.0	0.22	1		03/15/20 13:37	127-18-4	
1,1,1-Trichloroethane	**2.9J**	ug/L	5.0	0.25	1		03/15/20 13:37	71-55-6	
Trichloroethene	**11.9**	ug/L	5.0	0.26	1		03/15/20 13:37	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/15/20 13:37	75-01-4	
Surrogates									
Dibromofluoromethane (S)	109	%.	75-120		1		03/15/20 13:37	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	85-116		1		03/15/20 13:37	460-00-4	
Toluene-d8 (S)	102	%.	83-111		1		03/15/20 13:37	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: MW-36 **Lab ID: 50251737006** Collected: 03/10/20 11:47 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.26	1		03/15/20 14:02	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/15/20 14:02	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		03/15/20 14:02	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/15/20 14:02	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/15/20 14:02	75-09-2	
Tetrachloroethene	**44.7**	ug/L	5.0	0.22	1		03/15/20 14:02	127-18-4	
1,1,1-Trichloroethane	**0.92J**	ug/L	5.0	0.25	1		03/15/20 14:02	71-55-6	
Trichloroethene	**4.1J**	ug/L	5.0	0.26	1		03/15/20 14:02	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/15/20 14:02	75-01-4	
Surrogates									
Dibromofluoromethane (S)	108	%.	75-120		1		03/15/20 14:02	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	85-116		1		03/15/20 14:02	460-00-4	
Toluene-d8 (S)	101	%.	83-111		1		03/15/20 14:02	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: MW-37 **Lab ID: 50251737007** Collected: 03/10/20 09:37 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.26	1		03/15/20 14:26	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/15/20 14:26	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		03/15/20 14:26	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/15/20 14:26	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/15/20 14:26	75-09-2	
Tetrachloroethene	**34.8**	ug/L	5.0	0.22	1		03/15/20 14:26	127-18-4	
1,1,1-Trichloroethane	**2.7J**	ug/L	5.0	0.25	1		03/15/20 14:26	71-55-6	
Trichloroethene	**18.0**	ug/L	5.0	0.26	1		03/15/20 14:26	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/15/20 14:26	75-01-4	
Surrogates									
Dibromofluoromethane (S)	108	%.	75-120		1		03/15/20 14:26	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-116		1		03/15/20 14:26	460-00-4	
Toluene-d8 (S)	102	%.	83-111		1		03/15/20 14:26	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: MW-39 **Lab ID: 50251737008** Collected: 03/09/20 12:53 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	**1.5J**	ug/L	5.0	0.26	1		03/15/20 14:51	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/15/20 14:51	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		03/15/20 14:51	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/15/20 14:51	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/15/20 14:51	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.22	1		03/15/20 14:51	127-18-4	
1,1,1-Trichloroethane	**2.2J**	ug/L	5.0	0.25	1		03/15/20 14:51	71-55-6	
Trichloroethene	**6.6**	ug/L	5.0	0.26	1		03/15/20 14:51	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/15/20 14:51	75-01-4	
Surrogates									
Dibromofluoromethane (S)	107	%.	75-120		1		03/15/20 14:51	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	85-116		1		03/15/20 14:51	460-00-4	
Toluene-d8 (S)	104	%.	83-111		1		03/15/20 14:51	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: MW-40 **Lab ID: 50251737009** Collected: 03/09/20 11:39 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	**0.46J**	ug/L	5.0	0.26	1		03/15/20 15:16	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/15/20 15:16	107-06-2	
cis-1,2-Dichloroethene	**4.9J**	ug/L	5.0	0.16	1		03/15/20 15:16	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/15/20 15:16	156-60-5	M1
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/15/20 15:16	75-09-2	
Tetrachloroethene	**18.0**	ug/L	5.0	0.22	1		03/15/20 15:16	127-18-4	M1,R1
1,1,1-Trichloroethane	**8.2**	ug/L	5.0	0.25	1		03/15/20 15:16	71-55-6	
Trichloroethene	**46.1**	ug/L	5.0	0.26	1		03/15/20 15:16	79-01-6	M1
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/15/20 15:16	75-01-4	R1
Surrogates									
Dibromofluoromethane (S)	110	%.	75-120		1		03/15/20 15:16	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	85-116		1		03/15/20 15:16	460-00-4	
Toluene-d8 (S)	101	%.	83-111		1		03/15/20 15:16	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: FD-2 WT **Lab ID: 50251737010** Collected: 03/10/20 08:00 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	**2.9J**	ug/L	5.0	0.26	1		03/15/20 15:41	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/15/20 15:41	107-06-2	
cis-1,2-Dichloroethene	**3.4J**	ug/L	5.0	0.16	1		03/15/20 15:41	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/15/20 15:41	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/15/20 15:41	75-09-2	
Tetrachloroethene	**293**	ug/L	5.0	0.22	1		03/15/20 15:41	127-18-4	
1,1,1-Trichloroethane	**27.7**	ug/L	5.0	0.25	1		03/15/20 15:41	71-55-6	
Trichloroethene	**116**	ug/L	5.0	0.26	1		03/15/20 15:41	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/15/20 15:41	75-01-4	
Surrogates									
Dibromofluoromethane (S)	111	%.	75-120		1		03/15/20 15:41	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	85-116		1		03/15/20 15:41	460-00-4	
Toluene-d8 (S)	103	%.	83-111		1		03/15/20 15:41	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: TB-2 WT **Lab ID: 50251737011** Collected: 03/09/20 10:30 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.26	1		03/15/20 16:31	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/15/20 16:31	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		03/15/20 16:31	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/15/20 16:31	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/15/20 16:31	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.22	1		03/15/20 16:31	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.25	1		03/15/20 16:31	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.26	1		03/15/20 16:31	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/15/20 16:31	75-01-4	
Surrogates									
Dibromofluoromethane (S)	110	%.	75-120		1		03/15/20 16:31	1868-53-7	
4-Bromofluorobenzene (S)	106	%.	85-116		1		03/15/20 16:31	460-00-4	
Toluene-d8 (S)	102	%.	83-111		1		03/15/20 16:31	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: EQ-2 WT **Lab ID: 50251737012** Collected: 03/10/20 09:40 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.26	1		03/15/20 16:56	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/15/20 16:56	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		03/15/20 16:56	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/15/20 16:56	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/15/20 16:56	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.22	1		03/15/20 16:56	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.25	1		03/15/20 16:56	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.26	1		03/15/20 16:56	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/15/20 16:56	75-01-4	
Surrogates									
Dibromofluoromethane (S)	111	%.	75-120		1		03/15/20 16:56	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	85-116		1		03/15/20 16:56	460-00-4	
Toluene-d8 (S)	101	%.	83-111		1		03/15/20 16:56	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50251737

Sample: EQ-1 WT **Lab ID: 50251737013** Collected: 03/09/20 10:44 Received: 03/11/20 14:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
1,1-Dichloroethane	ND	ug/L	5.0	0.26	1		03/15/20 17:21	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.27	1		03/15/20 17:21	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.16	1		03/15/20 17:21	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.23	1		03/15/20 17:21	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.4	1		03/15/20 17:21	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.22	1		03/15/20 17:21	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.25	1		03/15/20 17:21	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.26	1		03/15/20 17:21	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.13	1		03/15/20 17:21	75-01-4	
Surrogates									
Dibromofluoromethane (S)	110	%.	75-120		1		03/15/20 17:21	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-116		1		03/15/20 17:21	460-00-4	
Toluene-d8 (S)	106	%.	83-111		1		03/15/20 17:21	2037-26-5	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251737

QC Batch: 551807 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 50251737001, 50251737002, 50251737003

METHOD BLANK: 2545204 Matrix: Water
Associated Lab Samples: 50251737001, 50251737002, 50251737003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.25	03/14/20 01:47	
1,1-Dichloroethane	ug/L	ND	5.0	0.26	03/14/20 01:47	
1,2-Dichloroethane	ug/L	ND	5.0	0.27	03/14/20 01:47	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.16	03/14/20 01:47	
Methylene Chloride	ug/L	ND	5.0	2.4	03/14/20 01:47	
Tetrachloroethene	ug/L	ND	5.0	0.22	03/14/20 01:47	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.23	03/14/20 01:47	
Trichloroethene	ug/L	ND	5.0	0.26	03/14/20 01:47	
Vinyl chloride	ug/L	ND	2.0	0.13	03/14/20 01:47	
4-Bromofluorobenzene (S)	%.	103	85-116		03/14/20 01:47	
Dibromofluoromethane (S)	%.	111	75-120		03/14/20 01:47	
Toluene-d8 (S)	%.	102	83-111		03/14/20 01:47	

LABORATORY CONTROL SAMPLE: 2545205

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	55.3	111	78-130	
1,1-Dichloroethane	ug/L	50	50.8	102	77-123	
1,2-Dichloroethane	ug/L	50	50.5	101	66-127	
cis-1,2-Dichloroethene	ug/L	50	46.0	92	76-120	
Methylene Chloride	ug/L	50	52.6	105	68-126	
Tetrachloroethene	ug/L	50	49.6	99	70-123	
trans-1,2-Dichloroethene	ug/L	50	48.2	96	79-126	
Trichloroethene	ug/L	50	45.8	92	78-120	
Vinyl chloride	ug/L	50	52.9	106	55-122	
4-Bromofluorobenzene (S)	%.			106	85-116	
Dibromofluoromethane (S)	%.			102	75-120	
Toluene-d8 (S)	%.			104	83-111	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251737

QC Batch: 551937   Analysis Method: EPA 8260
QC Batch Method: EPA 8260   Analysis Description: 8260 MSV
Associated Lab Samples: 50251737004, 50251737005, 50251737006, 50251737007, 50251737008, 50251737009, 50251737010, 50251737011, 50251737012, 50251737013

METHOD BLANK: 2545873   Matrix: Water
Associated Lab Samples: 50251737004, 50251737005, 50251737006, 50251737007, 50251737008, 50251737009, 50251737010, 50251737011, 50251737012, 50251737013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.25	03/15/20 12:47	
1,1-Dichloroethane	ug/L	ND	5.0	0.26	03/15/20 12:47	
1,2-Dichloroethane	ug/L	ND	5.0	0.27	03/15/20 12:47	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.16	03/15/20 12:47	
Methylene Chloride	ug/L	ND	5.0	2.4	03/15/20 12:47	
Tetrachloroethene	ug/L	ND	5.0	0.22	03/15/20 12:47	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.23	03/15/20 12:47	
Trichloroethene	ug/L	ND	5.0	0.26	03/15/20 12:47	
Vinyl chloride	ug/L	ND	2.0	0.13	03/15/20 12:47	
4-Bromofluorobenzene (S)	%.	97	85-116		03/15/20 12:47	
Dibromofluoromethane (S)	%.	107	75-120		03/15/20 12:47	
Toluene-d8 (S)	%.	101	83-111		03/15/20 12:47	

LABORATORY CONTROL SAMPLE: 2545874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	54.8	110	78-130	
1,1-Dichloroethane	ug/L	50	49.5	99	77-123	
1,2-Dichloroethane	ug/L	50	49.9	100	66-127	
cis-1,2-Dichloroethene	ug/L	50	46.6	93	76-120	
Methylene Chloride	ug/L	50	52.5	105	68-126	
Tetrachloroethene	ug/L	50	51.2	102	70-123	
trans-1,2-Dichloroethene	ug/L	50	53.3	107	79-126	
Trichloroethene	ug/L	50	46.5	93	78-120	
Vinyl chloride	ug/L	50	50.4	101	55-122	
4-Bromofluorobenzene (S)	%.			103	85-116	
Dibromofluoromethane (S)	%.			104	75-120	
Toluene-d8 (S)	%.			103	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2545875   2545876

Parameter	Units	50251737009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	8.2	50	50	40.7	42.7	65	69	56-144	5	20	
1,1-Dichloroethane	ug/L	0.46J	50	50	39.5	41.4	78	82	53-140	5	20	
1,2-Dichloroethane	ug/L	ND	50	50	39.7	41.7	79	83	46-145	5	20	
cis-1,2-Dichloroethene	ug/L	4.9J	50	50	32.0	33.1	54	56	53-134	3	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical
www.pacelabs.com

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50251737

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2545875 2545876

Parameter	Units	50251737009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methylene Chloride	ug/L	ND	50	50	39.0	47.2	78	94	46-138	19	20	
Tetrachloroethene	ug/L	18.0	50	50	12.8	10.3	-10	-15	32-140	22	20	M1,R1
trans-1,2-Dichloroethene	ug/L	ND	50	50	26.5	27.7	53	55	57-138	5	20	M1
Trichloroethene	ug/L	46.1	50	50	34.8	33.9	-22	-24	47-137	3	20	M1
Vinyl chloride	ug/L	ND	50	50	41.6	52.7	83	105	36-136	24	20	R1
4-Bromofluorobenzene (S)	%.						95	106	85-116			
Dibromofluoromethane (S)	%.						106	108	75-120			
Toluene-d8 (S)	%.						105	104	83-111			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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www.pacelabs.com

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALIFIERS

Project:	Amphenol
Pace Project No.:	50251737

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-I	Pace Analytical Services - Indianapolis

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50251737

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50251737001	**IT-2**	EPA 8260	551807		
50251737002	**MW-12R**	EPA 8260	551807		
50251737003	**MW-32**	EPA 8260	551807		
50251737004	**MW-33**	EPA 8260	551937		
50251737005	**MW-34**	EPA 8260	551937		
50251737006	**MW-36**	EPA 8260	551937		
50251737007	**MW-37**	EPA 8260	551937		
50251737008	**MW-39**	EPA 8260	551937		
50251737009	**MW-40**	EPA 8260	551937		
50251737010	**FD-2 WT**	EPA 8260	551937		
50251737011	**TB-2 WT**	EPA 8260	551937		
50251737012	**EQ-2 WT**	EPA 8260	551937		
50251737013	**EQ-1 WT**	EPA 8260	551937		

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or

WO#:50251737

50251737

Company: IWM CONSULTING GROUP LLC

Billing Information: SAME

Address: 7428 Rockville Rd, Indianapolis, IN 46214

Report To: Chris Parks

Email To: cparks@iwmconsult.com

Copy To: Brad Gentry

Site Collection Info/Address: 980 Hurricane Road

Customer Project Name/Number: Amphenol

State: IN / County/City: Franklin

Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET

Phone: 317-347-1111

Email: cparks@iwmconsult.com

Site/Facility ID #: Former Amphenol Facility

Compliance Monitoring? [ ] Yes [✓] No

Collected By (print): D.E. White

Purchase Order #:

Quote #: IN, AMP18.01

DW PWS ID #:

DW Location Code:

Collected By (signature): Duane E White

Turnaround Date Required: 1-Week

Immediately Packed on Ice: [✓] Yes [ ] No

Sample Disposal: [✓] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [✓] No

Analysis: ______

Container: 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Analyses: Short List VOCs 8260

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	Short List VOCs 8260	Lab Sample # / Comments: See Scr
IT-2	GW	G	3/10	13:21	—	—	—	3	X	001
MW-12R	GW	G	3/10	14:20	—	—	—	3	X	002
MW-32	GW	G	3/9	10:33	—	—	—	3	X	003
MW-33	GW	G	3/9	14:17	—	—	—	3	X	004
MW-34	GW	G	3/10	10:44	—	—	—	3	X	005
MW-36	GW	G	3/10	11:47	—	—	—	3	X	006
MW-37	GW	G	3/10	9:37	—	—	—	3	X	007
MW-39	GW	G	3/9	12:53	—	—	—	3	X	008
MW-40 MS/MSD	GW	G	3/9	11:39	—	—	—	9	X	009
FD-2 WT	GW	G	3/10		—	—	—	3	X	010

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

LAB USE ONLY:

Customer Remarks / Special Conditions / Possible Hazards: Short List: Vinyl Chloride, Methylene Chloride, PCE, TCE, 111TCA, 11DCA, cis/trans-1,2-DCE, 1,2-DCA

Level IV QA/QC

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2477960

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:

Temp Blank Received: Y N NA

Therm ID#: F

Cooler 1 Temp Upon Receipt: 0.6 oC

Cooler 1 Therm Corr. Factor: 0.1 oC

Cooler 1 Corrected Temp: 0.7 oC

Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
Duane E White	3/11/20 14:25	[signature]	3-11-20 1425	Table #:
				Acctnum:
				Template:
				Prelogin:
				PM:
				PB:

Trip Blank Received: Y N NA

HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 1 of: 2

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM Consulting Group, LLC
Address: 7428 Rockville Rd, Indianapolis, IN 46214
Billing Information: SAME
Report To: Chris Parks
Email To: SAME
Copy To: Brad Gentry
Site Collection Info/Address: 980 Hurricane Rd
Customer Project Name/Number: Amphenol
State: IN / County/City: Franklin / Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET
Phone:
Email: cparks@iwmconsult.com
Site/Facility ID #: Former Amphenol Facility
Compliance Monitoring? [ ] Yes [✓] No
Collected By (print): D.E. White
Purchase Order #:
Quote #: IN.AMP18.01
DW PWS ID #:
DW Location Code:
Collected By (signature):
Turnaround Date Required: 1 - week
Immediately Packed on Ice: [✓] Yes [ ] No
Sample Disposal: [✓] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______
Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)
Field Filtered (if applicable): [ ] Yes [✓] No
Analysis: ______

Container Preservative Type **: 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

Lab Project Manager:

Lab Profile/Line:

```
Lab Sample Receipt Checklist:
Custody Seals Present/Intact  Y N NA
Custody Signatures Present    Y N NA
Collector Signature Present   Y N NA
Bottles Intact                Y N NA
Correct Bottles               Y N NA
Sufficient Volume             Y N NA
Samples Received on Ice       Y N NA
VOA - Headspace Acceptable    Y N NA
USDA Regulated Soils          Y N NA
Samples in Holding Time       Y N NA
Residual Chlorine Present     Y N NA
Cl Strips: ______
Sample pH Acceptable          Y N NA
pH Strips: ______
Sulfide Present               Y N NA
Lead Acetate Strips: ______
LAB USE ONLY:
Lab Sample # / Comments:
```

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	Analyses: Short List VOCs 8260	Lab Sample # / Comments: see Sur
TB-2 WT	GW	G	3/9	10:30	—	—		3	X	011
EQ-2 WT	GW	G	3/10	9:40	—	—		3	X	012
EQ-1 WT	GW	G	3/9	10:44	—	—		3	X	013

Customer Remarks / Special Conditions / Possible Hazards: Short List: Methylene Chloride, Vinyl Chloride, PCE, TCE, 111TCA, 12DCA, 11DCA, Cis/trans-12DCE,

Type of Ice Used: Wet Blue Dry None
Packing Material Used:
Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A
Lab Tracking #: 2477961
Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: (Y) N NA
Therm ID#: F
Cooler 1 Temp Upon Receipt: 0.6 oC
Cooler 1 Therm Corr. Factor: 0.1 oC
Cooler 1 Corrected Temp: 0.7 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
[signature]	3/11/20 14:25	[signature]	3-11-20 1425	Table #:
				Acctnum:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Template:
				Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM:
				PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 2 of: 2

Pace Analytical

SAMPLE CONDITION UPON RECEIPT FORM

Project #: 50251737

Date/Time and Initials of person examining contents: JH 3-11 1504

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other

Tracking #:

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No **Seals Intact:** ☐ Yes ☑ No

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Thermometer: 1 2 3 4 5 6 A B C D E F (F circled) Ice Type: ☑ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☐ Yes ☐ No ☑ N/A

Cooler Temperature: 0.6 / 0.7 Ice Visible in Sample Containers?: ☐ Yes ☑ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☑ N/A

All discrepancies will be written out in the comments section below.

	Yes	No		Yes	No	N/A
Are samples from West Virginia? Document any containers out of temp.		X	All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted. Circle: HNO3 H2SO4 NaOH NaOH/ZnAc			X
USDA Regulated Soils? (ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		X				
Chain of Custody Present:	X					
Chain of Custody Filled Out:	X		Dissolved Metals field filtered?:			X
Short Hold Time Analysis (<72hr)?: Analysis:		/	Headspace Wisconsin Sulfide			X
Time 5035A TC placed in Freezer or Short Holds To Lab:				Present	Absent	N/A
			Residual Chlorine Check (SVOC 625 Pest/PCB 608)			X
			Residual Chlorine Check (Total/Amenable/Free Cyanide)			X
Rush TAT Requested:		/	Headspace in VOA Vials (>6mm):		X	
Containers Intact?:	X		Trip Blank Present?:	X		
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	X		Trip Blank Custody Seals?:	X		
Extra labels on Terracore Vials (soils only)?		X				

Comments:

COC PAGE 1 of 2

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							WT			
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9			9																										
10			3																										
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

COC PAGE 2 of 2

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							wt			
2			3																										
3			3																										
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

May 07, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol
Pace Project No.: 50254108

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on April 08, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Indianapolis

Revised Report: This revision replaces previous report dated April 15, 2020. "J" flags removed per client request. SAB 04/17/20

Revised Report: This revision replaces previous report dated May 4, 2020. VOA parameter list shortened, "J" flags replaced and estimated Methylene Chloride sample results flagged "C9" per client request. SAB 050420

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Chris Parks, IWM Consulting Group

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project:	Amphenol
Pace Project No.:	50254108

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Accreditation #: 200074
Indiana Drinking Water Laboratory #: C-49-06
Kansas/TNI Certification #: E-10177
Kentucky UST Agency Interest #: 80226
Kentucky WW Laboratory ID #: 98019
Michigan Drinking Water Laboratory #9050
Ohio VAP Certified Laboratory #: CL0065
Oklahoma Laboratory #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Laboratory #: 999788130
USDA Soil Permit #: P330-19-00257

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SAMPLE SUMMARY

Project: Amphenol
Pace Project No.: 50254108

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50254108001	**IT-2**	Water	04/07/20 11:39	04/08/20 14:05
50254108002	**MW-12R**	Water	04/07/20 14:15	04/08/20 14:05
50254108003	**MW-32**	Water	04/07/20 11:09	04/08/20 14:05
50254108004	**MW-33**	Water	04/06/20 18:08	04/08/20 14:05
50254108005	**MW-34**	Water	04/07/20 09:10	04/08/20 14:05
50254108006	**MW-36**	Water	04/07/20 10:05	04/08/20 14:05
50254108007	**MW-37**	Water	04/06/20 15:57	04/08/20 14:05
50254108008	**MW-39**	Water	04/06/20 14:09	04/08/20 14:05
50254108009	**MW-40**	Water	04/06/20 12:45	04/08/20 14:05
50254108010	**FD-2 WT**	Water	04/07/20 08:00	04/08/20 14:05
50254108011	**TB-1**	Water	04/06/20 10:45	04/08/20 14:05
50254108012	**EQ-2**	Water	04/07/20 09:15	04/08/20 14:05
50254108013	**EQ-1**	Water	04/06/20 11:20	04/08/20 14:05
50254108014	**MW-31**	Water	04/08/20 10:24	04/08/20 14:05
50254108015	**MW-35**	Water	04/08/20 11:45	04/08/20 14:05
50254108016	**MW-38**	Water	04/08/20 09:14	04/08/20 14:05
50254108017	**FD-1 WT**	Water	04/08/20 08:00	04/08/20 14:05
50254108018	**TB-2 WT**	Water	04/08/20 09:18	04/08/20 14:05
50254108019	**EQ-3 WT**	Water	04/08/20 10:33	04/08/20 14:05

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SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50254108

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50254108001	**IT-2**	EPA 8260	LKC	12	PASI-I
50254108002	**MW-12R**	EPA 8260	LKC	12	PASI-I
50254108003	**MW-32**	EPA 8260	LKC	12	PASI-I
50254108004	**MW-33**	EPA 8260	LKC	12	PASI-I
50254108005	**MW-34**	EPA 8260	LKC	12	PASI-I
50254108006	**MW-36**	EPA 8260	LKC	12	PASI-I
50254108007	**MW-37**	EPA 8260	LKC	12	PASI-I
50254108008	**MW-39**	EPA 8260	LKC	12	PASI-I
50254108009	**MW-40**	EPA 8260	LKC	12	PASI-I
50254108010	**FD-2 WT**	EPA 8260	LKC	12	PASI-I
50254108011	**TB-1**	EPA 8260	LKC	12	PASI-I
50254108012	**EQ-2**	EPA 8260	LKC	12	PASI-I
50254108013	**EQ-1**	EPA 8260	LKC	12	PASI-I
50254108014	**MW-31**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 8260	LKC	12	PASI-I
		SM 4500-S2-D	DAS	1	PASI-I
		EPA 9038	ZM	1	PASI-I
		EPA 353.2	GWA	2	PASI-I
50254108015	**MW-35**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 8260	LKC	12	PASI-I
		SM 4500-S2-D	DAS	1	PASI-I
		EPA 9038	ZM	1	PASI-I
		EPA 353.2	GWA	2	PASI-I
50254108016	**MW-38**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 8260	LKC	12	PASI-I
		SM 4500-S2-D	DAS	1	PASI-I
		EPA 9038	ZM	1	PASI-I
		EPA 353.2	GWA	2	PASI-I
50254108017	**FD-1 WT**	RSK 175 Modified	MEH	3	PASI-I
		EPA 6010	KJE	2	PASI-I
		EPA 6010	KJE	2	PASI-I

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SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50254108

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 8260	LKC	12	PASI-I
		SM 4500-S2-D	DAS	1	PASI-I
		EPA 9038	ZM	1	PASI-I
		EPA 353.2	GWA	2	PASI-I
50254108018	**TB-2 WT**	EPA 8260	LKC	12	PASI-I
50254108019	**EQ-3 WT**	EPA 8260	LKC	12	PASI-I

PASI-I = Pace Analytical Services - Indianapolis

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SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50254108

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50254108001	**IT-2**					
EPA 8260	cis-1,2-Dichloroethene	4.2J	ug/L	5.0	04/11/20 13:55	
EPA 8260	Tetrachloroethene	0.76J	ug/L	5.0	04/11/20 13:55	
EPA 8260	Trichloroethene	3.7J	ug/L	5.0	04/11/20 13:55	
50254108002	**MW-12R**					
EPA 8260	Methylene Chloride	1.4J	ug/L	5.0	04/11/20 18:08	C9
EPA 8260	Tetrachloroethene	210	ug/L	5.0	04/11/20 18:08	
EPA 8260	1,1,1-Trichloroethane	25.0	ug/L	5.0	04/11/20 18:08	
EPA 8260	Trichloroethene	111	ug/L	5.0	04/11/20 18:08	
50254108003	**MW-32**					
EPA 8260	Methylene Chloride	1.3J	ug/L	5.0	04/11/20 13:38	C9
50254108004	**MW-33**					
EPA 8260	Methylene Chloride	1.2J	ug/L	5.0	04/11/20 19:16	C9
50254108005	**MW-34**					
EPA 8260	Methylene Chloride	1.4J	ug/L	5.0	04/11/20 19:50	C9
EPA 8260	Tetrachloroethene	26.4	ug/L	5.0	04/11/20 19:50	
EPA 8260	1,1,1-Trichloroethane	3.3J	ug/L	5.0	04/11/20 19:50	
EPA 8260	Trichloroethene	13.6	ug/L	5.0	04/11/20 19:50	
50254108006	**MW-36**					
EPA 8260	Methylene Chloride	1.2J	ug/L	5.0	04/11/20 20:24	C9
EPA 8260	Tetrachloroethene	46.5	ug/L	5.0	04/11/20 20:24	
EPA 8260	Trichloroethene	5.1	ug/L	5.0	04/11/20 20:24	
50254108007	**MW-37**					
EPA 8260	Methylene Chloride	1.4J	ug/L	5.0	04/11/20 20:58	C9
EPA 8260	Tetrachloroethene	38.9	ug/L	5.0	04/11/20 20:58	
EPA 8260	1,1,1-Trichloroethane	3.5J	ug/L	5.0	04/11/20 20:58	
EPA 8260	Trichloroethene	31.2	ug/L	5.0	04/11/20 20:58	
50254108008	**MW-39**					
EPA 8260	Methylene Chloride	1.1J	ug/L	5.0	04/11/20 21:31	C9
EPA 8260	Trichloroethene	6.9	ug/L	5.0	04/11/20 21:31	
50254108009	**MW-40**					
EPA 8260	Tetrachloroethene	22.2	ug/L	5.0	04/11/20 14:29	
EPA 8260	1,1,1-Trichloroethane	8.8	ug/L	5.0	04/11/20 14:29	
EPA 8260	Trichloroethene	51.6	ug/L	5.0	04/11/20 14:29	
50254108010	**FD-2 WT**					
EPA 8260	1,1-Dichloroethane	2.3J	ug/L	5.0	04/11/20 22:05	
EPA 8260	Methylene Chloride	1.2J	ug/L	5.0	04/11/20 22:05	C9
EPA 8260	Tetrachloroethene	203	ug/L	5.0	04/11/20 22:05	
EPA 8260	1,1,1-Trichloroethane	24.5	ug/L	5.0	04/11/20 22:05	
EPA 8260	Trichloroethene	108	ug/L	5.0	04/11/20 22:05	
50254108011	**TB-1**					
EPA 8260	Methylene Chloride	1.8J	ug/L	5.0	04/11/20 22:39	C9

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SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50254108

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50254108012	**EQ-2**					
EPA 8260	Methylene Chloride	1.5J	ug/L	5.0	04/11/20 23:13	C9
50254108013	**EQ-1**					
EPA 8260	Methylene Chloride	1.5J	ug/L	5.0	04/11/20 23:47	C9
50254108014	**MW-31**					
EPA 6010	Iron	83.1J	ug/L	100	04/12/20 11:32	
EPA 6010	Manganese	3.1J	ug/L	10.0	04/12/20 11:32	
EPA 8260	Methylene Chloride	1.5J	ug/L	5.0	04/12/20 00:21	C9
EPA 8260	Tetrachloroethene	28.1	ug/L	5.0	04/12/20 00:21	
EPA 8260	1,1,1-Trichloroethane	7.5	ug/L	5.0	04/12/20 00:21	
EPA 8260	Trichloroethene	37.4	ug/L	5.0	04/12/20 00:21	
EPA 9038	Sulfate	36.4	mg/L	20.0	04/14/20 10:26	
EPA 353.2	Nitrogen, NO2 plus NO3	4.1	mg/L	0.10	04/09/20 15:28	
EPA 353.2	Nitrogen, Nitrate	4.1	mg/L	0.10	04/09/20 15:28	
50254108015	**MW-35**					
RSK 175 Modified	Methane	88.3	ug/L	10.0	04/09/20 20:41	
EPA 6010	Iron	9250	ug/L	100	04/12/20 11:34	B
EPA 6010	Manganese	173	ug/L	10.0	04/12/20 11:34	
EPA 6010	Manganese, Dissolved	160	ug/L	10.0	04/14/20 14:18	
EPA 8260	Methylene Chloride	1.5J	ug/L	5.0	04/11/20 14:12	C9
EPA 9038	Sulfate	25.2	mg/L	10.0	04/14/20 09:19	
EPA 353.2	Nitrogen, NO2 plus NO3	0.56	mg/L	0.10	04/09/20 15:29	
EPA 353.2	Nitrogen, Nitrate	0.54	mg/L	0.10	04/09/20 15:29	
50254108016	**MW-38**					
EPA 6010	Iron	2870	ug/L	100	04/12/20 11:44	B
EPA 6010	Manganese	98.5	ug/L	10.0	04/12/20 11:44	
EPA 6010	Manganese, Dissolved	1.6J	ug/L	10.0	04/14/20 14:29	
EPA 8260	Methylene Chloride	1.2J	ug/L	5.0	04/12/20 00:54	C9
EPA 8260	Tetrachloroethene	7.8	ug/L	5.0	04/12/20 00:54	
EPA 8260	Trichloroethene	8.3	ug/L	5.0	04/12/20 00:54	
EPA 9038	Sulfate	61.4	mg/L	25.0	04/14/20 09:39	
EPA 353.2	Nitrogen, NO2 plus NO3	4.2	mg/L	0.10	04/09/20 15:32	
EPA 353.2	Nitrogen, Nitrate	4.2	mg/L	0.10	04/09/20 15:32	
50254108017	**FD-1 WT**					
EPA 6010	Iron	2240	ug/L	100	04/12/20 11:47	B
EPA 6010	Manganese	79.0	ug/L	10.0	04/12/20 11:47	
EPA 6010	Manganese, Dissolved	1.3J	ug/L	10.0	04/14/20 14:35	
EPA 8260	Methylene Chloride	1.2J	ug/L	5.0	04/12/20 01:28	C9
EPA 8260	Tetrachloroethene	8.5	ug/L	5.0	04/12/20 01:28	
EPA 8260	Trichloroethene	9.6	ug/L	5.0	04/12/20 01:28	
EPA 9038	Sulfate	58.3	mg/L	25.0	04/14/20 09:39	
EPA 353.2	Nitrogen, NO2 plus NO3	4.1	mg/L	0.10	04/09/20 15:33	
EPA 353.2	Nitrogen, Nitrate	4.1	mg/L	0.10	04/09/20 15:33	
50254108018	**TB-2 WT**					
EPA 8260	Methylene Chloride	1.5J	ug/L	5.0	04/12/20 02:02	C9

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: IT-2 **Lab ID: 50254108001** Collected: 04/07/20 11:39 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.43	1		04/11/20 13:55	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	3.2	1		04/11/20 13:55	107-06-2	
cis-1,2-Dichloroethene	**4.2J**	ug/L	5.0	3.7	1		04/11/20 13:55	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.3	1		04/11/20 13:55	156-60-5	
Methylene Chloride	ND	ug/L	5.0	5.0	1		04/11/20 13:55	75-09-2	
Tetrachloroethene	**0.76J**	ug/L	5.0	0.43	1		04/11/20 13:55	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.6	1		04/11/20 13:55	71-55-6	
Trichloroethene	**3.7J**	ug/L	5.0	3.3	1		04/11/20 13:55	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.31	1		04/11/20 13:55	75-01-4	
Surrogates									
Dibromofluoromethane (S)	110	%.	75-120		1		04/11/20 13:55	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-116		1		04/11/20 13:55	460-00-4	
Toluene-d8 (S)	100	%.	83-111		1		04/11/20 13:55	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: MW-12R **Lab ID: 50254108002** Collected: 04/07/20 14:15 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/11/20 18:08	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 18:08	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 18:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 18:08	156-60-5	
Methylene Chloride	**1.4J**	ug/L	5.0	0.47	1		04/11/20 18:08	75-09-2	C9
Tetrachloroethene	**210**	ug/L	5.0	0.32	1		04/11/20 18:08	127-18-4	
1,1,1-Trichloroethane	**25.0**	ug/L	5.0	3.1	1		04/11/20 18:08	71-55-6	
Trichloroethene	**111**	ug/L	5.0	2.7	1		04/11/20 18:08	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 18:08	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		04/11/20 18:08	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-116		1		04/11/20 18:08	460-00-4	
Toluene-d8 (S)	102	%.	83-111		1		04/11/20 18:08	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: MW-32 **Lab ID: 50254108003** Collected: 04/07/20 11:09 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/11/20 13:38	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 13:38	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 13:38	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 13:38	156-60-5	
Methylene Chloride	**1.3J**	ug/L	5.0	0.47	1		04/11/20 13:38	75-09-2	C9
Tetrachloroethene	ND	ug/L	5.0	0.32	1		04/11/20 13:38	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.1	1		04/11/20 13:38	71-55-6	
Trichloroethene	ND	ug/L	5.0	2.7	1		04/11/20 13:38	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 13:38	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	75-120		1		04/11/20 13:38	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-116		1		04/11/20 13:38	460-00-4	
Toluene-d8 (S)	100	%.	83-111		1		04/11/20 13:38	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: MW-33 **Lab ID: 50254108004** Collected: 04/06/20 18:08 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/11/20 19:16	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 19:16	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 19:16	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 19:16	156-60-5	
Methylene Chloride	**1.2J**	ug/L	5.0	0.47	1		04/11/20 19:16	75-09-2	C9
Tetrachloroethene	ND	ug/L	5.0	0.32	1		04/11/20 19:16	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.1	1		04/11/20 19:16	71-55-6	
Trichloroethene	ND	ug/L	5.0	2.7	1		04/11/20 19:16	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 19:16	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	75-120		1		04/11/20 19:16	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-116		1		04/11/20 19:16	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		04/11/20 19:16	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: MW-34 **Lab ID: 50254108005** Collected: 04/07/20 09:10 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/11/20 19:50	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 19:50	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 19:50	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 19:50	156-60-5	
Methylene Chloride	**1.4J**	ug/L	5.0	0.47	1		04/11/20 19:50	75-09-2	C9
Tetrachloroethene	**26.4**	ug/L	5.0	0.32	1		04/11/20 19:50	127-18-4	
1,1,1-Trichloroethane	**3.3J**	ug/L	5.0	3.1	1		04/11/20 19:50	71-55-6	
Trichloroethene	**13.6**	ug/L	5.0	2.7	1		04/11/20 19:50	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 19:50	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	75-120		1		04/11/20 19:50	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-116		1		04/11/20 19:50	460-00-4	
Toluene-d8 (S)	100	%.	83-111		1		04/11/20 19:50	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: MW-36 **Lab ID: 50254108006** Collected: 04/07/20 10:05 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/11/20 20:24	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 20:24	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 20:24	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 20:24	156-60-5	
Methylene Chloride	**1.2J**	ug/L	5.0	0.47	1		04/11/20 20:24	75-09-2	C9
Tetrachloroethene	**46.5**	ug/L	5.0	0.32	1		04/11/20 20:24	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.1	1		04/11/20 20:24	71-55-6	
Trichloroethene	**5.1**	ug/L	5.0	2.7	1		04/11/20 20:24	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 20:24	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	75-120		1		04/11/20 20:24	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-116		1		04/11/20 20:24	460-00-4	
Toluene-d8 (S)	101	%.	83-111		1		04/11/20 20:24	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: MW-37 **Lab ID: 50254108007** Collected: 04/06/20 15:57 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/11/20 20:58	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 20:58	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 20:58	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 20:58	156-60-5	
Methylene Chloride	**1.4J**	ug/L	5.0	0.47	1		04/11/20 20:58	75-09-2	C9
Tetrachloroethene	**38.9**	ug/L	5.0	0.32	1		04/11/20 20:58	127-18-4	
1,1,1-Trichloroethane	**3.5J**	ug/L	5.0	3.1	1		04/11/20 20:58	71-55-6	
Trichloroethene	**31.2**	ug/L	5.0	2.7	1		04/11/20 20:58	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 20:58	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		04/11/20 20:58	1868-53-7	
4-Bromofluorobenzene (S)	95	%.	85-116		1		04/11/20 20:58	460-00-4	
Toluene-d8 (S)	97	%.	83-111		1		04/11/20 20:58	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: MW-39 **Lab ID: 50254108008** Collected: 04/06/20 14:09 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/11/20 21:31	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 21:31	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 21:31	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 21:31	156-60-5	
Methylene Chloride	**1.1J**	ug/L	5.0	0.47	1		04/11/20 21:31	75-09-2	C9
Tetrachloroethene	ND	ug/L	5.0	0.32	1		04/11/20 21:31	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.1	1		04/11/20 21:31	71-55-6	
Trichloroethene	**6.9**	ug/L	5.0	2.7	1		04/11/20 21:31	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 21:31	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	75-120		1		04/11/20 21:31	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-116		1		04/11/20 21:31	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		04/11/20 21:31	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: MW-40 **Lab ID: 50254108009** Collected: 04/06/20 12:45 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.43	1		04/11/20 14:29	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	3.2	1		04/11/20 14:29	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.7	1		04/11/20 14:29	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.3	1		04/11/20 14:29	156-60-5	
Methylene Chloride	ND	ug/L	5.0	5.0	1		04/11/20 14:29	75-09-2	
Tetrachloroethene	**22.2**	ug/L	5.0	0.43	1		04/11/20 14:29	127-18-4	
1,1,1-Trichloroethane	**8.8**	ug/L	5.0	3.6	1		04/11/20 14:29	71-55-6	
Trichloroethene	**51.6**	ug/L	5.0	3.3	1		04/11/20 14:29	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.31	1		04/11/20 14:29	75-01-4	
Surrogates									
Dibromofluoromethane (S)	109	%.	75-120		1		04/11/20 14:29	1868-53-7	
4-Bromofluorobenzene (S)	95	%.	85-116		1		04/11/20 14:29	460-00-4	
Toluene-d8 (S)	102	%.	83-111		1		04/11/20 14:29	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: FD-2 WT **Lab ID: 50254108010** Collected: 04/07/20 08:00 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**2.3J**	ug/L	5.0	0.46	1		04/11/20 22:05	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 22:05	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 22:05	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 22:05	156-60-5	
Methylene Chloride	**1.2J**	ug/L	5.0	0.47	1		04/11/20 22:05	75-09-2	C9
Tetrachloroethene	**203**	ug/L	5.0	0.32	1		04/11/20 22:05	127-18-4	
1,1,1-Trichloroethane	**24.5**	ug/L	5.0	3.1	1		04/11/20 22:05	71-55-6	
Trichloroethene	**108**	ug/L	5.0	2.7	1		04/11/20 22:05	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 22:05	75-01-4	
Surrogates									
Dibromofluoromethane (S)	101	%.	75-120		1		04/11/20 22:05	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-116		1		04/11/20 22:05	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		04/11/20 22:05	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: TB-1 **Lab ID: 50254108011** Collected: 04/06/20 10:45 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/11/20 22:39	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 22:39	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 22:39	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 22:39	156-60-5	
Methylene Chloride	**1.8J**	ug/L	5.0	0.47	1		04/11/20 22:39	75-09-2	C9
Tetrachloroethene	ND	ug/L	5.0	0.32	1		04/11/20 22:39	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.1	1		04/11/20 22:39	71-55-6	
Trichloroethene	ND	ug/L	5.0	2.7	1		04/11/20 22:39	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 22:39	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	75-120		1		04/11/20 22:39	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-116		1		04/11/20 22:39	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		04/11/20 22:39	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: EQ-2 **Lab ID: 50254108012** Collected: 04/07/20 09:15 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/11/20 23:13	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 23:13	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 23:13	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 23:13	156-60-5	
Methylene Chloride	**1.5J**	ug/L	5.0	0.47	1		04/11/20 23:13	75-09-2	C9
Tetrachloroethene	ND	ug/L	5.0	0.32	1		04/11/20 23:13	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.1	1		04/11/20 23:13	71-55-6	
Trichloroethene	ND	ug/L	5.0	2.7	1		04/11/20 23:13	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 23:13	75-01-4	
Surrogates									
Dibromofluoromethane (S)	107	%.	75-120		1		04/11/20 23:13	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-116		1		04/11/20 23:13	460-00-4	
Toluene-d8 (S)	98	%.	83-111		1		04/11/20 23:13	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: EQ-1 **Lab ID: 50254108013** Collected: 04/06/20 11:20 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/11/20 23:47	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 23:47	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 23:47	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 23:47	156-60-5	
Methylene Chloride	**1.5J**	ug/L	5.0	0.47	1		04/11/20 23:47	75-09-2	C9
Tetrachloroethene	ND	ug/L	5.0	0.32	1		04/11/20 23:47	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.1	1		04/11/20 23:47	71-55-6	
Trichloroethene	ND	ug/L	5.0	2.7	1		04/11/20 23:47	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 23:47	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	75-120		1		04/11/20 23:47	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-116		1		04/11/20 23:47	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		04/11/20 23:47	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: MW-31 **Lab ID: 50254108014** Collected: 04/08/20 10:24 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified Pace Analytical Services - Indianapolis								
Ethane	ND	ug/L	10.0	5.0	1		04/09/20 20:21	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		04/09/20 20:21	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		04/09/20 20:21	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Iron	**83.1J**	ug/L	100	32.4	1	04/10/20 06:40	04/12/20 11:32	7439-89-6	
Manganese	**3.1J**	ug/L	10.0	1.1	1	04/10/20 06:40	04/12/20 11:32	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Iron, Dissolved	ND	ug/L	100	32.4	1	04/14/20 05:58	04/14/20 14:16	7439-89-6	
Manganese, Dissolved	ND	ug/L	10.0	1.1	1	04/14/20 05:58	04/14/20 14:16	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/12/20 00:21	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/12/20 00:21	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/12/20 00:21	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/12/20 00:21	156-60-5	
Methylene Chloride	**1.5J**	ug/L	5.0	0.47	1		04/12/20 00:21	75-09-2	C9
Tetrachloroethene	**28.1**	ug/L	5.0	0.32	1		04/12/20 00:21	127-18-4	
1,1,1-Trichloroethane	**7.5**	ug/L	5.0	3.1	1		04/12/20 00:21	71-55-6	
Trichloroethene	**37.4**	ug/L	5.0	2.7	1		04/12/20 00:21	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/12/20 00:21	75-01-4	
Surrogates									
Dibromofluoromethane (S)	107	%.	75-120		1		04/12/20 00:21	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-116		1		04/12/20 00:21	460-00-4	
Toluene-d8 (S)	100	%.	83-111		1		04/12/20 00:21	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D Pace Analytical Services - Indianapolis								
Sulfide	ND	mg/L	0.10	0.017	1		04/09/20 11:46	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038 Pace Analytical Services - Indianapolis								
Sulfate	**36.4**	mg/L	20.0	7.6	2		04/14/20 10:26	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2 Pace Analytical Services - Indianapolis								
Nitrogen, NO2 plus NO3	**4.1**	mg/L	0.10	0.020	1		04/09/20 15:28		
Nitrogen, Nitrate	**4.1**	mg/L	0.10	0.020	1		04/09/20 15:28	14797-55-8	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: MW-35 **Lab ID: 50254108015** Collected: 04/08/20 11:45 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified Pace Analytical Services - Indianapolis								
Ethane	ND	ug/L	10.0	5.0	1		04/09/20 20:41	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		04/09/20 20:41	74-85-1	
Methane	**88.3**	ug/L	10.0	6.4	1		04/09/20 20:41	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Iron	**9250**	ug/L	100	32.4	1	04/10/20 06:40	04/12/20 11:34	7439-89-6	B
Manganese	**173**	ug/L	10.0	1.1	1	04/10/20 06:40	04/12/20 11:34	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Iron, Dissolved	ND	ug/L	100	32.4	1	04/14/20 05:58	04/14/20 14:18	7439-89-6	
Manganese, Dissolved	**160**	ug/L	10.0	1.1	1	04/14/20 05:58	04/14/20 14:18	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/11/20 14:12	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/11/20 14:12	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/11/20 14:12	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/11/20 14:12	156-60-5	
Methylene Chloride	**1.5J**	ug/L	5.0	0.47	1		04/11/20 14:12	75-09-2	C9
Tetrachloroethene	ND	ug/L	5.0	0.32	1		04/11/20 14:12	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.1	1		04/11/20 14:12	71-55-6	
Trichloroethene	ND	ug/L	5.0	2.7	1		04/11/20 14:12	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/11/20 14:12	75-01-4	
Surrogates									
Dibromofluoromethane (S)	107	%.	75-120		1		04/11/20 14:12	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-116		1		04/11/20 14:12	460-00-4	
Toluene-d8 (S)	100	%.	83-111		1		04/11/20 14:12	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D Pace Analytical Services - Indianapolis								
Sulfide	ND	mg/L	0.10	0.017	1		04/09/20 11:46	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038 Pace Analytical Services - Indianapolis								
Sulfate	**25.2**	mg/L	10.0	3.8	1		04/14/20 09:19	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2 Pace Analytical Services - Indianapolis								
Nitrogen, NO2 plus NO3	**0.56**	mg/L	0.10	0.020	1		04/09/20 15:29		
Nitrogen, Nitrate	**0.54**	mg/L	0.10	0.020	1		04/09/20 15:29	14797-55-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: MW-38 **Lab ID: 50254108016** Collected: 04/08/20 09:14 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified Pace Analytical Services - Indianapolis								
Ethane	ND	ug/L	10.0	5.0	1		04/09/20 21:38	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		04/09/20 21:38	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		04/09/20 21:38	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Iron	**2870**	ug/L	100	32.4	1	04/10/20 06:40	04/12/20 11:44	7439-89-6	B
Manganese	**98.5**	ug/L	10.0	1.1	1	04/10/20 06:40	04/12/20 11:44	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Iron, Dissolved	ND	ug/L	100	32.4	1	04/14/20 05:58	04/14/20 14:29	7439-89-6	
Manganese, Dissolved	**1.6J**	ug/L	10.0	1.1	1	04/14/20 05:58	04/14/20 14:29	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/12/20 00:54	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/12/20 00:54	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/12/20 00:54	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/12/20 00:54	156-60-5	
Methylene Chloride	**1.2J**	ug/L	5.0	0.47	1		04/12/20 00:54	75-09-2	C9
Tetrachloroethene	**7.8**	ug/L	5.0	0.32	1		04/12/20 00:54	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.1	1		04/12/20 00:54	71-55-6	
Trichloroethene	**8.3**	ug/L	5.0	2.7	1		04/12/20 00:54	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/12/20 00:54	75-01-4	
Surrogates									
Dibromofluoromethane (S)	105	%.	75-120		1		04/12/20 00:54	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-116		1		04/12/20 00:54	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		04/12/20 00:54	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D Pace Analytical Services - Indianapolis								
Sulfide	ND	mg/L	0.10	0.017	1		04/09/20 11:46	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038 Pace Analytical Services - Indianapolis								
Sulfate	**61.4**	mg/L	25.0	9.4	2.5		04/14/20 09:39	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2 Pace Analytical Services - Indianapolis								
Nitrogen, NO2 plus NO3	**4.2**	mg/L	0.10	0.020	1		04/09/20 15:32		
Nitrogen, Nitrate	**4.2**	mg/L	0.10	0.020	1		04/09/20 15:32	14797-55-8	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: FD-1 WT **Lab ID: 50254108017** Collected: 04/08/20 08:00 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 Headspace	Analytical Method: RSK 175 Modified Pace Analytical Services - Indianapolis								
Ethane	ND	ug/L	10.0	5.0	1		04/09/20 21:57	74-84-0	
Ethene	ND	ug/L	10.0	4.1	1		04/09/20 21:57	74-85-1	
Methane	ND	ug/L	10.0	6.4	1		04/09/20 21:57	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Iron	**2240**	ug/L	100	32.4	1	04/10/20 06:40	04/12/20 11:47	7439-89-6	B
Manganese	**79.0**	ug/L	10.0	1.1	1	04/10/20 06:40	04/12/20 11:47	7439-96-5	
6010 MET ICP, Lab Filtered	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Iron, Dissolved	ND	ug/L	100	32.4	1	04/14/20 05:58	04/14/20 14:35	7439-89-6	
Manganese, Dissolved	**1.3J**	ug/L	10.0	1.1	1	04/14/20 05:58	04/14/20 14:35	7439-96-5	
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/12/20 01:28	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/12/20 01:28	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/12/20 01:28	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/12/20 01:28	156-60-5	
Methylene Chloride	**1.2J**	ug/L	5.0	0.47	1		04/12/20 01:28	75-09-2	C9
Tetrachloroethene	**8.5**	ug/L	5.0	0.32	1		04/12/20 01:28	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.1	1		04/12/20 01:28	71-55-6	
Trichloroethene	**9.6**	ug/L	5.0	2.7	1		04/12/20 01:28	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/12/20 01:28	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	75-120		1		04/12/20 01:28	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-116		1		04/12/20 01:28	460-00-4	
Toluene-d8 (S)	98	%.	83-111		1		04/12/20 01:28	2037-26-5	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2-D Pace Analytical Services - Indianapolis								
Sulfide	ND	mg/L	0.10	0.017	1		04/09/20 11:46	18496-25-8	
9038 Sulfate Water	Analytical Method: EPA 9038 Pace Analytical Services - Indianapolis								
Sulfate	**58.3**	mg/L	25.0	9.4	2.5		04/14/20 09:39	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2 Pace Analytical Services - Indianapolis								
Nitrogen, NO2 plus NO3	**4.1**	mg/L	0.10	0.020	1		04/09/20 15:33		
Nitrogen, Nitrate	**4.1**	mg/L	0.10	0.020	1		04/09/20 15:33	14797-55-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: TB-2 WT **Lab ID: 50254108018** Collected: 04/08/20 09:18 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.46	1		04/12/20 02:02	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	2.9	1		04/12/20 02:02	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.2	1		04/12/20 02:02	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.4	1		04/12/20 02:02	156-60-5	
Methylene Chloride	**1.5J**	ug/L	5.0	0.47	1		04/12/20 02:02	75-09-2	C9
Tetrachloroethene	ND	ug/L	5.0	0.32	1		04/12/20 02:02	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.1	1		04/12/20 02:02	71-55-6	
Trichloroethene	ND	ug/L	5.0	2.7	1		04/12/20 02:02	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.55	1		04/12/20 02:02	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	75-120		1		04/12/20 02:02	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-116		1		04/12/20 02:02	460-00-4	
Toluene-d8 (S)	102	%.	83-111		1		04/12/20 02:02	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50254108

Sample: EQ-3 WT **Lab ID: 50254108019** Collected: 04/08/20 10:33 Received: 04/08/20 14:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.43	1		04/11/20 18:25	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	3.2	1		04/11/20 18:25	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	3.7	1		04/11/20 18:25	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	3.3	1		04/11/20 18:25	156-60-5	
Methylene Chloride	ND	ug/L	5.0	5.0	1		04/11/20 18:25	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.43	1		04/11/20 18:25	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	3.6	1		04/11/20 18:25	71-55-6	
Trichloroethene	ND	ug/L	5.0	3.3	1		04/11/20 18:25	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.31	1		04/11/20 18:25	75-01-4	
Surrogates									
Dibromofluoromethane (S)	111	%.	75-120		1		04/11/20 18:25	1868-53-7	
4-Bromofluorobenzene (S)	95	%.	85-116		1		04/11/20 18:25	460-00-4	
Toluene-d8 (S)	101	%.	83-111		1		04/11/20 18:25	2037-26-5	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

QC Batch: 556405 Analysis Method: RSK 175 Modified
QC Batch Method: RSK 175 Modified Analysis Description: RSK 175 HEADSPACE
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

METHOD BLANK: 2566103 Matrix: Water
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Ethane	ug/L	ND	10.0	5.0	04/09/20 17:28	
Ethene	ug/L	ND	10.0	4.1	04/09/20 17:28	
Methane	ug/L	ND	10.0	6.4	04/09/20 17:28	

LABORATORY CONTROL SAMPLE: 2566104

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Ethane	ug/L	1980	2310	117	67-148	
Ethene	ug/L	2250	2660	118	79-140	
Methane	ug/L	1980	2050	103	59-135	

SAMPLE DUPLICATE: 2566105

Parameter	Units	50254108015 Result	Dup Result	RPD	Max RPD	Qualifiers
Ethane	ug/L	ND	7.4J		20	
Ethene	ug/L	ND	6.8J		20	
Methane	ug/L	88.3	101	13	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

QC Batch: 556231 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

METHOD BLANK: 2565367 Matrix: Water
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron	ug/L	152	100	32.4	04/12/20 11:07	P8
Manganese	ug/L	4.3J	10.0	1.1	04/12/20 11:07	

LABORATORY CONTROL SAMPLE: 2565368

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	10300	103	80-120	
Manganese	ug/L	1000	986	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2565369 2565370

Parameter	Units	50254108015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	9250	10000	10000	19400	19100	101	99	75-125	1	20	
Manganese	ug/L	173	1000	1000	1140	1120	97	95	75-125	2	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

QC Batch: 556831 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET Dissolved
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

METHOD BLANK: 2568376 Matrix: Water
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Dissolved	ug/L	48.8J	100	32.4	04/14/20 13:56	
Manganese, Dissolved	ug/L	1.5J	10.0	1.1	04/14/20 13:56	

LABORATORY CONTROL SAMPLE: 2568377

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	10000	9440	94	80-120	
Manganese, Dissolved	ug/L	1000	929	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2568378 2568379

Parameter	Units	50254108015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	9430	9460	94	95	75-125	0	20	
Manganese, Dissolved	ug/L	160	1000	1000	1080	1080	92	92	75-125	0	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

QC Batch: 556657
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50254108003, 50254108015

METHOD BLANK: 2567642 Matrix: Water
Associated Lab Samples: 50254108003, 50254108015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	3.1	04/11/20 13:04	
1,1-Dichloroethane	ug/L	ND	5.0	0.46	04/11/20 13:04	
1,2-Dichloroethane	ug/L	ND	5.0	2.9	04/11/20 13:04	
cis-1,2-Dichloroethene	ug/L	ND	5.0	3.2	04/11/20 13:04	
Methylene Chloride	ug/L	1.8J	5.0	0.47	04/11/20 13:04	
Tetrachloroethene	ug/L	ND	5.0	0.32	04/11/20 13:04	
trans-1,2-Dichloroethene	ug/L	ND	5.0	3.4	04/11/20 13:04	
Trichloroethene	ug/L	ND	5.0	2.7	04/11/20 13:04	
Vinyl chloride	ug/L	ND	2.0	0.55	04/11/20 13:04	
4-Bromofluorobenzene (S)	%.	97	85-116		04/11/20 13:04	
Dibromofluoromethane (S)	%.	103	75-120		04/11/20 13:04	
Toluene-d8 (S)	%.	98	83-111		04/11/20 13:04	

LABORATORY CONTROL SAMPLE: 2567643

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	49.7	99	78-130	
1,2-Dichloroethane	ug/L	50	47.6	95	66-127	
cis-1,2-Dichloroethene	ug/L	50	46.1	92	76-120	
Tetrachloroethene	ug/L	50	40.7	81	70-123	
trans-1,2-Dichloroethene	ug/L	50	51.1	102	79-126	
Trichloroethene	ug/L	50	45.9	92	78-120	
Vinyl chloride	ug/L	50	51.7	103	55-122	
4-Bromofluorobenzene (S)	%.			99	85-116	
Dibromofluoromethane (S)	%.			101	75-120	
Toluene-d8 (S)	%.			100	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2567644 2567645

Parameter	Units	50254108015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	48.8	49.9	98	100	56-144	2	20	
1,2-Dichloroethane	ug/L	ND	50	50	48.1	47.4	96	95	46-145	2	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	45.8	46.0	92	92	53-134	0	20	
Tetrachloroethene	ug/L	ND	50	50	35.9	37.2	72	74	32-140	4	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	49.5	50.7	99	101	57-138	2	20	
Trichloroethene	ug/L	ND	50	50	43.3	43.6	87	87	47-137	1	20	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2567644 2567645

Parameter	Units	50254108015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Vinyl chloride	ug/L	ND	50	50	51.1	51.7	102	103	36-136	1	20	
4-Bromofluorobenzene (S)	%.						99	100	85-116			
Dibromofluoromethane (S)	%.						102	100	75-120			
Toluene-d8 (S)	%.						99	98	83-111			

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

QC Batch:	556659	Analysis Method:	EPA 8260
QC Batch Method:	EPA 8260	Analysis Description:	8260 MSV
		Laboratory:	Pace Analytical Services - Indianapolis

Associated Lab Samples: 50254108001, 50254108009

METHOD BLANK: 2567648 Matrix: Water

Associated Lab Samples: 50254108001, 50254108009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	3.6	04/11/20 05:28	
1,1-Dichloroethane	ug/L	ND	5.0	0.43	04/11/20 05:28	
1,2-Dichloroethane	ug/L	ND	5.0	3.2	04/11/20 05:28	
cis-1,2-Dichloroethene	ug/L	ND	5.0	3.7	04/11/20 05:28	
Methylene Chloride	ug/L	ND	5.0	5.0	04/11/20 05:28	
Tetrachloroethene	ug/L	ND	5.0	0.43	04/11/20 05:28	
trans-1,2-Dichloroethene	ug/L	ND	5.0	3.3	04/11/20 05:28	
Trichloroethene	ug/L	ND	5.0	3.3	04/11/20 05:28	
Vinyl chloride	ug/L	ND	2.0	0.31	04/11/20 05:28	
4-Bromofluorobenzene (S)	%.	97	85-116		04/11/20 05:28	
Dibromofluoromethane (S)	%.	111	75-120		04/11/20 05:28	
Toluene-d8 (S)	%.	102	83-111		04/11/20 05:28	

LABORATORY CONTROL SAMPLE: 2567649

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	57.4	115	78-130	
1,2-Dichloroethane	ug/L	50	48.2	96	66-127	
cis-1,2-Dichloroethene	ug/L	50	49.0	98	76-120	
Tetrachloroethene	ug/L	50	55.1	110	70-123	
trans-1,2-Dichloroethene	ug/L	50	61.4	123	79-126	
Trichloroethene	ug/L	50	53.9	108	78-120	
Vinyl chloride	ug/L	50	51.3	103	55-122	
4-Bromofluorobenzene (S)	%.			99	85-116	
Dibromofluoromethane (S)	%.			97	75-120	
Toluene-d8 (S)	%.			102	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2567650 2567651

Parameter	Units	50254108009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	8.8	50	50	65.3	64.7	113	112	56-144	1	20	
1,2-Dichloroethane	ug/L	ND	50	50	49.0	46.2	98	92	46-145	6	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	51.3	49.7	95	92	53-134	3	20	
Tetrachloroethene	ug/L	22.2	50	50	60.6	61.9	77	79	32-140	2	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	57.4	57.8	115	116	57-138	1	20	
Trichloroethene	ug/L	51.6	50	50	95.6	91.4	88	80	47-137	4	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
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Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2567650 2567651

Parameter	Units	50254108009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Vinyl chloride	ug/L	ND	50	50	50.8	49.9	102	100	36-136	2	20	
4-Bromofluorobenzene (S)	%.						96	98	85-116			
Dibromofluoromethane (S)	%.						100	99	75-120			
Toluene-d8 (S)	%.						100	102	83-111			

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

QC Batch: 556892 | Analysis Method: EPA 8260
QC Batch Method: EPA 8260 | Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50254108019

METHOD BLANK: 2568569 Matrix: Water

Associated Lab Samples: 50254108019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	3.6	04/11/20 17:52	
1,1-Dichloroethane	ug/L	ND	5.0	0.43	04/11/20 17:52	
1,2-Dichloroethane	ug/L	ND	5.0	3.2	04/11/20 17:52	
cis-1,2-Dichloroethene	ug/L	ND	5.0	3.7	04/11/20 17:52	
Methylene Chloride	ug/L	ND	5.0	5.0	04/11/20 17:52	
Tetrachloroethene	ug/L	ND	5.0	0.43	04/11/20 17:52	
trans-1,2-Dichloroethene	ug/L	ND	5.0	3.3	04/11/20 17:52	
Trichloroethene	ug/L	ND	5.0	3.3	04/11/20 17:52	
Vinyl chloride	ug/L	ND	2.0	0.31	04/11/20 17:52	
4-Bromofluorobenzene (S)	%.	97	85-116		04/11/20 17:52	
Dibromofluoromethane (S)	%.	109	75-120		04/11/20 17:52	
Toluene-d8 (S)	%.	99	83-111		04/11/20 17:52	

LABORATORY CONTROL SAMPLE: 2568570

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	60.1	120	78-130	
1,1-Dichloroethane	ug/L	50	48.2	96	77-123	
1,2-Dichloroethane	ug/L	50	47.8	96	66-127	
cis-1,2-Dichloroethene	ug/L	50	49.5	99	76-120	
Methylene Chloride	ug/L	50	51.6	103	68-126	
Tetrachloroethene	ug/L	50	54.4	109	70-123	
trans-1,2-Dichloroethene	ug/L	50	60.8	122	79-126	
Trichloroethene	ug/L	50	51.1	102	78-120	
Vinyl chloride	ug/L	50	48.9	98	55-122	
4-Bromofluorobenzene (S)	%.			96	85-116	
Dibromofluoromethane (S)	%.			98	75-120	
Toluene-d8 (S)	%.			100	83-111	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

QC Batch: 556894 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50254108002, 50254108004, 50254108005, 50254108006, 50254108007, 50254108008, 50254108010, 50254108011, 50254108012, 50254108013, 50254108014, 50254108016, 50254108017, 50254108018

METHOD BLANK: 2568574 Matrix: Water
Associated Lab Samples: 50254108002, 50254108004, 50254108005, 50254108006, 50254108007, 50254108008, 50254108010, 50254108011, 50254108012, 50254108013, 50254108014, 50254108016, 50254108017, 50254108018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	3.1	04/11/20 17:34	
1,1-Dichloroethane	ug/L	ND	5.0	0.46	04/11/20 17:34	
1,2-Dichloroethane	ug/L	ND	5.0	2.9	04/11/20 17:34	
cis-1,2-Dichloroethene	ug/L	ND	5.0	3.2	04/11/20 17:34	
Methylene Chloride	ug/L	1.7J	5.0	0.47	04/11/20 17:34	
Tetrachloroethene	ug/L	ND	5.0	0.32	04/11/20 17:34	
trans-1,2-Dichloroethene	ug/L	ND	5.0	3.4	04/11/20 17:34	
Trichloroethene	ug/L	ND	5.0	2.7	04/11/20 17:34	
Vinyl chloride	ug/L	ND	2.0	0.55	04/11/20 17:34	
4-Bromofluorobenzene (S)	%.	98	85-116		04/11/20 17:34	
Dibromofluoromethane (S)	%.	106	75-120		04/11/20 17:34	
Toluene-d8 (S)	%.	98	83-111		04/11/20 17:34	

LABORATORY CONTROL SAMPLE: 2568575

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	50.5	101	78-130	
1,2-Dichloroethane	ug/L	50	47.9	96	66-127	
cis-1,2-Dichloroethene	ug/L	50	48.0	96	76-120	
Tetrachloroethene	ug/L	50	42.0	84	70-123	
trans-1,2-Dichloroethene	ug/L	50	51.9	104	79-126	
Trichloroethene	ug/L	50	46.9	94	78-120	
Vinyl chloride	ug/L	50	51.1	102	55-122	
4-Bromofluorobenzene (S)	%.			99	85-116	
Dibromofluoromethane (S)	%.			103	75-120	
Toluene-d8 (S)	%.			99	83-111	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

QC Batch: 556311
QC Batch Method: SM 4500-S2-D
Analysis Method: SM 4500-S2-D
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

METHOD BLANK: 2565651 Matrix: Water
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.017	04/09/20 11:46	

LABORATORY CONTROL SAMPLE: 2565652

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.47	94	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2565653 2565654

Parameter	Units	50253975005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.35	0.37	69	72	90-110	4	20	M3

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2565655 2565656

Parameter	Units	50254108015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.42	0.39	83	77	90-110	7	20	M3

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

QC Batch: 556935 | Analysis Method: EPA 9038
QC Batch Method: EPA 9038 | Analysis Description: 9038 Sulfate Water
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

METHOD BLANK: 2568722 Matrix: Water
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	3.8	04/14/20 09:15	

LABORATORY CONTROL SAMPLE: 2568723

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	20	18.2	91	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2568724 2568725

Parameter	Units	50254108015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	25.2	50	50	80.8	84.0	111	118	90-110	4	20	M3

MATRIX SPIKE SAMPLE: 2568726

Parameter	Units	50254254001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	59.7	200	256	98	90-110	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50254108

QC Batch: 556440 | Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 | Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

METHOD BLANK: 2566345 Matrix: Water
Associated Lab Samples: 50254108014, 50254108015, 50254108016, 50254108017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	ND	0.10	0.020	04/09/20 15:26	
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.020	04/09/20 15:26	

LABORATORY CONTROL SAMPLE: 2566346

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	1	1.0	103	90-110	
Nitrogen, NO2 plus NO3	mg/L	2	2.0	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2566351 2566352

Parameter	Units	50254108015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Nitrate	mg/L	0.54	1	1	1.8	1.7	122	118	90-110	2	20	
Nitrogen, NO2 plus NO3	mg/L	0.56	2	2	2.8	2.8	113	111	90-110	1	20	M3

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2566353 2566354

Parameter	Units	50254136002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Nitrate	mg/L	ND	1	1	1.2	1.2	114	114	90-110	0	20	
Nitrogen, NO2 plus NO3	mg/L	0.022J	2	2	2.2	2.2	109	109	90-110	0	20	

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QUALIFIERS

Project: Amphenol
Pace Project No.: 50254108

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
C9	Common Laboratory Contaminant.
M3	Matrix spike recovery was outside laboratory control limits due to matrix interferences.
P8	Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50254108

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50254108014	**MW-31**	RSK 175 Modified	556405		
50254108015	**MW-35**	RSK 175 Modified	556405		
50254108016	**MW-38**	RSK 175 Modified	556405		
50254108017	**FD-1 WT**	RSK 175 Modified	556405		
50254108014	**MW-31**	EPA 3010	556231	EPA 6010	556689
50254108015	**MW-35**	EPA 3010	556231	EPA 6010	556689
50254108016	**MW-38**	EPA 3010	556231	EPA 6010	556689
50254108017	**FD-1 WT**	EPA 3010	556231	EPA 6010	556689
50254108014	**MW-31**	EPA 3010	556831	EPA 6010	557026
50254108015	**MW-35**	EPA 3010	556831	EPA 6010	557026
50254108016	**MW-38**	EPA 3010	556831	EPA 6010	557026
50254108017	**FD-1 WT**	EPA 3010	556831	EPA 6010	557026
50254108001	**IT-2**	EPA 8260	556659		
50254108002	**MW-12R**	EPA 8260	556894		
50254108003	**MW-32**	EPA 8260	556657		
50254108004	**MW-33**	EPA 8260	556894		
50254108005	**MW-34**	EPA 8260	556894		
50254108006	**MW-36**	EPA 8260	556894		
50254108007	**MW-37**	EPA 8260	556894		
50254108008	**MW-39**	EPA 8260	556894		
50254108009	**MW-40**	EPA 8260	556659		
50254108010	**FD-2 WT**	EPA 8260	556894		
50254108011	**TB-1**	EPA 8260	556894		
50254108012	**EQ-2**	EPA 8260	556894		
50254108013	**EQ-1**	EPA 8260	556894		
50254108014	**MW-31**	EPA 8260	556894		
50254108015	**MW-35**	EPA 8260	556657		
50254108016	**MW-38**	EPA 8260	556894		
50254108017	**FD-1 WT**	EPA 8260	556894		
50254108018	**TB-2 WT**	EPA 8260	556894		
50254108019	**EQ-3 WT**	EPA 8260	556892		
50254108014	**MW-31**	SM 4500-S2-D	556311		
50254108015	**MW-35**	SM 4500-S2-D	556311		
50254108016	**MW-38**	SM 4500-S2-D	556311		
50254108017	**FD-1 WT**	SM 4500-S2-D	556311		
50254108014	**MW-31**	EPA 9038	556935		
50254108015	**MW-35**	EPA 9038	556935		
50254108016	**MW-38**	EPA 9038	556935		
50254108017	**FD-1 WT**	EPA 9038	556935		
50254108014	**MW-31**	EPA 353.2	556440		
50254108015	**MW-35**	EPA 353.2	556440		
50254108016	**MW-38**	EPA 353.2	556440		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50254108

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50254108017	**FD-1 WT**	EPA 353.2	556440		

WO#:50254108

50254108

CHAIN-OF-CUSTODY Analytical Request Document

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Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY

Company: IWM Consulting Group
Billing Information: SAME
Address: 7428 Rockville Rd, Indianapolis IN 46214
Report To: Brad Gentry
Email To: cparks@iwmconsult.com
Copy To: Chris Parks
Site Collection Info/Address: 980 Hurricane Rd
Customer Project Name/Number: Amphenol
State: IN
County/City: Franklin
Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET
Phone: 317-347-1111
Email: cparks@iwmconsult.com
Site/Facility ID #: Former Amphenol Facility
Compliance Monitoring? [ ] Yes [✓] No
Collected By (print): D.E. White
Purchase Order #:
Quote #: IN. AMP18.02
DW PWS ID #:
DW Location Code:
Collected By (signature): [signature]
Turnaround Date Required: 1- Week
Immediately Packed on Ice: [✓] Yes [ ] No
Sample Disposal: [✓] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:
Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)
Field Filtered (if applicable): [ ] Yes [✓] No
Analysis:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Container Preservative Type: 3

Customer Sample ID	Matrix *	Comp / Grab	Collected Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: Full Short List VOCs 8260	Lab Sample # / Comments
IT-2	GW	GRAB	4/7	11:39				3	X	001
MW-12R	↓	↓	4/7	14:15				3	X	002
MW-32			4/7	11:09				3	X	003
MW-33			4/6	18:08				3	X	004
MW-34			4/7	9:10				3	X	005
MW-36			4/7	10:05				3	X	006
MW-37			4/6	15:57				3	X	007
MW-39			4/6	14:09				3	X	008
MW-40 MS/MSD			4/6	12:45				9	X	009
FD-2 WT	↓	↓	4/7	—				3	X	010

Lab Profile/Line:

Lab Sample Receipt Checklist:
- Custody Seals Present/Intact Y N NA
- Custody Signatures Present Y N NA
- Collector Signature Present Y N NA
- Bottles Intact Y N NA
- Correct Bottles Y N NA
- Sufficient Volume Y N NA
- Samples Received on Ice Y N NA
- VOA - Headspace Acceptable Y N NA
- USDA Regulated Soils Y N NA
- Samples in Holding Time Y N NA
- Residual Chlorine Present Y N NA
- Cl Strips:
- Sample pH Acceptable Y N NA
- pH Strips:
- Sulfide Present Y N NA
- Lead Acetate Strips:

LAB USE ONLY: Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards: SHORT LIST: vinyl chloride, methylene chloride, PCE, TCE, 111TCA, 11 DCA, cis/trans-1,2-DCE, 1,2-DCA LEVEL IV QA/QC

Type of Ice Used: Wet Blue Dry None
Packing Material Used:
Radchem sample(s) screened (<500 cpm): Y N NA
SHORT HOLDS PRESENT (<72 hours): Y N N/A
Lab Tracking #: 2506315
Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: F
Cooler 1 Temp Upon Receipt: 1.6 oC
Cooler 1 Therm Corr. Factor: +.1 oC
Cooler 1 Corrected Temp: 1.7 oC
Comments: 4.4/4.5

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
[signature]	4/8 1410	[signature] Pace	4/8/20 1405

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 1 of: 2

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM Consulting Group LLC

Address: 7428 Rockville Rd, Indianapolis, IN 46214

Billing Information: SAME

Report To: Brad Gentry

Email To: SAME

Copy To: Chris Parks

Site Collection Info/Address: 980 Hurricane Rd

Customer Project Name/Number: Amphenol

State: IN / County/City: Franklin / Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET

Phone: 317-347-1111

Email: cparks@iwmconsult.com

Site/Facility ID #: Former Amphenol Facility

Compliance Monitoring? [ ] Yes [✓] No

Collected By (print): D. E. White

Purchase Order #:

Quote #: IN. AMP18.02

DW PWS ID #:

DW Location Code:

Collected By (signature):

Turnaround Date Required: 1-WEEK

Immediately Packed on Ice: [✓] Yes [ ] No

Sample Disposal: [✓] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [✓] No

Analysis:

Container Preservative Type **: 3

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses: Full ~~Short~~ List VOCs 8260

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Full List VOCs 8260	LAB USE ONLY: Lab Sample # / Comments
TB-1	GW	GRAB	4/6	10:45				3	X	011
EQ-2	GW	GRAB	4/7	9:15				3	X	012
EQ-1	GW	GRAB	4/6	11:20				3	X	013

Customer Remarks / Special Conditions / Possible Hazards: Short List: Vinyl Chloride, Methylene Chloride, PCE, TCE, 111-TCA, 12DCA, 11-DCA, cis/trans-1,2-DCE

LEVEL IV QA/QC

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2506316

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#:
Cooler 1 Temp Upon Receipt: 1.6 oC
Cooler 1 Therm Corr. Factor: +.1 oC
Cooler 1 Corrected Temp: 1.7 oC
Comments: 4.4/4.5

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
[signature]	4/8/20 14:05	[signature] Pace	4/8/20 1405

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: of: 2

Pace Analytical®

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM Consulting Group LLC

Address: 7428 Rockville Rd, Indianapolis, IN 46214

Billing Information: SAME

Report To: Brad Gentry

Email To: SAME

Copy To: Chris Parks

Site Collection Info/Address: 980 Hurricane Rd

Customer Project Name/Number: Amphenol

State: IN / County/City: Franklin / Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET

Phone: 317-347-1111

Email: cparks@iwmconsult.com

Site/Facility ID #: Former Amphenol Facility

Compliance Monitoring? [ ] Yes [✓] No

Collected By (print): D. E. White

Purchase Order #:

Quote #: IN. AMP18.02

DW PWS ID #:

DW Location Code:

Collected By (signature): [signature]

Turnaround Date Required: 1-WEEK

Immediately Packed on Ice: [✓] Yes [ ] No

Sample Disposal: [✓] Dispose as appropriate [ ] Return [ ] Archive: ____ [ ] Hold: ____

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [✓] No

Analysis: ____

Container Preservative Type **: 3

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ____

Analyses: Full ~~Short~~ List VOCs 8260

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Full List VOCs 8260	LAB USE ONLY: Lab Sample # / Comments
TB-1	GW	GRAB	4/6	10:45				3	X	011
EQ-2	GW	GRAB	4/7	9:15				3	X	012
EQ-1	GW	GRAB	4/6	11:20				3	X	013

Customer Remarks / Special Conditions / Possible Hazards: Short List: Vinyl Chloride, Methylene Chloride, PCE, TCE, 111-TCA, 12DCA, 11-DCA, cis/trans-1,2-DCE

LEVEL IV QA/QC

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2506316

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:

Temp Blank Received: Y N NA

Therm ID#: ____

Cooler 1 Temp Upon Receipt: 1.6 oC

Cooler 1 Therm Corr. Factor: +.1 oC

Cooler 1 Corrected Temp: 1.7 oC

Comments: 4.4/4.5

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
[signature]	4/8/20 14:05	[signature] Pace	4/8/20 1405

MTJL LAB USE ONLY

Table #:

Acctnum:

Template:

Prelogin:

PM:

PB:

Trip Blank Received: Y N NA HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: of: 2

Pace Analytical

SAMPLE CONDITION UPON RECEIPT FORM

Project #: 50254108

Date/Time and Initials of person examining contents: ZL 4/8/20 17:05

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other

Tracking #:

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No **Seals Intact:** ☐ Yes ☑ No

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Thermometer: 1 2 3 4 5 6 A B C D E F Ice Type: ☑ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☐ Yes ☐ No ☑ N/A

Cooler Temperature: 1.6/1.7 , 4.4/4.5 Ice Visible in Sample Containers?: ☐ Yes ☑ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☑ N/A

All discrepancies will be written out in the comments section below.

	Yes	No		Yes	No	N/A
Are samples from West Virginia? Document any containers out of temp.		✓	All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted.	✓		
USDA Regulated Soils? (ID, NY, WA, OR, CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		✓				
Chain of Custody Present:	✓		Circle: HNO3 H2SO4 NaOH NaOH/ZnAc			
Chain of Custody Filled Out:	✓		Dissolved Metals field filtered?:		✓	
Short Hold Time Analysis (<72hr)?: Analysis: Nitrate	✓	~~✓~~ ZL	Headspace Wisconsin Sulfide			✓
Time 5035A TC placed in Freezer or Short Holds To Lab: 17:25				Present	Absent	N/A
			Residual Chlorine Check (SVOC 625 Pest/PCB 608)			✓
			Residual Chlorine Check (Total/Amenable/Free Cyanide)			✓
Rush TAT Requested:		✓	Headspace in VOA Vials (>6mm):		✓	
Containers Intact?:	✓		Trip Blank Present?:	✓		
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	✓		Trip Blank Custody Seals?:	✓		
Extra labels on Terracore Vials (soils only)?		N/A				

Comments:

F-IN-Q-290-rev.18,22Apr2019

COC PAGE 1 of 3

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							WT			
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9			9																										
10			3																										
11																											2L		
12																											2L		

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

F-IN-Q-270-rev.11,26Sep2019

COC PAGE 2 of 3

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H	VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1				3																							WT			
2																														
3																														
4																														
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Container Codes

Glass

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DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
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VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
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WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
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CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

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BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

F-IN-Q-270-rev.11,26Sep2019

COC PAGE 3 of 3

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3		3										2	1				1						WT	✓	✓	
2			9		9										6	3				3									
3			3		3										2	1				1									
4																													
5																													
6																													
7																													
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9																													
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DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
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JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
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BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

F-IN-Q-270-rev.11,26Sep2019

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

May 20, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol
Pace Project No.: 50256968

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on May 13, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Indianapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Chris Parks, IWM Consulting Group

CERTIFICATIONS

Project:	Amphenol
Pace Project No.:	50256968

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Accreditation #: 200074
Indiana Drinking Water Laboratory #: C-49-06
Kansas/TNI Certification #: E-10177
Kentucky UST Agency Interest #: 80226
Kentucky WW Laboratory ID #: 98019
Michigan Drinking Water Laboratory #9050
Ohio VAP Certified Laboratory #: CL0065
Oklahoma Laboratory #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Laboratory #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical
www.pacelabs.com

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE SUMMARY

Project: Amphenol
Pace Project No.: 50256968

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50256968001	**MW-35**	Water	05/12/20 15:05	05/13/20 09:51
50256968002	**MW-40**	Water	05/11/20 11:51	05/13/20 09:51
50256968003	**MW-32**	Water	05/11/20 10:53	05/13/20 09:51
50256968004	**MW-31**	Water	05/11/20 13:59	05/13/20 09:51
50256968005	**MW-37**	Water	05/11/20 15:30	05/13/20 09:51
50256968006	**MW-12R**	Water	05/12/20 09:50	05/13/20 09:51
50256968007	**MW-33**	Water	05/12/20 10:46	05/13/20 09:51
50256968008	**MW-39**	Water	05/12/20 11:42	05/13/20 09:51
50256968009	**MW-34**	Water	05/12/20 12:33	05/13/20 09:51
50256968010	**IT-2**	Water	05/12/20 14:15	05/13/20 09:51
50256968011	**MW-36**	Water	05/12/20 08:55	05/13/20 09:51
50256968012	**MW-38**	Water	05/11/20 12:56	05/13/20 09:51
50256968013	**Dup-#1**	Water	05/12/20 08:00	05/13/20 09:51
50256968014	**Dup-#2**	Water	05/11/20 08:00	05/13/20 09:51
50256968015	**EQ#1**	Water	05/11/20 11:01	05/13/20 09:51
50256968016	**EQ#2**	Water	05/12/20 12:40	05/13/20 09:51
50256968017	**T.B.**	Water	05/11/20 11:10	05/13/20 09:51

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50256968

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50256968001	**MW-35**	EPA 8260	CAP	12	PASI-I
50256968002	**MW-40**	EPA 8260	CAP	12	PASI-I
50256968003	**MW-32**	EPA 8260	CAP	12	PASI-I
50256968004	**MW-31**	EPA 8260	CAP	12	PASI-I
50256968005	**MW-37**	EPA 8260	CAP	12	PASI-I
50256968006	**MW-12R**	EPA 8260	CAP	12	PASI-I
50256968007	**MW-33**	EPA 8260	CAP	12	PASI-I
50256968008	**MW-39**	EPA 8260	CAP	12	PASI-I
50256968009	**MW-34**	EPA 8260	CAP	12	PASI-I
50256968010	**IT-2**	EPA 8260	CAP	12	PASI-I
50256968011	**MW-36**	EPA 8260	CAP	12	PASI-I
50256968012	**MW-38**	EPA 8260	CAP	12	PASI-I
50256968013	**Dup-#1**	EPA 8260	CAP	12	PASI-I
50256968014	**Dup-#2**	EPA 8260	CAP	12	PASI-I
50256968015	**EQ#1**	EPA 8260	CAP	12	PASI-I
50256968016	**EQ#2**	EPA 8260	CAP	12	PASI-I
50256968017	**T.B.**	EPA 8260	CAP	12	PASI-I

PASI-I = Pace Analytical Services - Indianapolis

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50256968

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50256968002	**MW-40**					
EPA 8260	cis-1,2-Dichloroethene	3.1J	ug/L	5.0	05/16/20 04:25	
EPA 8260	Tetrachloroethene	27.0	ug/L	5.0	05/16/20 04:25	
EPA 8260	1,1,1-Trichloroethane	8.7	ug/L	5.0	05/16/20 04:25	
EPA 8260	Trichloroethene	60.0	ug/L	5.0	05/16/20 04:25	
50256968003	**MW-32**					
EPA 8260	Trichloroethene	2.4J	ug/L	5.0	05/15/20 04:46	
50256968004	**MW-31**					
EPA 8260	Tetrachloroethene	43.6	ug/L	5.0	05/15/20 05:19	
EPA 8260	1,1,1-Trichloroethane	6.9	ug/L	5.0	05/15/20 05:19	
EPA 8260	Trichloroethene	39.5	ug/L	5.0	05/15/20 05:19	
50256968005	**MW-37**					
EPA 8260	Tetrachloroethene	55.1	ug/L	5.0	05/15/20 05:51	
EPA 8260	1,1,1-Trichloroethane	3.5J	ug/L	5.0	05/15/20 05:51	
EPA 8260	Trichloroethene	34.5	ug/L	5.0	05/15/20 05:51	
50256968006	**MW-12R**					
EPA 8260	1,1-Dichloroethane	3.2J	ug/L	5.0	05/15/20 06:24	
EPA 8260	cis-1,2-Dichloroethene	2.8J	ug/L	5.0	05/15/20 06:24	
EPA 8260	Tetrachloroethene	272	ug/L	25.0	05/15/20 16:41	
EPA 8260	1,1,1-Trichloroethane	36.9	ug/L	5.0	05/15/20 06:24	
EPA 8260	Trichloroethene	167	ug/L	5.0	05/15/20 06:24	
50256968008	**MW-39**					
EPA 8260	1,1-Dichloroethane	2.6J	ug/L	5.0	05/15/20 07:30	
EPA 8260	1,1,1-Trichloroethane	3.0J	ug/L	5.0	05/15/20 07:30	
EPA 8260	Trichloroethene	11.1	ug/L	5.0	05/15/20 07:30	
50256968009	**MW-34**					
EPA 8260	Tetrachloroethene	40.6	ug/L	5.0	05/15/20 08:03	
EPA 8260	1,1,1-Trichloroethane	2.9J	ug/L	5.0	05/15/20 08:03	
EPA 8260	Trichloroethene	14.7	ug/L	5.0	05/15/20 08:03	
50256968010	**IT-2**					
EPA 8260	cis-1,2-Dichloroethene	3.3J	ug/L	5.0	05/15/20 08:36	
EPA 8260	Trichloroethene	1.4J	ug/L	5.0	05/15/20 08:36	
50256968011	**MW-36**					
EPA 8260	Tetrachloroethene	69.3	ug/L	5.0	05/15/20 09:09	
EPA 8260	Trichloroethene	6.2	ug/L	5.0	05/15/20 09:09	
50256968012	**MW-38**					
EPA 8260	Tetrachloroethene	34.9	ug/L	5.0	05/16/20 04:58	
EPA 8260	1,1,1-Trichloroethane	3.4J	ug/L	5.0	05/16/20 04:58	
EPA 8260	Trichloroethene	24.8	ug/L	5.0	05/16/20 04:58	
50256968013	**Dup-#1**					
EPA 8260	1,1-Dichloroethane	3.6J	ug/L	5.0	05/16/20 05:31	
EPA 8260	cis-1,2-Dichloroethene	3.1J	ug/L	5.0	05/16/20 05:31	

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SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50256968

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50256968013	**Dup-#1**					
EPA 8260	Tetrachloroethene	274	ug/L	25.0	05/19/20 15:16	
EPA 8260	1,1,1-Trichloroethane	39.8	ug/L	5.0	05/16/20 05:31	
EPA 8260	Trichloroethene	200	ug/L	5.0	05/16/20 05:31	
50256968014	**Dup-#2**					
EPA 8260	Tetrachloroethene	34.0	ug/L	5.0	05/16/20 06:04	
EPA 8260	1,1,1-Trichloroethane	3.5J	ug/L	5.0	05/16/20 06:04	
EPA 8260	Trichloroethene	23.8	ug/L	5.0	05/16/20 06:04	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: MW-35 **Lab ID: 50256968001** Collected: 05/12/20 15:05 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		05/15/20 04:13	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		05/15/20 04:13	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		05/15/20 04:13	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		05/15/20 04:13	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		05/15/20 04:13	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.84	1		05/15/20 04:13	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.90	1		05/15/20 04:13	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.0	1		05/15/20 04:13	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		05/15/20 04:13	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	75-120		1		05/15/20 04:13	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-116		1		05/15/20 04:13	460-00-4	
Toluene-d8 (S)	97	%.	83-111		1		05/15/20 04:13	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: MW-40 **Lab ID: 50256968002** Collected: 05/11/20 11:51 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		05/16/20 04:25	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		05/16/20 04:25	107-06-2	
cis-1,2-Dichloroethene	**3.1J**	ug/L	5.0	0.49	1		05/16/20 04:25	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		05/16/20 04:25	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.92	1		05/16/20 04:25	75-09-2	
Tetrachloroethene	**27.0**	ug/L	5.0	0.55	1		05/16/20 04:25	127-18-4	
1,1,1-Trichloroethane	**8.7**	ug/L	5.0	0.42	1		05/16/20 04:25	71-55-6	
Trichloroethene	**60.0**	ug/L	5.0	0.52	1		05/16/20 04:25	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.77	1		05/16/20 04:25	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		05/16/20 04:25	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-116		1		05/16/20 04:25	460-00-4	
Toluene-d8 (S)	96	%.	83-111		1		05/16/20 04:25	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: MW-32 **Lab ID: 50256968003** Collected: 05/11/20 10:53 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		05/15/20 04:46	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		05/15/20 04:46	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		05/15/20 04:46	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		05/15/20 04:46	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		05/15/20 04:46	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.84	1		05/15/20 04:46	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.90	1		05/15/20 04:46	71-55-6	
Trichloroethene	**2.4J**	ug/L	5.0	1.0	1		05/15/20 04:46	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		05/15/20 04:46	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		05/15/20 04:46	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-116		1		05/15/20 04:46	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		05/15/20 04:46	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: MW-31 **Lab ID: 50256968004** Collected: 05/11/20 13:59 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		05/15/20 05:19	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		05/15/20 05:19	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		05/15/20 05:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		05/15/20 05:19	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		05/15/20 05:19	75-09-2	
Tetrachloroethene	**43.6**	ug/L	5.0	0.84	1		05/15/20 05:19	127-18-4	
1,1,1-Trichloroethane	**6.9**	ug/L	5.0	0.90	1		05/15/20 05:19	71-55-6	
Trichloroethene	**39.5**	ug/L	5.0	1.0	1		05/15/20 05:19	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		05/15/20 05:19	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		05/15/20 05:19	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-116		1		05/15/20 05:19	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		05/15/20 05:19	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: MW-37 **Lab ID: 50256968005** Collected: 05/11/20 15:30 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		05/15/20 05:51	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		05/15/20 05:51	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		05/15/20 05:51	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		05/15/20 05:51	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		05/15/20 05:51	75-09-2	
Tetrachloroethene	**55.1**	ug/L	5.0	0.84	1		05/15/20 05:51	127-18-4	
1,1,1-Trichloroethane	**3.5J**	ug/L	5.0	0.90	1		05/15/20 05:51	71-55-6	
Trichloroethene	**34.5**	ug/L	5.0	1.0	1		05/15/20 05:51	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		05/15/20 05:51	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		05/15/20 05:51	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-116		1		05/15/20 05:51	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		05/15/20 05:51	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: MW-12R **Lab ID: 50256968006** Collected: 05/12/20 09:50 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**3.2J**	ug/L	5.0	0.81	1		05/15/20 06:24	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		05/15/20 06:24	107-06-2	
cis-1,2-Dichloroethene	**2.8J**	ug/L	5.0	1.1	1		05/15/20 06:24	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		05/15/20 06:24	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		05/15/20 06:24	75-09-2	
Tetrachloroethene	**272**	ug/L	25.0	4.2	5		05/15/20 16:41	127-18-4	
1,1,1-Trichloroethane	**36.9**	ug/L	5.0	0.90	1		05/15/20 06:24	71-55-6	
Trichloroethene	**167**	ug/L	5.0	1.0	1		05/15/20 06:24	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		05/15/20 06:24	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		05/15/20 06:24	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-116		1		05/15/20 06:24	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		05/15/20 06:24	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: MW-33 **Lab ID: 50256968007** Collected: 05/12/20 10:46 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		05/15/20 06:57	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		05/15/20 06:57	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		05/15/20 06:57	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		05/15/20 06:57	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		05/15/20 06:57	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.84	1		05/15/20 06:57	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.90	1		05/15/20 06:57	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.0	1		05/15/20 06:57	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		05/15/20 06:57	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		05/15/20 06:57	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-116		1		05/15/20 06:57	460-00-4	
Toluene-d8 (S)	98	%.	83-111		1		05/15/20 06:57	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: MW-39 **Lab ID: 50256968008** Collected: 05/12/20 11:42 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**2.6J**	ug/L	5.0	0.81	1		05/15/20 07:30	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		05/15/20 07:30	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		05/15/20 07:30	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		05/15/20 07:30	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		05/15/20 07:30	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.84	1		05/15/20 07:30	127-18-4	
1,1,1-Trichloroethane	**3.0J**	ug/L	5.0	0.90	1		05/15/20 07:30	71-55-6	
Trichloroethene	**11.1**	ug/L	5.0	1.0	1		05/15/20 07:30	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		05/15/20 07:30	75-01-4	
Surrogates									
Dibromofluoromethane (S)	101	%.	75-120		1		05/15/20 07:30	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-116		1		05/15/20 07:30	460-00-4	
Toluene-d8 (S)	100	%.	83-111		1		05/15/20 07:30	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: MW-34 **Lab ID: 50256968009** Collected: 05/12/20 12:33 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		05/15/20 08:03	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		05/15/20 08:03	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		05/15/20 08:03	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		05/15/20 08:03	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		05/15/20 08:03	75-09-2	
Tetrachloroethene	**40.6**	ug/L	5.0	0.84	1		05/15/20 08:03	127-18-4	
1,1,1-Trichloroethane	**2.9J**	ug/L	5.0	0.90	1		05/15/20 08:03	71-55-6	
Trichloroethene	**14.7**	ug/L	5.0	1.0	1		05/15/20 08:03	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		05/15/20 08:03	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		05/15/20 08:03	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	85-116		1		05/15/20 08:03	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		05/15/20 08:03	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: IT-2 **Lab ID: 50256968010** Collected: 05/12/20 14:15 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		05/15/20 08:36	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		05/15/20 08:36	107-06-2	
cis-1,2-Dichloroethene	**3.3J**	ug/L	5.0	1.1	1		05/15/20 08:36	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		05/15/20 08:36	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		05/15/20 08:36	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.84	1		05/15/20 08:36	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.90	1		05/15/20 08:36	71-55-6	
Trichloroethene	**1.4J**	ug/L	5.0	1.0	1		05/15/20 08:36	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		05/15/20 08:36	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		05/15/20 08:36	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-116		1		05/15/20 08:36	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		05/15/20 08:36	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: MW-36 **Lab ID: 50256968011** Collected: 05/12/20 08:55 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		05/15/20 09:09	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		05/15/20 09:09	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		05/15/20 09:09	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		05/15/20 09:09	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		05/15/20 09:09	75-09-2	
Tetrachloroethene	**69.3**	ug/L	5.0	0.84	1		05/15/20 09:09	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.90	1		05/15/20 09:09	71-55-6	
Trichloroethene	**6.2**	ug/L	5.0	1.0	1		05/15/20 09:09	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		05/15/20 09:09	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	75-120		1		05/15/20 09:09	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-116		1		05/15/20 09:09	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		05/15/20 09:09	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: MW-38 **Lab ID: 50256968012** Collected: 05/11/20 12:56 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		05/16/20 04:58	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		05/16/20 04:58	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		05/16/20 04:58	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		05/16/20 04:58	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.92	1		05/16/20 04:58	75-09-2	
Tetrachloroethene	**34.9**	ug/L	5.0	0.55	1		05/16/20 04:58	127-18-4	
1,1,1-Trichloroethane	**3.4J**	ug/L	5.0	0.42	1		05/16/20 04:58	71-55-6	
Trichloroethene	**24.8**	ug/L	5.0	0.52	1		05/16/20 04:58	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.77	1		05/16/20 04:58	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		05/16/20 04:58	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-116		1		05/16/20 04:58	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		05/16/20 04:58	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: Dup-#1 **Lab ID: 50256968013** Collected: 05/12/20 08:00 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**3.6J**	ug/L	5.0	0.44	1		05/16/20 05:31	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		05/16/20 05:31	107-06-2	
cis-1,2-Dichloroethene	**3.1J**	ug/L	5.0	0.49	1		05/16/20 05:31	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		05/16/20 05:31	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.92	1		05/16/20 05:31	75-09-2	
Tetrachloroethene	**274**	ug/L	25.0	4.2	5		05/19/20 15:16	127-18-4	
1,1,1-Trichloroethane	**39.8**	ug/L	5.0	0.42	1		05/16/20 05:31	71-55-6	
Trichloroethene	**200**	ug/L	5.0	0.52	1		05/16/20 05:31	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.77	1		05/16/20 05:31	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		05/16/20 05:31	1868-53-7	
4-Bromofluorobenzene (S)	98	%.	85-116		1		05/16/20 05:31	460-00-4	
Toluene-d8 (S)	98	%.	83-111		1		05/16/20 05:31	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: Dup-#2 **Lab ID: 50256968014** Collected: 05/11/20 08:00 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		05/16/20 06:04	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		05/16/20 06:04	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		05/16/20 06:04	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		05/16/20 06:04	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.92	1		05/16/20 06:04	75-09-2	
Tetrachloroethene	**34.0**	ug/L	5.0	0.55	1		05/16/20 06:04	127-18-4	
1,1,1-Trichloroethane	**3.5J**	ug/L	5.0	0.42	1		05/16/20 06:04	71-55-6	
Trichloroethene	**23.8**	ug/L	5.0	0.52	1		05/16/20 06:04	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.77	1		05/16/20 06:04	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	75-120		1		05/16/20 06:04	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-116		1		05/16/20 06:04	460-00-4	
Toluene-d8 (S)	97	%.	83-111		1		05/16/20 06:04	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: EQ#1 **Lab ID: 50256968015** Collected: 05/11/20 11:01 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		05/16/20 06:36	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		05/16/20 06:36	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		05/16/20 06:36	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		05/16/20 06:36	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.92	1		05/16/20 06:36	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.55	1		05/16/20 06:36	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.42	1		05/16/20 06:36	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.52	1		05/16/20 06:36	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.77	1		05/16/20 06:36	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		05/16/20 06:36	1868-53-7	
4-Bromofluorobenzene (S)	97	%.	85-116		1		05/16/20 06:36	460-00-4	
Toluene-d8 (S)	97	%.	83-111		1		05/16/20 06:36	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: EQ#2 **Lab ID: 50256968016** Collected: 05/12/20 12:40 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		05/16/20 07:09	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		05/16/20 07:09	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		05/16/20 07:09	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		05/16/20 07:09	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.92	1		05/16/20 07:09	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.55	1		05/16/20 07:09	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.42	1		05/16/20 07:09	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.52	1		05/16/20 07:09	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.77	1		05/16/20 07:09	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		05/16/20 07:09	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	85-116		1		05/16/20 07:09	460-00-4	
Toluene-d8 (S)	101	%.	83-111		1		05/16/20 07:09	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50256968

Sample: T.B. **Lab ID: 50256968017** Collected: 05/11/20 11:10 Received: 05/13/20 09:51 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		05/16/20 07:42	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.54	1		05/16/20 07:42	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		05/16/20 07:42	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.59	1		05/16/20 07:42	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.92	1		05/16/20 07:42	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.55	1		05/16/20 07:42	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.42	1		05/16/20 07:42	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.52	1		05/16/20 07:42	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.77	1		05/16/20 07:42	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	75-120		1		05/16/20 07:42	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-116		1		05/16/20 07:42	460-00-4	
Toluene-d8 (S)	98	%.	83-111		1		05/16/20 07:42	2037-26-5	

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50256968

QC Batch: 561983 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50256968001, 50256968003, 50256968004, 50256968005, 50256968006, 50256968007, 50256968008, 50256968009, 50256968010, 50256968011

METHOD BLANK: 2592066 Matrix: Water
Associated Lab Samples: 50256968001, 50256968003, 50256968004, 50256968005, 50256968006, 50256968007, 50256968008, 50256968009, 50256968010, 50256968011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.90	05/15/20 01:29	
1,1-Dichloroethane	ug/L	ND	5.0	0.81	05/15/20 01:29	
1,2-Dichloroethane	ug/L	ND	5.0	0.47	05/15/20 01:29	
cis-1,2-Dichloroethene	ug/L	ND	5.0	1.1	05/15/20 01:29	
Methylene Chloride	ug/L	0.79J	5.0	0.53	05/15/20 01:29	
Tetrachloroethene	ug/L	ND	5.0	0.84	05/15/20 01:29	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.95	05/15/20 01:29	
Trichloroethene	ug/L	ND	5.0	1.0	05/15/20 01:29	
Vinyl chloride	ug/L	ND	2.0	0.41	05/15/20 01:29	
4-Bromofluorobenzene (S)	%.	98	85-116		05/15/20 01:29	
Dibromofluoromethane (S)	%.	103	75-120		05/15/20 01:29	
Toluene-d8 (S)	%.	101	83-111		05/15/20 01:29	

LABORATORY CONTROL SAMPLE: 2592067

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	56.7	113	78-130	
1,1-Dichloroethane	ug/L	50	54.4	109	77-123	
1,2-Dichloroethane	ug/L	50	51.1	102	66-127	
cis-1,2-Dichloroethene	ug/L	50	50.9	102	76-120	
Methylene Chloride	ug/L	50	45.6	91	68-126	
Tetrachloroethene	ug/L	50	48.9	98	70-123	
trans-1,2-Dichloroethene	ug/L	50	51.2	102	79-126	
Trichloroethene	ug/L	50	47.8	96	78-120	
Vinyl chloride	ug/L	50	44.2	88	55-122	
4-Bromofluorobenzene (S)	%.			98	85-116	
Dibromofluoromethane (S)	%.			101	75-120	
Toluene-d8 (S)	%.			97	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2592068 2592069

Parameter	Units	50256968001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	60.9	63.8	122	128	56-144	5	20	
1,1-Dichloroethane	ug/L	ND	50	50	53.3	54.8	107	110	53-140	3	20	
1,2-Dichloroethane	ug/L	ND	50	50	48.1	49.9	96	100	46-145	4	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50256968

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2592068 2592069

Parameter	Units	50256968001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	50	50	51.5	52.9	103	106	53-134	3	20	
Methylene Chloride	ug/L	ND	50	50	45.1	47.4	90	95	46-138	5	20	
Tetrachloroethene	ug/L	ND	50	50	51.3	53.8	103	108	32-140	5	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	57.3	57.8	115	116	57-138	1	20	
Trichloroethene	ug/L	ND	50	50	48.5	50.6	97	101	47-137	4	20	
Vinyl chloride	ug/L	ND	50	50	48.3	50.9	97	102	36-136	5	20	
4-Bromofluorobenzene (S)	%.						99	99	85-116			
Dibromofluoromethane (S)	%.						101	101	75-120			
Toluene-d8 (S)	%.						97	99	83-111			

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50256968

QC Batch: 562198 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50256968002, 50256968012, 50256968013, 50256968014, 50256968015, 50256968016, 50256968017

METHOD BLANK: 2593598 Matrix: Water
Associated Lab Samples: 50256968002, 50256968012, 50256968013, 50256968014, 50256968015, 50256968016, 50256968017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.42	05/16/20 03:53	
1,1-Dichloroethane	ug/L	ND	5.0	0.44	05/16/20 03:53	
1,2-Dichloroethane	ug/L	ND	5.0	0.54	05/16/20 03:53	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.49	05/16/20 03:53	
Methylene Chloride	ug/L	ND	5.0	0.92	05/16/20 03:53	
Tetrachloroethene	ug/L	ND	5.0	0.55	05/16/20 03:53	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.59	05/16/20 03:53	
Trichloroethene	ug/L	ND	5.0	0.52	05/16/20 03:53	
Vinyl chloride	ug/L	ND	2.0	0.77	05/16/20 03:53	
4-Bromofluorobenzene (S)	%.	96	85-116		05/16/20 03:53	
Dibromofluoromethane (S)	%.	106	75-120		05/16/20 03:53	
Toluene-d8 (S)	%.	97	83-111		05/16/20 03:53	

LABORATORY CONTROL SAMPLE: 2593599

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	64.8	130	78-130	
1,1-Dichloroethane	ug/L	50	56.0	112	77-123	
1,2-Dichloroethane	ug/L	50	51.9	104	66-127	
cis-1,2-Dichloroethene	ug/L	50	58.7	117	76-120	
Methylene Chloride	ug/L	50	48.5	97	68-126	
Tetrachloroethene	ug/L	50	59.1	118	70-123	
trans-1,2-Dichloroethene	ug/L	50	63.2	126	79-126	
Trichloroethene	ug/L	50	58.5	117	78-120	
Vinyl chloride	ug/L	50	51.5	103	55-122	
4-Bromofluorobenzene (S)	%.			97	85-116	
Dibromofluoromethane (S)	%.			100	75-120	
Toluene-d8 (S)	%.			97	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2593600 2593601

Parameter	Units	50256968002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	8.7	50	50	74.9	73.6	132	130	56-144	2	20	
1,1-Dichloroethane	ug/L	ND	50	50	54.3	53.9	109	108	53-140	1	20	
1,2-Dichloroethane	ug/L	ND	50	50	50.6	49.5	101	99	46-145	2	20	
cis-1,2-Dichloroethene	ug/L	3.1J	50	50	61.2	60.4	116	114	53-134	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50256968

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2593600 2593601

Parameter	Units	50256968002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methylene Chloride	ug/L	ND	50	50	46.3	46.3	93	93	46-138	0	20	
Tetrachloroethene	ug/L	27.0	50	50	88.0	84.6	122	115	32-140	4	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	60.3	59.1	121	118	57-138	2	20	
Trichloroethene	ug/L	60.0	50	50	121	119	121	118	47-137	2	20	
Vinyl chloride	ug/L	ND	50	50	50.1	49.3	100	99	36-136	1	20	
4-Bromofluorobenzene (S)	%.						98	98	85-116			
Dibromofluoromethane (S)	%.						102	102	75-120			
Toluene-d8 (S)	%.						99	96	83-111			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALIFIERS

Project:	Amphenol
Pace Project No.:	50256968

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Pace Analytical
www.pacelabs.com

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50256968

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50256968001	**MW-35**	EPA 8260	561983		
50256968002	**MW-40**	EPA 8260	562198		
50256968003	**MW-32**	EPA 8260	561983		
50256968004	**MW-31**	EPA 8260	561983		
50256968005	**MW-37**	EPA 8260	561983		
50256968006	**MW-12R**	EPA 8260	561983		
50256968007	**MW-33**	EPA 8260	561983		
50256968008	**MW-39**	EPA 8260	561983		
50256968009	**MW-34**	EPA 8260	561983		
50256968010	**IT-2**	EPA 8260	561983		
50256968011	**MW-36**	EPA 8260	561983		
50256968012	**MW-38**	EPA 8260	562198		
50256968013	**Dup-#1**	EPA 8260	562198		
50256968014	**Dup-#2**	EPA 8260	562198		
50256968015	**EQ#1**	EPA 8260	562198		
50256968016	**EQ#2**	EPA 8260	562198		
50256968017	**T.B.**	EPA 8260	562198		

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

WO#: 50256968

50256968

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM Consuting	Billing Information:
Address: 7428 Rockville RD.	
Report To: C. Parks	Email To:
Copy To: B. Gentry	Site Collection Info/Address:
Customer Project Name/Number: Amphenol	State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET
Phone: 317-347-1111 Email:	Site/Facility ID #:
Collected By (print): D. E. White	Purchase Order #: Quote#:
Collected By (signature): [signature]	Turnaround Date Required:
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [X] 5 Day (Expedite Charges Apply)

Compliance Monitoring? [X] Yes [ ] No

DW PWS ID #:

DW Location Code:

Immediately Packed on Ice: [X] Yes [ ] No

Field Filtered (if applicable): [ ] Yes [ ] No

Analysis:

Container Preservative Type ** 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses: VOCs 8260 short list + PCE, TCE, 111TCA, 12DCA, 11DCA, Cis/trans 12DCE, MC, VC

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	VOCs 8260	LAB USE ONLY: Lab Sample # / Comments
MW 35 (MS-MSD)	GW	G	5/12	15:05				9	X	001
MW 40 (MS-MSD)	↓	↓	5/11	11:51				9	X	002
MW-32			5/11	10:53				3	X	003
MW-31			5/11	13:59				↓	X	004
MW-37			5/11	15:30					X	005
MW-12R			5/12	9:50					X	006
MW-33			5/12	10:46					X	007
MW-39			5/12	11:42					X	008
MW-34			5/12	12:33					X	009
IT-2	↓	↓	5/12	14:15				↓	X	010

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2506040

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:

Temp Blank Received: Y N NA

Therm ID#: B

Cooler 1 Temp Upon Receipt: 1.1 oC

Cooler 1 Therm Corr. Factor: 0 oC

Cooler 1 Corrected Temp: 1.1 oC

Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
[signature] IWM	5/13/20 9:51	[signature] Pace	5/13/20 951	Table #:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Acctnum: Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM: PB:

Trip Blank Received: Y N NA

HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: of:

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM Consulting
Address: 7420 Rockville RD
Report To: C. Parks - B. Gentry
Copy To:
Customer Project Name/Number: Amphenol
Phone: 317-347-1111
Email:
Collected By (print): D.E. White
Collected By (signature): Diane E White

Billing Information:
Email To:
Site Collection Info/Address:
State: / County/City:
Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Site/Facility ID #:
Compliance Monitoring? [X] Yes [ ] No
Purchase Order #:
Quote#:
DW PWS ID #:
DW Location Code:
Turnaround Date Required:
Immediately Packed on Ice: [X] Yes [ ] No

Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:
Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [X] 5 Day (Expedite Charges Apply)
Field Filtered (if applicable): [ ] Yes [ ] No
Analysis:

Container Preservative Type **: 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Lab Project Manager:

Analyses: VOCs 8260 short list — PCE, TCE, 111 TCA, 12DCA, 11 DCA, cis/trans 12 DCE, MC, VC

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	VOCs 8260 short list	Lab Sample # / Comments
MW-36	GW	G	5/12	8:55				3	X	011
MW-38	↓	↓	5/11	12:56				3	X	012
Dup-#1			5/12	—				3	X	013
Dup-#2			5/11	—				3	X	014
EQ#1			5/11	11:01				3	X	015
EQ#2			5/12	12:40				3	X	016
T:B			5/11	11:10				3	X	017

Lab Profile/Line:
Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present Y N NA
Cl Strips:
Sample pH Acceptable Y N NA
pH Strips:
Sulfide Present Y N NA
Lead Acetate Strips:
LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None
Packing Material Used:
Radchem sample(s) screened (<500 cpm): Y N NA
SHORT HOLDS PRESENT (<72 hours): Y N N/A
Lab Tracking #: 2506039
Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: B
Cooler 1 Temp Upon Receipt: 1.1 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 1.1 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Diane E White	5/13/20 9:51	Pace	5/13/20 951

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO
Page: of:

Pace Analytical

SAMPLE CONDITION UPON RECEIPT FORM

1000

Project #: 50256968

Date/Time and Initials of person examining contents: MP 5/13/20

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other ______

Tracking #: ______

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No **Seals Intact:** ☐ Yes ☑ No

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other ______

Thermometer: 1 2 3 4 5 6 A B C D E F (B circled) Ice Type: ☑ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☐ Yes ☐ No ☑ N/A

Cooler Temperature: 1.1/1.1 Ice Visible in Sample Containers?: ☐ Yes ☑ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☑ N/A

All discrepancies will be written out in the comments section below.

	Yes	No		Yes	No	N/A
Are samples from West Virginia? Document any containers out of temp.		✓	All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted. Circle: HNO3 H2SO4 NaOH NaOH/ZnAc			✓
USDA Regulated Soils? (ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		✓				
Chain of Custody Present:	✓					
Chain of Custody Filled Out:	✓		Dissolved Metals field filtered?:			✓
Short Hold Time Analysis (<72hr)?: Analysis:		✓	Headspace Wisconsin Sulfide			✓
Time 5035A TC placed in Freezer or Short Holds To Lab:				Present	Absent	N/A
			Residual Chlorine Check (SVOC 625 Pest/PCB 608) Residual Chlorine Check (Total/Amenable/Free Cyanide)			✓
Rush TAT Requested: 5 day	✓		Headspace in VOA Vials (>6mm):		✓	
Containers Intact?:	✓		Trip Blank Present?:	✓		
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	✓		Trip Blank Custody Seals?:	✓		
Extra labels on Terracore Vials (soils only)?		✓				

Comments:

F-IN-Q-290-rev.18,22Apr2019

COC PAGE 1 of 2

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			9																							WT			
2			9																										
3			3																										
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

COC PAGE 2 of 2

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							WT			
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

June 15, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol
Pace Project No.: 50259475

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on June 10, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Indianapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Chris Parks, IWM Consulting Group

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

CERTIFICATIONS

Project:	Amphenol
Pace Project No.:	50259475

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Accreditation #: 200074
Indiana Drinking Water Laboratory #: C-49-06
Kansas/TNI Certification #: E-10177
Kentucky UST Agency Interest #: 80226
Kentucky WW Laboratory ID #: 98019
Michigan Drinking Water Laboratory #9050
Ohio VAP Certified Laboratory #: CL0065
Oklahoma Laboratory #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Laboratory #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE SUMMARY

Project: Amphenol
Pace Project No.: 50259475

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50259475001	**IT-2**	Water	06/10/20 10:40	06/10/20 15:00
50259475002	**MW-12R**	Water	06/09/20 16:16	06/10/20 15:00
50259475003	**MW-31**	Water	06/09/20 09:48	06/10/20 15:00
50259475004	**MW-32**	Water	06/08/20 10:24	06/10/20 15:00
50259475005	**MW-33**	Water	06/08/20 14:55	06/10/20 15:00
50259475006	**MW-34**	Water	06/09/20 13:08	06/10/20 15:00
50259475007	**MW-35**	Water	06/10/20 11:59	06/10/20 15:00
50259475008	**MW-36**	Water	06/09/20 14:53	06/10/20 15:00
50259475009	**MW-37**	Water	06/09/20 11:25	06/10/20 15:00
50259475010	**MW-38**	Water	06/08/20 16:18	06/10/20 15:00
50259475011	**MW-39**	Water	06/08/20 13:45	06/10/20 15:00
50259475012	**MW-40**	Water	06/08/20 11:40	06/10/20 15:00
50259475013	**DUP #1**	Water	06/09/20 07:00	06/10/20 15:00
50259475014	**DUP #2**	Water	06/08/20 07:05	06/10/20 15:00
50259475015	**EB #1**	Water	06/08/20 10:35	06/10/20 15:00
50259475016	**EB #2**	Water	06/09/20 09:55	06/10/20 15:00
50259475017	**EB #3**	Water	06/10/20 10:50	06/10/20 15:00
50259475018	**TRIP BLANK-1**	Water	06/08/20 10:30	06/10/20 15:00

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50259475

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50259475001	**IT-2**	EPA 8260	CAP	12	PASI-I
50259475002	**MW-12R**	EPA 8260	CAP	12	PASI-I
50259475003	**MW-31**	EPA 8260	CAP	12	PASI-I
50259475004	**MW-32**	EPA 8260	CAP	12	PASI-I
50259475005	**MW-33**	EPA 8260	CAP	12	PASI-I
50259475006	**MW-34**	EPA 8260	CAP	12	PASI-I
50259475007	**MW-35**	EPA 8260	CAP	12	PASI-I
50259475008	**MW-36**	EPA 8260	CAP	12	PASI-I
50259475009	**MW-37**	EPA 8260	CAP	12	PASI-I
50259475010	**MW-38**	EPA 8260	CAP	12	PASI-I
50259475011	**MW-39**	EPA 8260	CAP	12	PASI-I
50259475012	**MW-40**	EPA 8260	CAP	12	PASI-I
50259475013	**DUP #1**	EPA 8260	CAP	12	PASI-I
50259475014	**DUP #2**	EPA 8260	CAP	12	PASI-I
50259475015	**EB #1**	EPA 8260	CAP	12	PASI-I
50259475016	**EB #2**	EPA 8260	CAP	12	PASI-I
50259475017	**EB #3**	EPA 8260	CAP	12	PASI-I
50259475018	**TRIP BLANK-1**	EPA 8260	CAP	12	PASI-I

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SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50259475

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50259475001	**IT-2**					
EPA 8260	cis-1,2-Dichloroethene	4.2J	ug/L	5.0	06/11/20 06:36	
EPA 8260	Trichloroethene	1.1J	ug/L	5.0	06/11/20 06:36	
50259475002	**MW-12R**					
EPA 8260	1,1-Dichloroethane	2.8J	ug/L	5.0	06/11/20 07:09	
EPA 8260	cis-1,2-Dichloroethene	2.5J	ug/L	5.0	06/11/20 07:09	
EPA 8260	Tetrachloroethene	258	ug/L	25.0	06/11/20 07:42	
EPA 8260	1,1,1-Trichloroethane	28.2	ug/L	5.0	06/11/20 07:09	
EPA 8260	Trichloroethene	169	ug/L	5.0	06/11/20 07:09	
50259475003	**MW-31**					
EPA 8260	Tetrachloroethene	46.5	ug/L	5.0	06/11/20 08:14	
EPA 8260	1,1,1-Trichloroethane	6.0	ug/L	5.0	06/11/20 08:14	
EPA 8260	Trichloroethene	43.7	ug/L	5.0	06/11/20 08:14	
50259475004	**MW-32**					
EPA 8260	1,1,1-Trichloroethane	1.2J	ug/L	5.0	06/11/20 08:47	
EPA 8260	Trichloroethene	4.5J	ug/L	5.0	06/11/20 08:47	
50259475006	**MW-34**					
EPA 8260	Tetrachloroethene	43.0	ug/L	5.0	06/11/20 09:52	
EPA 8260	1,1,1-Trichloroethane	2.5J	ug/L	5.0	06/11/20 09:52	
EPA 8260	Trichloroethene	16.7	ug/L	5.0	06/11/20 09:52	
50259475008	**MW-36**					
EPA 8260	Tetrachloroethene	71.6	ug/L	5.0	06/11/20 10:25	
EPA 8260	Trichloroethene	7.2	ug/L	5.0	06/11/20 10:25	
50259475009	**MW-37**					
EPA 8260	Tetrachloroethene	51.3	ug/L	5.0	06/11/20 17:13	
EPA 8260	1,1,1-Trichloroethane	2.9J	ug/L	5.0	06/11/20 17:13	
EPA 8260	Trichloroethene	35.2	ug/L	5.0	06/11/20 17:13	
50259475010	**MW-38**					
EPA 8260	Tetrachloroethene	26.2	ug/L	5.0	06/11/20 17:46	
EPA 8260	1,1,1-Trichloroethane	2.7J	ug/L	5.0	06/11/20 17:46	
EPA 8260	Trichloroethene	20.6	ug/L	5.0	06/11/20 17:46	
50259475011	**MW-39**					
EPA 8260	1,1-Dichloroethane	3.5J	ug/L	5.0	06/11/20 18:18	
EPA 8260	1,1,1-Trichloroethane	3.1J	ug/L	5.0	06/11/20 18:18	
EPA 8260	Trichloroethene	13.7	ug/L	5.0	06/11/20 18:18	
50259475012	**MW-40**					
EPA 8260	cis-1,2-Dichloroethene	2.1J	ug/L	5.0	06/11/20 18:51	
EPA 8260	Tetrachloroethene	25.5	ug/L	5.0	06/11/20 18:51	
EPA 8260	1,1,1-Trichloroethane	8.0	ug/L	5.0	06/11/20 18:51	
EPA 8260	Trichloroethene	60.0	ug/L	5.0	06/11/20 18:51	
50259475013	**DUP #1**					
EPA 8260	1,1-Dichloroethane	2.8J	ug/L	5.0	06/11/20 20:28	

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SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50259475

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50259475013	**DUP #1**					
EPA 8260	cis-1,2-Dichloroethene	2.6J	ug/L	5.0	06/11/20 20:28	
EPA 8260	Tetrachloroethene	287	ug/L	5.0	06/11/20 20:28	
EPA 8260	1,1,1-Trichloroethane	29.5	ug/L	5.0	06/11/20 20:28	
EPA 8260	Trichloroethene	165	ug/L	5.0	06/11/20 20:28	
50259475014	**DUP #2**					
EPA 8260	Tetrachloroethene	25.6	ug/L	5.0	06/11/20 21:33	
EPA 8260	1,1,1-Trichloroethane	2.6J	ug/L	5.0	06/11/20 21:33	
EPA 8260	Trichloroethene	20.6	ug/L	5.0	06/11/20 21:33	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: IT-2 **Lab ID: 50259475001** Collected: 06/10/20 10:40 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		06/11/20 06:36	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		06/11/20 06:36	107-06-2	
cis-1,2-Dichloroethene	**4.2J**	ug/L	5.0	1.1	1		06/11/20 06:36	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		06/11/20 06:36	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		06/11/20 06:36	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.84	1		06/11/20 06:36	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.90	1		06/11/20 06:36	71-55-6	
Trichloroethene	**1.1J**	ug/L	5.0	1.0	1		06/11/20 06:36	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		06/11/20 06:36	75-01-4	
Surrogates									
Dibromofluoromethane (S)	98	%.	75-120		1		06/11/20 06:36	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-116		1		06/11/20 06:36	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		06/11/20 06:36	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: MW-12R **Lab ID: 50259475002** Collected: 06/09/20 16:16 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**2.8J**	ug/L	5.0	0.81	1		06/11/20 07:09	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		06/11/20 07:09	107-06-2	
cis-1,2-Dichloroethene	**2.5J**	ug/L	5.0	1.1	1		06/11/20 07:09	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		06/11/20 07:09	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		06/11/20 07:09	75-09-2	
Tetrachloroethene	**258**	ug/L	25.0	4.2	5		06/11/20 07:42	127-18-4	
1,1,1-Trichloroethane	**28.2**	ug/L	5.0	0.90	1		06/11/20 07:09	71-55-6	
Trichloroethene	**169**	ug/L	5.0	1.0	1		06/11/20 07:09	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		06/11/20 07:09	75-01-4	
Surrogates									
Dibromofluoromethane (S)	93	%.	75-120		1		06/11/20 07:09	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-116		1		06/11/20 07:09	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		06/11/20 07:09	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: MW-31 **Lab ID: 50259475003** Collected: 06/09/20 09:48 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		06/11/20 08:14	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		06/11/20 08:14	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		06/11/20 08:14	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		06/11/20 08:14	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		06/11/20 08:14	75-09-2	
Tetrachloroethene	**46.5**	ug/L	5.0	0.84	1		06/11/20 08:14	127-18-4	
1,1,1-Trichloroethane	**6.0**	ug/L	5.0	0.90	1		06/11/20 08:14	71-55-6	
Trichloroethene	**43.7**	ug/L	5.0	1.0	1		06/11/20 08:14	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		06/11/20 08:14	75-01-4	
Surrogates									
Dibromofluoromethane (S)	97	%.	75-120		1		06/11/20 08:14	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-116		1		06/11/20 08:14	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		06/11/20 08:14	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: MW-32 **Lab ID: 50259475004** Collected: 06/08/20 10:24 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		06/11/20 08:47	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		06/11/20 08:47	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		06/11/20 08:47	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		06/11/20 08:47	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		06/11/20 08:47	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.84	1		06/11/20 08:47	127-18-4	
1,1,1-Trichloroethane	**1.2J**	ug/L	5.0	0.90	1		06/11/20 08:47	71-55-6	
Trichloroethene	**4.5J**	ug/L	5.0	1.0	1		06/11/20 08:47	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		06/11/20 08:47	75-01-4	
Surrogates									
Dibromofluoromethane (S)	97	%.	75-120		1		06/11/20 08:47	1868-53-7	
4-Bromofluorobenzene (S)	109	%.	85-116		1		06/11/20 08:47	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		06/11/20 08:47	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: MW-33 **Lab ID: 50259475005** Collected: 06/08/20 14:55 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		06/11/20 09:19	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		06/11/20 09:19	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		06/11/20 09:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		06/11/20 09:19	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		06/11/20 09:19	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.84	1		06/11/20 09:19	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.90	1		06/11/20 09:19	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.0	1		06/11/20 09:19	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		06/11/20 09:19	75-01-4	
Surrogates									
Dibromofluoromethane (S)	98	%.	75-120		1		06/11/20 09:19	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-116		1		06/11/20 09:19	460-00-4	
Toluene-d8 (S)	96	%.	83-111		1		06/11/20 09:19	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: MW-34 **Lab ID: 50259475006** Collected: 06/09/20 13:08 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		06/11/20 09:52	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		06/11/20 09:52	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		06/11/20 09:52	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		06/11/20 09:52	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		06/11/20 09:52	75-09-2	
Tetrachloroethene	**43.0**	ug/L	5.0	0.84	1		06/11/20 09:52	127-18-4	
1,1,1-Trichloroethane	**2.5J**	ug/L	5.0	0.90	1		06/11/20 09:52	71-55-6	
Trichloroethene	**16.7**	ug/L	5.0	1.0	1		06/11/20 09:52	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		06/11/20 09:52	75-01-4	
Surrogates									
Dibromofluoromethane (S)	97	%.	75-120		1		06/11/20 09:52	1868-53-7	
4-Bromofluorobenzene (S)	109	%.	85-116		1		06/11/20 09:52	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		06/11/20 09:52	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: MW-35 **Lab ID: 50259475007** Collected: 06/10/20 11:59 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 15:35	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 15:35	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.46	1		06/11/20 15:35	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.32	1		06/11/20 15:35	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.86	1		06/11/20 15:35	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.44	1		06/11/20 15:35	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.40	1		06/11/20 15:35	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.51	1		06/11/20 15:35	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.28	1		06/11/20 15:35	75-01-4	
Surrogates									
Dibromofluoromethane (S)	109	%.	75-120		1		06/11/20 15:35	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	85-116		1		06/11/20 15:35	460-00-4	
Toluene-d8 (S)	96	%.	83-111		1		06/11/20 15:35	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: MW-36 **Lab ID: 50259475008** Collected: 06/09/20 14:53 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		06/11/20 10:25	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		06/11/20 10:25	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		06/11/20 10:25	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		06/11/20 10:25	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		06/11/20 10:25	75-09-2	
Tetrachloroethene	**71.6**	ug/L	5.0	0.84	1		06/11/20 10:25	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.90	1		06/11/20 10:25	71-55-6	
Trichloroethene	**7.2**	ug/L	5.0	1.0	1		06/11/20 10:25	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		06/11/20 10:25	75-01-4	
Surrogates									
Dibromofluoromethane (S)	96	%.	75-120		1		06/11/20 10:25	1868-53-7	
4-Bromofluorobenzene (S)	109	%.	85-116		1		06/11/20 10:25	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		06/11/20 10:25	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: MW-37 **Lab ID: 50259475009** Collected: 06/09/20 11:25 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 17:13	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 17:13	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.46	1		06/11/20 17:13	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.32	1		06/11/20 17:13	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.86	1		06/11/20 17:13	75-09-2	
Tetrachloroethene	**51.3**	ug/L	5.0	0.44	1		06/11/20 17:13	127-18-4	
1,1,1-Trichloroethane	**2.9J**	ug/L	5.0	0.40	1		06/11/20 17:13	71-55-6	
Trichloroethene	**35.2**	ug/L	5.0	0.51	1		06/11/20 17:13	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.28	1		06/11/20 17:13	75-01-4	
Surrogates									
Dibromofluoromethane (S)	109	%.	75-120		1		06/11/20 17:13	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-116		1		06/11/20 17:13	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		06/11/20 17:13	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: MW-38 **Lab ID: 50259475010** Collected: 06/08/20 16:18 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 17:46	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 17:46	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.46	1		06/11/20 17:46	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.32	1		06/11/20 17:46	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.86	1		06/11/20 17:46	75-09-2	
Tetrachloroethene	**26.2**	ug/L	5.0	0.44	1		06/11/20 17:46	127-18-4	
1,1,1-Trichloroethane	**2.7J**	ug/L	5.0	0.40	1		06/11/20 17:46	71-55-6	
Trichloroethene	**20.6**	ug/L	5.0	0.51	1		06/11/20 17:46	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.28	1		06/11/20 17:46	75-01-4	
Surrogates									
Dibromofluoromethane (S)	109	%.	75-120		1		06/11/20 17:46	1868-53-7	
4-Bromofluorobenzene (S)	109	%.	85-116		1		06/11/20 17:46	460-00-4	
Toluene-d8 (S)	96	%.	83-111		1		06/11/20 17:46	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: MW-39 **Lab ID: 50259475011** Collected: 06/08/20 13:45 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**3.5J**	ug/L	5.0	0.41	1		06/11/20 18:18	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 18:18	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.46	1		06/11/20 18:18	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.32	1		06/11/20 18:18	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.86	1		06/11/20 18:18	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.44	1		06/11/20 18:18	127-18-4	
1,1,1-Trichloroethane	**3.1J**	ug/L	5.0	0.40	1		06/11/20 18:18	71-55-6	
Trichloroethene	**13.7**	ug/L	5.0	0.51	1		06/11/20 18:18	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.28	1		06/11/20 18:18	75-01-4	
Surrogates									
Dibromofluoromethane (S)	110	%.	75-120		1		06/11/20 18:18	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-116		1		06/11/20 18:18	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		06/11/20 18:18	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: MW-40 **Lab ID: 50259475012** Collected: 06/08/20 11:40 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 18:51	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 18:51	107-06-2	
cis-1,2-Dichloroethene	**2.1J**	ug/L	5.0	0.46	1		06/11/20 18:51	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.32	1		06/11/20 18:51	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.86	1		06/11/20 18:51	75-09-2	
Tetrachloroethene	**25.5**	ug/L	5.0	0.44	1		06/11/20 18:51	127-18-4	
1,1,1-Trichloroethane	**8.0**	ug/L	5.0	0.40	1		06/11/20 18:51	71-55-6	
Trichloroethene	**60.0**	ug/L	5.0	0.51	1		06/11/20 18:51	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.28	1		06/11/20 18:51	75-01-4	
Surrogates									
Dibromofluoromethane (S)	110	%.	75-120		1		06/11/20 18:51	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-116		1		06/11/20 18:51	460-00-4	
Toluene-d8 (S)	96	%.	83-111		1		06/11/20 18:51	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: DUP #1 **Lab ID: 50259475013** Collected: 06/09/20 07:00 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**2.8J**	ug/L	5.0	0.41	1		06/11/20 20:28	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 20:28	107-06-2	
cis-1,2-Dichloroethene	**2.6J**	ug/L	5.0	0.46	1		06/11/20 20:28	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.32	1		06/11/20 20:28	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.86	1		06/11/20 20:28	75-09-2	
Tetrachloroethene	**287**	ug/L	5.0	0.44	1		06/11/20 20:28	127-18-4	
1,1,1-Trichloroethane	**29.5**	ug/L	5.0	0.40	1		06/11/20 20:28	71-55-6	
Trichloroethene	**165**	ug/L	5.0	0.51	1		06/11/20 20:28	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.28	1		06/11/20 20:28	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	75-120		1		06/11/20 20:28	1868-53-7	
4-Bromofluorobenzene (S)	109	%.	85-116		1		06/11/20 20:28	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		06/11/20 20:28	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: DUP #2 **Lab ID: 50259475014** Collected: 06/08/20 07:05 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 21:33	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 21:33	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.46	1		06/11/20 21:33	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.32	1		06/11/20 21:33	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.86	1		06/11/20 21:33	75-09-2	
Tetrachloroethene	**25.6**	ug/L	5.0	0.44	1		06/11/20 21:33	127-18-4	
1,1,1-Trichloroethane	**2.6J**	ug/L	5.0	0.40	1		06/11/20 21:33	71-55-6	
Trichloroethene	**20.6**	ug/L	5.0	0.51	1		06/11/20 21:33	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.28	1		06/11/20 21:33	75-01-4	
Surrogates									
Dibromofluoromethane (S)	111	%.	75-120		1		06/11/20 21:33	1868-53-7	
4-Bromofluorobenzene (S)	107	%.	85-116		1		06/11/20 21:33	460-00-4	
Toluene-d8 (S)	96	%.	83-111		1		06/11/20 21:33	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: EB #1 **Lab ID: 50259475015** Collected: 06/08/20 10:35 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 22:06	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 22:06	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.46	1		06/11/20 22:06	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.32	1		06/11/20 22:06	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.86	1		06/11/20 22:06	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.44	1		06/11/20 22:06	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.40	1		06/11/20 22:06	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.51	1		06/11/20 22:06	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.28	1		06/11/20 22:06	75-01-4	
Surrogates									
Dibromofluoromethane (S)	110	%.	75-120		1		06/11/20 22:06	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-116		1		06/11/20 22:06	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		06/11/20 22:06	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: EB #2 **Lab ID: 50259475016** Collected: 06/09/20 09:55 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 22:38	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 22:38	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.46	1		06/11/20 22:38	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.32	1		06/11/20 22:38	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.86	1		06/11/20 22:38	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.44	1		06/11/20 22:38	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.40	1		06/11/20 22:38	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.51	1		06/11/20 22:38	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.28	1		06/11/20 22:38	75-01-4	
Surrogates									
Dibromofluoromethane (S)	112	%.	75-120		1		06/11/20 22:38	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-116		1		06/11/20 22:38	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		06/11/20 22:38	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: EB #3 **Lab ID: 50259475017** Collected: 06/10/20 10:50 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 23:11	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.41	1		06/11/20 23:11	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.46	1		06/11/20 23:11	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.32	1		06/11/20 23:11	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.86	1		06/11/20 23:11	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.44	1		06/11/20 23:11	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.40	1		06/11/20 23:11	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.51	1		06/11/20 23:11	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.28	1		06/11/20 23:11	75-01-4	
Surrogates									
Dibromofluoromethane (S)	111	%.	75-120		1		06/11/20 23:11	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	85-116		1		06/11/20 23:11	460-00-4	
Toluene-d8 (S)	96	%.	83-111		1		06/11/20 23:11	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50259475

Sample: TRIP BLANK-1 **Lab ID: 50259475018** Collected: 06/08/20 10:30 Received: 06/10/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.81	1		06/11/20 15:19	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.47	1		06/11/20 15:19	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	1.1	1		06/11/20 15:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.95	1		06/11/20 15:19	156-60-5	
Methylene Chloride	ND	ug/L	5.0	0.53	1		06/11/20 15:19	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.84	1		06/11/20 15:19	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.90	1		06/11/20 15:19	71-55-6	
Trichloroethene	ND	ug/L	5.0	1.0	1		06/11/20 15:19	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.41	1		06/11/20 15:19	75-01-4	
Surrogates									
Dibromofluoromethane (S)	96	%.	75-120		1		06/11/20 15:19	1868-53-7	
4-Bromofluorobenzene (S)	109	%.	85-116		1		06/11/20 15:19	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		06/11/20 15:19	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50259475

QC Batch: 566537 | Analysis Method: EPA 8260
QC Batch Method: EPA 8260 | Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50259475001, 50259475002, 50259475003, 50259475004, 50259475005, 50259475006, 50259475008

METHOD BLANK: 2613050 | Matrix: Water
Associated Lab Samples: 50259475001, 50259475002, 50259475003, 50259475004, 50259475005, 50259475006, 50259475008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.90	06/11/20 01:43	
1,1-Dichloroethane	ug/L	ND	5.0	0.81	06/11/20 01:43	
1,2-Dichloroethane	ug/L	ND	5.0	0.47	06/11/20 01:43	
cis-1,2-Dichloroethene	ug/L	ND	5.0	1.1	06/11/20 01:43	
Methylene Chloride	ug/L	ND	5.0	0.53	06/11/20 01:43	
Tetrachloroethene	ug/L	ND	5.0	0.84	06/11/20 01:43	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.95	06/11/20 01:43	
Trichloroethene	ug/L	ND	5.0	1.0	06/11/20 01:43	
Vinyl chloride	ug/L	ND	2.0	0.41	06/11/20 01:43	
4-Bromofluorobenzene (S)	%.	106	85-116		06/11/20 01:43	
Dibromofluoromethane (S)	%.	96	75-120		06/11/20 01:43	
Toluene-d8 (S)	%.	95	83-111		06/11/20 01:43	

LABORATORY CONTROL SAMPLE: 2613051

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	48.1	96	78-130	
1,1-Dichloroethane	ug/L	50	53.6	107	77-123	
1,2-Dichloroethane	ug/L	50	43.0	86	66-127	
cis-1,2-Dichloroethene	ug/L	50	51.6	103	76-120	
Methylene Chloride	ug/L	50	52.9	106	68-126	
Tetrachloroethene	ug/L	50	46.7	93	70-123	
trans-1,2-Dichloroethene	ug/L	50	53.4	107	79-126	
Trichloroethene	ug/L	50	50.7	101	78-120	
Vinyl chloride	ug/L	50	48.4	97	55-122	
4-Bromofluorobenzene (S)	%.			106	85-116	
Dibromofluoromethane (S)	%.			94	75-120	
Toluene-d8 (S)	%.			94	83-111	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50259475

QC Batch: 566682 — Analysis Method: EPA 8260
QC Batch Method: EPA 8260 — Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50259475007, 50259475009, 50259475010, 50259475011, 50259475012, 50259475013, 50259475014, 50259475015, 50259475016, 50259475017

METHOD BLANK: 2613737 — Matrix: Water

Associated Lab Samples: 50259475007, 50259475009, 50259475010, 50259475011, 50259475012, 50259475013, 50259475014, 50259475015, 50259475016, 50259475017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.40	06/11/20 13:58	
1,1-Dichloroethane	ug/L	ND	5.0	0.41	06/11/20 13:58	
1,2-Dichloroethane	ug/L	ND	5.0	0.41	06/11/20 13:58	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.46	06/11/20 13:58	
Methylene Chloride	ug/L	ND	5.0	0.86	06/11/20 13:58	
Tetrachloroethene	ug/L	ND	5.0	0.44	06/11/20 13:58	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.32	06/11/20 13:58	
Trichloroethene	ug/L	ND	5.0	0.51	06/11/20 13:58	
Vinyl chloride	ug/L	ND	2.0	0.28	06/11/20 13:58	
4-Bromofluorobenzene (S)	%.	108	85-116		06/11/20 13:58	
Dibromofluoromethane (S)	%.	108	75-120		06/11/20 13:58	
Toluene-d8 (S)	%.	95	83-111		06/11/20 13:58	

LABORATORY CONTROL SAMPLE: 2613738

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	49.0	98	78-130	
1,1-Dichloroethane	ug/L	50	54.8	110	77-123	
1,2-Dichloroethane	ug/L	50	43.0	86	66-127	
cis-1,2-Dichloroethene	ug/L	50	55.6	111	76-120	
Methylene Chloride	ug/L	50	54.7	109	68-126	
Tetrachloroethene	ug/L	50	46.5	93	70-123	
trans-1,2-Dichloroethene	ug/L	50	57.1	114	79-126	
Trichloroethene	ug/L	50	50.7	101	78-120	
Vinyl chloride	ug/L	50	49.6	99	55-122	
4-Bromofluorobenzene (S)	%.			106	85-116	
Dibromofluoromethane (S)	%.			108	75-120	
Toluene-d8 (S)	%.			95	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2613739 — 2613740

Parameter	Units	50259475007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	50.1	50.9	100	102	56-144	2	20	
1,1-Dichloroethane	ug/L	ND	50	50	54.7	55.3	109	111	53-140	1	20	
1,2-Dichloroethane	ug/L	ND	50	50	42.3	41.2	85	82	46-145	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50259475

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2613739 2613740

Parameter	Units	50259475007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	50	50	54.4	54.9	109	110	53-134	1	20	
Methylene Chloride	ug/L	ND	50	50	51.2	51.9	102	104	46-138	1	20	
Tetrachloroethene	ug/L	ND	50	50	46.4	47.8	93	96	32-140	3	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	56.8	57.8	114	116	57-138	2	20	
Trichloroethene	ug/L	ND	50	50	51.5	52.5	103	105	47-137	2	20	
Vinyl chloride	ug/L	ND	50	50	48.4	48.6	97	97	36-136	0	20	
4-Bromofluorobenzene (S)	%.						106	107	85-116			
Dibromofluoromethane (S)	%.						109	108	75-120			
Toluene-d8 (S)	%.						96	97	83-111			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2613741 2613742

Parameter	Units	50259475012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	8.0	50	50	67.0	64.4	118	113	56-144	4	20	
1,1-Dichloroethane	ug/L	ND	50	50	62.9	60.3	126	121	53-140	4	20	
1,2-Dichloroethane	ug/L	ND	50	50	48.1	46.0	96	92	46-145	5	20	
cis-1,2-Dichloroethene	ug/L	2.1J	50	50	64.8	62.0	125	120	53-134	4	20	
Methylene Chloride	ug/L	ND	50	50	59.2	56.7	118	113	46-138	4	20	
Tetrachloroethene	ug/L	25.5	50	50	78.2	78.7	105	106	32-140	1	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	65.8	63.2	132	126	57-138	4	20	
Trichloroethene	ug/L	60.0	50	50	120	119	119	118	47-137	1	20	
Vinyl chloride	ug/L	ND	50	50	55.5	53.2	111	106	36-136	4	20	
4-Bromofluorobenzene (S)	%.						105	105	85-116			
Dibromofluoromethane (S)	%.						108	107	75-120			
Toluene-d8 (S)	%.						94	96	83-111			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50259475

QC Batch: 566684
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50259475018

METHOD BLANK: 2613752 Matrix: Water
Associated Lab Samples: 50259475018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.90	06/11/20 14:14	
1,1-Dichloroethane	ug/L	ND	5.0	0.81	06/11/20 14:14	
1,2-Dichloroethane	ug/L	ND	5.0	0.47	06/11/20 14:14	
cis-1,2-Dichloroethene	ug/L	ND	5.0	1.1	06/11/20 14:14	
Methylene Chloride	ug/L	ND	5.0	0.53	06/11/20 14:14	
Tetrachloroethene	ug/L	ND	5.0	0.84	06/11/20 14:14	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.95	06/11/20 14:14	
Trichloroethene	ug/L	ND	5.0	1.0	06/11/20 14:14	
Vinyl chloride	ug/L	ND	2.0	0.41	06/11/20 14:14	
4-Bromofluorobenzene (S)	%.	110	85-116		06/11/20 14:14	
Dibromofluoromethane (S)	%.	96	75-120		06/11/20 14:14	
Toluene-d8 (S)	%.	96	83-111		06/11/20 14:14	

LABORATORY CONTROL SAMPLE: 2613753

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	53.4	107	78-130	
1,1-Dichloroethane	ug/L	50	59.8	120	77-123	
1,2-Dichloroethane	ug/L	50	46.3	93	66-127	
cis-1,2-Dichloroethene	ug/L	50	56.3	113	76-120	
Methylene Chloride	ug/L	50	56.6	113	68-126	
Tetrachloroethene	ug/L	50	53.7	107	70-123	
trans-1,2-Dichloroethene	ug/L	50	59.4	119	79-126	
Trichloroethene	ug/L	50	56.3	113	78-120	
Vinyl chloride	ug/L	50	55.2	110	55-122	
4-Bromofluorobenzene (S)	%.			108	85-116	
Dibromofluoromethane (S)	%.			96	75-120	
Toluene-d8 (S)	%.			95	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2613754 2613755

Parameter	Units	50258798006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	48.2	53.1	96	106	56-144	10	20	
1,1-Dichloroethane	ug/L	ND	50	50	52.1	60.1	104	120	53-140	14	20	
1,2-Dichloroethane	ug/L	ND	50	50	40.6	47.0	81	94	46-145	15	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	49.9	55.5	100	111	53-134	11	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50259475

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2613754 2613755

Parameter	Units	50258798006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methylene Chloride	ug/L	ND	50	50	49.3	56.2	99	112	46-138	13	20	
Tetrachloroethene	ug/L	ND	50	50	49.6	52.1	99	104	32-140	5	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	53.1	58.9	106	118	57-138	10	20	
Trichloroethene	ug/L	ND	50	50	50.9	54.7	102	109	47-137	7	20	
Vinyl chloride	ug/L	ND	50	50	48.6	53.6	97	107	36-136	10	20	
4-Bromofluorobenzene (S)	%.						105	108	85-116			
Dibromofluoromethane (S)	%.						96	94	75-120			
Toluene-d8 (S)	%.						94	94	83-111			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALIFIERS

Project: Amphenol
Pace Project No.: 50259475

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50259475

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50259475001	**IT-2**	EPA 8260	566537		
50259475002	**MW-12R**	EPA 8260	566537		
50259475003	**MW-31**	EPA 8260	566537		
50259475004	**MW-32**	EPA 8260	566537		
50259475005	**MW-33**	EPA 8260	566537		
50259475006	**MW-34**	EPA 8260	566537		
50259475007	**MW-35**	EPA 8260	566682		
50259475008	**MW-36**	EPA 8260	566537		
50259475009	**MW-37**	EPA 8260	566682		
50259475010	**MW-38**	EPA 8260	566682		
50259475011	**MW-39**	EPA 8260	566682		
50259475012	**MW-40**	EPA 8260	566682		
50259475013	**DUP #1**	EPA 8260	566682		
50259475014	**DUP #2**	EPA 8260	566682		
50259475015	**EB #1**	EPA 8260	566682		
50259475016	**EB #2**	EPA 8260	566682		
50259475017	**EB #3**	EPA 8260	566682		
50259475018	**TRIP BLANK-1**	EPA 8260	566684		

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

WO# : 50259475

50259475

order Number or

ONLY

Company: IWM CONSULTING GROUP

Address: 7428 ROCKVILLE RD INDPLS IN 46214

Billing Information: SAME

Report To: CHRIS PARKS

Email To: cparks@iwmconsult.com

Copy To: BRAD GENTRY

Site Collection Info/Address: 980 HURRICANE ROAD

Customer Project Name/Number: AMPHENOL

State: IN / County/City: FRANKLIN / Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET

Phone: 317-347-1111
Email: cparks@iwmconsult.com

Site/Facility ID #: FORMER AMPHENOL FACILITY

Compliance Monitoring? [ ] Yes [ ] No

Collected By (print): REBECCA PITCOCK

Purchase Order #: IW.AMP18.02
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Rebecca Pitcock

Turnaround Date Required: 1 WEEK

Immediately Packed on Ice: [✓] Yes [ ] No

Sample Disposal:
[✓] Dispose as appropriate [ ] Return
[ ] Archive: ____
[ ] Hold: ____

Rush:
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day [ ] 4 Day [✓] 5 Day
(Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [✓] No

Analysis: ____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ____

Preservative: 3

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	Analyses: 8260 VOC SHORT LIST	Lab Sample # / Comments: See SWR
IT-2	GW	G			6/10/20	10:40		3	X	001
MW-12R	GW	G			6/9/20	16:16		3	X	002
MW-31	GW	G			6/9/20	9:48		3	X	003
MW-32	GW	G			6/8/20	10:24		3	X	004
MW-33	GW	G			6/8/20	14:55		3	X	005
MW-34	GW	G			6/9/20	13:08		3	X	006
MW-35 (MS/MSD)	GW	G			6/10/20	11:59		9	X	007
MW-36	GW	G			6/9/20	14:53		3	X	008
MW-37	GW	G			6/9/20	11:25		3	X	009
MW-38	GW	G			6/8/20	16:18		3	X	010

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips: ____	
Sample pH Acceptable	Y N NA
pH Strips: ____	
Sulfide Present	Y N NA
Lead Acetate Strips: ____	

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:
LEVEL IV QA/QC
SHORT LIST: PCE, TCE, 111TCA, 11DCA, 12DCA, MC, VC, cis/trans 12 DCE

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2478427

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 2
Cooler 1 Temp Upon Receipt: 4.4 oC
Cooler 1 Therm Corr. Factor: -.4 oC
Cooler 1 Corrected Temp: 4.0 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Rebecca Pitcock IWM	6/10/20 15:00	[signature]	6/10/20 1500
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 1 of: 1

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM CONSULTING GROUP

Address: 7428 ROCKVILLE RD INDPLS IN

Billing Information: SAME

Report To: CHRIS PARKS

Email To: cparks@iwmconsult.com

Copy To: BRAD GENTRY

Site Collection Info/Address: 980 HURRICANE ROAD

Customer Project Name/Number: AMPHENOL

State: IN / County/City: FRANKLIN / Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET

Phone: 317-347-1111
Email:

Site/Facility ID #: FORMER AMPHENOL FACILITY

Compliance Monitoring? [ ] Yes [ ] No

Collected By (print): REBECCA PITCOCK

Purchase Order #: IN.AMP18.02
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Rebecca Pitcock

Turnaround Date Required: 1 WEEK

Immediately Packed on Ice: [✓] Yes [ ] No

Sample Disposal:
[✓] Dispose as appropriate [ ] Return
[ ] Archive:
[ ] Hold:

Rush:
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day [ ] 4 Day [✓] 5 Day
(Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [✓] No

Analysis:

Container Preservative Type **: 3

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses: 8260 VOC SHORT LIST

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	8260 VOC SHORT LIST	LAB USE ONLY: Lab Sample # / Comments: See SCUR
MW-39	GW	G			6/8/20	13:45		3	X	011
MW-40 (MS/MSD)	GW	G			6/8/20	11:40		9	X	012
DUP #1	GW	G			6/9/20	7:00		3	X	013
DUP #2	GW	G			6/8/20	7:05		3	X	014
EB #1	GW	G			6/8/20	10:35		3	X	015
EB #2	GW	G			6/9/20	9:55		3	X	016
EB #3	GW	G			6/10/20	10:50		3	X	017
TRIP BLANK-1	GW	G			6/8/20	10:30		3	X	018

Customer Remarks / Special Conditions / Possible Hazards:
LEVEL IV QA/QC
SHORT LIST: PCE, TCE, 111TCA, 11DCA, 12DCA, MC, VC, cis/trans 12DCE

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2478429

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 2
Cooler 1 Temp Upon Receipt: 4.4 oC
Cooler 1 Therm Corr. Factor: -.4 oC
Cooler 1 Corrected Temp: 4.0 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Rebecca Pitcock	6/10/20 15:00	[signature]	6/10/20 1500

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 3 of: 3

Pace Analytical

SAMPLE CONDITION UPON RECEIPT FORM

Project #: 50259475

Date/Time and Initials of person examining contents: MS 6/20/20 1515

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Other

Tracking #:

Custody Seal on Cooler/Box Present: ☐ Yes ☒ No **Seals Intact:** ☐ Yes ☒ No

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other

Thermometer: 1 (2) 3 4 5 6 A B C D E F Ice Type: ☒ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☒ Yes ☐ No ☐ N/A

Cooler Temperature: 4.4/4.0 Ice Visible in Sample Containers?: ☐ Yes ☒ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☒ N/A

All discrepancies will be written out in the comments section below.

	Yes	No		Yes	No	N/A
Are samples from West Virginia? Document any containers out of temp.		X	All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted. Circle: HNO3 H2SO4 NaOH NaOH/ZnAc			X
USDA Regulated Soils? (ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		X				
Chain of Custody Present:	X					
Chain of Custody Filled Out:	X		Dissolved Metals field filtered?:			X
Short Hold Time Analysis (<72hr)?: Analysis:		X	Headspace Wisconsin Sulfide			X
Time 5035A TC placed in Freezer or Short Holds To Lab:				Present	Absent	N/A
			Residual Chlorine Check (SVOC 625 Pest/PCB 608)			X
			Residual Chlorine Check (Total/Amenable/Free Cyanide)			X
Rush TAT Requested:		X	Headspace in VOA Vials (>6mm):		X	
Containers Intact?:	X		Trip Blank Present?:	Y		
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	X		Trip Blank Custody Seals?:	X		
Extra labels on Terracore Vials (soils only)?		X				

Comments:

F-IN-Q-290-rev.18,22Apr2019

COC PAGE 1 of 2

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							WT			
2																													
3																													
4																													
5																													
6																													
7			9																										
8			3																										
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

F-IN-Q-270-rev.11,26Sep2019

COC PAGE 2 of 2

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							wt			
2			7																										
3			3																										
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

July 21, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol
Pace Project No.: 50262022

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on July 10, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Indianapolis

Revised Report: This revision replaces previous report dated July 17, 2020. "J" flags added per client request. SAB 7/21/20

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Chris Parks, IWM Consulting Group

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project:	Amphenol
Pace Project No.:	50262022

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Accreditation #: 200074
Indiana Drinking Water Laboratory #: C-49-06
Kansas/TNI Certification #: E-10177
Kentucky UST Agency Interest #: 80226
Kentucky WW Laboratory ID #: 98019
Michigan Drinking Water Laboratory #9050
Ohio VAP Certified Laboratory #: CL0065
Oklahoma Laboratory #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Laboratory #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services, LLC
7726 Moller Road
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(317)228-3100

SAMPLE SUMMARY

Project: Amphenol
Pace Project No.: 50262022

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50262022001	IT-2	Water	07/09/20 16:51	07/10/20 08:52
50262022002	MW-12R	Water	07/09/20 10:15	07/10/20 08:52
50262022003	MW-31	Water	07/09/20 12:33	07/10/20 08:52
50262022004	MW-32	Water	07/08/20 12:07	07/10/20 08:52
50262022005	MW-33	Water	07/08/20 14:44	07/10/20 08:52
50262022006	MW-34	Water	07/09/20 14:04	07/10/20 08:52
50262022007	MW-35	Water	07/09/20 17:45	07/10/20 08:52
50262022008	MW-36	Water	07/09/20 15:34	07/10/20 08:52
50262022009	MW-37	Water	07/09/20 11:25	07/10/20 08:52
50262022010	MW-38	Water	07/08/20 16:15	07/10/20 08:52
50262022011	MW-39	Water	07/08/20 13:35	07/10/20 08:52
50262022012	MW-40	Water	07/08/20 11:01	07/10/20 08:52
50262022013	DUP1	Water	07/08/20 08:00	07/10/20 08:52
50262022014	DUP2	Water	07/09/20 08:00	07/10/20 08:52
50262022015	EB-1	Water	07/08/20 16:30	07/10/20 08:52
50262022016	EB-2	Water	07/09/20 18:00	07/10/20 08:52
50262022017	TRIP BLANK	Water	07/08/20 09:00	07/10/20 08:52

Pace Analytical Services, LLC
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(317)228-3100

SAMPLE ANALYTE COUNT

Project: Amphenol
Pace Project No.: 50262022

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50262022001	**IT-2**	EPA 8260	ZAH	12	PASI-I
50262022002	**MW-12R**	EPA 8260	ZAH	12	PASI-I
50262022003	**MW-31**	EPA 8260	ZAH	12	PASI-I
50262022004	**MW-32**	EPA 8260	ZAH	12	PASI-I
50262022005	**MW-33**	EPA 8260	ZAH	12	PASI-I
50262022006	**MW-34**	EPA 8260	ZAH	12	PASI-I
50262022007	**MW-35**	EPA 8260	ZAH	12	PASI-I
50262022008	**MW-36**	EPA 8260	ZAH	12	PASI-I
50262022009	**MW-37**	EPA 8260	ZAH	12	PASI-I
50262022010	**MW-38**	EPA 8260	ZAH	12	PASI-I
50262022011	**MW-39**	EPA 8260	ZAH	12	PASI-I
50262022012	**MW-40**	EPA 8260	ZAH	12	PASI-I
50262022013	**DUP1**	EPA 8260	ZAH	12	PASI-I
50262022014	**DUP2**	EPA 8260	ZAH	12	PASI-I
50262022015	**EB-1**	EPA 8260	ZAH	12	PASI-I
50262022016	**EB-2**	EPA 8260	ZAH	12	PASI-I
50262022017	**TRIP BLANK**	EPA 8260	ZAH	12	PASI-I

PASI-I = Pace Analytical Services - Indianapolis

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50262022

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50262022001	**IT-2**					
EPA 8260	cis-1,2-Dichloroethene	4.8J	ug/L	5.0	07/14/20 01:55	
EPA 8260	1,1,1-Trichloroethane	0.60J	ug/L	5.0	07/14/20 01:55	
EPA 8260	Trichloroethene	2.1J	ug/L	5.0	07/14/20 01:55	
50262022002	**MW-12R**					
EPA 8260	1,1-Dichloroethane	2.9J	ug/L	5.0	07/14/20 02:27	
EPA 8260	cis-1,2-Dichloroethene	29.3	ug/L	5.0	07/14/20 02:27	
EPA 8260	trans-1,2-Dichloroethene	0.65J	ug/L	5.0	07/14/20 02:27	
EPA 8260	Tetrachloroethene	281	ug/L	5.0	07/14/20 02:27	
EPA 8260	1,1,1-Trichloroethane	28.6	ug/L	5.0	07/14/20 02:27	
EPA 8260	Trichloroethene	147	ug/L	5.0	07/14/20 02:27	
EPA 8260	Vinyl chloride	10.0	ug/L	2.0	07/14/20 02:27	
50262022003	**MW-31**					
EPA 8260	Tetrachloroethene	37.7	ug/L	5.0	07/14/20 03:30	
EPA 8260	1,1,1-Trichloroethane	5.0J	ug/L	5.0	07/14/20 03:30	
EPA 8260	Trichloroethene	31.3	ug/L	5.0	07/14/20 03:30	
50262022004	**MW-32**					
EPA 8260	1,1-Dichloroethane	0.89J	ug/L	5.0	07/14/20 04:01	
EPA 8260	1,1,1-Trichloroethane	2.4J	ug/L	5.0	07/14/20 04:01	
EPA 8260	Trichloroethene	7.5	ug/L	5.0	07/14/20 04:01	
50262022006	**MW-34**					
EPA 8260	Tetrachloroethene	36.2	ug/L	5.0	07/14/20 05:04	
EPA 8260	1,1,1-Trichloroethane	2.5J	ug/L	5.0	07/14/20 05:04	
EPA 8260	Trichloroethene	14.6	ug/L	5.0	07/14/20 05:04	
50262022008	**MW-36**					
EPA 8260	Tetrachloroethene	55.8	ug/L	5.0	07/14/20 05:36	
EPA 8260	1,1,1-Trichloroethane	0.90J	ug/L	5.0	07/14/20 05:36	
EPA 8260	Trichloroethene	5.4	ug/L	5.0	07/14/20 05:36	
50262022009	**MW-37**					
EPA 8260	Tetrachloroethene	44.9	ug/L	5.0	07/14/20 06:08	
EPA 8260	1,1,1-Trichloroethane	2.6J	ug/L	5.0	07/14/20 06:08	
EPA 8260	Trichloroethene	26.9	ug/L	5.0	07/14/20 06:08	
50262022010	**MW-38**					
EPA 8260	Tetrachloroethene	27.4	ug/L	5.0	07/14/20 06:39	
EPA 8260	1,1,1-Trichloroethane	3.3J	ug/L	5.0	07/14/20 06:39	
EPA 8260	Trichloroethene	21.3	ug/L	5.0	07/14/20 06:39	
50262022011	**MW-39**					
EPA 8260	1,1-Dichloroethane	3.0J	ug/L	5.0	07/14/20 07:11	
EPA 8260	1,1,1-Trichloroethane	4.3J	ug/L	5.0	07/14/20 07:11	
EPA 8260	Trichloroethene	16.0	ug/L	5.0	07/14/20 07:11	
50262022012	**MW-40**					
EPA 8260	cis-1,2-Dichloroethene	4.2J	ug/L	5.0	07/14/20 21:11	
EPA 8260	Tetrachloroethene	8.8	ug/L	5.0	07/14/20 21:11	

Pace Analytical Services, LLC
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(317)228-3100

SUMMARY OF DETECTION

Project: Amphenol
Pace Project No.: 50262022

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50262022012	**MW-40**					
EPA 8260	1,1,1-Trichloroethane	5.0J	ug/L	5.0	07/14/20 21:11	
EPA 8260	Trichloroethene	29.0	ug/L	5.0	07/14/20 21:11	
50262022013	**DUP1**					
EPA 8260	Tetrachloroethene	26.9	ug/L	5.0	07/14/20 18:32	
EPA 8260	1,1,1-Trichloroethane	3.0J	ug/L	5.0	07/14/20 18:32	
EPA 8260	Trichloroethene	21.4	ug/L	5.0	07/14/20 18:32	
50262022014	**DUP2**					
EPA 8260	1,1-Dichloroethane	3.2J	ug/L	5.0	07/14/20 19:04	
EPA 8260	cis-1,2-Dichloroethene	29.6	ug/L	5.0	07/14/20 19:04	
EPA 8260	Tetrachloroethene	281	ug/L	25.0	07/16/20 18:04	
EPA 8260	1,1,1-Trichloroethane	28.8	ug/L	5.0	07/14/20 19:04	
EPA 8260	Trichloroethene	153	ug/L	5.0	07/14/20 19:04	
EPA 8260	Vinyl chloride	10.5	ug/L	2.0	07/14/20 19:04	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: IT-2 **Lab ID: 50262022001** Collected: 07/09/20 16:51 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 01:55	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.43	1		07/14/20 01:55	107-06-2	
cis-1,2-Dichloroethene	**4.8J**	ug/L	5.0	0.38	1		07/14/20 01:55	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.36	1		07/14/20 01:55	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.0	1		07/14/20 01:55	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.32	1		07/14/20 01:55	127-18-4	
1,1,1-Trichloroethane	**0.60J**	ug/L	5.0	0.47	1		07/14/20 01:55	71-55-6	
Trichloroethene	**2.1J**	ug/L	5.0	0.39	1		07/14/20 01:55	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.35	1		07/14/20 01:55	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	75-120		1		07/14/20 01:55	1868-53-7	
4-Bromofluorobenzene (S)	89	%.	85-116		1		07/14/20 01:55	460-00-4	
Toluene-d8 (S)	97	%.	83-111		1		07/14/20 01:55	2037-26-5	

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: MW-12R **Lab ID: 50262022002** Collected: 07/09/20 10:15 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**2.9J**	ug/L	5.0	0.44	1		07/14/20 02:27	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.43	1		07/14/20 02:27	107-06-2	
cis-1,2-Dichloroethene	**29.3**	ug/L	5.0	0.38	1		07/14/20 02:27	156-59-2	
trans-1,2-Dichloroethene	**0.65J**	ug/L	5.0	0.36	1		07/14/20 02:27	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.0	1		07/14/20 02:27	75-09-2	
Tetrachloroethene	**281**	ug/L	5.0	0.32	1		07/14/20 02:27	127-18-4	
1,1,1-Trichloroethane	**28.6**	ug/L	5.0	0.47	1		07/14/20 02:27	71-55-6	
Trichloroethene	**147**	ug/L	5.0	0.39	1		07/14/20 02:27	79-01-6	
Vinyl chloride	**10.0**	ug/L	2.0	0.35	1		07/14/20 02:27	75-01-4	
Surrogates									
Dibromofluoromethane (S)	100	%.	75-120		1		07/14/20 02:27	1868-53-7	
4-Bromofluorobenzene (S)	89	%.	85-116		1		07/14/20 02:27	460-00-4	
Toluene-d8 (S)	97	%.	83-111		1		07/14/20 02:27	2037-26-5	

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: MW-31 **Lab ID: 50262022003** Collected: 07/09/20 12:33 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 03:30	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.43	1		07/14/20 03:30	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 03:30	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.36	1		07/14/20 03:30	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.0	1		07/14/20 03:30	75-09-2	
Tetrachloroethene	**37.7**	ug/L	5.0	0.32	1		07/14/20 03:30	127-18-4	
1,1,1-Trichloroethane	**5.0J**	ug/L	5.0	0.47	1		07/14/20 03:30	71-55-6	
Trichloroethene	**31.3**	ug/L	5.0	0.39	1		07/14/20 03:30	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.35	1		07/14/20 03:30	75-01-4	
Surrogates									
Dibromofluoromethane (S)	101	%.	75-120		1		07/14/20 03:30	1868-53-7	
4-Bromofluorobenzene (S)	88	%.	85-116		1		07/14/20 03:30	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		07/14/20 03:30	2037-26-5	

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Indianapolis, IN 46268
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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: MW-32 **Lab ID: 50262022004** Collected: 07/08/20 12:07 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**0.89J**	ug/L	5.0	0.44	1		07/14/20 04:01	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.43	1		07/14/20 04:01	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 04:01	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.36	1		07/14/20 04:01	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.0	1		07/14/20 04:01	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.32	1		07/14/20 04:01	127-18-4	
1,1,1-Trichloroethane	**2.4J**	ug/L	5.0	0.47	1		07/14/20 04:01	71-55-6	
Trichloroethene	**7.5**	ug/L	5.0	0.39	1		07/14/20 04:01	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.35	1		07/14/20 04:01	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	75-120		1		07/14/20 04:01	1868-53-7	
4-Bromofluorobenzene (S)	88	%.	85-116		1		07/14/20 04:01	460-00-4	
Toluene-d8 (S)	98	%.	83-111		1		07/14/20 04:01	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: MW-33 **Lab ID: 50262022005** Collected: 07/08/20 14:44 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 04:33	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.43	1		07/14/20 04:33	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 04:33	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.36	1		07/14/20 04:33	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.0	1		07/14/20 04:33	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.32	1		07/14/20 04:33	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.47	1		07/14/20 04:33	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.39	1		07/14/20 04:33	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.35	1		07/14/20 04:33	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	75-120		1		07/14/20 04:33	1868-53-7	
4-Bromofluorobenzene (S)	89	%.	85-116		1		07/14/20 04:33	460-00-4	
Toluene-d8 (S)	98	%.	83-111		1		07/14/20 04:33	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: MW-34 **Lab ID: 50262022006** Collected: 07/09/20 14:04 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 05:04	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.43	1		07/14/20 05:04	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 05:04	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.36	1		07/14/20 05:04	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.0	1		07/14/20 05:04	75-09-2	
Tetrachloroethene	**36.2**	ug/L	5.0	0.32	1		07/14/20 05:04	127-18-4	
1,1,1-Trichloroethane	**2.5J**	ug/L	5.0	0.47	1		07/14/20 05:04	71-55-6	
Trichloroethene	**14.6**	ug/L	5.0	0.39	1		07/14/20 05:04	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.35	1		07/14/20 05:04	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		07/14/20 05:04	1868-53-7	
4-Bromofluorobenzene (S)	88	%.	85-116		1		07/14/20 05:04	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		07/14/20 05:04	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: MW-35 **Lab ID: 50262022007** Collected: 07/09/20 17:45 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 07:42	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.43	1		07/14/20 07:42	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 07:42	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.36	1		07/14/20 07:42	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.0	1		07/14/20 07:42	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.32	1		07/14/20 07:42	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.47	1		07/14/20 07:42	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.39	1		07/14/20 07:42	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.35	1		07/14/20 07:42	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		07/14/20 07:42	1868-53-7	
4-Bromofluorobenzene (S)	86	%.	85-116		1		07/14/20 07:42	460-00-4	
Toluene-d8 (S)	101	%.	83-111		1		07/14/20 07:42	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: MW-36 **Lab ID: 50262022008** Collected: 07/09/20 15:34 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 05:36	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.43	1		07/14/20 05:36	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 05:36	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.36	1		07/14/20 05:36	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.0	1		07/14/20 05:36	75-09-2	
Tetrachloroethene	**55.8**	ug/L	5.0	0.32	1		07/14/20 05:36	127-18-4	
1,1,1-Trichloroethane	**0.90J**	ug/L	5.0	0.47	1		07/14/20 05:36	71-55-6	
Trichloroethene	**5.4**	ug/L	5.0	0.39	1		07/14/20 05:36	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.35	1		07/14/20 05:36	75-01-4	
Surrogates									
Dibromofluoromethane (S)	101	%.	75-120		1		07/14/20 05:36	1868-53-7	
4-Bromofluorobenzene (S)	90	%.	85-116		1		07/14/20 05:36	460-00-4	
Toluene-d8 (S)	100	%.	83-111		1		07/14/20 05:36	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: MW-37 **Lab ID: 50262022009** Collected: 07/09/20 11:25 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 06:08	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.43	1		07/14/20 06:08	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 06:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.36	1		07/14/20 06:08	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.0	1		07/14/20 06:08	75-09-2	
Tetrachloroethene	**44.9**	ug/L	5.0	0.32	1		07/14/20 06:08	127-18-4	
1,1,1-Trichloroethane	**2.6J**	ug/L	5.0	0.47	1		07/14/20 06:08	71-55-6	
Trichloroethene	**26.9**	ug/L	5.0	0.39	1		07/14/20 06:08	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.35	1		07/14/20 06:08	75-01-4	
Surrogates									
Dibromofluoromethane (S)	101	%.	75-120		1		07/14/20 06:08	1868-53-7	
4-Bromofluorobenzene (S)	88	%.	85-116		1		07/14/20 06:08	460-00-4	
Toluene-d8 (S)	100	%.	83-111		1		07/14/20 06:08	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: MW-38 **Lab ID: 50262022010** Collected: 07/08/20 16:15 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 06:39	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.43	1		07/14/20 06:39	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 06:39	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.36	1		07/14/20 06:39	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.0	1		07/14/20 06:39	75-09-2	
Tetrachloroethene	**27.4**	ug/L	5.0	0.32	1		07/14/20 06:39	127-18-4	
1,1,1-Trichloroethane	**3.3J**	ug/L	5.0	0.47	1		07/14/20 06:39	71-55-6	
Trichloroethene	**21.3**	ug/L	5.0	0.39	1		07/14/20 06:39	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.35	1		07/14/20 06:39	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	75-120		1		07/14/20 06:39	1868-53-7	
4-Bromofluorobenzene (S)	87	%.	85-116		1		07/14/20 06:39	460-00-4	
Toluene-d8 (S)	99	%.	83-111		1		07/14/20 06:39	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: MW-39 **Lab ID: 50262022011** Collected: 07/08/20 13:35 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**3.0J**	ug/L	5.0	0.44	1		07/14/20 07:11	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.43	1		07/14/20 07:11	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 07:11	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.36	1		07/14/20 07:11	156-60-5	
Methylene Chloride	ND	ug/L	5.0	2.0	1		07/14/20 07:11	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.32	1		07/14/20 07:11	127-18-4	
1,1,1-Trichloroethane	**4.3J**	ug/L	5.0	0.47	1		07/14/20 07:11	71-55-6	
Trichloroethene	**16.0**	ug/L	5.0	0.39	1		07/14/20 07:11	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.35	1		07/14/20 07:11	75-01-4	
Surrogates									
Dibromofluoromethane (S)	106	%.	75-120		1		07/14/20 07:11	1868-53-7	
4-Bromofluorobenzene (S)	86	%.	85-116		1		07/14/20 07:11	460-00-4	
Toluene-d8 (S)	100	%.	83-111		1		07/14/20 07:11	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: MW-40 **Lab ID: 50262022012** Collected: 07/08/20 11:01 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		07/14/20 21:11	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 21:11	107-06-2	
cis-1,2-Dichloroethene	**4.2J**	ug/L	5.0	0.39	1		07/14/20 21:11	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 21:11	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		07/14/20 21:11	75-09-2	
Tetrachloroethene	**8.8**	ug/L	5.0	0.27	1		07/14/20 21:11	127-18-4	
1,1,1-Trichloroethane	**5.0J**	ug/L	5.0	0.37	1		07/14/20 21:11	71-55-6	
Trichloroethene	**29.0**	ug/L	5.0	0.42	1		07/14/20 21:11	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		07/14/20 21:11	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		07/14/20 21:11	1868-53-7	
4-Bromofluorobenzene (S)	86	%.	85-116		1		07/14/20 21:11	460-00-4	
Toluene-d8 (S)	101	%.	83-111		1		07/14/20 21:11	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: DUP1 **Lab ID: 50262022013** Collected: 07/08/20 08:00 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		07/14/20 18:32	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 18:32	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		07/14/20 18:32	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 18:32	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		07/14/20 18:32	75-09-2	
Tetrachloroethene	**26.9**	ug/L	5.0	0.27	1		07/14/20 18:32	127-18-4	
1,1,1-Trichloroethane	**3.0J**	ug/L	5.0	0.37	1		07/14/20 18:32	71-55-6	
Trichloroethene	**21.4**	ug/L	5.0	0.42	1		07/14/20 18:32	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		07/14/20 18:32	75-01-4	
Surrogates									
Dibromofluoromethane (S)	100	%.	75-120		1		07/14/20 18:32	1868-53-7	
4-Bromofluorobenzene (S)	86	%.	85-116		1		07/14/20 18:32	460-00-4	
Toluene-d8 (S)	98	%.	83-111		1		07/14/20 18:32	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: DUP2 **Lab ID: 50262022014** Collected: 07/09/20 08:00 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**3.2J**	ug/L	5.0	0.33	1		07/14/20 19:04	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 19:04	107-06-2	
cis-1,2-Dichloroethene	**29.6**	ug/L	5.0	0.39	1		07/14/20 19:04	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 19:04	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		07/14/20 19:04	75-09-2	
Tetrachloroethene	**281**	ug/L	25.0	1.6	5		07/16/20 18:04	127-18-4	
1,1,1-Trichloroethane	**28.8**	ug/L	5.0	0.37	1		07/14/20 19:04	71-55-6	
Trichloroethene	**153**	ug/L	5.0	0.42	1		07/14/20 19:04	79-01-6	
Vinyl chloride	**10.5**	ug/L	2.0	0.23	1		07/14/20 19:04	75-01-4	
Surrogates									
Dibromofluoromethane (S)	99	%.	75-120		1		07/14/20 19:04	1868-53-7	
4-Bromofluorobenzene (S)	88	%.	85-116		1		07/14/20 19:04	460-00-4	
Toluene-d8 (S)	101	%.	83-111		1		07/14/20 19:04	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: EB-1 **Lab ID: 50262022015** Collected: 07/08/20 16:30 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		07/14/20 19:36	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 19:36	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		07/14/20 19:36	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 19:36	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		07/14/20 19:36	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		07/14/20 19:36	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.37	1		07/14/20 19:36	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.42	1		07/14/20 19:36	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		07/14/20 19:36	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		07/14/20 19:36	1868-53-7	
4-Bromofluorobenzene (S)	87	%.	85-116		1		07/14/20 19:36	460-00-4	
Toluene-d8 (S)	100	%.	83-111		1		07/14/20 19:36	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: EB-2 **Lab ID: 50262022016** Collected: 07/09/20 18:00 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		07/14/20 20:07	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 20:07	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		07/14/20 20:07	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 20:07	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		07/14/20 20:07	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		07/14/20 20:07	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.37	1		07/14/20 20:07	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.42	1		07/14/20 20:07	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		07/14/20 20:07	75-01-4	
Surrogates									
Dibromofluoromethane (S)	99	%.	75-120		1		07/14/20 20:07	1868-53-7	
4-Bromofluorobenzene (S)	87	%.	85-116		1		07/14/20 20:07	460-00-4	
Toluene-d8 (S)	102	%.	83-111		1		07/14/20 20:07	2037-26-5	

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

ANALYTICAL RESULTS

Project: Amphenol
Pace Project No.: 50262022

Sample: TRIP BLANK **Lab ID: 50262022017** Collected: 07/08/20 09:00 Received: 07/10/20 08:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		07/14/20 20:39	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		07/14/20 20:39	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		07/14/20 20:39	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		07/14/20 20:39	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		07/14/20 20:39	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		07/14/20 20:39	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.37	1		07/14/20 20:39	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.42	1		07/14/20 20:39	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		07/14/20 20:39	75-01-4	
Surrogates									
Dibromofluoromethane (S)	100	%.	75-120		1		07/14/20 20:39	1868-53-7	
4-Bromofluorobenzene (S)	85	%.	85-116		1		07/14/20 20:39	460-00-4	
Toluene-d8 (S)	102	%.	83-111		1		07/14/20 20:39	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50262022

QC Batch: 571855
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50262022001, 50262022002, 50262022003, 50262022004, 50262022005, 50262022006, 50262022007, 50262022008, 50262022009, 50262022010, 50262022011

METHOD BLANK: 2637896 Matrix: Water

Associated Lab Samples: 50262022001, 50262022002, 50262022003, 50262022004, 50262022005, 50262022006, 50262022007, 50262022008, 50262022009, 50262022010, 50262022011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.47	07/13/20 22:46	
1,1-Dichloroethane	ug/L	ND	5.0	0.44	07/13/20 22:46	
1,2-Dichloroethane	ug/L	ND	5.0	0.43	07/13/20 22:46	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.38	07/13/20 22:46	
Methylene Chloride	ug/L	ND	5.0	2.0	07/13/20 22:46	
Tetrachloroethene	ug/L	ND	5.0	0.32	07/13/20 22:46	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.36	07/13/20 22:46	
Trichloroethene	ug/L	ND	5.0	0.39	07/13/20 22:46	
Vinyl chloride	ug/L	ND	2.0	0.35	07/13/20 22:46	
4-Bromofluorobenzene (S)	%.	90	85-116		07/13/20 22:46	
Dibromofluoromethane (S)	%.	106	75-120		07/13/20 22:46	
Toluene-d8 (S)	%.	92	83-111		07/13/20 22:46	

LABORATORY CONTROL SAMPLE: 2637897

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	47.3	95	78-130	
1,1-Dichloroethane	ug/L	50	44.0	88	77-123	
1,2-Dichloroethane	ug/L	50	44.5	89	66-127	
cis-1,2-Dichloroethene	ug/L	50	45.0	90	76-120	
Methylene Chloride	ug/L	50	45.6	91	68-126	
Tetrachloroethene	ug/L	50	43.4	87	70-123	
trans-1,2-Dichloroethene	ug/L	50	46.5	93	79-126	
Trichloroethene	ug/L	50	43.3	87	78-120	
Vinyl chloride	ug/L	50	46.7	93	55-122	
4-Bromofluorobenzene (S)	%.			99	85-116	
Dibromofluoromethane (S)	%.			101	75-120	
Toluene-d8 (S)	%.			92	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2637898 2637899

Parameter	Units	50262022007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	50.8	51.5	102	103	56-144	1	20	
1,1-Dichloroethane	ug/L	ND	50	50	50.1	47.9	100	96	53-140	5	20	
1,2-Dichloroethane	ug/L	ND	50	50	47.9	47.9	96	96	46-145	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50262022

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2637898 2637899

Parameter	Units	50262022007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	50	50	48.7	48.9	97	98	53-134	0	20	
Methylene Chloride	ug/L	ND	50	50	48.2	47.4	96	95	46-138	2	20	
Tetrachloroethene	ug/L	ND	50	50	44.1	44.0	88	88	32-140	0	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	48.7	47.9	97	96	57-138	2	20	
Trichloroethene	ug/L	ND	50	50	45.8	45.3	92	91	47-137	1	20	
Vinyl chloride	ug/L	ND	50	50	53.5	51.9	107	104	36-136	3	20	
4-Bromofluorobenzene (S)	%.						97	95	85-116			
Dibromofluoromethane (S)	%.						100	102	75-120			
Toluene-d8 (S)	%.						95	92	83-111			

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50262022

QC Batch: 572045 | Analysis Method: EPA 8260
QC Batch Method: EPA 8260 | Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50262022012, 50262022013, 50262022014, 50262022015, 50262022016, 50262022017

METHOD BLANK: 2638634 Matrix: Water
Associated Lab Samples: 50262022012, 50262022013, 50262022014, 50262022015, 50262022016, 50262022017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.37	07/14/20 12:12	
1,1-Dichloroethane	ug/L	ND	5.0	0.33	07/14/20 12:12	
1,2-Dichloroethane	ug/L	ND	5.0	0.44	07/14/20 12:12	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.39	07/14/20 12:12	
Methylene Chloride	ug/L	ND	5.0	3.0	07/14/20 12:12	
Tetrachloroethene	ug/L	ND	5.0	0.27	07/14/20 12:12	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.38	07/14/20 12:12	
Trichloroethene	ug/L	ND	5.0	0.42	07/14/20 12:12	
Vinyl chloride	ug/L	ND	2.0	0.23	07/14/20 12:12	
4-Bromofluorobenzene (S)	%.	87	85-116		07/14/20 12:12	
Dibromofluoromethane (S)	%.	95	75-120		07/14/20 12:12	
Toluene-d8 (S)	%.	101	83-111		07/14/20 12:12	

LABORATORY CONTROL SAMPLE: 2638635

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	52.3	105	78-130	
1,1-Dichloroethane	ug/L	50	48.7	97	77-123	
1,2-Dichloroethane	ug/L	50	48.9	98	66-127	
cis-1,2-Dichloroethene	ug/L	50	49.2	98	76-120	
Methylene Chloride	ug/L	50	47.9	96	68-126	
Tetrachloroethene	ug/L	50	47.3	95	70-123	
trans-1,2-Dichloroethene	ug/L	50	52.5	105	79-126	
Trichloroethene	ug/L	50	49.2	98	78-120	
Vinyl chloride	ug/L	50	54.3	109	55-122	
4-Bromofluorobenzene (S)	%.			96	85-116	
Dibromofluoromethane (S)	%.			101	75-120	
Toluene-d8 (S)	%.			92	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2638636 2638637

Parameter	Units	50262022012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	5.0J	50	50	54.3	55.4	99	101	56-144	2	20	
1,1-Dichloroethane	ug/L	ND	50	50	47.3	49.4	95	99	53-140	4	20	
1,2-Dichloroethane	ug/L	ND	50	50	49.2	50.3	98	101	46-145	2	20	
cis-1,2-Dichloroethene	ug/L	4.2J	50	50	51.5	52.6	95	97	53-134	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: Amphenol
Pace Project No.: 50262022

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2638636 2638637

Parameter	Units	50262022012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methylene Chloride	ug/L	ND	50	50	46.9	48.1	94	96	46-138	3	20	
Tetrachloroethene	ug/L	8.8	50	50	51.1	51.0	84	84	32-140	0	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	50.4	50.7	101	101	57-138	1	20	
Trichloroethene	ug/L	29.0	50	50	70.1	72.9	82	88	47-137	4	20	
Vinyl chloride	ug/L	ND	50	50	53.5	52.7	107	105	36-136	2	20	
4-Bromofluorobenzene (S)	%.						94	93	85-116			
Dibromofluoromethane (S)	%.						103	103	75-120			
Toluene-d8 (S)	%.						98	93	83-111			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALIFIERS

Project: Amphenol
Pace Project No.: 50262022

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol
Pace Project No.: 50262022

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50262022001	**IT-2**	EPA 8260	571855		
50262022002	**MW-12R**	EPA 8260	571855		
50262022003	**MW-31**	EPA 8260	571855		
50262022004	**MW-32**	EPA 8260	571855		
50262022005	**MW-33**	EPA 8260	571855		
50262022006	**MW-34**	EPA 8260	571855		
50262022007	**MW-35**	EPA 8260	571855		
50262022008	**MW-36**	EPA 8260	571855		
50262022009	**MW-37**	EPA 8260	571855		
50262022010	**MW-38**	EPA 8260	571855		
50262022011	**MW-39**	EPA 8260	571855		
50262022012	**MW-40**	EPA 8260	572045		
50262022013	**DUP1**	EPA 8260	572045		
50262022014	**DUP2**	EPA 8260	572045		
50262022015	**EB-1**	EPA 8260	572045		
50262022016	**EB-2**	EPA 8260	572045		
50262022017	**TRIP BLANK**	EPA 8260	572045		

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

WO#: 50262022

50262022

...orkorder Number or ... ONLY

Company: IWM Consulting
Address: 7428 Rockville Rd
Report To: Brad Gentry
Copy To: Chris Parks
Customer Project Name/Number: Amphenol
Phone: 317-347-1111
Email:
Collected By (print): Garrett Page
Collected By (signature): [signature]
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:

Billing Information: SAME
Email To: bgentry@iwmconsult.com
Site Collection Info/Address:
State: IN / County/City: Johnson / Franklin / Time Zone Collected: [ ] PT [ ] MT [ ] CT [X] ET

Site/Facility ID #:
Compliance Monitoring? [ ] Yes [ ] No
Purchase Order #: Quote #: Level IV QA/QC
DW PWS ID #: DW Location Code:
Turnaround Date Required: Standard
Immediately Packed on Ice: [X] Yes [ ] No
Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)
Field Filtered (if applicable): [ ] Yes [X] No
Analysis:

Container Preservative Type: 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses: VOCs 8260 (Shortlist)

Lab Project Manager:

Lab Profile/Line:

Lab Sample Receipt Checklist: See Scan

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	VOCs 8260 (Shortlist)	LAB USE ONLY: Lab Sample # / Comments:
IT-2	GW	G			7/9	16:51		3		001
MW-12R					7/9	10:15		3		002
MW-31					7/9	12:33		3		003
MW-32					7/8	12:07		3		004
MW-33					7/8	14:44		3		005
MW-34					7/9	14:04		3		006
MW-35 (MS/MSD 2)					7/9	17:45		9		007
MW-36					7/9	15:34		3		008
MW-37					7/9	11:25		3		009
MW-38					7/8	16:15		3		010

Customer Remarks / Special Conditions / Possible Hazards: Shortlist - PCE, TCE, 1,1,1-TCA, 1,1-DCA, 1,2-DCA, Cis/trans-1,2-DCE, VC, MC

Type of Ice Used: Wet Blue Dry None
Packing Material Used:
Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A
Lab Tracking #: 2534097
Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: E
Cooler 1 Temp Upon Receipt: 1.2 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 1.2 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
[signature] / IWM	7/10 8:52	[signature]	7/10/20 0852	Table #: Acctnum:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM: PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 1 of: 2

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM Consulting

Address: 7428 Rockville Rd

Report To: Brad Gentry

Copy To: Chris Parks

Customer Project Name/Number: Amphenol

Phone: 317-347-1111

Email:

Collected By (print): Garrett Payne

Collected By (signature): Garrett Payne

Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______

Billing Information: SAME

Email To: bgentry@iwmconsult.com

Site Collection Info/Address:

State: IN / County/City: Johnson/Franklin / Time Zone Collected: [ ] PT [ ] MT [ ] CT [X] ET

Site/Facility ID #:

Compliance Monitoring? [ ] Yes [ ] No

Purchase Order #:

Quote#: Level IV QA/QC

DW PWS ID #:

DW Location Code:

Turnaround Date Required: Standard

Immediately Packed on Ice: [X] Yes [ ] No

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [X] No

Analysis: ______

Container Preservative Type **: 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

Lab Project Manager:

Analyses: VOCs 8260 (Shortlist)

Lab Profile/Line:

```
Lab Sample Receipt Checklist:          822 SCa
Custody Seals Present/Intact         Y N NA
Custody Signatures Present           Y N NA
Collector Signature Present          Y N NA
Bottles Intact                       Y N NA
Correct Bottles                      Y N NA
Sufficient Volume                    Y N NA
Samples Received on Ice              Y N NA
VOA - Headspace Acceptable           Y N NA
USDA Regulated Soils                 Y N NA
Samples in Holding Time              Y N NA
Residual Chlorine Present            Y N NA
Cl Strips: ______
Sample pH Acceptable                 Y N NA
pH Strips: ______
Sulfide Present                      Y N NA
Lead Acetate Strips: ______
```

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	VOCs 8260 (Shortlist)	LAB USE ONLY: Lab Sample # / Comments:
MW-39	GW	G			7/8	13:35		3		011
MW-40 (MS/MSD 1)	↓	↓			7/8	11:01		9		012
DUP 1					7/8	—		3		013
DUP 2	↓				7/9	—		3		014
EB-1	OT				7/8	16:30		3		015
EB-2					7/9	18:00		3		016
TRIP BLANK	↓	↓			7/8	9:00		3		017

Customer Remarks / Special Conditions / Possible Hazards: (Shortlist on Page 1)

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2534098

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: (Y) N NA
Therm ID#: E
Cooler 1 Temp Upon Receipt: 1.2 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 1.2 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
Garrett Payne/IWM	7/10 8:52	[signature]	7/10/25 0852	Table #: Acctnum:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM: PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 2 of: 2

Pace Analytical

SAMPLE CONDITION UPON RECEIPT FORM

Project #: 50262022

Date/Time and Initials of person examining contents: MTR 7/6/20 1140

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other ________

Tracking #: ________

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No **Seals Intact:** ☐ Yes ☑ No

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other ________

Thermometer: 1 2 3 4 5 6 A B C D E F (E circled) Ice Type: ☑ Wet ☐ Blue ☐ None | Samples collected today and on ice: ☐ Yes ☐ No ☑ N/A

Cooler Temperature: 1.2/1.2 Ice Visible in Sample Containers?: ☐ Yes ☑ No ☐ N/A

(Initial/Corrected) Temp should be above freezing to 6°C If temp. is Over 6°C or under 0°C, was the PM Notified?: ☐ Yes ☐ No ☑ N/A

All discrepancies will be written out in the comments section below.

	Yes	No
Are samples from West Virginia? Document any containers out of temp.		✓
USDA Regulated Soils? (ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		✓
Chain of Custody Present:	✓	
Chain of Custody Filled Out:	✓	
Short Hold Time Analysis (<72hr)?: Analysis:		✓
Time 5035A TC placed in Freezer or Short Holds To Lab:		
Rush TAT Requested:		✓
Containers Intact?:	✓	
Sample Labels (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	✓	
Extra labels on Terracore Vials (soils only)?		✓

	Yes	No	N/A
All containers needing acid/base pres. Have been checked?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted. Circle: HNO3 H2SO4 NaOH NaOH/ZnAc			✓
Dissolved Metals field filtered?:			✓
Headspace Wisconsin Sulfide			✓
	Present	Absent	N/A
Residual Chlorine Check (SVOC 625 Pest/PCB 608)			✓
Residual Chlorine Check (Total/Amenable/Free Cyanide)			✓
Headspace in VOA Vials (>6mm):		✓	
Trip Blank Present?:	✓		
Trip Blank Custody Seals?:	✓		

Comments:

COC PAGE 1 of 2

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							WT			
2																													
3																													
4																													
5																													
6																													
7			9																										
8			3																										
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

COC PAGE 2 of 2

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																							WT			
2			9																										
3			3																										
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

August 12, 2020

Mr. Chris Newell
IWM Consulting
7428 Rockville Road
Indianapolis, IN 46214

RE: Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Dear Mr. Newell:

Enclosed are the analytical results for sample(s) received by the laboratory on August 06, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Indianapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Susan Brotherton

Sue Brotherton
sue.brotherton@pacelabs.com
(317)228-3100
Project Manager

Enclosures

cc: Mr. Brad Gentry, IWM Consulting
Mr. Chris Parks, IWM Consulting Group

CERTIFICATIONS

Project:	Amphenol/ iNAMP18.02
Pace Project No.:	50264206

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Accreditation #: 200074
Indiana Drinking Water Laboratory #: C-49-06
Kansas/TNI Certification #: E-10177
Kentucky UST Agency Interest #: 80226
Kentucky WW Laboratory ID #: 98019
Michigan Drinking Water Laboratory #9050
Ohio VAP Certified Laboratory #: CL0065
Oklahoma Laboratory #: 9204
Texas Certification #: T104704355
West Virginia Certification #: 330
Wisconsin Laboratory #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE SUMMARY

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50264206001	**IT-2**	Water	08/06/20 10:40	08/06/20 17:00
50264206002	**MW-12R**	Water	08/05/20 16:57	08/06/20 17:00
50264206003	**MW-31**	Water	08/05/20 11:01	08/06/20 17:00
50264206004	**MW-32**	Water	08/04/20 11:29	08/06/20 17:00
50264206005	**MW-33**	Water	08/04/20 14:45	08/06/20 17:00
50264206006	**MW-34**	Water	08/05/20 13:54	08/06/20 17:00
50264206007	**MW-35**	Water	08/06/20 12:04	08/06/20 17:00
50264206008	**MW-36**	Water	08/05/20 15:41	08/06/20 17:00
50264206009	**MW-37**	Water	08/05/20 12:36	08/06/20 17:00
50264206010	**MW-38**	Water	08/04/20 16:07	08/06/20 17:00
50264206011	**MW-39**	Water	08/04/20 13:51	08/06/20 17:00
50264206012	**MW-40**	Water	08/04/20 12:48	08/06/20 17:00
50264206013	**FD-1 WT**	Water	08/05/20 08:00	08/06/20 17:00
50264206014	**FD-2 WT**	Water	08/04/20 08:00	08/06/20 17:00
50264206015	**EB-1 WT**	Water	08/04/20 11:36	08/06/20 17:00
50264206016	**EB-2 WT**	Water	08/05/20 11:07	08/06/20 17:00
50264206017	**TB-1 WT**	Water	08/04/20 07:00	08/06/20 17:00
50264206018	**EB-3 WT**	Water	08/06/20 10:45	08/06/20 17:00

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SAMPLE ANALYTE COUNT

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50264206001	**IT-2**	EPA 8260	ZAH	12	PASI-I
50264206002	**MW-12R**	EPA 8260	ZAH	12	PASI-I
50264206003	**MW-31**	EPA 8260	ZAH	12	PASI-I
50264206004	**MW-32**	EPA 8260	ZAH	12	PASI-I
50264206005	**MW-33**	EPA 8260	ZAH	12	PASI-I
50264206006	**MW-34**	EPA 8260	ZAH	12	PASI-I
50264206007	**MW-35**	EPA 8260	ZAH	12	PASI-I
50264206008	**MW-36**	EPA 8260	ZAH	12	PASI-I
50264206009	**MW-37**	EPA 8260	ZAH	12	PASI-I
50264206010	**MW-38**	EPA 8260	ZAH	12	PASI-I
50264206011	**MW-39**	EPA 8260	ZAH	12	PASI-I
50264206012	**MW-40**	EPA 8260	ZAH	12	PASI-I
50264206013	**FD-1 WT**	EPA 8260	ZAH	12	PASI-I
50264206014	**FD-2 WT**	EPA 8260	ZAH	12	PASI-I
50264206015	**EB-1 WT**	EPA 8260	ZAH	12	PASI-I
50264206016	**EB-2 WT**	EPA 8260	ZAH	12	PASI-I
50264206017	**TB-1 WT**	EPA 8260	ZAH	12	PASI-I
50264206018	**EB-3 WT**	EPA 8260	ZAH	12	PASI-I

PASI-I = Pace Analytical Services - Indianapolis

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

SUMMARY OF DETECTION

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50264206001	**IT-2**					
EPA 8260	cis-1,2-Dichloroethene	6.4	ug/L	5.0	08/10/20 12:16	
EPA 8260	Trichloroethene	1.3J	ug/L	5.0	08/10/20 12:16	
50264206002	**MW-12R**					
EPA 8260	1,1-Dichloroethane	4.0J	ug/L	5.0	08/10/20 12:48	
EPA 8260	cis-1,2-Dichloroethene	77.1	ug/L	5.0	08/10/20 12:48	
EPA 8260	trans-1,2-Dichloroethene	0.76J	ug/L	5.0	08/10/20 12:48	
EPA 8260	Tetrachloroethene	294	ug/L	5.0	08/10/20 12:48	
EPA 8260	1,1,1-Trichloroethane	28.5	ug/L	5.0	08/10/20 12:48	
EPA 8260	Trichloroethene	153	ug/L	5.0	08/10/20 12:48	
EPA 8260	Vinyl chloride	15.3	ug/L	2.0	08/10/20 12:48	
50264206003	**MW-31**					
EPA 8260	Tetrachloroethene	36.9	ug/L	5.0	08/10/20 13:20	
EPA 8260	1,1,1-Trichloroethane	5.5	ug/L	5.0	08/10/20 13:20	
EPA 8260	Trichloroethene	33.3	ug/L	5.0	08/10/20 13:20	
50264206004	**MW-32**					
EPA 8260	1,1,1-Trichloroethane	1.5J	ug/L	5.0	08/10/20 13:51	
EPA 8260	Trichloroethene	5.9	ug/L	5.0	08/10/20 13:51	
50264206006	**MW-34**					
EPA 8260	Tetrachloroethene	35.9	ug/L	5.0	08/10/20 14:58	
EPA 8260	1,1,1-Trichloroethane	2.5J	ug/L	5.0	08/10/20 14:58	
EPA 8260	Trichloroethene	14.8	ug/L	5.0	08/10/20 14:58	
50264206008	**MW-36**					
EPA 8260	Tetrachloroethene	58.4	ug/L	5.0	08/10/20 15:29	
EPA 8260	1,1,1-Trichloroethane	0.77J	ug/L	5.0	08/10/20 15:29	
EPA 8260	Trichloroethene	5.6	ug/L	5.0	08/10/20 15:29	
50264206009	**MW-37**					
EPA 8260	Tetrachloroethene	42.4	ug/L	5.0	08/10/20 16:01	
EPA 8260	1,1,1-Trichloroethane	2.4J	ug/L	5.0	08/10/20 16:01	
EPA 8260	Trichloroethene	25.6	ug/L	5.0	08/10/20 16:01	
50264206010	**MW-38**					
EPA 8260	Tetrachloroethene	27.6	ug/L	5.0	08/10/20 16:33	
EPA 8260	1,1,1-Trichloroethane	3.3J	ug/L	5.0	08/10/20 16:33	
EPA 8260	Trichloroethene	21.7	ug/L	5.0	08/10/20 16:33	
50264206011	**MW-39**					
EPA 8260	1,1-Dichloroethane	2.6J	ug/L	5.0	08/10/20 17:05	
EPA 8260	1,1,1-Trichloroethane	4.5J	ug/L	5.0	08/10/20 17:05	
EPA 8260	Trichloroethene	18.3	ug/L	5.0	08/10/20 17:05	
50264206012	**MW-40**					
EPA 8260	cis-1,2-Dichloroethene	3.5J	ug/L	5.0	08/11/20 07:24	
EPA 8260	Tetrachloroethene	4.7J	ug/L	5.0	08/11/20 07:24	
EPA 8260	1,1,1-Trichloroethane	5.1	ug/L	5.0	08/11/20 07:24	
EPA 8260	Trichloroethene	26.7	ug/L	5.0	08/11/20 07:24	

Pace Analytical Services, LLC
7726 Moller Road
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(317)228-3100

SUMMARY OF DETECTION

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50264206013	**FD-1 WT**					
EPA 8260	1,1-Dichloroethane	4.3J	ug/L	5.0	08/10/20 17:36	
EPA 8260	cis-1,2-Dichloroethene	85.4	ug/L	5.0	08/10/20 17:36	
EPA 8260	trans-1,2-Dichloroethene	0.59J	ug/L	5.0	08/10/20 17:36	
EPA 8260	Tetrachloroethene	316	ug/L	50.0	08/12/20 07:05	
EPA 8260	1,1,1-Trichloroethane	29.7	ug/L	5.0	08/10/20 17:36	
EPA 8260	Trichloroethene	161	ug/L	5.0	08/10/20 17:36	
EPA 8260	Vinyl chloride	16.5	ug/L	2.0	08/10/20 17:36	
50264206014	**FD-2 WT**					
EPA 8260	cis-1,2-Dichloroethene	1.7J	ug/L	5.0	08/10/20 18:08	
EPA 8260	Tetrachloroethene	34.9	ug/L	5.0	08/10/20 18:08	
EPA 8260	1,1,1-Trichloroethane	4.1J	ug/L	5.0	08/10/20 18:08	
EPA 8260	Trichloroethene	25.3	ug/L	5.0	08/10/20 18:08	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: IT-2 **Lab ID: 50264206001** Collected: 08/06/20 10:40 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 12:16	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 12:16	107-06-2	
cis-1,2-Dichloroethene	**6.4**	ug/L	5.0	0.39	1		08/10/20 12:16	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 12:16	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 12:16	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		08/10/20 12:16	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.37	1		08/10/20 12:16	71-55-6	
Trichloroethene	**1.3J**	ug/L	5.0	0.42	1		08/10/20 12:16	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 12:16	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	75-120		1		08/10/20 12:16	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	85-116		1		08/10/20 12:16	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		08/10/20 12:16	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
7726 Moller Road
Indianapolis, IN 46268
(317)228-3100

ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: MW-12R **Lab ID: 50264206002** Collected: 08/05/20 16:57 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**4.0J**	ug/L	5.0	0.33	1		08/10/20 12:48	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 12:48	107-06-2	
cis-1,2-Dichloroethene	**77.1**	ug/L	5.0	0.39	1		08/10/20 12:48	156-59-2	
trans-1,2-Dichloroethene	**0.76J**	ug/L	5.0	0.38	1		08/10/20 12:48	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 12:48	75-09-2	
Tetrachloroethene	**294**	ug/L	5.0	0.27	1		08/10/20 12:48	127-18-4	
1,1,1-Trichloroethane	**28.5**	ug/L	5.0	0.37	1		08/10/20 12:48	71-55-6	
Trichloroethene	**153**	ug/L	5.0	0.42	1		08/10/20 12:48	79-01-6	
Vinyl chloride	**15.3**	ug/L	2.0	0.23	1		08/10/20 12:48	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		08/10/20 12:48	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	85-116		1		08/10/20 12:48	460-00-4	
Toluene-d8 (S)	93	%.	83-111		1		08/10/20 12:48	2037-26-5	

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: MW-31 **Lab ID: 50264206003** Collected: 08/05/20 11:01 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 13:20	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 13:20	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 13:20	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 13:20	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 13:20	75-09-2	
Tetrachloroethene	**36.9**	ug/L	5.0	0.27	1		08/10/20 13:20	127-18-4	
1,1,1-Trichloroethane	**5.5**	ug/L	5.0	0.37	1		08/10/20 13:20	71-55-6	
Trichloroethene	**33.3**	ug/L	5.0	0.42	1		08/10/20 13:20	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 13:20	75-01-4	
Surrogates									
Dibromofluoromethane (S)	101	%.	75-120		1		08/10/20 13:20	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	85-116		1		08/10/20 13:20	460-00-4	
Toluene-d8 (S)	91	%.	83-111		1		08/10/20 13:20	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: MW-32 **Lab ID: 50264206004** Collected: 08/04/20 11:29 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 13:51	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 13:51	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 13:51	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 13:51	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 13:51	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		08/10/20 13:51	127-18-4	
1,1,1-Trichloroethane	**1.5J**	ug/L	5.0	0.37	1		08/10/20 13:51	71-55-6	
Trichloroethene	**5.9**	ug/L	5.0	0.42	1		08/10/20 13:51	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 13:51	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		08/10/20 13:51	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	85-116		1		08/10/20 13:51	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		08/10/20 13:51	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: MW-33 **Lab ID: 50264206005** Collected: 08/04/20 14:45 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 14:26	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 14:26	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 14:26	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 14:26	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 14:26	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		08/10/20 14:26	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.37	1		08/10/20 14:26	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.42	1		08/10/20 14:26	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 14:26	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		08/10/20 14:26	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-116		1		08/10/20 14:26	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		08/10/20 14:26	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: MW-34 **Lab ID: 50264206006** Collected: 08/05/20 13:54 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 14:58	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 14:58	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 14:58	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 14:58	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 14:58	75-09-2	
Tetrachloroethene	**35.9**	ug/L	5.0	0.27	1		08/10/20 14:58	127-18-4	
1,1,1-Trichloroethane	**2.5J**	ug/L	5.0	0.37	1		08/10/20 14:58	71-55-6	
Trichloroethene	**14.8**	ug/L	5.0	0.42	1		08/10/20 14:58	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 14:58	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		08/10/20 14:58	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	85-116		1		08/10/20 14:58	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		08/10/20 14:58	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: MW-35 **Lab ID: 50264206007** Collected: 08/06/20 12:04 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 20:47	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 20:47	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 20:47	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 20:47	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 20:47	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		08/10/20 20:47	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.37	1		08/10/20 20:47	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.42	1		08/10/20 20:47	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 20:47	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		08/10/20 20:47	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	85-116		1		08/10/20 20:47	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		08/10/20 20:47	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: MW-36 **Lab ID: 50264206008** Collected: 08/05/20 15:41 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 15:29	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 15:29	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 15:29	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 15:29	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 15:29	75-09-2	
Tetrachloroethene	**58.4**	ug/L	5.0	0.27	1		08/10/20 15:29	127-18-4	
1,1,1-Trichloroethane	**0.77J**	ug/L	5.0	0.37	1		08/10/20 15:29	71-55-6	
Trichloroethene	**5.6**	ug/L	5.0	0.42	1		08/10/20 15:29	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 15:29	75-01-4	
Surrogates									
Dibromofluoromethane (S)	100	%.	75-120		1		08/10/20 15:29	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	85-116		1		08/10/20 15:29	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		08/10/20 15:29	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: MW-37 **Lab ID: 50264206009** Collected: 08/05/20 12:36 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 16:01	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 16:01	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 16:01	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 16:01	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 16:01	75-09-2	
Tetrachloroethene	**42.4**	ug/L	5.0	0.27	1		08/10/20 16:01	127-18-4	
1,1,1-Trichloroethane	**2.4J**	ug/L	5.0	0.37	1		08/10/20 16:01	71-55-6	
Trichloroethene	**25.6**	ug/L	5.0	0.42	1		08/10/20 16:01	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 16:01	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		08/10/20 16:01	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-116		1		08/10/20 16:01	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		08/10/20 16:01	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: MW-38 **Lab ID: 50264206010** Collected: 08/04/20 16:07 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 16:33	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 16:33	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 16:33	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 16:33	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 16:33	75-09-2	
Tetrachloroethene	**27.6**	ug/L	5.0	0.27	1		08/10/20 16:33	127-18-4	
1,1,1-Trichloroethane	**3.3J**	ug/L	5.0	0.37	1		08/10/20 16:33	71-55-6	
Trichloroethene	**21.7**	ug/L	5.0	0.42	1		08/10/20 16:33	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 16:33	75-01-4	
Surrogates									
Dibromofluoromethane (S)	104	%.	75-120		1		08/10/20 16:33	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-116		1		08/10/20 16:33	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		08/10/20 16:33	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: MW-39 **Lab ID: 50264206011** Collected: 08/04/20 13:51 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**2.6J**	ug/L	5.0	0.33	1		08/10/20 17:05	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 17:05	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 17:05	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 17:05	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 17:05	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		08/10/20 17:05	127-18-4	
1,1,1-Trichloroethane	**4.5J**	ug/L	5.0	0.37	1		08/10/20 17:05	71-55-6	
Trichloroethene	**18.3**	ug/L	5.0	0.42	1		08/10/20 17:05	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 17:05	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		08/10/20 17:05	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-116		1		08/10/20 17:05	460-00-4	
Toluene-d8 (S)	93	%.	83-111		1		08/10/20 17:05	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: MW-40 **Lab ID: 50264206012** Collected: 08/04/20 12:48 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/11/20 07:24	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/11/20 07:24	107-06-2	
cis-1,2-Dichloroethene	**3.5J**	ug/L	5.0	0.39	1		08/11/20 07:24	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/11/20 07:24	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/11/20 07:24	75-09-2	
Tetrachloroethene	**4.7J**	ug/L	5.0	0.27	1		08/11/20 07:24	127-18-4	
1,1,1-Trichloroethane	**5.1**	ug/L	5.0	0.37	1		08/11/20 07:24	71-55-6	
Trichloroethene	**26.7**	ug/L	5.0	0.42	1		08/11/20 07:24	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/11/20 07:24	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		08/11/20 07:24	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-116		1		08/11/20 07:24	460-00-4	
Toluene-d8 (S)	93	%.	83-111		1		08/11/20 07:24	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: FD-1 WT **Lab ID: 50264206013** Collected: 08/05/20 08:00 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	**4.3J**	ug/L	5.0	0.33	1		08/10/20 17:36	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 17:36	107-06-2	
cis-1,2-Dichloroethene	**85.4**	ug/L	5.0	0.39	1		08/10/20 17:36	156-59-2	
trans-1,2-Dichloroethene	**0.59J**	ug/L	5.0	0.38	1		08/10/20 17:36	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 17:36	75-09-2	
Tetrachloroethene	**316**	ug/L	50.0	2.7	10		08/12/20 07:05	127-18-4	
1,1,1-Trichloroethane	**29.7**	ug/L	5.0	0.37	1		08/10/20 17:36	71-55-6	
Trichloroethene	**161**	ug/L	5.0	0.42	1		08/10/20 17:36	79-01-6	
Vinyl chloride	**16.5**	ug/L	2.0	0.23	1		08/10/20 17:36	75-01-4	
Surrogates									
Dibromofluoromethane (S)	99	%.	75-120		1		08/10/20 17:36	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	85-116		1		08/10/20 17:36	460-00-4	
Toluene-d8 (S)	96	%.	83-111		1		08/10/20 17:36	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: FD-2 WT **Lab ID: 50264206014** Collected: 08/04/20 08:00 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 18:08	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 18:08	107-06-2	
cis-1,2-Dichloroethene	**1.7J**	ug/L	5.0	0.39	1		08/10/20 18:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 18:08	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 18:08	75-09-2	
Tetrachloroethene	**34.9**	ug/L	5.0	0.27	1		08/10/20 18:08	127-18-4	
1,1,1-Trichloroethane	**4.1J**	ug/L	5.0	0.37	1		08/10/20 18:08	71-55-6	
Trichloroethene	**25.3**	ug/L	5.0	0.42	1		08/10/20 18:08	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 18:08	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		08/10/20 18:08	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-116		1		08/10/20 18:08	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		08/10/20 18:08	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: EB-1 WT **Lab ID: 50264206015** Collected: 08/04/20 11:36 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 18:40	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 18:40	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 18:40	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 18:40	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 18:40	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		08/10/20 18:40	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.37	1		08/10/20 18:40	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.42	1		08/10/20 18:40	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 18:40	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		08/10/20 18:40	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	85-116		1		08/10/20 18:40	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		08/10/20 18:40	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: EB-2 WT **Lab ID: 50264206016** Collected: 08/05/20 11:07 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 19:12	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 19:12	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 19:12	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 19:12	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 19:12	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		08/10/20 19:12	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.37	1		08/10/20 19:12	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.42	1		08/10/20 19:12	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 19:12	75-01-4	
Surrogates									
Dibromofluoromethane (S)	100	%.	75-120		1		08/10/20 19:12	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-116		1		08/10/20 19:12	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		08/10/20 19:12	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: TB-1 WT **Lab ID: 50264206017** Collected: 08/04/20 07:00 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 19:44	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 19:44	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 19:44	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 19:44	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 19:44	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		08/10/20 19:44	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.37	1		08/10/20 19:44	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.42	1		08/10/20 19:44	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 19:44	75-01-4	
Surrogates									
Dibromofluoromethane (S)	102	%.	75-120		1		08/10/20 19:44	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	85-116		1		08/10/20 19:44	460-00-4	
Toluene-d8 (S)	95	%.	83-111		1		08/10/20 19:44	2037-26-5	

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ANALYTICAL RESULTS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Sample: EB-3 WT **Lab ID: 50264206018** Collected: 08/06/20 10:45 Received: 08/06/20 17:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260								
	Pace Analytical Services - Indianapolis								
1,1-Dichloroethane	ND	ug/L	5.0	0.33	1		08/10/20 20:15	75-34-3	
1,2-Dichloroethane	ND	ug/L	5.0	0.44	1		08/10/20 20:15	107-06-2	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.39	1		08/10/20 20:15	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.38	1		08/10/20 20:15	156-60-5	
Methylene Chloride	ND	ug/L	5.0	3.0	1		08/10/20 20:15	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	0.27	1		08/10/20 20:15	127-18-4	
1,1,1-Trichloroethane	ND	ug/L	5.0	0.37	1		08/10/20 20:15	71-55-6	
Trichloroethene	ND	ug/L	5.0	0.42	1		08/10/20 20:15	79-01-6	
Vinyl chloride	ND	ug/L	2.0	0.23	1		08/10/20 20:15	75-01-4	
Surrogates									
Dibromofluoromethane (S)	103	%.	75-120		1		08/10/20 20:15	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	85-116		1		08/10/20 20:15	460-00-4	
Toluene-d8 (S)	94	%.	83-111		1		08/10/20 20:15	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

QC Batch: 575963 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50264206001, 50264206002, 50264206003, 50264206004, 50264206005, 50264206006, 50264206007, 50264206008, 50264206009, 50264206010, 50264206011, 50264206013, 50264206014, 50264206015, 50264206016, 50264206017, 50264206018

METHOD BLANK: 2656073 Matrix: Water
Associated Lab Samples: 50264206001, 50264206002, 50264206003, 50264206004, 50264206005, 50264206006, 50264206007, 50264206008, 50264206009, 50264206010, 50264206011, 50264206013, 50264206014, 50264206015, 50264206016, 50264206017, 50264206018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.37	08/10/20 11:45	
1,1-Dichloroethane	ug/L	ND	5.0	0.33	08/10/20 11:45	
1,2-Dichloroethane	ug/L	ND	5.0	0.44	08/10/20 11:45	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.39	08/10/20 11:45	
Methylene Chloride	ug/L	ND	5.0	3.0	08/10/20 11:45	
Tetrachloroethene	ug/L	ND	5.0	0.27	08/10/20 11:45	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.38	08/10/20 11:45	
Trichloroethene	ug/L	ND	5.0	0.42	08/10/20 11:45	
Vinyl chloride	ug/L	ND	2.0	0.23	08/10/20 11:45	
4-Bromofluorobenzene (S)	%.	103	85-116		08/10/20 11:45	
Dibromofluoromethane (S)	%.	101	75-120		08/10/20 11:45	
Toluene-d8 (S)	%.	94	83-111		08/10/20 11:45	

LABORATORY CONTROL SAMPLE: 2656074

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	48.5	97	78-130	
1,1-Dichloroethane	ug/L	50	48.4	97	77-123	
1,2-Dichloroethane	ug/L	50	43.4	87	66-127	
cis-1,2-Dichloroethene	ug/L	50	47.7	95	76-120	
Methylene Chloride	ug/L	50	45.4	91	68-126	
Tetrachloroethene	ug/L	50	47.0	94	70-123	
trans-1,2-Dichloroethene	ug/L	50	52.2	104	79-126	
Trichloroethene	ug/L	50	47.2	94	78-120	
Vinyl chloride	ug/L	50	53.1	106	55-122	
4-Bromofluorobenzene (S)	%.			104	85-116	
Dibromofluoromethane (S)	%.			100	75-120	
Toluene-d8 (S)	%.			95	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2656075 2656076

Parameter	Units	50264206007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	ND	50	50	40.4	43.9	81	88	56-144	8	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2656075 2656076

Parameter	Units	50264206007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	42.4	46.2	85	92	53-140	9	20	
1,2-Dichloroethane	ug/L	ND	50	50	37.5	42.3	75	85	46-145	12	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	40.4	44.3	81	89	53-134	9	20	
Methylene Chloride	ug/L	ND	50	50	38.4	42.1	77	84	46-138	9	20	
Tetrachloroethene	ug/L	ND	50	50	36.9	41.4	74	83	32-140	11	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	42.2	45.8	84	92	57-138	8	20	
Trichloroethene	ug/L	ND	50	50	38.4	42.7	77	85	47-137	11	20	
Vinyl chloride	ug/L	ND	50	50	49.0	48.9	98	98	36-136	0	20	
4-Bromofluorobenzene (S)	%.						102	103	85-116			
Dibromofluoromethane (S)	%.						100	102	75-120			
Toluene-d8 (S)	%.						95	93	83-111			

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

QC Batch: 576056
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50264206012

METHOD BLANK: 2656441 Matrix: Water

Associated Lab Samples: 50264206012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	ND	5.0	0.37	08/11/20 00:30	
1,1-Dichloroethane	ug/L	ND	5.0	0.33	08/11/20 00:30	
1,2-Dichloroethane	ug/L	ND	5.0	0.44	08/11/20 00:30	
cis-1,2-Dichloroethene	ug/L	ND	5.0	0.39	08/11/20 00:30	
Methylene Chloride	ug/L	ND	5.0	3.0	08/11/20 00:30	
Tetrachloroethene	ug/L	ND	5.0	0.27	08/11/20 00:30	
trans-1,2-Dichloroethene	ug/L	ND	5.0	0.38	08/11/20 00:30	
Trichloroethene	ug/L	ND	5.0	0.42	08/11/20 00:30	
Vinyl chloride	ug/L	ND	2.0	0.23	08/11/20 00:30	
4-Bromofluorobenzene (S)	%.	102	85-116		08/11/20 00:30	
Dibromofluoromethane (S)	%.	101	75-120		08/11/20 00:30	
Toluene-d8 (S)	%.	95	83-111		08/11/20 00:30	

LABORATORY CONTROL SAMPLE: 2656442

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	48.7	97	78-130	
1,1-Dichloroethane	ug/L	50	49.9	100	77-123	
1,2-Dichloroethane	ug/L	50	44.3	89	66-127	
cis-1,2-Dichloroethene	ug/L	50	49.2	98	76-120	
Methylene Chloride	ug/L	50	51.6	103	68-126	
Tetrachloroethene	ug/L	50	45.1	90	70-123	
trans-1,2-Dichloroethene	ug/L	50	51.3	103	79-126	
Trichloroethene	ug/L	50	47.3	95	78-120	
Vinyl chloride	ug/L	50	54.4	109	55-122	
4-Bromofluorobenzene (S)	%.			103	85-116	
Dibromofluoromethane (S)	%.			102	75-120	
Toluene-d8 (S)	%.			94	83-111	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2656443 2656444

Parameter	Units	50264206012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	5.1	50	50	52.3	57.0	94	104	56-144	9	20	
1,1-Dichloroethane	ug/L	ND	50	50	50.9	54.2	102	108	53-140	6	20	
1,2-Dichloroethane	ug/L	ND	50	50	42.8	48.4	86	97	46-145	12	20	
cis-1,2-Dichloroethene	ug/L	3.5J	50	50	52.0	54.7	97	102	53-134	5	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2656443 2656444

Parameter	Units	50264206012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methylene Chloride	ug/L	ND	50	50	47.8	50.4	96	101	46-138	5	20	
Tetrachloroethene	ug/L	4.7J	50	50	48.2	51.0	87	93	32-140	6	20	
trans-1,2-Dichloroethene	ug/L	ND	50	50	49.8	54.0	100	108	57-138	8	20	
Trichloroethene	ug/L	26.7	50	50	66.7	71.5	80	90	47-137	7	20	
Vinyl chloride	ug/L	ND	50	50	54.3	57.7	109	115	36-136	6	20	
4-Bromofluorobenzene (S)	%.						103	105	85-116			
Dibromofluoromethane (S)	%.						100	99	75-120			
Toluene-d8 (S)	%.						96	95	83-111			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALIFIERS

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Amphenol/ iNAMP18.02
Pace Project No.: 50264206

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50264206001	**IT-2**	EPA 8260	575963		
50264206002	**MW-12R**	EPA 8260	575963		
50264206003	**MW-31**	EPA 8260	575963		
50264206004	**MW-32**	EPA 8260	575963		
50264206005	**MW-33**	EPA 8260	575963		
50264206006	**MW-34**	EPA 8260	575963		
50264206007	**MW-35**	EPA 8260	575963		
50264206008	**MW-36**	EPA 8260	575963		
50264206009	**MW-37**	EPA 8260	575963		
50264206010	**MW-38**	EPA 8260	575963		
50264206011	**MW-39**	EPA 8260	575963		
50264206012	**MW-40**	EPA 8260	576056		
50264206013	**FD-1 WT**	EPA 8260	575963		
50264206014	**FD-2 WT**	EPA 8260	575963		
50264206015	**EB-1 WT**	EPA 8260	575963		
50264206016	**EB-2 WT**	EPA 8260	575963		
50264206017	**TB-1 WT**	EPA 8260	575963		
50264206018	**EB-3 WT**	EPA 8260	575963		

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or

WO# : 50264206

50264206

Company: IWM Consulting Group

Billing Information: SAME

Address: 7428 Rockville Rd, Indianapolis IN 46214

Report To: Chris Parks

Email To: cparks@iwmconsult.com

Copy To: Brad Gentry

Site Collection Info/Address: 980 Hurricane Rd

Customer Project Name/Number: Amphenol / INAMP18.02

State: IN County/City: Johnson/Franklin Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET

Phone: 317-347-1111

Email: cparks@iwmconsult.com

Site/Facility ID #: Former Amphenol Facility

Compliance Monitoring? [✓] Yes [ ] No

Collected By (print): REBECCA PITCOCK

Purchase Order #:

Quote #: IN AMP 18.02

DW PWS ID #:

DW Location Code:

Collected By (signature): Rebecca Pitcock

Turnaround Date Required: STANDARD TAT

Immediately Packed on Ice: [✓] Yes [ ] No

Sample Disposal: [✓] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [✓] No

Analysis: ______

Container ... 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Analyses: Short List VOCs 8260

Lab Profile/Line:

Lab Sample Receipt Checklist:

- Custody Seals Present/Intact Y N NA
- Custody Signatures Present Y N NA
- Collector Signature Present Y N NA
- Bottles Intact Y N NA
- Correct Bottles Y N NA
- Sufficient Volume Y N NA
- Samples Received on Ice Y N NA
- VOA - Headspace Acceptable Y N NA
- USDA Regulated Soils Y N NA
- Samples in Holding Time Y N NA
- Residual Chlorine Present Y N NA
- Cl Strips: ______
- Sample pH Acceptable Y N NA
- pH Strips: ______
- Sulfide Present Y N NA
- Lead Acetate Strips: ______

LAB USE ONLY:
Lab Sample # / Comments:

Customer Sample ID	Matrix *	Comp / Grab	Collected Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Short List VOCs 8260	Lab Sample # / Comments
IT-2	GW	G	8/6/20	10:40				3	X	001
MW-12R	↓	↓	8/5/20	16:57				3	X	002
MW-31			8/5/20	11:01				3	X	003
MW-32			8/4/20	11:29				3	X	004
MW-33			8/4/20	14:45				3	X	005
MW-34			8/5/20	13:54				3	X	006
MW-35 MS/MSD			8/6/20	12:04				9	X	007
MW-36			8/5/20	15:41				3	X	008
MW-37			8/5/20	12:36				3	X	009
MW-38	↓	↓	8/4/20	16:07				3	X	010

Customer Remarks / Special Conditions / Possible Hazards: Short List Includes: PCE, TCE, 111-TCA cis/trans-1,2-DCE, 1,1-DCA, 12-DCA VC, MC

Level IV QA/QC; J-Flags

Type of Ice Used: Wet Blue Dry None

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Packing Material Used:

Lab Tracking #: 2534131

Radchem sample(s) screened (<500 cpm): Y N NA

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: B
Cooler 1 Temp Upon Receipt: 1.0 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 1.0 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Rebecca Pitcock IWM	8/6/2020 17:00	[signature]	8-6-20 1700

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 1 of: 2

Pace Analytical®

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: IWM Consulting Group

Address: 7428 Rockville Rd, Indianapolis, IN 46214

Billing Information: SAME

Report To: Chris Parks

Email To: cparks@iwmconsult.com

Copy To: Brad Gentry

Site Collection Info/Address: 980 Hurricane Rd

Customer Project Name/Number: Amphenol / IN AMP18.02

State: IN County/City: Johnson/Franklin Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET

Phone: 317-347-1111

Email: cparks@iwmconsult.com

Site/Facility ID #: Former Amphenol Facility

Compliance Monitoring? [✓] Yes [ ] No

Collected By (print): REBECCA PITORK

Purchase Order #:

Quote #: IN.AMP18.02

DW PWS ID #:

DW Location Code:

Collected By (signature): Rebecca Pitork

Turnaround Date Required: STANDARD TAT

Immediately Packed on Ice: [✓] Yes [ ] No

Sample Disposal: [✓] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [✓] No

Analysis: ______

Container Preservative Type **: 3

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Analyses: Short List VOCs 8260

Customer Sample ID	Matrix *	Comp / Grab	Collected Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Short List VOCs 8260	Lab Sample # / Comments
MW-39	GW	G	8/4/20	13:51			–	3	X	011
MW-40 MS/MSD	↓	↓	8/4/20	12:48			–	9	X	012
FD-1 WT			8/5/20	–			–	3	X	013
FD-2 WT			8/4/20	–			–	3	X	014
EB-1 WT			8/4/20	11:36			–	3	X	015
EB-2 WT			8/5/20	11:07			–	3	X	016
TB-1 WT	↓	↓	8/4/20	7:00			–	3	X	017
EB-3 WT	↓	↓	8/6/20	10:45						018

Lab Profile/Line:

```
Lab Sample Receipt Checklist:
Custody Seals Present/Intact  Y N NA
Custody Signatures Present    Y N NA
Collector Signature Present   Y N NA
Bottles Intact                Y N NA
Correct Bottles               Y N NA
Sufficient Volume             Y N NA
Samples Received on Ice       Y N NA
VOA - Headspace Acceptable    Y N NA
USDA Regulated Soils          Y N NA
Samples in Holding Time       Y N NA
Residual Chlorine Present     Y N NA
Cl Strips: ________
Sample pH Acceptable          Y N NA
pH Strips: ________
Sulfide Present               Y N NA
Lead Acetate Strips: ________

LAB USE ONLY
Lab Sample # / Comments:
```

Customer Remarks / Special Conditions / Possible Hazards: Short List Includes: PCE, TCE, 111TCA, VC, MC, 11DCA, 12DCA, cis/trans 12DCE

Level IV QA/QC ; J-Flags

Type of Ice Used: Wet Blue Dry None

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Packing Material Used:

Lab Tracking #: 2534132

Radchem sample(s) screened (<500 cpm): Y N NA

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: (Y) N NA
Therm ID#: B
Cooler 1 Temp Upon Receipt: 1.0 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 1.0 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Rebecca Pitork IWM	8/6/2020 17:00	[signature]	8.6.20 1700

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 2 of: 2

F-IN-Q-290-rev.19,23Jul2020

Pace Analytical

SAMPLE CONDITION UPON RECEIPT FORM

Date/Time and Initials of person examining contents: MN 8-6-20 1710

Courier: Fed Ex UPS Client Pace USPS Other

Custody Seal on Cooler/Box Present: Yes No **(If yes)Seals Intact:** Yes No **(leave blank if no seals were present)**

Packing Material: Bubble Wrap Bubble Bags None Other

Thermometer: 1 2 3 4 5 6 A B C D E F **Ice Type:** Wet Blue None

Cooler Temperature: 1.0 / 1.0 °C **If temp. is over 6°C or under 0°C, was the PM notified?:** Yes No

Temp should be above freezing to 6°C (Initial/Corrected)

All discrepancies will be written out in the comments section below.

	Yes	No		Yes	No	N/A
Are samples from West Virginia? Document any containers out of temp.		—	All containers needing acid/base pres. Have been CHECKED?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** **Circle:** **HNO3 (<2) H2SO4 (<2) NaOH (>10) NaOH/ZnAc (>9)** Any non-conformance to pH recommendations will be noted on the container count form			—
USDA Regulated Soils? (HI, ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		—				
Short Hold Time Analysis (48 hours or less)? Analysis:		—		Present	Absent	N/A
			Residual Chlorine Check (SVOC 625 Pest/PCB 608)			—
Time 5035A TC placed in Freezer or Short Holds To Lab	Time:		Residual Chlorine Check (Total/Amenable/Free Cyanide)			—
Rush TAT Requested (4 days or less):		—	Headspace Wisconsin Sulfide?			—
Custody Signatures Present?	—		Headspace in VOA Vials (>6mm):		—	
Containers Intact?:	—		Trip Blank Present?	—		
Sample Label (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	—		Trip Blank Custody Seals?:	—		
Extra labels on Terracore Vials? (soils only)		—				

COMMENTS: sent 3/3 VG9H for EB-3 WT MN 8-6-20

COC PAGE 1 of 2

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H	VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1				3																							WT			
2																														
3																														
4																														
5																														
6																														
7				9																										
8				3																										
9																														
10																														
11																														
12																														

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

F-IN-Q-270-rev.11,26Sep2019

Sample Container Count

Sample Line Item	WGFU	SBS DI BK Kit R	DG9H VG9H	VOA VIALS (>6mm)	VG9U	DG9U	DG9T	AG0U	AG1H	AG1U	AG3S	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H					Matrix	pH <2	pH >9	pH>12
1			3																										
2			9																										
3			3																										
4																													
5																													
6																													
7																													
8			3																										
9																													
10																													
11																													
12																													

Container Codes

Glass

DG9B	40mL Na Bisulfate amber vial	AG0U	100mL unpres amber glass
DG9H	40mL HCl amber voa vial	AG1H	1L HCl amber glass
DG9M	40mL MeOH clear vial	AG1S	1L H2SO4 amber glass
DG9P	40mL TSP amber vial	AG1T	1L Na Thiosulfate amber glass
DG9S	40mL H2SO4 amber vial	AG1U	1liter unpres amber glass
DG9T	40mL Na Thio amber vial	AG2N	500mL HNO3 amber glass
DG9U	40mL unpreserved **amber** vial	AG2S	500mL H2SO4 amber glass
VG9H	40mL HCl clear vial	AG2U	500mL unpres amber glass
VG9T	40mL Na Thio. clear vial	AG3S	250mL H2SO4 amber glass
VG9U	40mL unpreserved **clear** vial	AG3U	250mL unpres amber glass
VGFX	40mL w/hexane wipe vial	BG1H	1L HCl clear glass
VSG	Headspace septa vial & HCl	BG1S	1L H2SO4 clear glass
WGKU	8oz unpreserved clear jar	BG1T	1L Na Thiosulfate clear glass
WGFU	4oz clear soil jar	BG1U	1L unpreserved glass
JGFU	4oz unpreserved amber wide	BG3H	250mL HCl Clear Glass
CG3H	250mL clear glass HCl	BG3U	250mL Unpres Clear Glass

Plastic / Misc.

BP1A	1L NaOH, Asc Acid plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn, Ac
BP2A	500mL NaOH, Asc Acid plastic
BP2N	500mL HNO3 plastic
BP2O	500mL NaOH plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Ac
BP3B	250mL NaOH plastic
BP3N	250mL HNO3 plastic
BP3F	250mL HNO3 plastic (field filtered)

BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Ac plastic

AF	Air Filter
C	Air Cassettes
R	Terra core kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT	Water
SL	Solid
NAL	Non-aqueous liquid
WP	Wipe

Attachment E

Regenesis® Pilot Study Evaluation Memo

June 30, 2020

To: Chris Parks and Brad Gentry– IWM Consulting Group
Via email

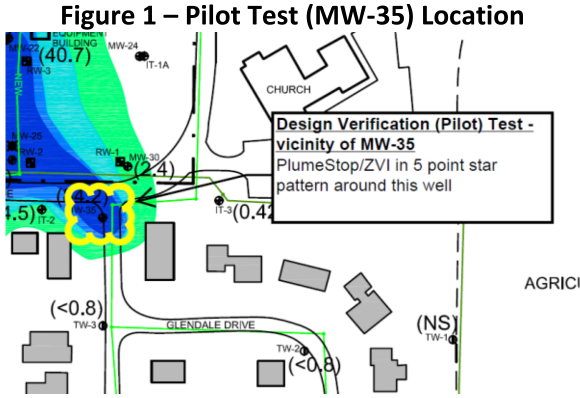
From: Doug Davis - Senior Design Specialist - 614-595-8515
Brett Hicks – Ohio Valley District Manager - 864-884-4346

Proposal #: 58294

Subject: **Pilot Test Data Review for PlumeStop® Liquid Activated Carbon and Sulfidated MicroZVI™ to Treat Chlorinated Solvents, Franklin-Amphenol Site, Franklin, Indiana**

REGENESIS appreciates the opportunity to provide IWM Consulting Group this document for interpreting performance data from the PlumeStop® Liquid Activated Carbon (PlumeStop) and Sulfidated MicroZVI™ (S-MicroZVI) pilot test to treat chlorinated solvents. The pilot test application area was focused around a single monitoring well, MW-35 near the residence of 898 Glendale Drive. Figure 1 below depicts the pilot test location. Further details on the application were included in Regenesis Remediation Services Application Summary Report, dated November 7, 2019.

Figure 1 – Pilot Test (MW-35) Location

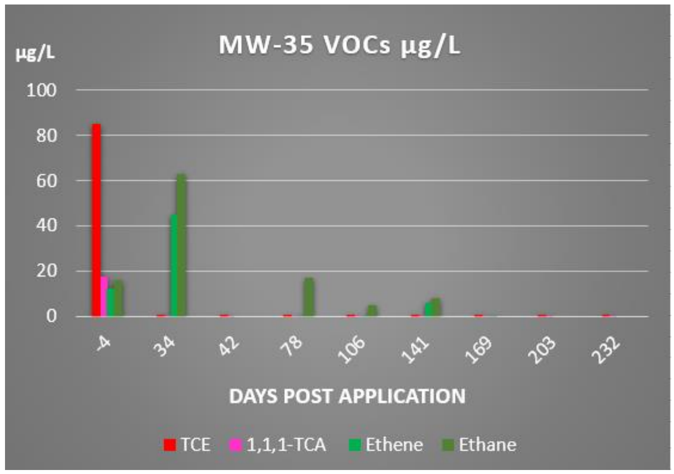


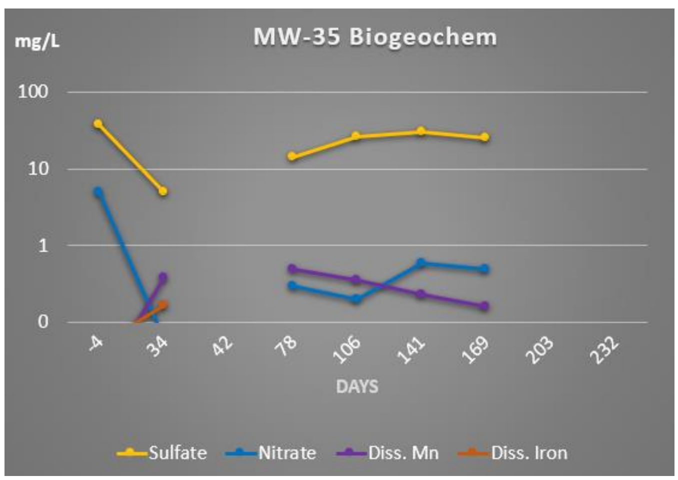
The purpose of the pilot test was to demonstrate efficacy of these technologies to remove chlorinated solvents (primarily trichloroethene [TCE] and 1,1,1-trichlorethane [TCA]) from the dissolved phase and remediate them via an abiotic reduction while minimizing methane formation. Additionally, the pilot test was used to confirm design assumptions relative to volumetric loadings and accommodation rates for full-scale estimation purposes. Data reviewed are through the June 10, 2020 sampling event and are discussed below with a primary focus on the MW-35 pilot test well. We also reviewed and comment on data from wells MW-31 and MW-38 which are located near the single injection point barriers that RRS applied within the backfilled sanitary sewer line concurrent with the pilot test.

RESULTS DISCUSSION - MW-35 Pilot Test

MW-35 is the monitoring well used to test efficacy of the sorption-enhanced in situ chemical reduction (ISCR) treatment approach. Below are charts showing: 1) TCE and TCA with non-toxic end products ethene and ethane and 2) a chart showing changes in key geochemical parameters. Interpretation notes are shown below the charts.

Figure 2. MW-35 Performance Charts through June 2020 Sampling Event.





MW-35 Results Interpretation

- MW-35 is the pilot test well to test efficacy of the sorption-enhanced in situ chemical reduction (ISCR) treatment approach utilizing PlumeStop plus S-MicroZVI.
- TCE and 1,1,1-TCA have been completely eliminated from the dissolved phase over the pilot test period.
- Ethene and ethane are the desired non-toxic end degradation products of TCE and 1,1,1-TCA. Their detection documents the destruction (and not mere sorption only) of these compounds. Relative to their parent compounds, ethene and ethane have little affinity to carbon and can thus be detected as they detach from the PlumeStop surface. This detachment results in a regeneration of sorption sites on the surface of the PlumeStop coated soils.
- Sustained reduction of nitrate and sustained but modest increase in dissolved manganese with only a temporary decline in sulfate and temporary increase in iron indicates groundwater redox

conditions in the treatment area are poised at manganese-reducing which is ideal for this application intended to keep methane concentrations low.

- Methane formation has been very minor averaging less than 100 ppb post-application.

MW-31 and MW-38 – Wells Outside of In-Trench Single-Point Barriers along N. Forsythe St.

Also submitted for our review were data from MW-31 and MW-38. These are monitoring wells near the sanitary sewer trench backfill where a series of single point barriers were installed to treat any residual contaminants migrating within the trench. These wells are ***not considered performance wells to test efficacy of PlumeStop and S-MicroZVI since they are outside of the intended treatment area.*** However, it is useful to observe effects from the nearby in-barrier treatment.

Significant concentration from baseline (approximately 80% reduction) have been observed at MW-38 indicating indirect effects from the in-trench treatments. Significant concentrations changes from baseline were not observed at MW-31. The proposed full-scale application targeting the area adjacent to Forsythe Street will treat these areas directly. Consequently, concentration changes mimicking what was observed at the MW-35 pilot test well are anticipated with completion of the full-scale application effort.

CLOSING

We sincerely appreciate the opportunity to present this information. We are looking forward to working together further with you on this project. Please feel free to contact us with any additional needs.

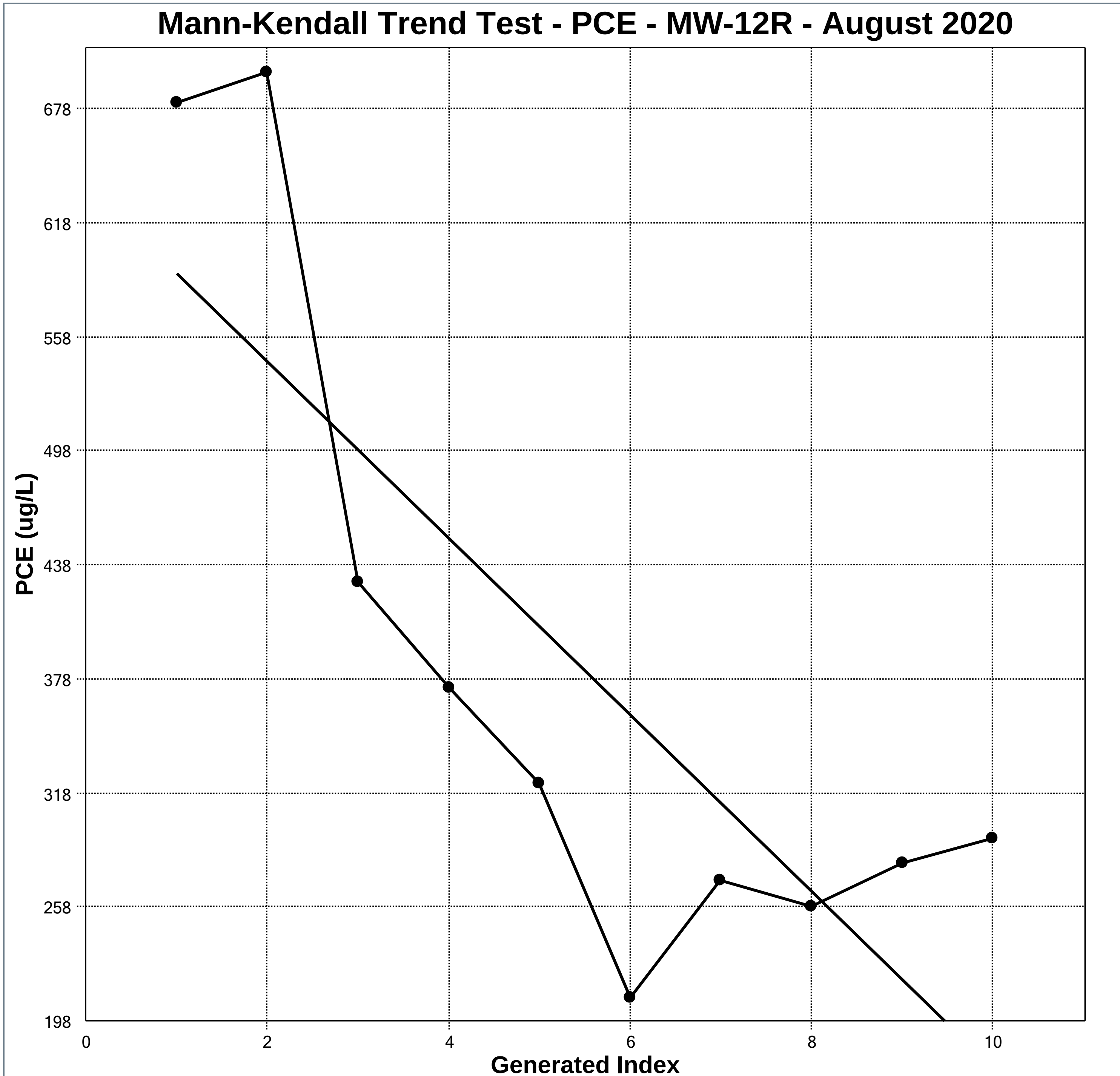
Sincerely,

Doug Davis, Sr. Design Specialist

Attachment F

Mann-Kendall Trend Analysis

IWM CONSULTING GROUP



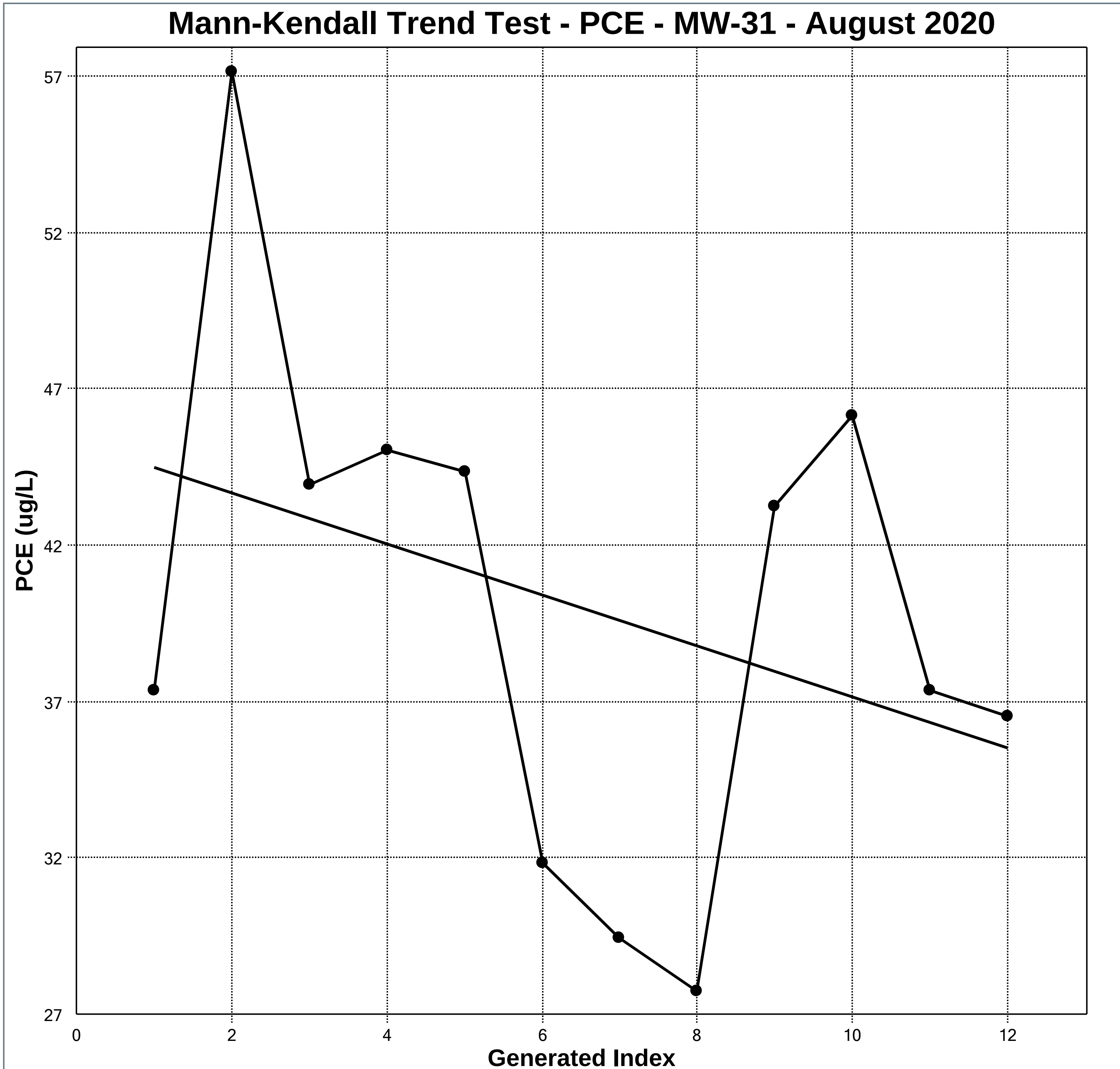
Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1803
Standardized Value of S	-2.1466
M-K Test Value (S)	-25
Tabulated p-value	0.0140
Approximate p-value	0.0159

OLS Regression Line (Blue)

OLS Regression Slope	-46.4606
OLS Regression Intercept	637.3333

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

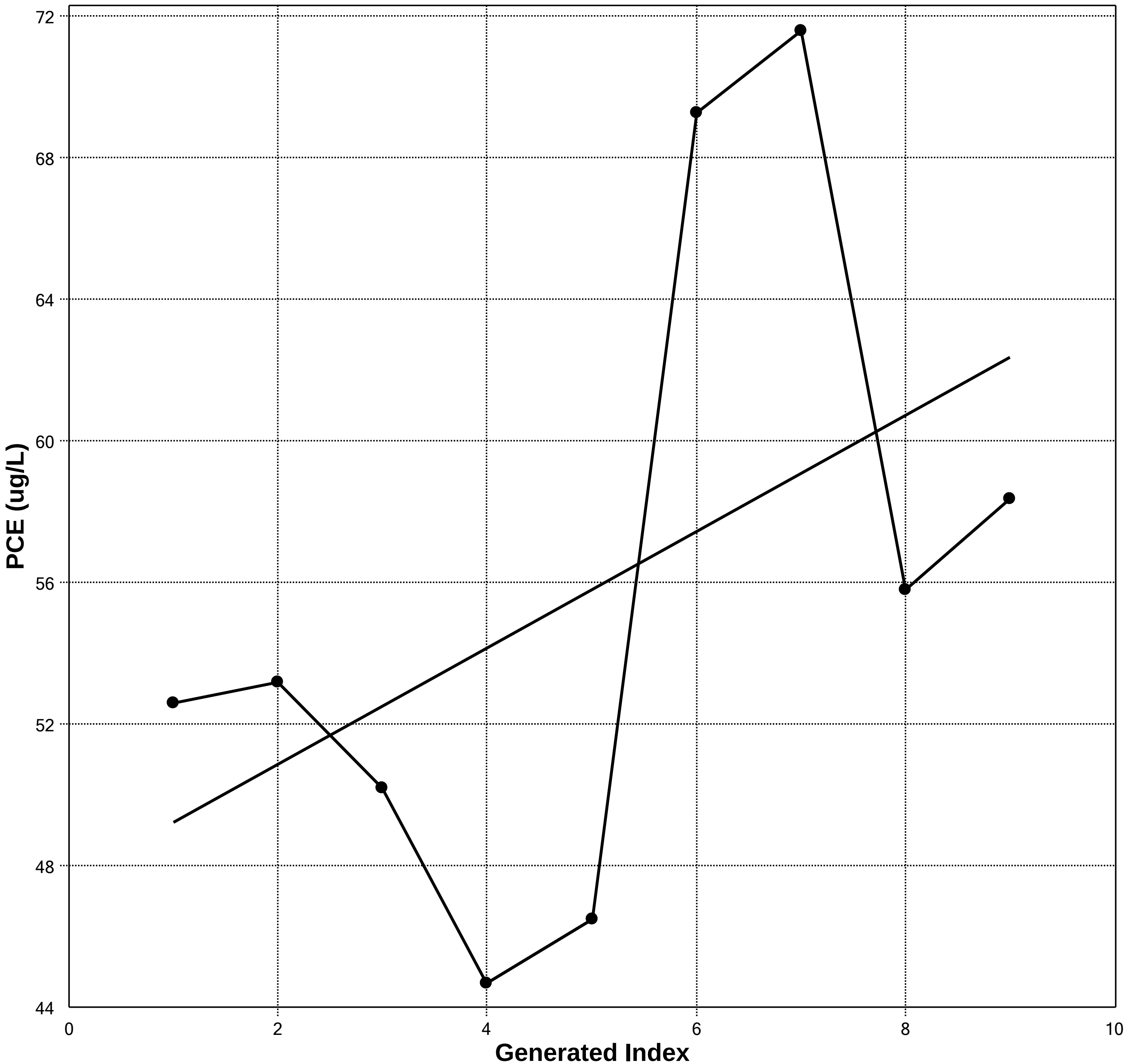
n	12
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	14.5488
Standardized Value of S	-1.0997
M-K Test Value (S)	-17
Tabulated p-value	0.1550
Approximate p-value	0.1357

OLS Regression Line (Blue)

OLS Regression Slope	-0.8140
OLS Regression Intercept	45.6576

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test - PCE - MW-36 - August 2020



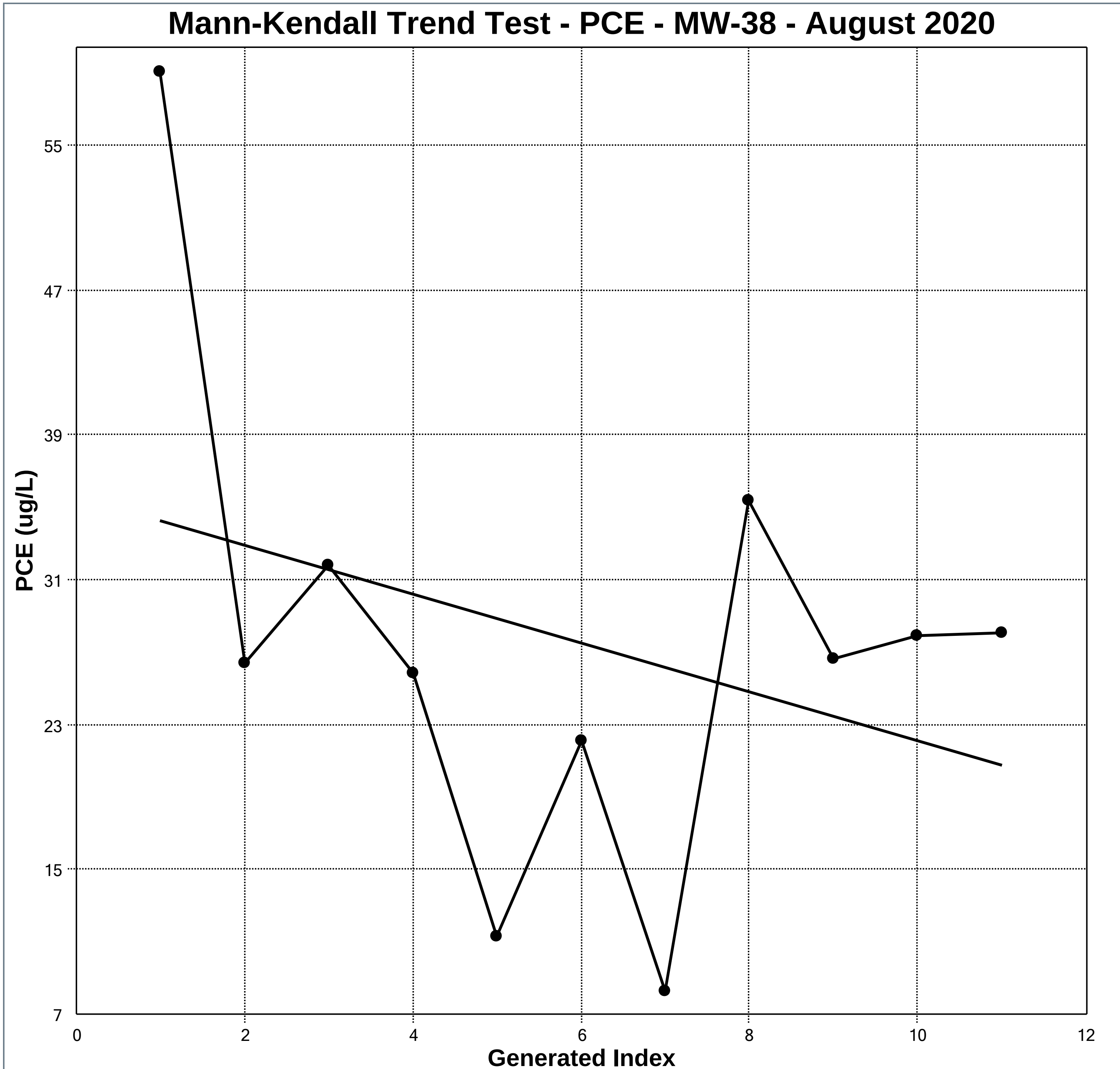
Mann-Kendall Trend Analysis

n	9
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.5917
Standardized Value of S	1.1468
M-K Test Value (S)	12
Tabulated p-value	0.1300
Approximate p-value	0.1257

OLS Regression Line (Blue)

OLS Regression Slope	1.6400
OLS Regression Intercept	47.6111

Insufficient statistical evidence of a significant trend at the specified level of significance.



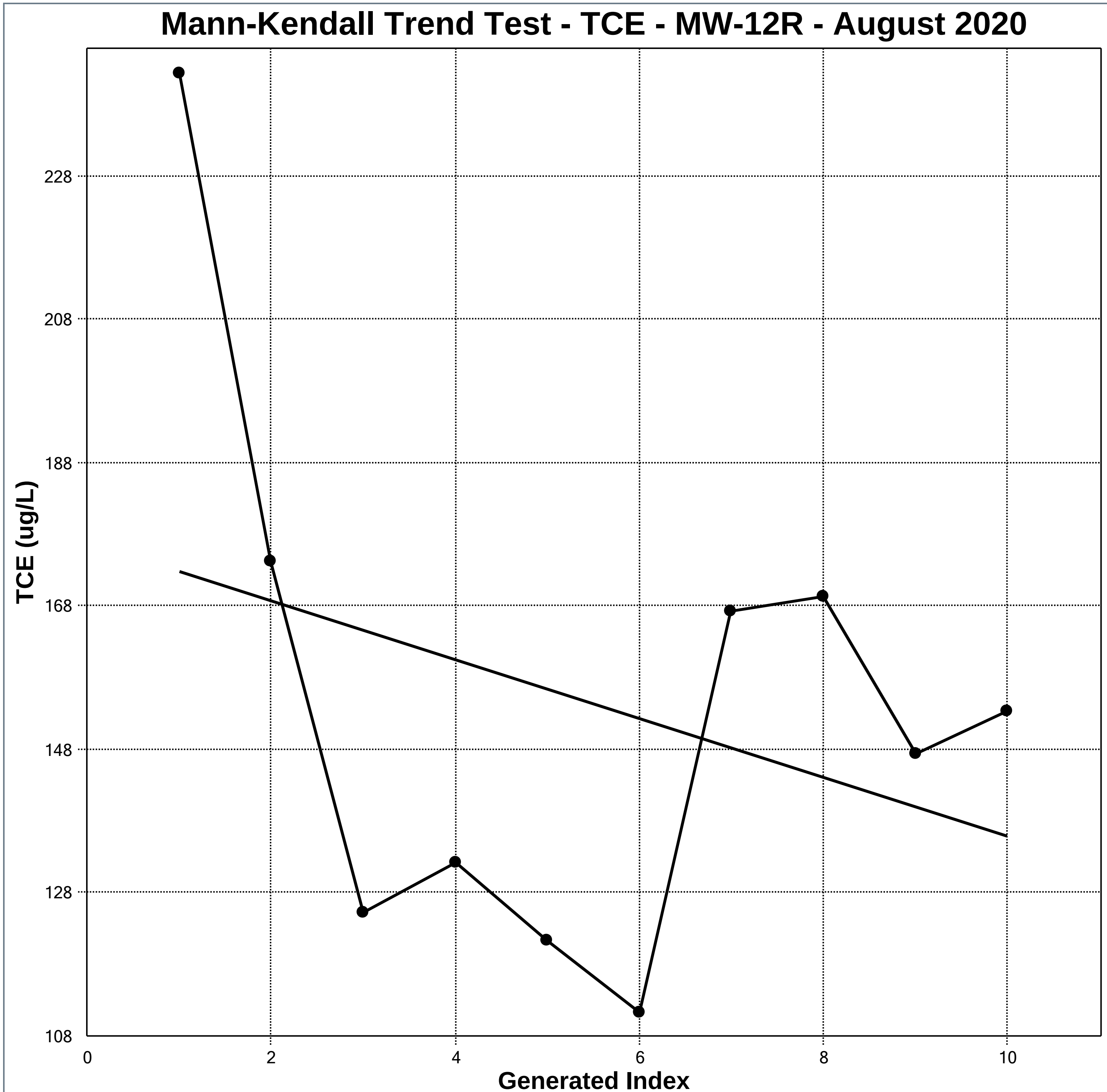
Mann-Kendall Trend Analysis

n	11
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	12.8452
Standardized Value of S	-0.1557
M-K Test Value (S)	-3
Tabulated p-value	0.4400
Approximate p-value	0.4381

OLS Regression Line (Blue)

OLS Regression Slope	-1.3482
OLS Regression Intercept	35.1345

Insufficient statistical evidence of a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

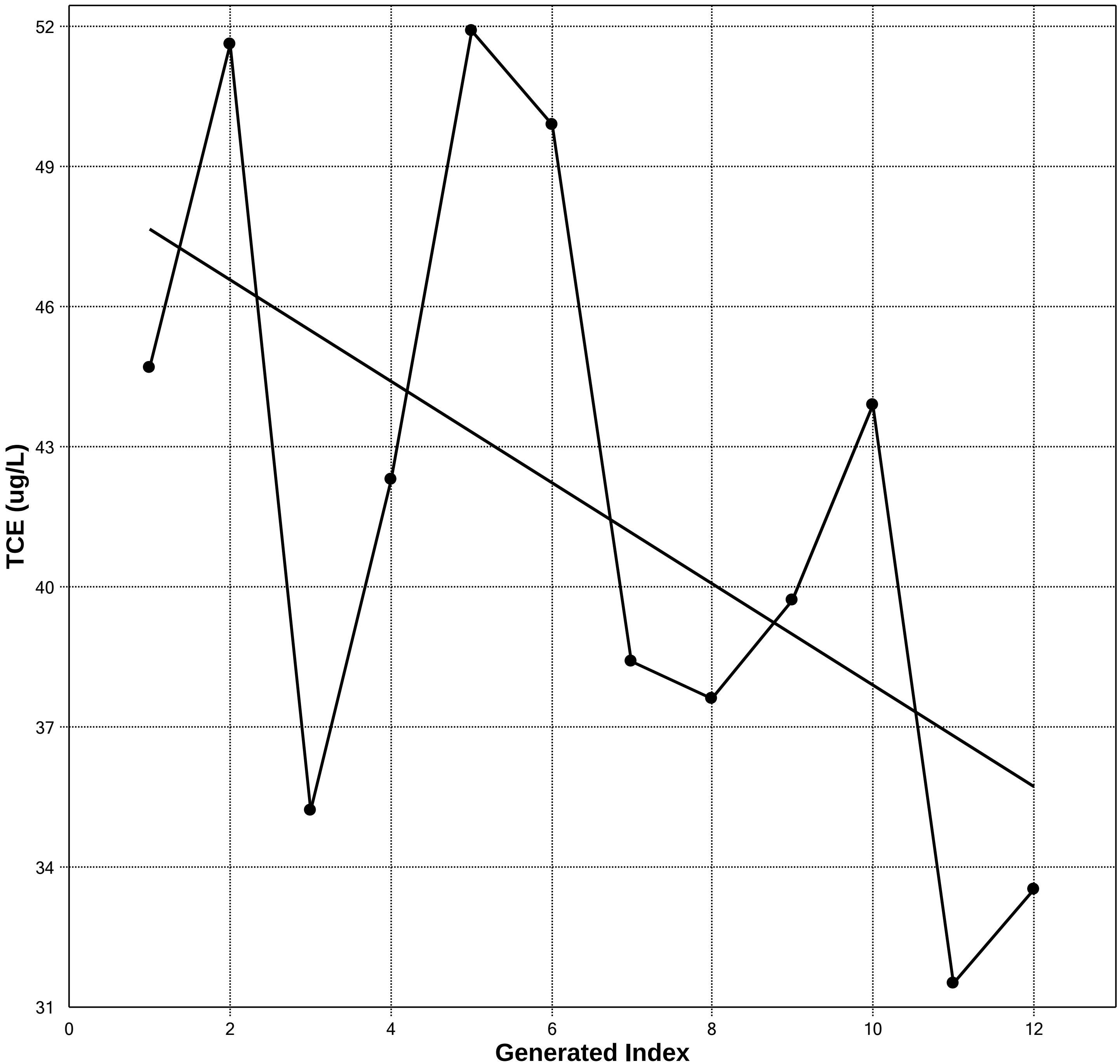
n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1803
Standardized Value of S	-0.5367
M-K Test Value (S)	-7
Tabulated p-value	0.3000
Approximate p-value	0.2958

OLS Regression Line (Blue)

OLS Regression Slope	-4.0909
OLS Regression Intercept	176.6000

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test - TCE - MW-31 - August 2020



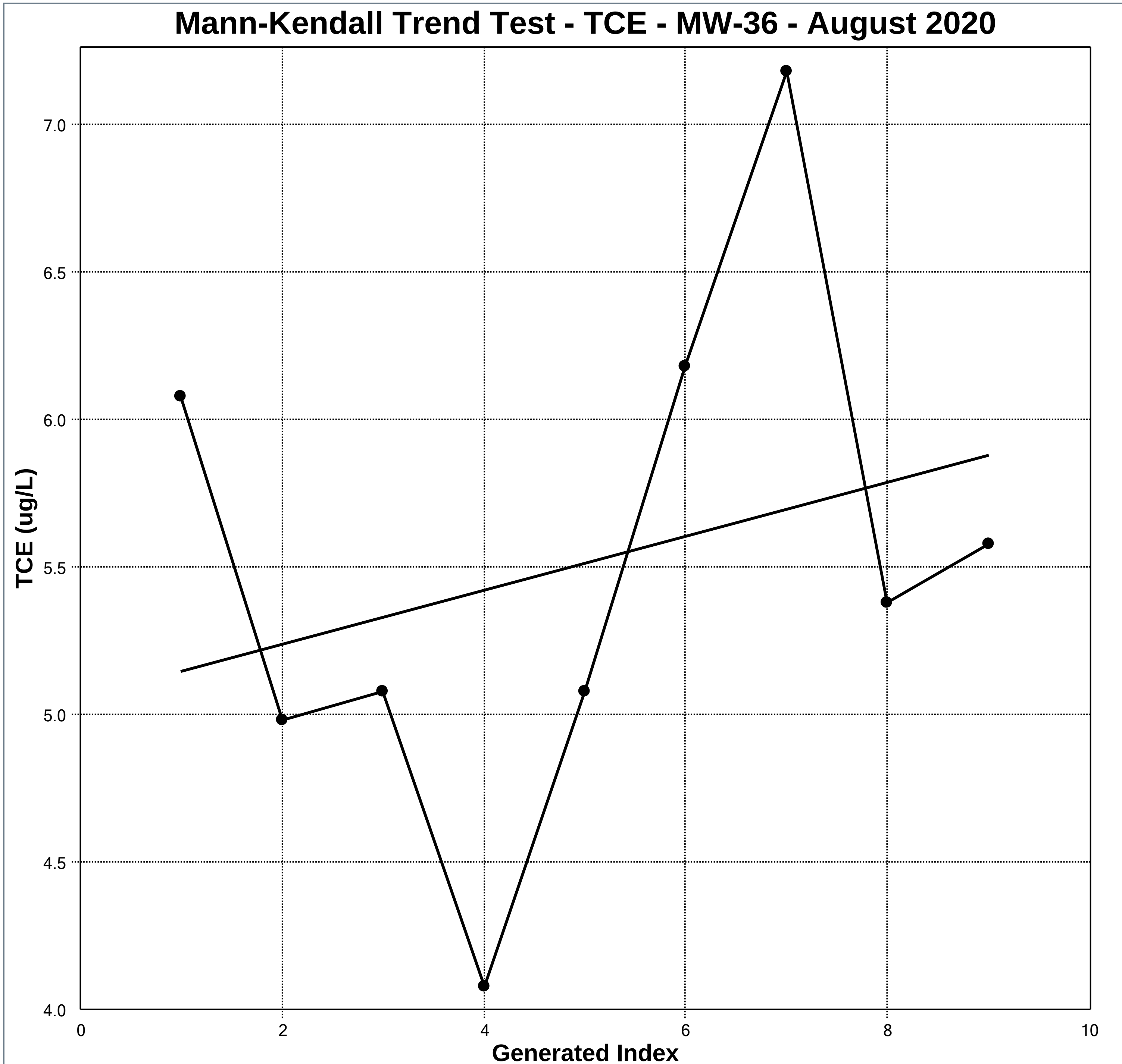
Mann-Kendall Trend Analysis

n	12
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	14.5831
Standardized Value of S	-1.7143
M-K Test Value (S)	-26
Tabulated p-value	0.0430
Approximate p-value	0.0432

OLS Regression Line (Blue)

OLS Regression Slope	-1.0860
OLS Regression Intercept	48.5424

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

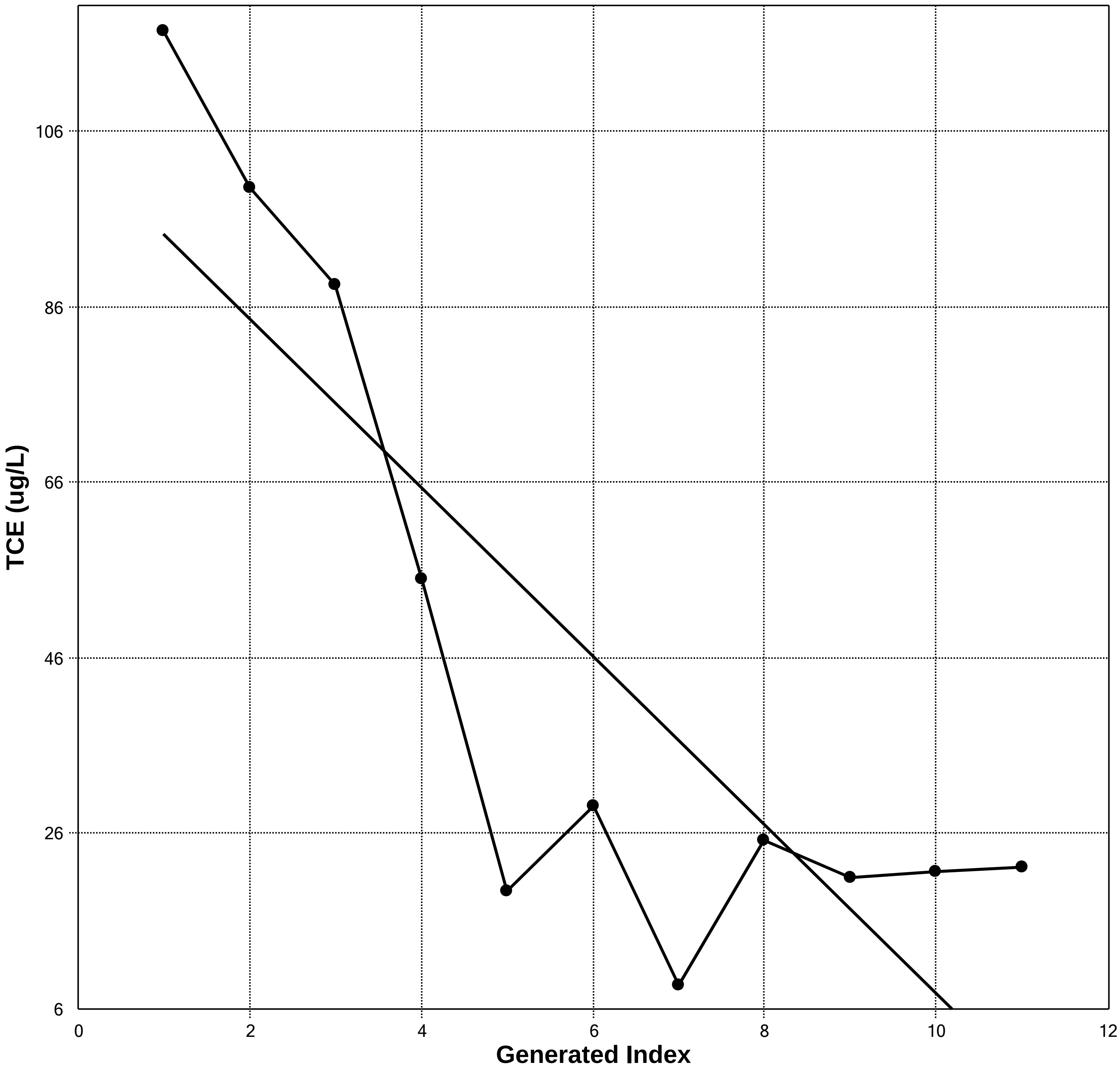
n	9
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.5394
Standardized Value of S	1.0483
M-K Test Value (S)	11
Tabulated p-value	0.1790
Approximate p-value	0.1473

OLS Regression Line (Blue)

OLS Regression Slope	0.0917
OLS Regression Intercept	5.0750

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test - TCE - MW-38 - August 2020



Mann-Kendall Trend Analysis

n	11
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	12.8452
Standardized Value of S	-2.3355
M-K Test Value (S)	-31
Tabulated p-value	0.0080
Approximate p-value	0.0098

OLS Regression Line (Blue)

OLS Regression Slope	-9.6391
OLS Regression Intercept	103.5800

Statistically significant evidence of a decreasing trend at the specified level of significance.

Attachment G

Regenesis® Technical Documents and Case Studies

IWM CONSULTING GROUP

REGENESIS

Technology-Based Solutions for the Environment

Sorption of Contaminants from Solution: Terms and Principles

PlumeStop® Technical Bulletin 2.1

www.regenesis.com

Quick Reference:

- Principles of PlumeStop sorption
- PlumeStop sorption isotherms
- Significance as a remediation tool

1. Background

PlumeStop Liquid Activated Carbon™ is composed of very fine particles of activated carbon (1-2µm) suspended in water through the use of a unique organic polymer dispersion chemistry. Once in the subsurface, the material behaves as a colloidal biomatrix, sorbing to the aquifer matrix, rapidly removing contaminants from groundwater, while still permitting their biodegradation.

2. Wide-Area Dispersive Distribution

Unlike any other sorbent technology, PlumeStop can be installed in the subsurface through dispersive flow via low-pressure injection (without fracturing the formation), providing a thin-film coating over a wide area of the aquifer matrix. It does not create preferential flow pathways, plug the formation, or compromise monitoring wells through extreme carbon loading, as is often the case with pressure-emplaced powdered activated carbon.

More information on low-pressure ease of distribution and dispersive emplacement of PlumeStop can be found in PlumeStop Technical Bulletin 1.1: Distribution through a Permeable Medium.

3. Rapid Removal of Contaminants from Groundwater

PlumeStop rapidly sorbs organic contaminants from aqueous solution within hours of application. Pollutants partition directly into the PlumeStop particles that are sorbed to the soil formation, thereby removing the pollutants from groundwater. Pollutants are removed from groundwater through sorption to PlumeStop particles which have partitioned to the soil formation. Contaminant advection in the aqueous phase is thereby eliminated and contaminant partitioning into the vapor phase is also reduced (Henry's Law). Results can be dramatic, with groundwater cleanup objectives often met within days of PlumeStop application. This technical bulletin delves more thoroughly into sorption of contaminants by PlumeStop.

4. *Contaminant Biodegradation*

In the soil matrix with contaminant partitioned onto its surface, PlumeStop is colonized by contaminant-degrading bacteria which may be naturally present or applied as an inoculum. PlumeStop essentially halts the flow of contaminants while still allowing them to be degraded by bacteria, preventing further movement of contaminants in the subsurface.

Information on post-sorption biodegradation of contaminants can be found in PlumeStop Technical Bulletin 3.1: Post-Sorption Contaminant Biodegradation.

5. *PlumeStop Contaminant Sorption*

Activated Carbon

The sorptive capacity of PlumeStop is due to its activated carbon content. The use of activated carbon for removal of organic contaminants from vapor and water streams is widespread in the environmental industry. Additionally, activated carbons are often the final polishing step in potable water clean up since they are non toxic and are able to remove even very low levels of organic (and some inorganic) contaminants.

Activated carbon materials can be formed from a range of organic and mineral carbonaceous feedstocks through heat and/or chemical treatment to provide a high-purity material with a microporous structure that yields a very high adsorptive surface area of 500 – 1,500 m^2 /g (1). As a result of this high surface area, the sorptive capacity of the carbon is increased significantly over that of the natural carbon. In the case of PlumeStop, this increase is 50 – 100 x greater than an equivalent mass of natural soil organic carbon (foc) (dry mass basis).

PLUME STOP
Liquid Activated Carbon

Forms of Activated Carbon

Traditionally, activated carbon has been available in two principle forms – Powdered Activated Carbon (PAC) and Granular Activated Carbon (GAC), both used primarily in *ex situ* applications. The development of PlumeStop introduces a third class of composition – *Liquid Activated Carbon* (LAC).

This new carbon composition extends the range of possible uses to include *in situ* applications, most notably subsurface applications, due to its ability to disperse freely through and coat permeable granular media (PlumeStop Technical Bulletin 1.1: Distribution through a Permeable Medium).

Contaminant Removal by Activated Carbon

Contaminant removal by activated carbon occurs principally through adsorption. This is driven by the hydrophobic / lipophilic characteristics of the sorbing species and by electrostatic Van der Waals interactions between the sorbent and sorbate (1).

By nature, there is no fixed 'capacity' of sorption by activated carbon (i.e. filling a container), rather an equilibrium between sorbed-phase and desorbedphase concentrations which is dependent on:

- The nature of the activated carbon (sorbent);
- The mass of the activated carbon;
- The hydrophobic / lipophilic nature of the contaminant (sorbate)
- The concentration of the contaminant (sorbate);
- The presence of, and interactions with, other contaminants and naturally-occurring species.

Isotherms

The influence of the above factors on the sorption equilibrium of contaminants on PlumeStop may be conveniently described using sorption isotherms–plots of sorbate mass adsorbed per mass of sorbent as a function of equilibrium concentration of sorbate in solution. These are commonly summarized from empirical data using the Freundlich equation[1] (2). Example sorption isotherms for benzene and TCE are presented in Figures 1 and 2. Freundlich parameters of common groundwater contaminants on PlumeStop are presented in Table 1.

[1] Freundlich Equation is $\mathbf{q_e = K_f C_e^{1/n}}$ and can be linearized as: $\mathbf{\log q_e = \log K_f + 1/n * \log C_e}$
$\mathbf{q_e}$ = equilibrium loading on the sorbent (mg chemical/g sorbent)
$\mathbf{C_e}$ = equilibrium concentration in the water (mg chemical/L)
$\mathbf{K_f}$ = adsorption capacity at unit concentration (mg/g)/(mg/L)$^{1/n}$
1/n = strength of adsorption (dimensionless)

PLUMESTOP
Liquid Activated Carbon

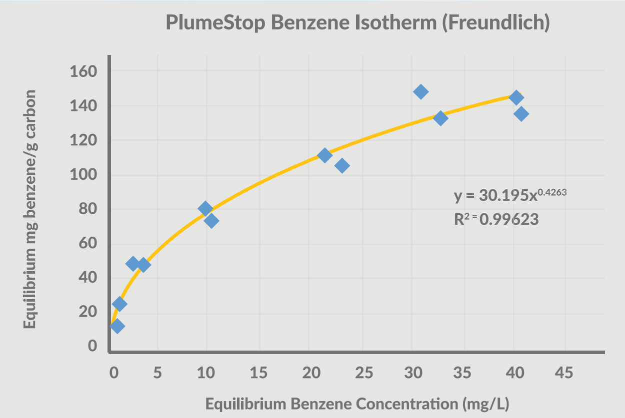


Figure 1. *Sorption isotherm of Benzene on PlumeStop*

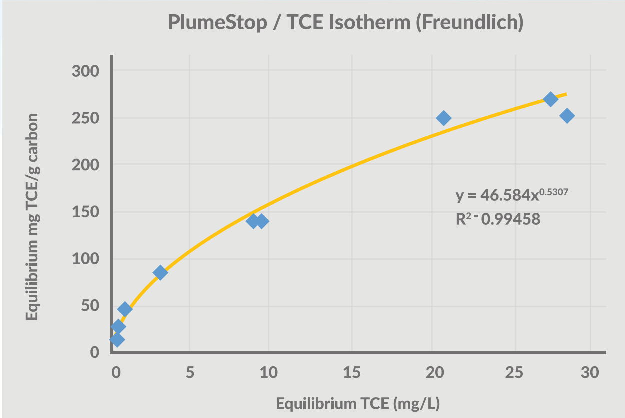


Figure 2. *Sorption isotherm of TCE on PlumeStop*

Note that while each contaminant will have a slightly different sorption isotherm with PlumeStop, the Freundlich nature of these isotherms means that sorption efficiency always increases as the solution concentration drops – the sorbed: solution ratio increases as the curve steepens at the lower end. In practical engineering terms, this translates as greater capture efficiency at lower concentrations, and as such may present a welcome contrast to the majority of remediation technologies that typically exhibit decreasing performance at lower contaminant concentrations.

Table 1. *Selected PlumeStop Freundlich Adsorption Isotherm Constants*

Non-chlorinated Species			Chlorinated Species		
Compound	**K_f**	**1/n**	**Compound**	**K_f**	**1/n**
Benzene	30.2	0.427	PCE	30.2	0.427
Toluene*	97.0	0.429	TCE	97.0	0.429
Ethylbenzene*	163	0.415	cis-1,2-DCE	163	0.415
o-xylene	217	0.428	VC*	217	0.428
p-xylene*	226	0.418	1,1,1-TCA	226	0.418
MtBE	6.54	0.397	1,2-DCA	6.54	0.397
Naphthalene*	132	0.420	Chlorobenzene	132	0.420
Phrenanthrene*	215	0.440	1,2-Dichlorobenzene	215	0.440
Benzo(a)pyrene*	34.0	0.440	2-Chlorotoluene	34.0	0.440
Styrene*	327	0.480	Pentachlorophenol*	327	0.480

K_f = (mg/g)/(mg/L)$^{1/n}$; n = dimensionless. Data derived empirically, unless * Data estimate from literature.

PLUME STOP
Liquid Activated Carbon

Sorption and Bioavailability

Importantly, the capture of organic species by the activated carbon results from a partitioning equilibrium between sorbed-phase and aqueous phase concentrations rather than a ‘fixed binding’ as is the case in immobilization technologies. As a result, the binding remains dynamic, with contaminants continually sorbing and desorbing on the PlumeStop surface. However, the sorbed-phase concentration always dominates the equilibrium when sufficient activated carbon is present.

On the macro scale, the partitioning equilibrium of organic species on the carbon surface resembles ’fixed binding’ as the contaminants are removed from the aqueous phase by the sorbent. However, on the micro scale, the repeated local desorption and re-sorption allows the contaminants to move about the sorbent surface. This process is strongly beneficial to post-sorption contaminant biodegradation because it overcomes local depletion of substrate around the immobile contaminant-degrading microorganism and thus ensures continued contaminant bioavailability.

6. Significance as a Remediation Tool

PlumeStop is not a Binding / Immobilization Technology

A key property of the success of PlumeStop in groundwater remediation is its ability to rapidly remove contaminants from the aqueous phase; in doing so, PlumeStop immediately decreases contaminant concentration and halts the progress of contaminant plumes thereby reducing flux across property boundaries. Ultimately, contaminant sorption allows contaminant-degrading bacteria more time to interact with and degrade, rather than simply immobilizing and storing long-term, the contaminants of concern.

PlumeStop as a Means of Engineering Plume Dynamics

Within the context of Contaminant Fate & Transport, the sorptive capacity of PlumeStop provides a means of controlling contaminant migration rate and/or residence time within a treatment zone. This control can be used to reduce attenuation distance and therefore restrict plume expansion on monitored natural attenuation (MNA) projects, as well as for risk-based corrective action strategies. It can similarly provide a means of increasing contaminant residence time within a focused treatment zone to increase efficiency and reduce the spatial footprint of compatible reagent injections.

PlumeStop as a Means of Reducing Risk

Rapid removal of contaminants from the aqueous phase provides a correspondingly fast reduction in risk (within the timescale of days). Contaminants are rapidly removed from the aqueous phase, thereby reducing migration and exposure via groundwater pathways. Partitioning from groundwater to the vapor-phase is also reduced as a consequence (Henry's Law).

PlumeStop as a Means of Back-Diffusion Management

The combined features of PlumeStop – wide-area dispersion, contaminant capture, contaminant biodegradation, and bio-regeneration of sorptive capacity – create a novel tool for back-diffusion management (Technical Bulletins 1.1: Distribution through a Permeable Medium; 3.1: Post Sorption Contaminant Biodegradation; and 4.1: Regeneration of Sorptive Capacity). The material may be dispersed freely through the primary porosity, where it will sorb to the soil, capture and degrade contaminants, and maintain a diffusion gradient out of the secondary porosity, thereby providing sustained capture and destruction of back-diffusing mass.

Literature Cited:

1. F. Çeçen, Ö. Aktas, *Activated carbon for water and wastewater treatment: Integration of adsorption and biological treatment* (John Wiley & Sons, 2011).
2. F. HMF, *ZPhys Chem* **57**, 385 (1906).
3. J. G. A. Birnstingl, Sandefur, C., Thoreson, K., Rittenhouse, S., Mork, B., www.plumestop.com (2014).
4. F. Roch, M. Alexander, *Environmental toxicology and chemistry* **16**, 1377 (1997).
5. L. Toräng, N. Nyholm, H.-J. Albrechtsen, *Environmental Science & Technology Environ. Sci. Technol.* **37**, 3095 (2003).

REGENESIS

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REGENESIS®

SITE GOALS ACHIEVED WITHIN TWO MONTHS

CASE STUDY:

A Former Santa Barbara Manufacturing Facility Treated Using a Combined Remedy Approach

REGENESIS®

OVERVIEW

This case study reviews a contaminated manufacturing site in Santa Barbara, California. A former manufacturing operation had left PCE and TCE contaminant levels above regulatory limits with previous remediation approaches attempted without complete success. Applying a combined remedy approach, Haro Environmental chose to focus on incorporating a design to rapidly reduce contaminant concentrations for sustained treatment, and reduce the potential for further downgradient migration of the PCE and TCE contaminants. Working with REGENESIS technical services, the consultant, Elliot Haro, chose PlumeStop®, Hydrogen Release Compound® (HRC), and Bio-Dechlor Inoculum Plus® (BDI+) in his application to treat contaminant levels and meet regulatory guidelines for the site.

HIGHLIGHTS

- This site has been an active case since 2007. REGENESIS was able to eliminate the contaminant quickly and effectively using a combined remedy approach.
- After conducting a pre-field remediation test, the injection interval was reduced from 12 feet to 9 feet with a bottom-up approach, reducing the project costs by 30%.
- The combination of PlumeStop, HRC and BDI+ successfully eliminated the contaminants and created conditions for sustained treatment at the site.

BACKGROUND

A former manufacturing facility in Santa Barbara, California is located in a busy area of the city which was once used primarily for industrial and commercial manufacturing. Recently, this area has evolved into a popular urban district known as the “Funk Zone.” Due to its manufacturing history, this site has been an active PCE and TCE case with the Central Coast Regional Water Quality Control Board (CCRWQCB) for over 11 years.

Since the late 1990s, assessments and remedial activities have been performed at the site. Previous remediation attempts were made through limited excavation and ISCO injections using permanganate, but were unsuccessful at achieving levels for groundwater closure. The site required an aggressive approach to reach CCRWQCB cleanup goals. Environmental Consultant, Elliot Haro, chose PlumeStop colloidal activated carbon combined with HRC enhanced reductive dechlorination and BDI+ to eliminate the contaminants.

SITE TIMELINE

1930-1950
Residential homes occupied the area.

1950–1980s
Auto repair facility with spray booths and solvents – manufacturing operations began.

1980s-present
Boat storage, misc. storage, commercial, and retail

PROJECT TIMELINE

1993
Phase I report - Case opened

1995
Tank removal

2000
PCE discovered in soil and groundwater

2007
Soil gas surveys performed

2008
Additional soil gas investigations

2009
Confirmed soil gas issue above California Human Health Screening Levels

2011
Excavation of impacted soils at source area (former tanks)

2012
In situ Chemical Oxidation using Permanganate in the soils and shallow groundwater

2013
Soils only closure approved by Santa Barbara Department of Public Health

2013
Groundwater Issue continued with groundwater monitoring only

2014
Change of consultants to Haro Environmental

HARO ENVIRONMENTAL

2015
REGENESIS® REGENESIS engaged on project

2016
Application of Amendments PlumeStop, HRC and BDI+

PLUME STOP® Liquid Activated Carbon

HRC® HYDROGEN RELEASE COMPOUND

BDI® BIO-DECHLOR INOCULUM

Request for Closure August 2017

DESIGN EFFORTS

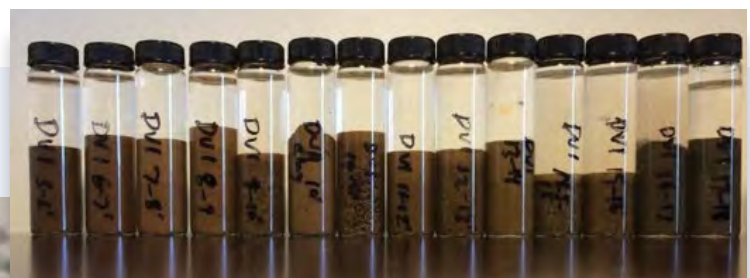
Prior to implementation of full-scale injection approach, a pre-field remediation test was implemented to confirm that the technology could properly treat the residual PCE and TCE groundwater. Continuous cores were collected to identify the transmissive zones and high mass zones. In addition, a clear water injection test was performed to demonstrate that *in situ* injections were capable of achieving sufficient lateral distribution for full-scale implementation. This pre-field remediation test led to a revised full-scale injection plan, which reduced the project cost by 30%.

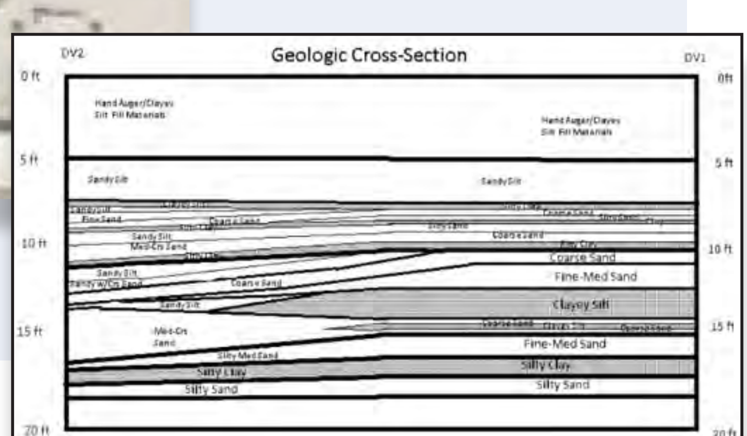
The revised injection plan led to the application taking place over 16 field days, including some weekends. 24,900 gallons of PlumeStop, HRC and BDI were injected into 51 injection points.

16 field days

24,900 Gallons

51 Injection Points



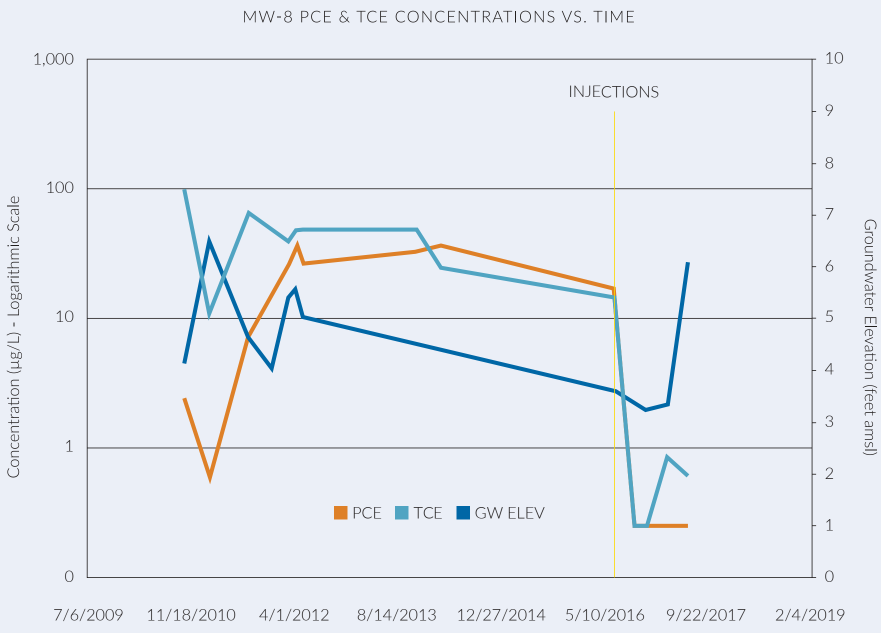


APPLICATION PLAN
COMMERCIAL/INDUSTRIAL PROPERTY

Well	PlumeStop Lbs.	PlumeStop Volume (as applied) Gals.	Area Ft^2	Application Points
MW7	2,400	4,800	700	11
MW8	8,800	16,300	2,800	28
MW9	2,000	3,800	600	12
Total	**13,200**	**24,900**	**4,100**	**51**

RESULTS

When REGENESIS began work on this site, the PCE concentrations were 53 µg/L and the TCE concentrations were 45 µg/L. After treatment of the 4,100 square foot area, PCE and TCE concentrations were reduced to clean-up goals set by the CCRWQCB. Site closure has been requested and development is scheduled for early 2019. The total project time from injection to closure is estimated to be 15 months.
The cost savings on this project for pre-field injection work is 30%, as the target treatment zone was reduced from 12 ft. to nine feet.



APPLICATION DETAILS

- 16 FIELD DAYS
- 24,900 GALLONS OF PLUMESTOP, HRC AND BDI+
- 51 PLUMESTOP/BDI+ POINTS SPACED 7-10’ BASED ON ACCESS
- 31 HRC POINTS SPACED 7-10’ BASED ON ACCESS
- TOTAL TREATMENT ZONE: 6-15’ BGS (REDUCED DUE TO RESULTS FROM DESIGN VERIFICATION TESTING)

ABOUT THE ENVIRONMENTAL CONSULTANT

ELLIOT R. HARO, PRINCIPAL SCIENTIST

As Principal Scientist at Haro Environmental, Mr. Haro's responsibilities include project procurement, budgeting, and project implementation. His project management experience includes proposal and cost estimate preparation for site assessments and remediation projects, design of soil and groundwater remediation systems, in-house staff and subcontractor coordination, technical report preparation, and permit acquisition. Mr. Haro has managed and performed numerous Phase I and Phase II Environmental Site Assessments (ESAs) as well as site investigation and remediation field activities including air, soil, groundwater, and surface water sampling, groundwater monitoring well installations, and remediation system operations and maintenance. He has prepared various environmental reports including site assessment reports, feasibility studies, remedial/corrective action plans, remedial work plans and health-based risk evaluations. Mr. Haro is familiar with the regulatory process and has consulted with both local and regional agencies on Client's behalf for work plan approvals and modifications. Mr. Haro's technical expertise includes evaluation, design and implementation of innovative *in situ* groundwater treatment technologies including enhanced bioremediation and *in situ* chemical oxidation.

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Web: www.haroenv.com

PLUME STOP
Liquid Activated Carbon

PlumeStop rapidly removes contaminants from groundwater and stimulates their permanent degradation.

KEY BENEFITS:

- Rapid reduction of dissolved-phase plumes.
- Distribution of widely under low injection pressures.
- Achievement of stringent groundwater clean-up standards.
- Providing a long-term means of addressing matrix back diffusion, so contaminants do not return.
- Elimination of excessive time and end-point uncertainty associated with groundwater remediation

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BIO-DECHLOR INOCULUM

Bio-Dechlor INOCULUM Plus (BDI-Plus) is an enriched, natural microbial consortium containing species of *Dehalococcoides sp*. (DHC) which are capable of completely dechlorinating contaminants during *in situ* anaerobic bioremediation processes.

KEY BENEFITS:

- Rapid and effective treatment of undesirable anaerobic dechlorination intermediates such as dichloroethene (DCE) and vinyl chloride (VC).
- Highly compatible with a range of electron donors such as 3-D Microemulsion and HRC.
- Easy to apply and handle.

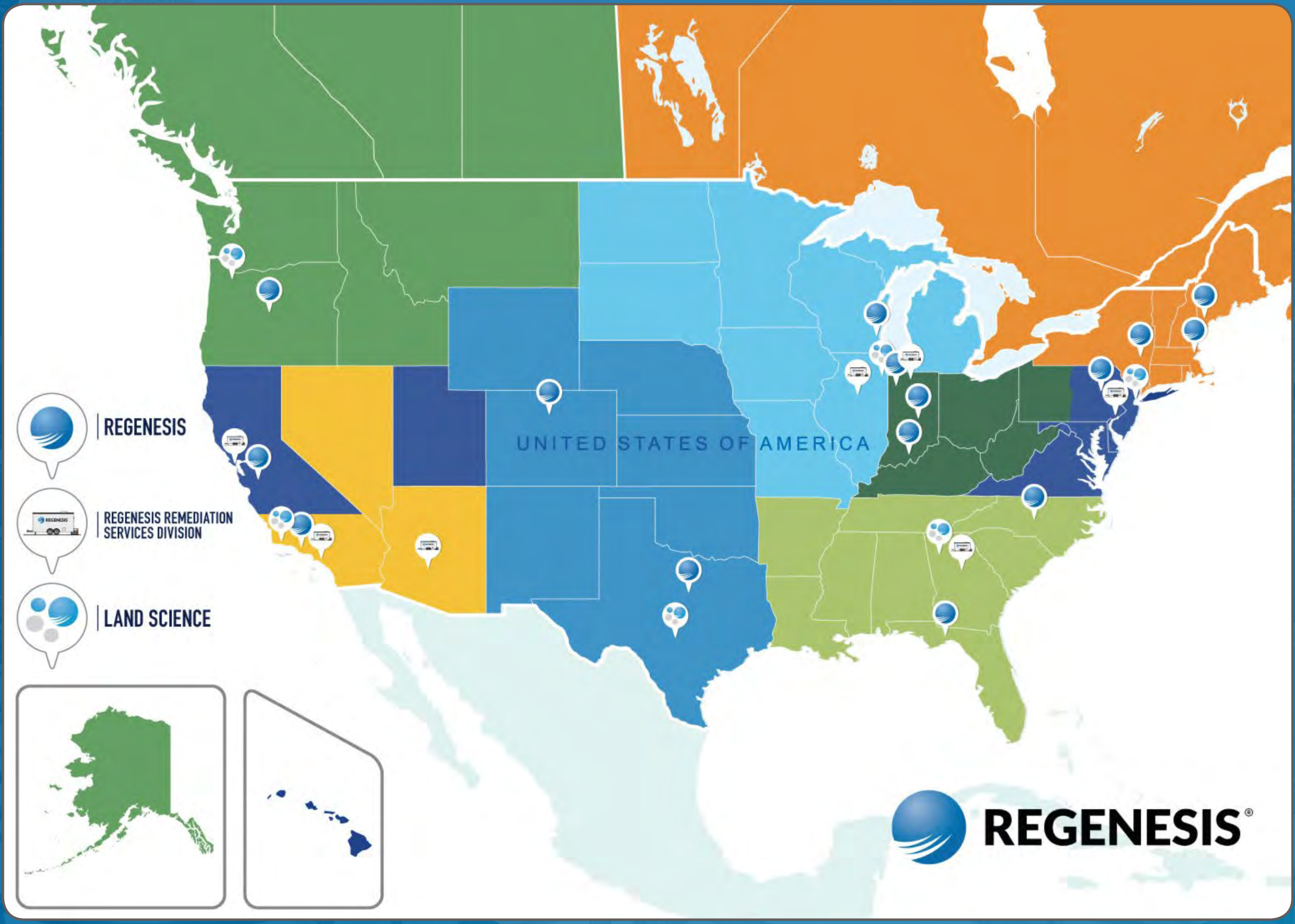
HYDROGEN RELEASE COMPOUND

HRC is an engineered, hydrogen release compound designed specifically for enhanced, *in situ* anaerobic bioremediation of chlorinated compounds in groundwater or highly saturated soils. Upon contact with groundwater, this viscous, poly-lactate ester material becomes hydrated and subject to microbial breakdown producing a controlled-release of hydrogen for periods of up to 18-24 months on a single application. HRC enables enhanced anaerobic biodegradation by adding hydrogen (an electron donor) to groundwater and/or soil to increase the number and vitality of indigenous microorganisms able to perform the naturally occurring process of enhanced reductive dechlorination.

KEY BENEFITS:

- Provides controlled-release lactic acid to promote reducing conditions and optimize the anaerobic enhanced reductive dechlorination process
- Highly viscous to stay in-place where injected for highly targeted treatment
- A viable, long-term source of staged-release hydrogen, on the order of 2-5 years from a single application
- Clean, low-cost, non-disruptive application (permanent wells, direct-push, excavations, etc.)
- No on-going operations and maintenance needed
- Faster and often lower cost than drawn out natural attenuation approaches

REGENESIS IS READY TO ASSIST YOU IN DETERMINING THE RIGHT SOLUTION FOR YOUR SITE



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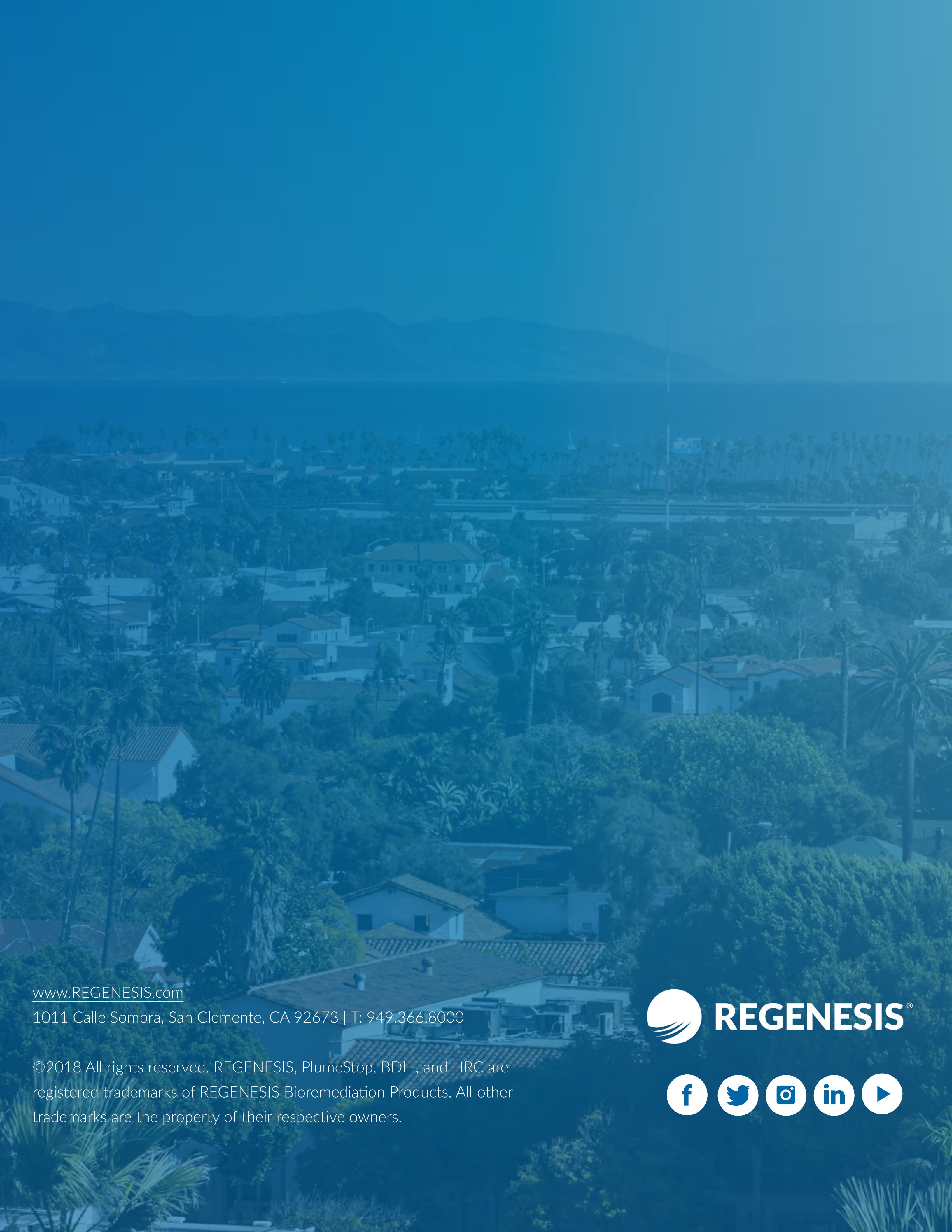

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REGENESIS®

PLUMESTOP ARRESTS PCE IN FAST MOVING AQUIFER

CASE STUDY:
Permeable Reactive Barrier Provides Sustaining Results for PCE Plume

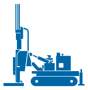
REGENESIS

Overview

PlumeStop Permeable Reactive Barrier Provides a Cost-Effective Approach to Treat a PCE Release at Former Dry Cleaning Site

Project Summary

Plume Size	1,400 feet in length
Fast-Moving Aquifer	1,560 ft/year
Geochemistry	Highly Aerobic
Area Zoning	Mixed-Use
Injection Accessibility	Limited



PlumeStop effectively treated the plume in the well-oxygenated, sand and gravel lithology

99% **Reductions met and sustained**

The installation of a fixed, permeable reactive barrier has allowed for indefinite treatment with 99% reductions met and sustained

A former dry-cleaning site in Martinsville, Indiana, had a perchloroethylene (PCE) release which contaminated the community's groundwater with concentrations in excess of 370 parts per billion (ppb). The sand and gravel aquifer created a challenging problem due to the high flow regime, with a groundwater velocity of approximately 1,560 ft/year and oxygenated geochemistry which had limited natural attenuation. The property owner, interested in the potential sale of the site, engaged Wilcox Environmental Engineering (Wilcox), a regional environmental consulting firm based in Indianapolis. The PCE plume stretched over 1,400 feet and extended through the surrounding 'mixed-use' residential area, limiting accessibility for the remediation efforts. As a result of the plume's location, the community was made aware of remediation efforts from the start and Wilcox communicated the remedial approach from the site assessment through to the pilot test. In order to provide assurance to the community, Wilcox promptly and clearly communicated with the residents and evaluated their homes for possible vapor inhalation risk as a result of the PCE release.

In order to prevent additional migration of PCE-impacted groundwater, Wilcox worked with REGENESIS® to create an *in situ* remedy compatible with the challenging aquifer and residential settings. After a thorough evaluation of possible technologies, Wilcox determined that PlumeStop® Liquid Activated Carbon™ in combination with HRC® and BDI Plus® could prevent the plume from migrating and would work in the well-oxygenated, sand and gravel lithology.

The combined remedial approach would enable the installation of a fixed permeable reactive barrier to capture and biodegrade the migrating plume. The team designed a pilot test using PlumeStop to prove the effectiveness of the technology in the specific site geology.

After a successful pilot test and four monitoring events, Wilcox and the site owner decided to implement a full-scale application using PlumeStop.

Background

Uniquely Challenging Site Conditions

From 1987 through 2011, the site operated as a dry cleaner, resulting in a PCE contaminant release in the groundwater. Presently, the site operates as a pick-up and drop-off dry cleaner, but does not conduct dry-cleaning activities on site. The site is located in a 'mixed-use' area where both commercial and residential properties reside. Due to the proximity of the plume to the residences, the community was included in communicating remediation efforts from the start of remedial efforts. Wilcox provided clear and prompt communication, offering assurance to concerned residents. Wilcox also evaluated vapor intrusion (VI) risk in their homes beginning in 2015. This included local sampling and installing poly diffusion bags to screen out some residences. They evaluated VI for over 20 residents, collected samples, and at one house installed a sub-slab depressurization system. There were no concerns regarding water ingestion because the community is connected to a municipal water supply.

REGENESIS

Timeline

Pilot Study Employing a PlumeStop Permeable Reactive Barrier Was Proven Effective and a Full-Scale Implementation is Planned

1987-2011

Site operated as a dry cleaner

2014

Wilcox began working with site owners to develop an effective plan to mitigate risk from the PCE plume

2015

Wilcox evaluated vapor intrusion risk for nearby residences and provided safe and effective measures to mitigate any VI exposure

July-August 2018

Conducted pilot test to demonstrate efficacy of permeable reactive barrier and to prove the success of the combined remedy of PlumeStop, HRC and BDI Plus

October-December 2018

Four rounds of post-injection monitoring performed

Spring 2020

Full-scale implementation of combined remedy

Treatment

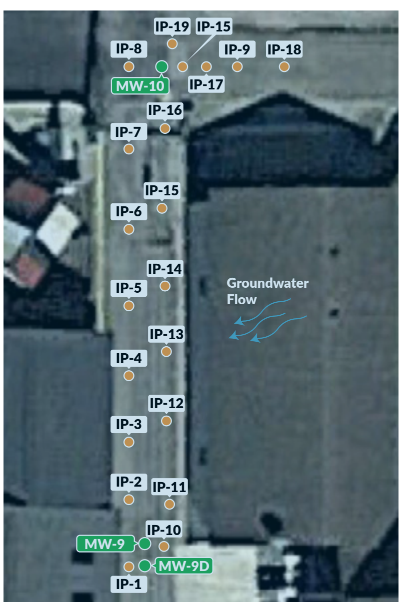
A Combined Remedy Approach Leads to Rapid and Promising Results

Site Details

Seepage Velocity	1,560 ft/yr.
Contaminants of Concern	PCE
Concentration	330 ppb
Treatment Interval	9-16 ft. bgs
Total Direct Push Points	35
Total Amount of Remedial Solution	6,100 gal.

Prior to implementation, Wilcox conducted a design verification testing (DVT) program to refine the site conceptual model and optimize the subsequent remedial design for the emplacement and dose of the reagents. The DVT effort entailed a Membrane Interface Hydraulic Profiling (MiHPT) survey and extensive aquifer testing program across the entirety of the plume. During July and August of 2018, Wilcox and REGENESIS conducted a PlumeStop pilot test in order to demonstrate the viability of the combined technologies. During the pilot test injection, the site location proved challenging as injections had to take place in an alley between busy service streets, with relatively tight access points.

Wilcox and REGENESIS communicated with the nearby community throughout the application process in order to address noise and driveway access. During the pilot test, 4,000 lbs. of PlumeStop, 400 lbs. of HRC, and 18 liters of BDI Plus were injected using a direct push method under low pressure into 35 injection points. In addition, a secondary co-reagent was applied to optimize distribution of the PlumeStop within the tight confines of the injection area and aquifer setting.



Map depicting injection locations

Workers applying amendments at IP-10 in July 2017

PLUME STOP®
Liquid Activated Carbon

BIO-DECHLOR INOCULUM PLUS

HYDROGEN RELEASE COMPOUND

99% reduction of PCE ~30 days after the application in key monitoring wells

PRB application highly successful approximately 1 year after installation

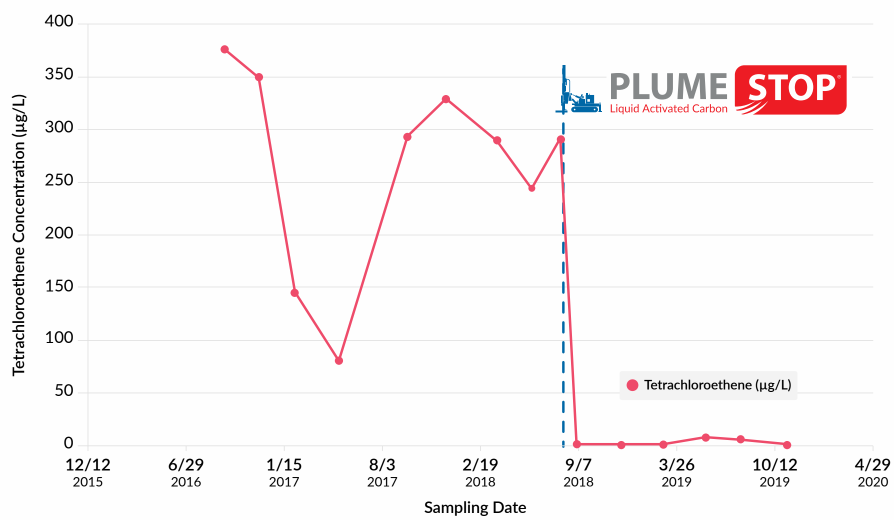
Demonstration of PRB leading to full-scale treatment in Spring 2020

Results

Immediate Contaminant Reduction Provides Stakeholder Assurance

Following the PlumeStop application, Wilcox monitored the results for four monitoring events. The pilot test's successful results proved that PlumeStop would work quickly in these site conditions and would sustain positive results over the long term. This was a key component to provide assurance to the nearby community, the property owner, and the insurance company. After thorough post-injection monitoring and successful results, Wilcox has has planned a full-scale application to begin in early 2020. Consistent with the pilot test application, the full-scale application utilizes an approach with minimal disruption of the community. Full-scale application, planned for the Spring of 2020, is designed to treat the entirety of the plume to below regulatory standards for decades, based upon contaminant retardation models developed by REGENESIS.

MW-09 PCE Concentrations Over Time



Within 30 days of the injection, the PCE concentration decreased from 291 µg/L to non-detect. Additional post-injection monitoring further demonstrates the effectiveness of the PlumeStop pilot test.

The Consultant
About Wilcox

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Wilcox Environmental Engineering, Inc. is a unique assembly of engineering and science-based professionals passionate about providing impeccable service and quality resources. Their founding vision in 1994 to provide innovative, comprehensive, cost-effective solutions for each project stands true today. Since their inception, Wilcox has successfully partnered with a wide base of clients spanning industrial and commercial sectors to address each unique environmental, regulatory, and health and safety need.

Jeremy Kinman, Associate Technical Director at Wilcox

Jeremy Kinman is an Associate Technical Director for Wilcox Environmental Engineering, Inc. based out of Speedway, Indiana with more than 19 years of experience in environmental consulting with a focus on contaminated property management. Jeremy's diversified professional experience includes mentorship of project staff, hydrogeologic data analysis and interpretation, conceptual site model analysis, human risk assessment, vapor intrusion investigation and remediation, client relations management, health and safety management, and overseeing quality assurance processes. Jeremy is also responsible for overseeing and training staff, making sure the best practices are applied providing technical oversight on compliance and management concerns, and engaging and assisting government officials with regulation, policy and rule interpretation. Jeremy also serves as the President of the Board of Directors for the Professional Geologists of Indiana (PGI).

Technology Used

PlumeStop, BDI Plus, and HRC

PlumeStop® Liquid Activated Carbon™ is an innovative groundwater remediation technology designed to address the challenges of excessive time and end-point uncertainty in the *in situ* remediation of groundwater contaminants. PlumeStop is composed of very fine particles of activated carbon (1-2µm) suspended in water through the use of unique organic polymer dispersion chemistry. Once in the subsurface, the material behaves as a colloidal biomatrix binding to the aquifer matrix, rapidly removing contaminants from groundwater, and expediting permanent contaminant biodegradation.

BDI Plus is designed for use at sites where chlorinated contaminants are present and unable to be completely biodegraded via the existing microbial communities. BDI Plus is an enriched, microbial consortium containing species of the bacteria *dehalococcoides sp.* (DHC) which is capable of completely dechlorinating contaminants during *in situ* anaerobic bioremediation processes. BDI Plus has been shown to stimulate the rapid dechlorination of chlorinated compounds such as tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE), and vinyl chloride (VC).

HRC is an engineered, hydrogen release compound designed specifically for enhanced, *in situ* anaerobic bioremediation of chlorinated compounds in groundwater or highly saturated soils. Upon contact with groundwater, this viscous, poly-lactate ester material becomes hydrated and subject to microbial breakdown producing a controlled release of hydrogen for periods of up to 18-24 months on a single application. HRC enables enhanced anaerobic biodegradation by adding hydrogen (an electron donor) to groundwater and/or soil to increase the number and vitality of indigenous microorganisms able to perform the naturally occurring process of enhanced reductive dechlorination.

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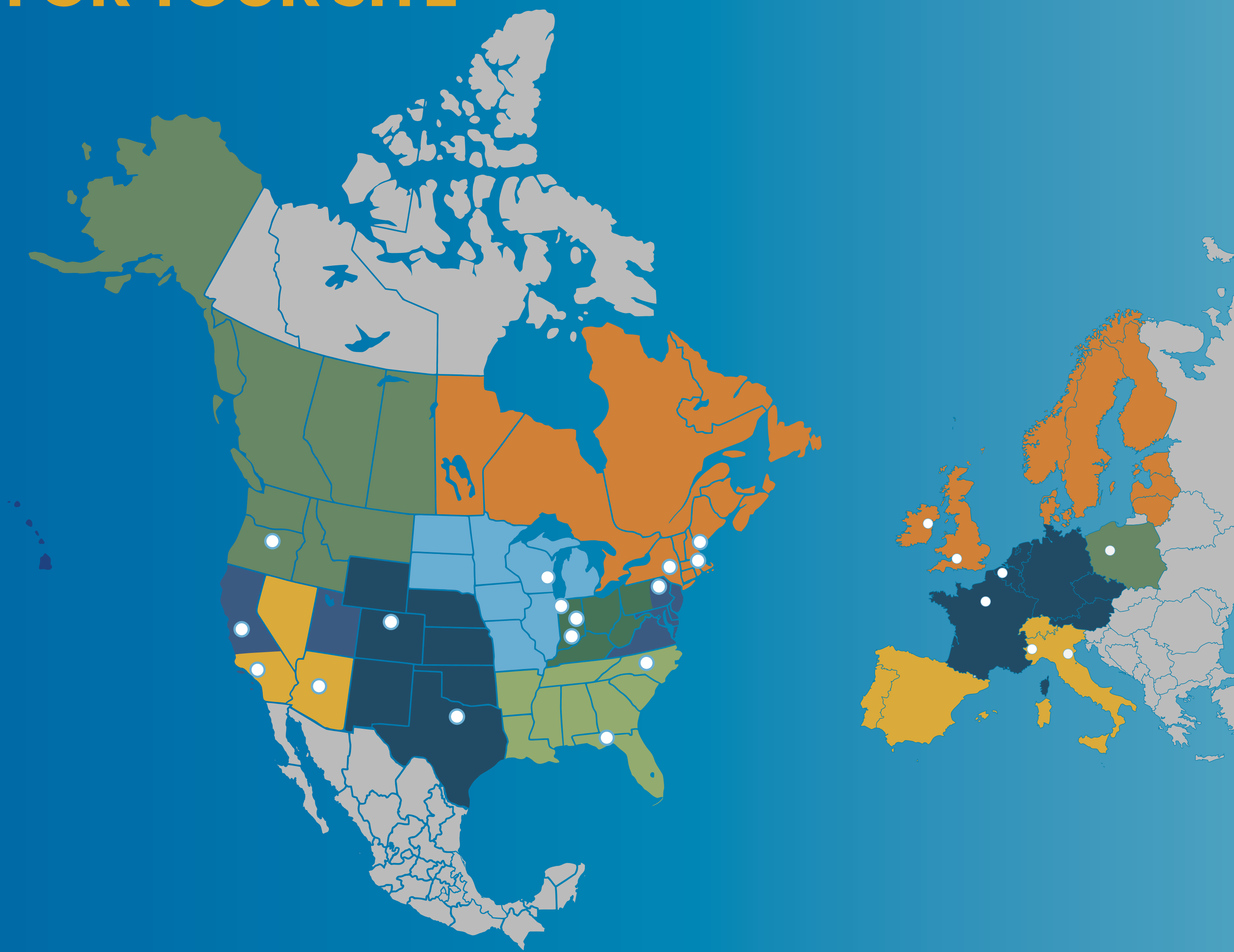

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REGENESIS®

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GLOBAL RETAILER ENTERS INTO ELECTIVE SITE CLEANUP AGREEMENT AND ACHIEVES NFA

CASE STUDY: Persistent PCE Plume Bioremediated to Move Development of Corporate Headquarters Forward

REGENESIS®

Overview

High-Profile Site Slated for Development Granted NFA to Make Way for Global Retailer's Corporate Campus

Site owner entered into an Elective Site Clean-up Agreement (ESCA) to remediate this site and to contribute to the area's revitalization.

PlumeStop, HRC, and BDI Plus successfully remediated persistent PCE, VC, and Cis-1,2,Dichloroethene contamination

ESGI and REGENESIS adapted the injection design according to the difficult site geology and weather conditions.

After one round of injections, successful results led to the site achieving No Further Action

At the site of a global retailer based in Arkansas, historic offsite dry cleaning operations caused tetrachloroethylene (PCE) contamination in the groundwater. The current site owner entered into an Elective Site Cleanup Agreement (ESCA) with the Arkansas Department of Environmental Quality (ADEQ) in order to address the contamination. The owner is remediating the contamination as part of their larger goal of contributing to the revitalization of the downtown area and the creation of a new corporate campus.

A previous bioremediation attempt successfully remediated a majority of the site but one persistent well remained. In order to achieve site closure, Environmental Services Group Incorporated (ESGI) had to continue quarterly monitoring until sufficient data existed to conclude that there was no potential for offsite migration of PCE above the acceptable groundwater screening levels. After time passed with little change to the B-45 well, ESGI sought out a bioremediation strategy that would work quickly with long term success. ESGI partnered with REGENESIS® to design a bioremediation plan that would apply PlumeStop®, Liquid activated Carbon, Hyrdogren Release Compound® (HRC) and Bio-Dechlor Inoculum® (BDI Plus) to eliminate the remaining contaminants of concern (COCs).

After the PlumeStop, HRC, and BDI Plus injection, ESGI conducted multiple rounds of sampling. By the fourth quarter sampling in 2018, results showed that all COCs were below the acceptable threshold levels. These results were maintained through the fifth sampling event. Due to these successful results the site achieved No Further Action (NFA) in January 2020.

Background

Uniquely Challenging Site Conditions

A 2012 Phase 1 Environmental Site Assessment (ESA) identified Recognized Environmental Conditions (RECs) associated with two onsite, historic filling stations, a former onsite dry-cleaning facility as well as several offsite and up-gradient former filling stations. The current site owner is not affiliated with these past operations in any way, but they voluntarily entered into an Elective Site Clean-up Agreement (ESCA) LIS 13-042 with the Arkansas Department of Environmental Quality (ADEQ). The ESCA governs remediation of the site and offers a means to address historic contamination from former onsite activities without penalty and with known objectives.

Since 2012, the owner has performed groundwater sampling across the site over multiple sampling events and confirmed that the petroleum hydrocarbon contamination detected in the southwest portion of the site originated from historic, offsite operations. Sampling also concluded that chlorinated solvent contamination on the northeastern portion of the site originated from historic, onsite operations as well.

The owner implemented dual-phase extraction (DPE) which removed the floating "free" petroleum product near the southwestern portion of the site. Following this, bioremediation of the groundwater on the northeastern portion of the site resulted in drastically-reduced concentrations of chlorinated solvents and the promotion of degradation and attenuation. Upon completion of active remediation, the ECA required quarterly groundwater sampling. This sampling showed that all COCs were below threshold levels except the B-45 well. After a year of monitoring this well remained as the only well with persistent contamination which led ESGI to seek out an alternative bioremediation strategy.

Timeline

Persistent PCE Plume Effectively Reduced with PlumeStop, HRC, and BDI Plus to Achieve NFA Status

2012

Phase I ESA identified Recognized Environmental Conditions (RECs)

2012

A limited site investigation (LSI) indicated petroleum hydrocarbon contamination near the southwest and south-central site boundaries, and chlorinated solvents were detected in the groundwater.

March 2013

the site owner voluntarily entered into Elective Site Clean-up Agreement (ESCA) with the ADEQ.

March 2018

A bioremediation plan to address the remaining COCs around B-45 well was authorized and implemented.

August 2019

The fifth sampling event post the PlumeStop, HRC and BDI Plus bioremediation plan shows that all remaining COCs in B-45 were brought below acceptable threshold levels.

November 2019

Plug and abandonment for the final B-45 well

January 2020

The site achieved No Further Action (NFA)

Treatment

Effective Bioremediation Strategy Using PlumeStop, HRC, and BDI Plus Achieves Cleanup Goals

Although previous efforts had successfully remediated a majority of the site, one well remained above target levels. In order to eliminate the remaining COCs around the B-45 well, a bioremediation plan involving PlumeStop, HRC, and BDI Plus was designed and implemented. Due to the challenging rocky geology, several wells had to be adjusted in the design in order to reach the target depth. Despite cold and rainy weather, the remedial solutions were successfully injected over two days.

Treatment Process

2,400 Pounds of PlumeStop

240 Pounds of HRC

18 Liters of BDI Plus

At the end of 2019, the ADEQ required that ESGI monitor the wells after a 2-inch rain event. In August of 2019 a rain event occurred and sampling showed that all of the wells around B-45 remained below the target levels. However they found an elevated level of PCE across the street in B-46. Previously, this well had been relatively dry and had not produced sampling results. Because this well was outside of the area of concern and its PCE levels were relatively low, ESGI conducted a human health risk assessment survey to prove that the outlying B-46 well would not have any impact on humans. The ADEQ approved the results of the assessment and in November 2019 they allowed the B-46 well to be plugged and abandoned.

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Technology Used

PlumeStop, BDI Plus and HRC

PLUME STOP Liquid Activated Carbon

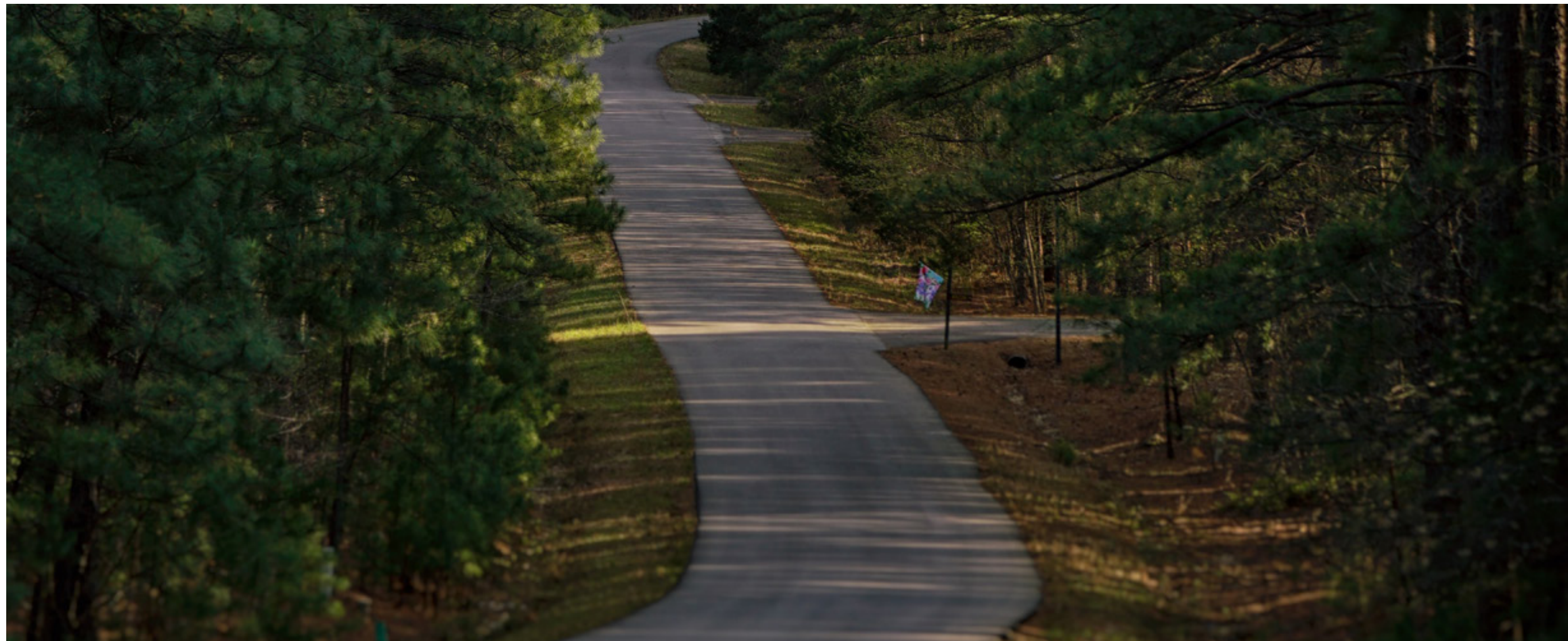
PlumeStop® Liquid Activated Carbon™ is an innovative groundwater remediation technology designed to address the challenges of excessive time and end-point uncertainty in the *in situ* remediation of groundwater contaminants. PlumeStop is composed of very fine particles of activated carbon (1-2µm) suspended in water through the use of unique organic polymer dispersion chemistry. Once in the subsurface, the material behaves as a colloidal biomatrix binding to the aquifer matrix, rapidly removing contaminants from groundwater, and expediting permanent contaminant biodegradation.

BDI PLUS BIO-DECHLOR INOCULUM

BDI Plus is designed for use at sites where chlorinated contaminants are present and unable to be completely biodegraded via the existing microbial communities. BDI Plus is an enriched, microbial consortium containing species of the bacteria *dehalococcoides sp.* (DHC) which is capable of completely dechlorinating contaminants during in situ anaerobic bioremediation processes. BDI Plus has been shown to stimulate the rapid dechlorination of chlorinated compounds such as tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE), and vinyl chloride (VC).

HRC HYDROGEN RELEASE COMPOUND

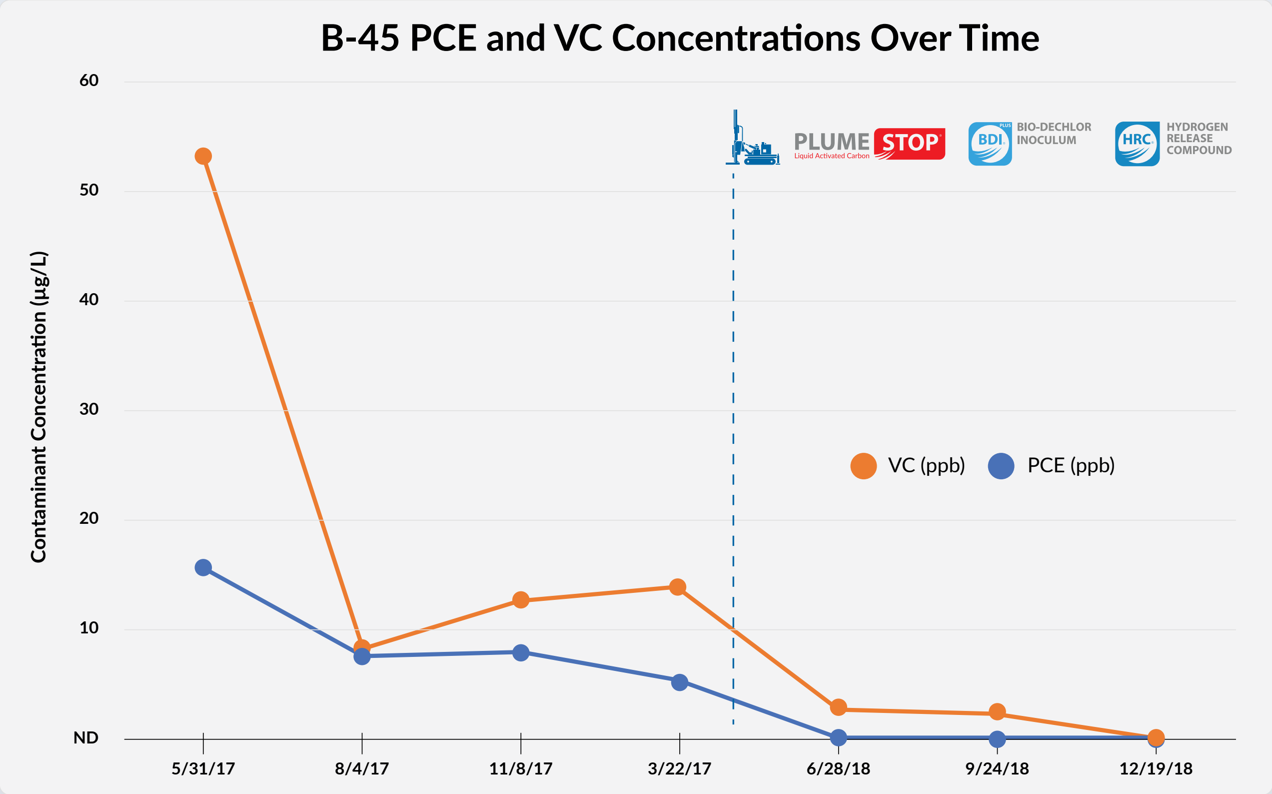
Hydrogen Release Compound provides controlled-release lactic acid to promote reducing conditions and optimize the anaerobic enhanced reductive dechlorination process. It is available in various viscosities to stay in-place where injected for highly targeted treatment HRC provides a viable, long-term source of staged-release hydrogen, on the order of 2-5 years from a single application. It is highly compatible with anaerobic bioaugmentation approaches using Bio-Dechlor INOCULUM PLUS.



Results

ADEQ Issues No Further Action Following the Successful Remediation Event

After injecting PlumeStop, HRC, and BDI Plus, the five quarterly water samples indicate successful remediation of the PCE and other COCs. All of the wells were plugged and abandoned in December 2019 and the ADEQ issued a No Further Action (NFA) in January 2020. After multiple years of ongoing efforts, the combined remedy of PlumeStop and BDI Plus has allowed for the remediation to be completed. The global retailer will soon break ground for their new campus.



REGENESIS®

The Consultant

About Environmental Services Group, Inc.

ESGI has extensive experience in Land Remediation. ESGI provides turn-key solutions for remediation of spills and contaminated land. ESGI has qualified technicians that will supervise the removal of the affected soils and will restore the property to its natural setting.

2300 Cottondale Lane, Suite 260,
Little Rock, AR 72202
Tel: (800) 887-6752

About The Consultant

Heading ESGI's expansion efforts across the United States, Timothy E. McDonald, P.E. has over 30 years of industry experience spanning energy, technology, engineering and consulting. A Harvard Business School alumnus and Registered Professional Engineer, Tim has broad functional experience covering general management, operations, finance, marketing, engineering and environmental, health and safety.

He held numerous technical and management positions with major oil and gas companies for over 21 years, and has been the president of 3 independent oil & gas companies with holdings in the Southwest and Offshore Gulf of Mexico.

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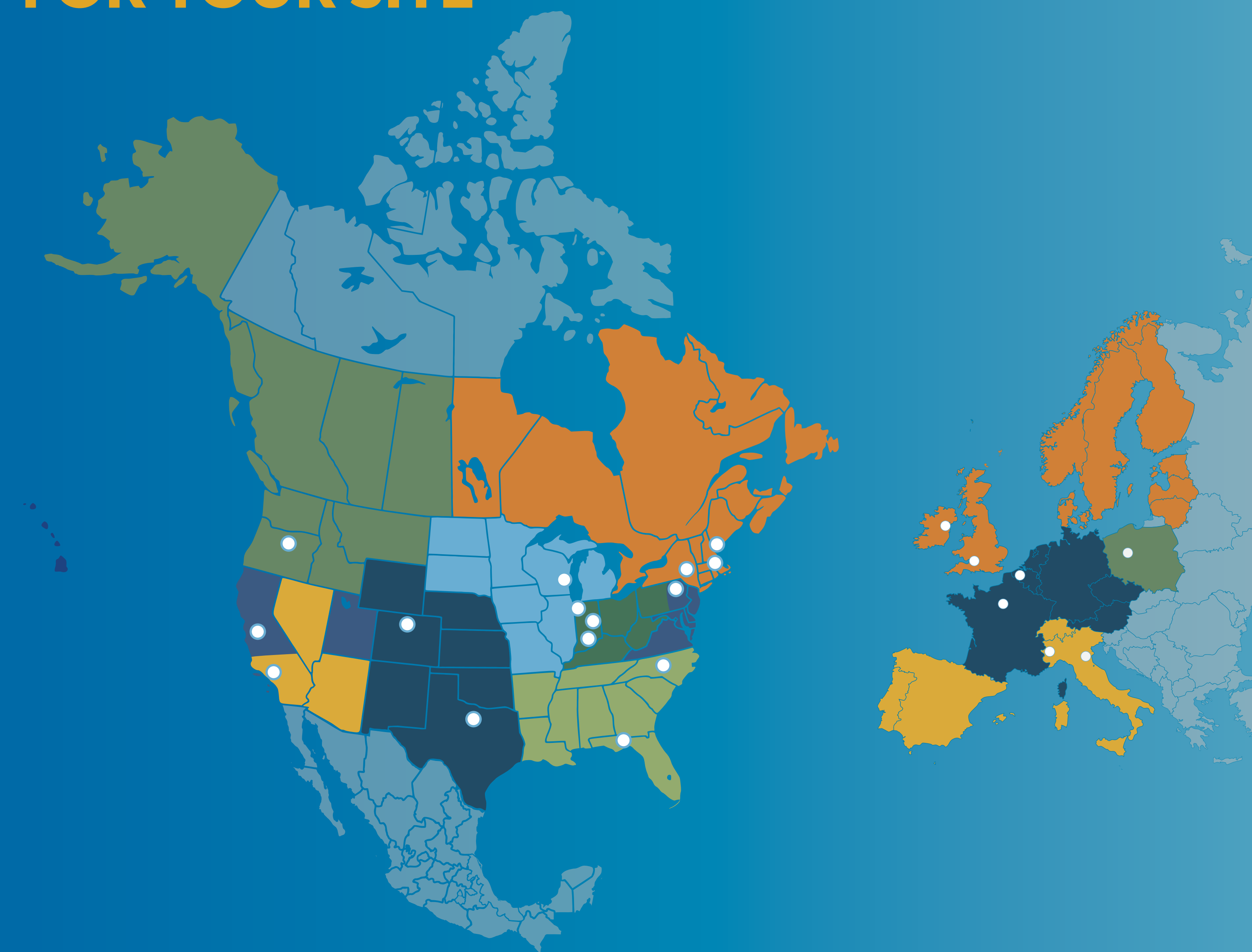

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REAL ESTATE TRANSACTION REQUIRES FAST-ACTING TREATMENT OF PCE CONTAMINATION

CASE STUDY:
Combined Remedy Approach Delivers Accelerated Results Using PlumeStop, BDI Plus and HRC

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OVERVIEW

Due to the owner's objective to sell their property, a multi-tenant commercial plaza in the greater Boston area required remediation of tetra-chloroethylene (PCE) contamination in groundwater associated with a historical operator. Because contamination had been identified during due diligence, it was very important to implement a time-effective remediation strategy with minimal disruption to the various operating businesses.

Wilcox & Barton, Inc. chose a combined remedial approach to treat the PCE contamination. This included liquid activated carbon (PlumeStop®), an enriched, microbial consortium (BDI Plus®), and an engineered, hydrogen release compound (HRC®). They chose this approach because it combines the fast-acting capabilities of PlumeStop with the reductive dechlorination process enhanced by HRC and BDI.

The high traffic at this multi-tenant site created challenges for the remediation team. Specifically, the operational hours of the various businesses required the injections to be performed at night to maximize safety and minimize disruption, while the quick timeline called for the remediation team to complete the injections during the winter. As a result, the injection project was completed over ten days from 10pm to 7am in freezing conditions. This winter weather challenged the remediation team because they needed to prevent the remediation fluid, water supply, and equipment from freezing. Although the work was being done at night, snow plows and other vehicles commonly use the large parking lot, so visibility and traffic control were vitally important. Heaters were incorporated to keep the injection fluids in liquid form and warming and rest facilities were provided for the injection team. Additionally, the driller provided lighting and traffic control. The injections covered a relatively large area and lasted for two weeks. The application event was successfully completed by January 2018.

There have been four quarters of post-injection monitoring. In the first month following the injections, all but one residual monitoring well in the treatment area experienced drastic reductions of PCE to Non-Detect (ND) levels. Concentrations of residual PCE in the remaining monitoring well are decreasing towards ND and currently barely exceed the drinking water standard. Overall, the combined remedy was considered extremely effective in reducing the PCE contamination in the groundwater at a fast rate.

HIGHLIGHTS

- Due to the high-traffic and operational hours at this site, injections were performed from 10pm-7am in January.
- The speed with which Wilcox & Barton, Inc. addressed the contaminants was crucial for the site owners to achieve their goal of marketing the property for sale.
- Site engineers innovatively included heating systems, additional lighting, and warming facilities to ensure that the remedial agents stayed in their liquid form and to provide necessary amenities to the injection specialists.
- The combined remedy approach of PlumeStop, BDI Plus, and HRC was selected over other remediation strategies for its fast-acting capabilities and its effectiveness in completely dechlorinating contaminants.

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PROJECT TIMELINE

March 2017
Reportable Condition identified during review of previous due diligence investigations conducted for others (120-day reporting obligation)

April 2017
Indoor air sampling initiated to evaluate risk to site occupants. Soil and groundwater sampling initiated to evaluate nature and extent of release.

July 2017
Massachusetts Department of Environmental Protection notified

September 2017
Contacted by Wilcox & Barton REGENESIS prepares preliminary design for PlumeStop - looking for rapid cVOC reductions

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October 2017
Additional data collected by Wilcox & Barton to further delineate the plume (new wells), minor adjustments to design made.

January 2018
Injections were completed at the site (night work)

PLUME STOP® Liquid Activated Carbon

BDI. BIO-DECHLOR INOCULUM

HRC® HYDROGEN RELEASE COMPOUND

January 2019
Four quarters of post-injection monitoring have been completed

BACKGROUND

A dry cleaner that previously operated at this site was the likely source of PCE contamination. In the past, a due diligence investigation identified PCE levels below regulatory levels. However, due to an updated and more stringent regulatory standard, a subsequent due diligence investigation showed the PCE levels above regulatory thresholds. While the PCE concentrations were not extremely elevated, this site is regulated according to drinking water standards due to a town ordinance. These regulatory standards lowered the acceptable threshold for PCE contamination and necessitated remediation efforts.

TREATMENT APPROACH

Wilcox & Barton, Inc. considered various approaches to remediate the site, including excavation. However, because of the many utilities located in the vicinity this approach was not feasible. Similarly, a standard biodegradation approach was also ultimately unfeasible because of the short time frame for remediation.

After determining a remedial approach, Wilcox & Barton, Inc. conducted design verification testing using Membrane Interface Probe (MIP) borings. This advanced method was used to target the location of their injections and to further delineate the plume. The MIP data showed that the plume was not concentrated in a single area and was instead distributed and diluted across the site. This required a broader approach, with injection points dispersed within the apparent source area and in the areas upstream of the contaminated wells.

The injections took place over two weeks in January 2018. The plume was treated with PlumeStop, BDI Plus, and HRC. PlumeStop works by sorbing the contaminants onto the Liquid Activated Carbon™ matrix. Once the contaminants are partitioned, BDI Plus and HRC stimulate the rapid and complete dechlorination of the contaminants.

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RESULTS

Four quarters of post-treatment data have been collected. Prior to the injections, the maximum PCE concentration was at 600 ppb. Immediately following the injections, PCE concentrations in all wells but one decreased to ND levels. The PCE concentration in the final well is decreasing and approaching the regulatory level, but at a slower pace. Overall, the combined remedy has been considered extremely effective in reducing the PCE contamination at a fast rate.

The regulatory expectations are for three to four quarters of data meeting applicable groundwater quality standards. Once PCE concentrations in the final well are maintained at ND levels, Wilcox & Barton, Inc. will file a Permanent Solution Statement for regulatory closure. Although the site is not yet fully closed, the significant improvement in groundwater quality and minimal residual contamination make the property easier to market for the real estate developer and owner.

ABOUT WILCOX & BARTON, INC

Since 2000, Wilcox & Barton, Inc. has provided clients with a complete range of civil, environmental, and geotechnical engineering services throughout the Northeast. The company has earned a reputation for responsiveness, successful management of complex problems, and for providing innovative, cost-effective solutions. Clients rely on Wilcox & Barton, Inc. to handle the problems that no one can see, that the layman wouldn't anticipate, and that would cost money or create liability if not dealt with swiftly and defensibly. Their experts know how to collect and evaluate environmental data to navigate regulatory hurdles so their clients can focus on their core business.

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TECHNOLOGY

PLUMESTOP
Liquid Activated Carbon

PlumeStop is an *in situ* technology that rapidly reduces dissolved-phase plumes. PlumeStop behaves as a colloidal matrix binding to the aquifer matrix, rapidly removing contaminants from groundwater, and expediting permanent contaminant biodegradation. The benefit to PlumeStop's dispersive properties is its ability to sorb contaminants, quickly removing them from the mobile phase while providing a high surface area matrix which proves favorable for microbial colonization and growth.

Key Benefits:

- *In Situ* remediation technology that rapidly reduces dissolved-phase plumes in days/weeks
- Distributes widely under low injection pressures
- Colloidal biomatrix completely biodegrades contaminants in-place
- Achieves stringent groundwater clean-up standards
- Provides a long-term means of addressing matrix back–diffusion
- Eliminates excessive time and end-point uncertainty associated with groundwater remediation

BDI PLUS BIO-DECHLOR INOCULUM

Bio-Dechlor Inoculum Plus (BDI Plus) is designed for use at sites where chlorinated contaminants are present and unable to be completely biodegraded via the existing microbial communities. BDI Plus is an enriched, microbial consortium containing species of the bacteria *dehalococcoides sp*. (DHC) which is capable of completely dechlorinating contaminants during in situ anaerobic bioremediation processes. BDI Plus has been shown to stimulate the rapid dechlorination of chlorinated compounds such as tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE), and vinyl chloride (VC).

Key Benefits:

- Micron-scale, zero-valent iron suspended in a colloidal solution allows for easy handling and application on-site.
- Micron-size particles flow through soil pores dispersing outward without the need for fracturing or mechanical mixing in the subsurface.
- Outperforms commodity iron 30-40 times.
- Creates an anoxic and highly reducing environment, providing ideal conditions for sequential enhanced anaerobic biodegradation to destroy chlorinated contaminants.

HRC HYDROGEN RELEASE COMPOUND

HRC is an engineered, hydrogen release compound designed specifically for enhanced, *in situ* anaerobic bioremediation of chlorinated compounds in groundwater or highly saturated soils. Upon contact with groundwater, this viscous, poly-lactate ester material becomes hydrated and subject to microbial breakdown producing a controlled-release of hydrogen for periods of up to 18-24 months on a single application. HRC enables enhanced anaerobic biodegradation by adding hydrogen (an electron donor) to groundwater and/or soil to increase the number and vitality of indigenous microorganisms able to perform the naturally occurring process of enhanced reductive dechlorination.

Key Benefits:

- Provides controlled-release lactic acid to promote reducing conditions and optimize the anaerobic enhanced reductive dechlorination process
- Highly viscous to viscous versions stay in-place where injected for highly targeted treatment
- A viable, long-term source of staged-release hydrogen, on the order of 2-5 years from a single application
- Highly compatible with anaerobic bioaugmentation approaches using Bio-Dechlor INOCULUM PLUS
- Clean, low-cost, non-disruptive application
- No on-going operations and maintenance needed
- Faster and often lower cost than natural attenuation approaches

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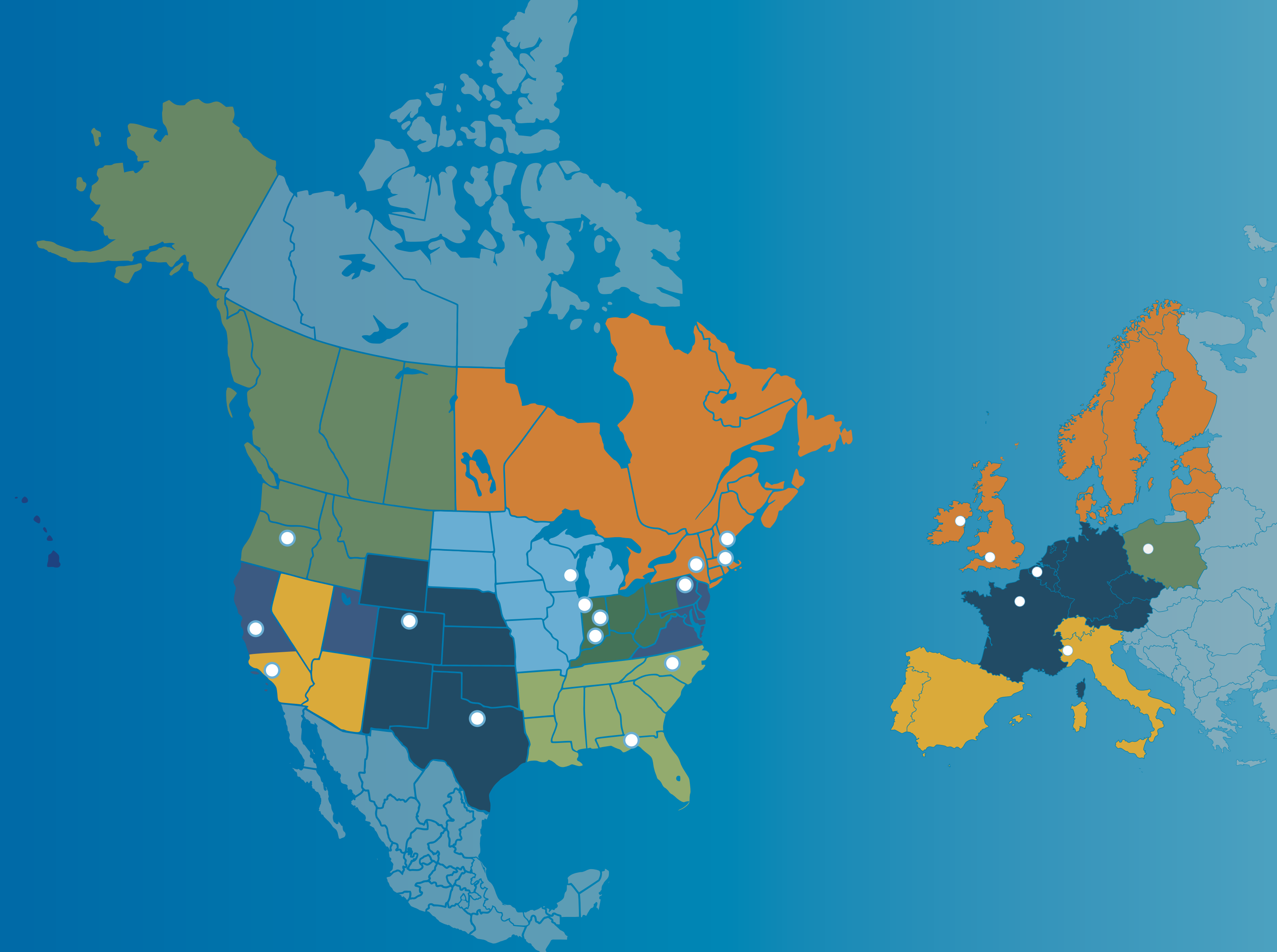

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FluxTracer® Results: Darcy Velocity, Mass Flux, and Contaminant Concentrations

March 16, 2023

TO: Chris Parks
IWM Consulting Group
7428 Rockville Rd
Indianapolis, IN 46214

FROM: Joshua Moreno, REGENESIS
Brett Hicks, REGENESIS

RE: Flux Tracer Results for Chris, Former Bendix Facility

Scope of Work

FluxTracer® testing was conducted to assess groundwater velocity and contaminant mass flux within existing monitoring wells to aid in site characterization and remedial designs. REGENESIS received 2 sets of 10' and 2 sets of 5' passive flux meter devices from IWM Consulting Group and performed FluxTracer analysis to determine Darcy flux, mass flux, and flux derived contaminant concentrations. The quantitative FluxTracer test measures the amount of alcohol tracers that desorbed from the activated carbon due to groundwater passively flowing through the cylinder cannisters. Concurrently, contaminants present in the plume will adsorb to the activated carbon during the deployed period after which will be extracted from the activated carbon to quantify mass flux and flux derived contaminant concentration.

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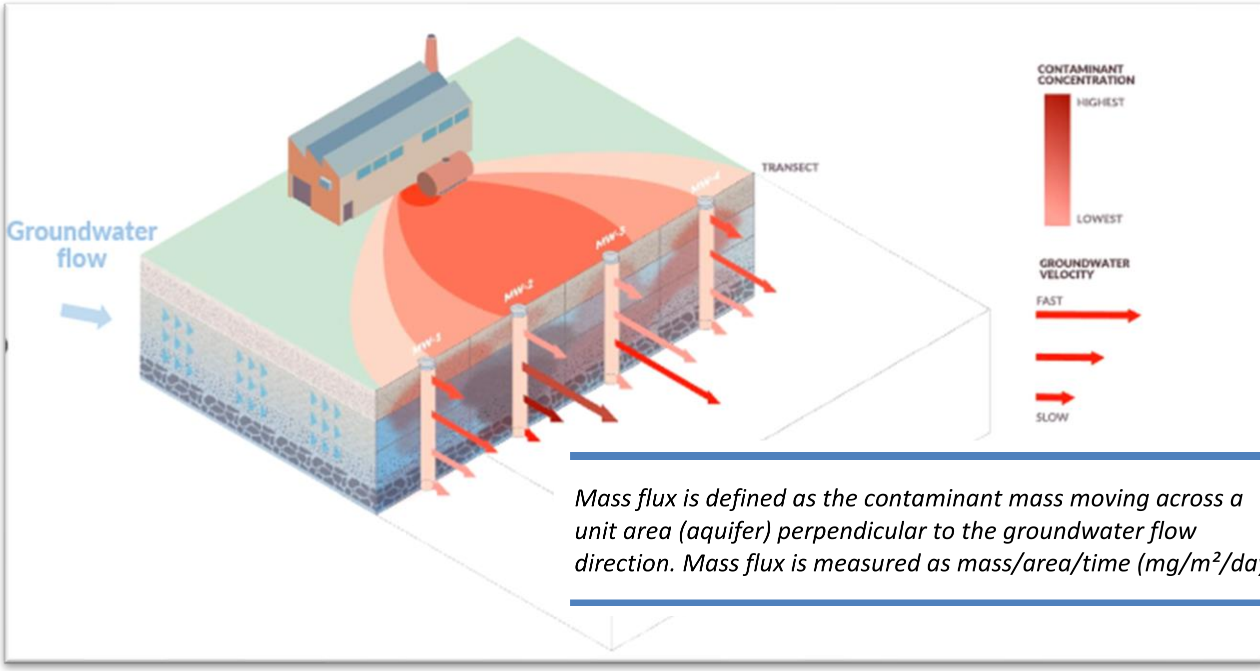
What is Mass Flux?



Mass flux is defined as the contaminant mass moving across a unit area (aquifer) perpendicular to the groundwater flow direction. Mass flux is measured as mass/area/time (mg/m²/day).

Conceptual site modeling overlaying hydraulic conductivity, groundwater velocity, and contaminant concentrations.

Mass flux refers to the movement of contaminant mass from one location to another, measured in units of mass per unit of time and area. Contaminant mass flux data is used in environmental remediation to identify the pathways through which contaminants are moving through the aquifer. This can involve the use of monitoring wells and various technologies to collect data on the flow of water and contaminants through the soil and rock formations. This information can help determine the locations of plumes and the direction of contaminant movement which is important for identifying the sources of contamination and designing remediation strategies.

Contaminant mass flux data can also be used to assess the potential risks to human and ecosystem health. By understanding the rate at which contaminants are moving through the groundwater and the concentrations at which they are present, it is possible to evaluate the potential impacts of environmental hazards on human and ecological receptors. Mass flux data can be used to prioritize remediation efforts and to develop risk management plans. For example, the use of permeable reactive barriers or in-situ bioremediation techniques may be more effective in certain locations based on contaminant mass flux data (ITRC, 2010). Contaminant mass flux data is an important tool in environmental remediation as it helps to understand and predict the movement of contaminants in the environment, assess potential risks to human and ecosystem, and design effective remediation strategies.

ITRC. (2010). Use and Measurement of Mass Flux and Mass Discharge. www.itrcweb.org.

Results

Table 1. MW-3 Darcy velocity and mass flux data

Sample No.	Depth below top of well casing (ft)	Darcy velocity (cm/day)	PCE ($mg/m^2/day$)	TCE ($mg/m^2/day$)	cDCE ($mg/m^2/day$)
1	19.3	<2.0	<1	<0.9	<0.7
2	20.3	<2.0	<1	<0.9	<0.7
3	21.3	8.5	<1	<0.9	<0.7
4	22.3	21.5	5	<0.9	2
5	23.3	14.2	47	<0.9	<0.7
6	24.3	10.9	45	<0.9	<0.7
7	25.3	12.5	150	<0.9	<0.7
8	26.3	12.7	100	<0.9	<0.7
9	27.3	10.9	19	<0.9	<0.7
10	28.3	11.6	22	<0.9	<0.7

Table 2. MW-3 Flux-derived concentration

Sample No.	Depth Below Casing (ft)	PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)
1	19.3	N/A	N/A	N/A
2	20.3	N/A	N/A	N/A
3	21.3	N/A	N/A	N/A
4	22.3	20	N/A	10
5	23.3	330	N/A	N/A
6	24.3	410	N/A	N/A
7	25.3	1200	N/A	N/A
8	26.3	790	N/A	N/A
9	27.3	170	N/A	N/A
10	28.3	190	N/A	N/A

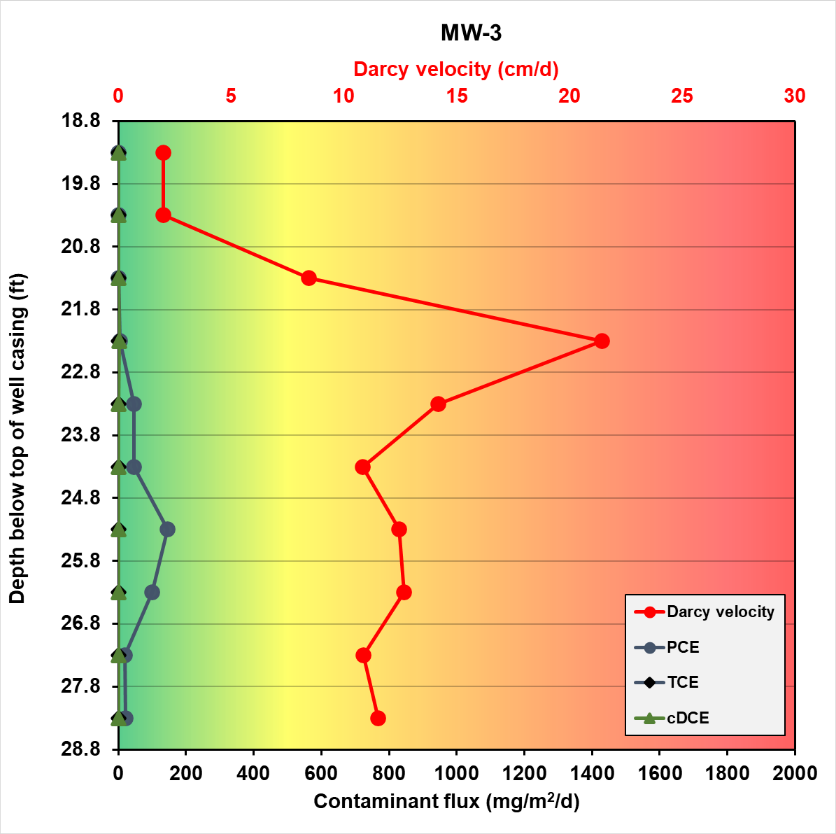


Figure 1. MW-3 Contaminant flux (mg/m^2/d), Darcy velocity, and depth below casing.

Table 3. MW-22 Darcy velocity and mass flux data

Sample No.	Depth below top of well casing (ft)	Darcy velocity (cm/day)	PCE ($mg/m^2/day$)	TCE ($mg/m^2/day$)	cDCE ($mg/m^2/day$)
1	12.7	<2.0	4	<0.9	<0.7
2	13.7	<2.0	46	<0.9	<0.7
3	14.7	<2.0	130	4	<0.7
4	15.7	2.2	4	<0.9	<0.7
5	16.7	6.8	<1	<0.9	<0.7
6	17.7	13.6	240	13	1
7	18.7	21.1	86	2	<0.7
8	19.7	23.0	61	<0.9	<0.7
9	20.7	25.1	88	1	<0.7
10	21.7	17.9	150	3	<0.7

Table 4. MW-22 Flux-derived concentration

Sample No.	Depth Below Casing (ft)	PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)
1	12.7	N/A	N/A	N/A
2	13.7	N/A	N/A	N/A
3	14.7	N/A	N/A	N/A
4	15.7	180	N/A	N/A
5	16.7	N/A	N/A	N/A
6	17.7	1760	100	10
7	18.7	410	10	N/A
8	19.7	270	N/A	N/A
9	20.7	350	0	N/A
10	21.7	840	20	N/A

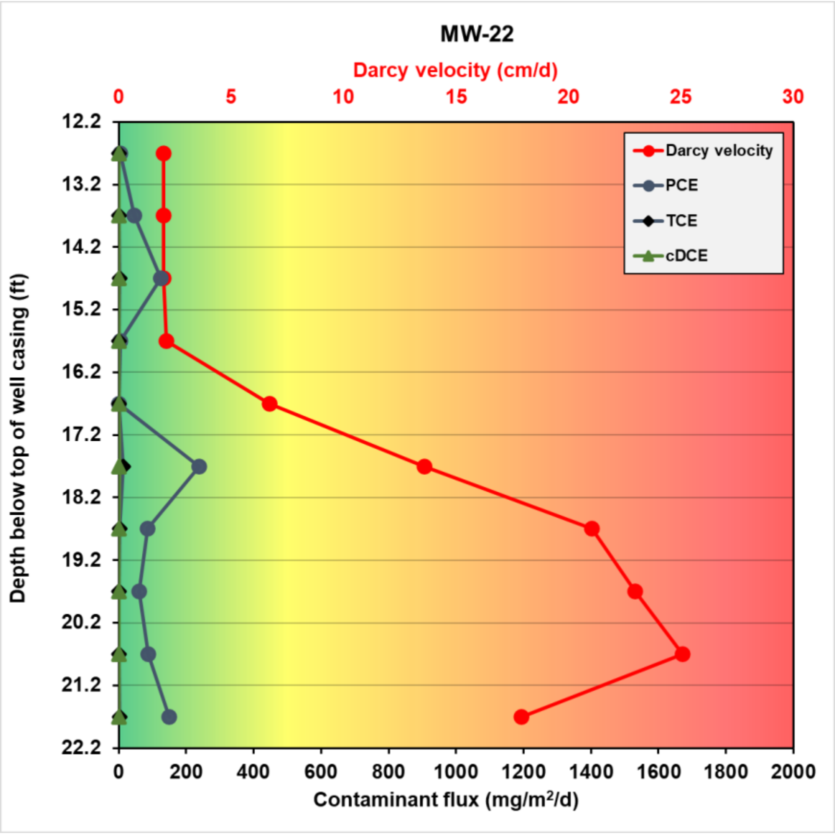


Figure 2. MW-22 Contaminant flux (mg/m^2/d), Darcy velocity, and depth below casing.

Table 5. MW-37 Darcy velocity and mass flux data

Sample No.	Depth below top of well casing (ft)	Darcy velocity (cm/day)	PCE ($mg/m^2/day$)	TCE ($mg/m^2/day$)	cDCE ($mg/m^2/day$)
1	9.0	<2.0	<1	<0.9	<0.7
2	10.0	9.3	<1	<0.9	<0.7
3	11.0	15.2	2	<0.9	<0.7
4	12.0	17.7	9	4	<0.7
5	13.0	18.7	10	4	<0.7

Table 6. MW-37 Flux-derived concentration

Sample No.	Depth Below Casing (ft)	PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)
1	9.0	N/A	N/A	N/A
2	10.0	N/A	N/A	N/A
3	11.0	10	N/A	N/A
4	12.0	50	20	N/A
5	13.0	50	20	N/A

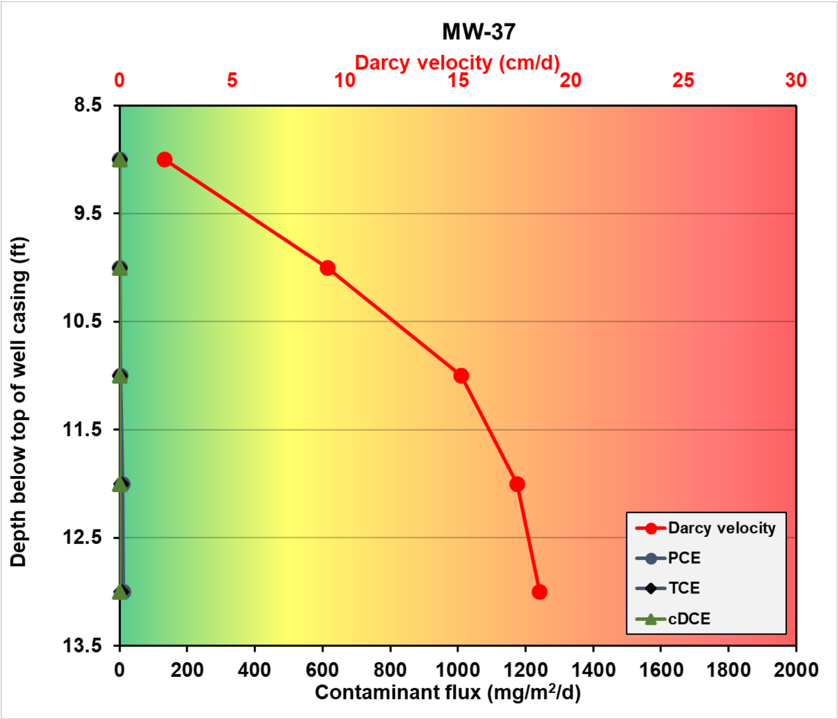


Figure 3. MW-37 Contaminant flux (mg/m^2/d), Darcy velocity, and depth below casing.

Table 7. MW-38 Darcy velocity and mass flux data

Sample No.	Depth below top of well casing (ft)	Darcy velocity (cm/day)	PCE ($mg/m^2/day$)	TCE ($mg/m^2/day$)	cDCE ($mg/m^2/day$)
1	7.7	<2.0	<1	<0.9	<0.7
2	8.7	<2.0	<1	<0.9	<0.7
3	9.7	8.7	<1	7	<0.7
4	10.7	8.2	<1	8	<0.7
5	11.7	7.9	<1	9	<0.7

Table 8. MW-38 Flux-derived concentration

Sample No.	Depth Below Casing (ft)	PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)
1	7.7	N/A	N/A	N/A
2	8.7	N/A	N/A	N/A
3	9.7	N/A	80	N/A
4	10.7	N/A	100	N/A
5	11.7	N/A	110	N/A

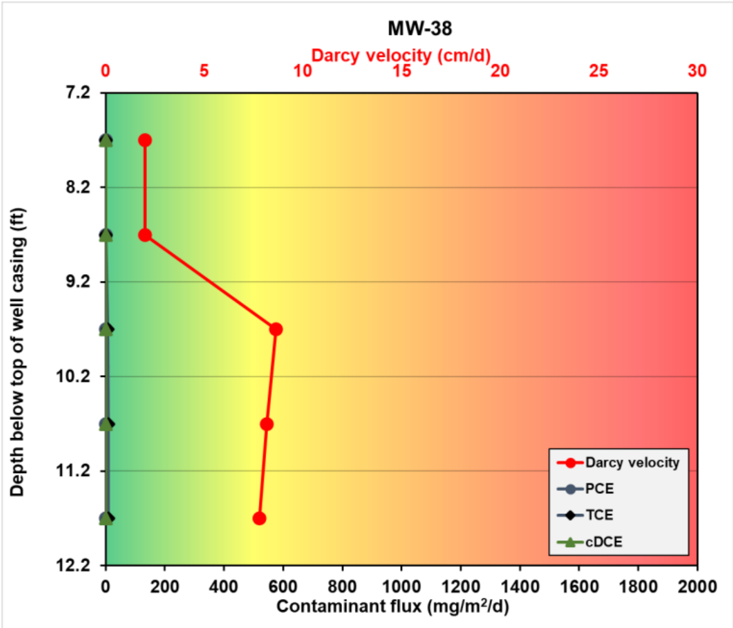


Figure 4. MW-38 Contaminant flux (mg/m^2/d), Darcy velocity, and depth below casing.

Interpretation of Results:

The FluxTracer test provides contaminant flux and Darcy velocity at 1-foot intervals. Contaminant flux and Darcy velocity are then used to derive contaminant mass at 1-foot intervals.

Under these test conditions, the Darcy velocity and contaminant flux for the groundwater plume can be interpreted as follows:

Indicator	**Qualitative Interpretation**	**Darcy Velocity (cm/day)**	***Seepage Rate (ft/yr)**	**Contaminant Flux ($mg/m^2/day$)**
Green to Yellow	Low	<2 - 5	<96 - 240	<10 - 300
Yellow to Orange	Medium	5 - 15	240 - 719	300 - 800
Orange to Red	High	15- >30	719 - 1437	800 - >2000

*Seepage rate assumes a 0.25 porosity

Flux derived concentration is derived using the following equation:

$$GW\ conventration\ (\mu g/L) = \frac{Mass\ flux\ (\mu g/m^2/d)}{Darcy(cm/d) * 10}$$

A non-applicable (N/A) is applied to the intervals where either the Darcy velocity, contaminant of concern, or both is less than the reporting limit.

A value of ND <X indicates that the analyte of concern is NOT detected above the method detection limit (MDL) or the method reporting limit (MRL).

A J-value indicates that the analyte of concern was detected and that the analyte concentration is an estimated value which is between the method detection limit (MDL) and the method reporting limit (MRL).

Description of Experimental Methods

A batch reactor is filled with 10 grams of sample from each 1-foot interval and is extracted for alcohol tracers followed by extraction of chlorinated volatile organic solvents (CVOCs) using of isobutanol and acetone-hexane, respectively. Batch reactors are then placed on a shaker for 24 hours. A 1 ml extract from each batch reactor is transferred to a liquid gas chromatography vial and each sample is analyzed by a GC-FID for alcohol tracers and GC-MS for CVOCs. Quantitation procedures of Darcy and mass flux can be found in, https://pubs.acs.org/doi/10.1021/es050074g.

TECHNICAL MEMORANDUM

DATE: August 3, 2023

TO: Brad Gentry, Bgentry@iwmconsult.com

FROM: Brett Hicks, Sr. Technical Manager, Bhicks@regenesis.com
Keith Gaskill, Sr. Design Specialist, Kgaskill@regenesis.com

RE: Longevity and Degradation in Barrier, Model Outputs, Former Bendix Facility, Franklin IN

Below are the results of the model runs assessing the performance of a Permeable Reactive Barrier (PRB) with Colloidal Activated Carbon (CAC) and Sulfidated Microscale Zero Valent Iron (S-MicroZVI) at the Former Bendix site in Indiana. The modeling scenario provided show performance at 10 years post-application using two different groundwater velocity estimates (183 feet/year, 350 feet/year)

This is to simulate in situ sorption and degradation of the contaminants of concern within the PRB under varying aquifer conditions. The results of the modeling exercise demonstrates excellent performance after 10+ years post-application with no breakthrough of contaminants observed beyond the PRB.

We appreciate supporting you on this site. If you have any questions, please contact Keith Gaskill (317-800-4529) or Brett Hicks (765.256.0272).

PlumeForce™ Design Model

The PlumeForce™ software is a modelling tool developed and used internally by REGENESIS for project design and interpretive support. At its core, it is a finite difference model that combines multi-phase degradation and transformation rates of target and non-target species with their retardation and transport within an aquifer. The retardation, transformation and partitioning processes are fully integrated within and between species, such that the behaviors of individual species within a mix are considered and modelled in full context with competitive interactions dynamically and quantitatively accommodated. This is particularly helpful in relation to competitive sorption / competitive displacement on CAC (1 to 2 microns, size of red blood cell). Our modeling conducted during this evaluation process estimates longevity of >10 years for the PRB.

The model assumes that the barrier is “filled” from left to right on the page which is the same as the predominant flow direction of groundwater. This can be interpreted as the distance any given contaminant will proceed through the barrier at a given time until they are either sorbed or degraded in place. The model outputs show the status of the barriers at 10 years from emplacement.

Figure 1. PRB Performance at 10+ years (183 feet/year)

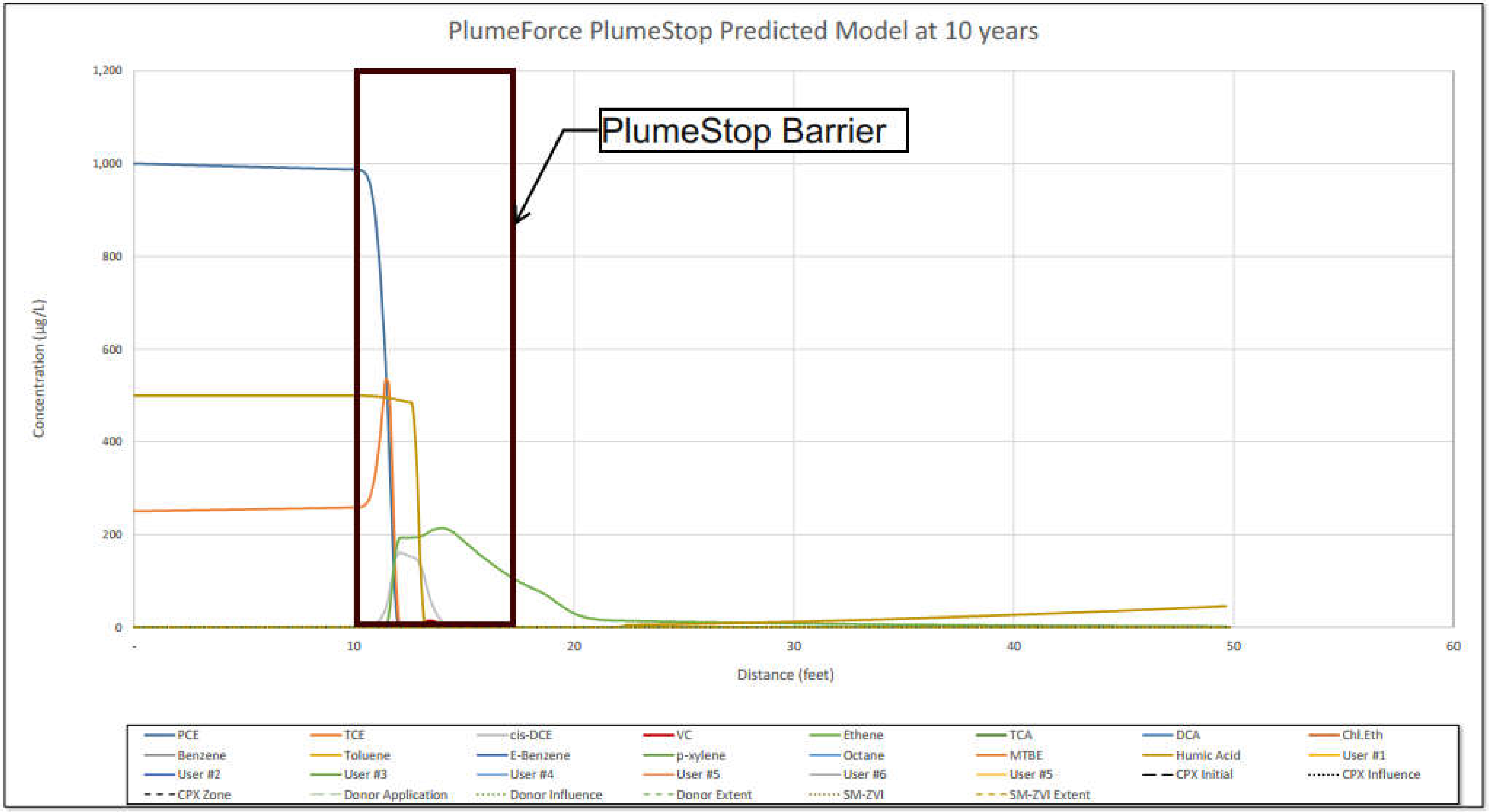
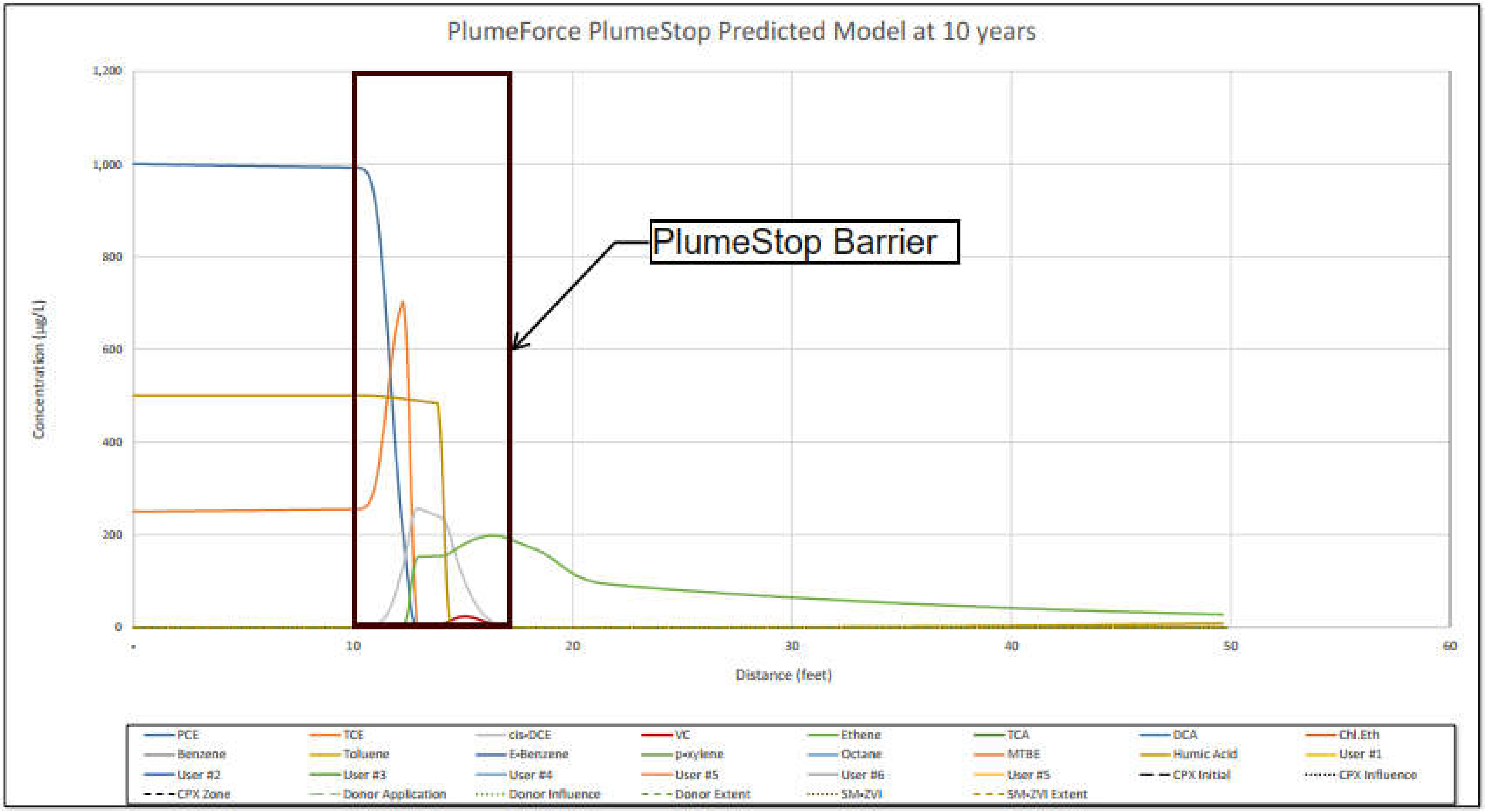


Figure 2. PRB Performance at 10+ years (350 feet/year)



Appendix D

Health and Safety Plan

IWM CONSULTING GROUP, LLC
Health & Safety Plan

PREPARED FOR:

Former Bendix Facility
(Customer Name)

Franklin, IN
(Project location)

980 B Hurricane Road, Franklin, IN
(Address)

IN.AMP18.04
(Project number)

4/24/2024	Ongoing
Start Date	**End Date**

PREPARED BY:

Garrett Page	4/24/2024
Name	**date**

APPROVED BY:

Mandy Hall - Office H&S Coordinator	Mandy Hall	4/24/2024
Print Name	**Signature**	**Date**
Brad Gentry - Project Manager		4/24/2024
Print Name	**Signature**	**Date**

ADDITIONAL APPROVALS
(if required)

Print Name	Title	Signature	Date
Print Name	Title	Signature	Date
Print Name	Title	Signature	Date

PURPOSE

This document defines the Health and Safety considerations for the on-site management activities by IWM CONSULTING personnel and contractors. This document is required by IWM CONSULTING policies and programs and **OSHA 29 CFR 1910.120**. The basic requirements for the health and safety of the project workers are delineated in the IWM CONSULTING Health and Safety procedures. All personnel on site will be informed about the pertinent sections of the Health and Safety Plan.

I. TYPE OF PROJECT

Check appropriate categories (more than one may apply)

N	Tank Decontamination	Y	On-site Treatment
N	Tank Excavation and Removal	N	Confined Space
N	Soil Excavation	Y	Drilling (In-situ Injection)
N	Filter Press Operation/Dewatering	Y	Gauging/Sampling
Y	IDW Drum Management	Y	Installation of Soil Borings/Monitoring Wells
Y	Other – Lawn restoration	Y	GPR Survey

A. Scope of Work

(Detailed description of project, including types of major equipment to be used, quantities of material to be managed, contaminants, number of specific job locations, (i.e., number of tanks, number of wells, sumps, etc.).

On-Site and Off-Site injection of ISCO, ISCR, and/or carbon substrate materials for the remediation of Chemicals of Concern. Soil boring installation with soil/groundwater sampling. Installation of 12 new monitoring wells. Low-Flow groundwater sampling of 30 monitoring wells. GPR surveys for private utility locations and paired sub-slab vapor/indoor air sampling. IDW generated in work activities to be containerized into 55-gallon steel drums or other appropriate container and subsequently disposed off-site at an approved facility. Drilling activities will utilize a direct push drilling unit (geoprobe rig) for soil boring/injection activities and augers will be utilized to install the groundwater monitoring wells. Traffic control measures will need to be in place to provide a safe working area when staging injection equipment/trailer in the public right-of-way (ROW) or when working in close proximity of the ROW.

*NOTE: * Appendix A - Appendix A should contain a site map which indicates existing facilities, work zones, evacuation routes, etc*.

B. Site Location Information

1. Site Description:

   Former Bendix Facility. The site's surface is mainly grass covered with asphalt driveways and parking lots. Remediation system shed is located on the grassy area south of the main building. The work activities will take place both on-site and off-site (south & west) in ROW & residential areas. Grayson Thermal Systems and Miller Chemical occupies the former Bendix site & both businesses are active.

2. Site History:

   Environmentally impacted waste water was historically (~1961-1981) discharged to the old sanitary sewer. The waste water was subsequently released into the subsurface via cracks in the sanitary sewer and subsurface soils and groundwater are known to be impacted by chlorinated solvents. A groundwater pump and treat system with 5 recovery wells is currently operational at the Site. The on-site P&T system was upgraded in 2020 to include vapor recovery from the on-site sanitary sewer lateral and the groundwater P&T system will be deactivated when on-site injection activities are initiated.

3. Area of Concern:

   Subsurface soil, groundwater, and soil gas.

4. Neighborhood Description:

   Residential directly south and west of the southern portion of Site. Mix of residential & commercial/industrial further south/southwest, commercial/industrial north of Site, & mix of commercial/industrial and residential east of the Site.

5. Topography and Site Access:

   Residential directly south and west of the southern portion of Site. Mix of residential & commercial/industrial further south/southwest, commercial/industrial north of Site, & mix of commercial/industrial and residential east of the Site.

6. Additional Information:

II. HAZARD EVALUATION

A. Physical Hazards (trenches, utilities, noise, biological, etc.)

Y	Auto Traffic	N	Fire	N	Explosion	N	Trenches
Y	Overhead Utilities	Y	Underground Utilities	Y	Heavy Equipment	Y	Noise
Y	Slip Trip Fall	N	Uneven Terrain	N	Other:	N	Other:

Explain:

*Note: * Appendix B: Attach a "hazard evaluation" for each task as part of Appendix B. (Tasks, Associated Risks and Hazards, Control Measures)*

B. Chemical Hazards

The following substances, are known or suspected to be on-site or are to be used on site.
The primary hazard of each are identified.

Chemical Name	PEL/TLV*	IDLH**	Exposure Route	Symptoms	First Aid
Trichloroethene	100 ppm 200-C	1,000 ppm	Inhalation, ingestion, skin, and/or eye contact	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**
Tetrachloroethene	100 ppm 200 ppm-C	150 ppm	Inhalation, ingestion, skin, and/or eye contact	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**
1,1,1-Trichloroethane	350 ppm	700 ppm	Inhalation, ingestion, skin, and/or eye contact	Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**
Cis-1,2-Dichloroethene (acetylene dichloride)	200 ppm	1,000 ppm	Inhalation, ingestion, skin, and/or eye contact	Irritation eyes, respiratory system; central nervous system depression	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**
Trans-1,2-Dichloroethene	200 ppm	1,000 ppm	Inhalation, ingestion, skin, and/or eye contact	Irritation, nausea, vomiting, drowsiness, symptoms of drunkenness	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**
1,2-Dichloroethane	500 ppm	50 ppm	Inhalation, ingestion, skin, and/or eye contact	Irritation of the mouth, throat, lungs, and nose; nausea, vomiting, headache, and dizziness; and liver and kidney damage	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**
1,1-Dichloroethane	100 ppm	3,000 ppm	Inhalation, ingestion, skin, and/or eye contact	Irritation of skin and eyes; toxic to kidneys, lungs, liver, central nervous system	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**
Vinyl Chloride	0.5 ppm	1 ppm	Inhalation, skin, and/or eye contact	Irritation of skin and eyes, nausea, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, disorientation, joint pain, loss of coordination, hearing loss, lung congestion, central nervous system depression, cancer hazard	Eye: **A** Skin: **E** Breath: **C**
Methylene Chloride	25 ppm	2,300 ppm	Inhalation, ingestion, skin, and/or eye contact	Irritation of skin and eyes, drowsiness, dizziness, may cause cancer, damage to organs	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**

Notes:
Permissible Exposure Limit (OSHA) or Threshold Limit Value (ACGIH) for time-weighted average for an 8-hour workday or 40-day workweek.
** Immediately dangerous to life and health
Ca Potential Human Carcinogen, no NIOSH IDLH listed

FIRST AID:
(A) Irrigate Immediately
(B) Water Flush Immediately
(C) Artificial Respiration
(D) Medical Attention Immediately
(E) Soap Wash Immediately

Sampling Preservatives

Chemical Name	PEL/TLV*	IDLH**	Exposure Route	Symptoms	First Aid
Hydrochloric Acid	5ppm	100ppm	Inhalation, skin and eye contact	Inhalation: cough, choking	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**
Methanol (Methyl Alcohol)	200ppm	25,000ppm	Inhalation, ingestion, skin absorption	Inhalation & ingestion: irritation of eye & nose, headache, fatigue, nausea, visual impairment, respiratory failure, Skin absorption–feeling of coldness, dryness, headache, fatigue & visual disturbance.	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**
Sulfuric Acid	1mg/m3	80mg/m3	Inhalation, skin & eye contact	Inhalation: coughing, sneezing, nose irritation, nose bleeds, shortness of breath. Ingestion: burns of mucous membranes, nausea, vomiting. Contact: severe burns, initially zone of contact is bleached, then turns brown.	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**
Nitric Acid	2ppm	100ppm	Inhalation, ingestion, skin/eye contact	Inhalation: may take hour & include throat and nose irritation, cough, chest pain, breathing difficulty, salivation, giddiness, nausea. Contact: depending on % of nitric acid burns, staining of skin. Ingestion: immediate pain, digestive tract burns.	Eye: **A** Skin: **E** Breath: **C** Swallow: **D**

Notes:
Permissible Exposure Limit (OSHA) or Threshold Limit Value (ACGIH) for time-weighted average for an 8-hour workday or 40-day workweek.
** Immediately dangerous to life and health
Ca Potential Human Carcinogen, no NIOSH IDLH listed

FIRST AID:
(A) Irrigate Immediately
(B) Water Flush Immediately
(C) Artificial Respiration
(D) Medical Attention Immediately
(E) Soap Wash Immediately

Note: Appendix C contains copies of MSDS for expected contaminants, if available

C. Medical Monitoring

Entire crew received baseline physicals?

No.

If No, why not?

List any special tests required & frequency:

None required.

III. MANPOWER

A. Crew Size

Category	Number	Names
Project Manager	1-2	Brad Gentry and/or Chris Parks
Hydrogeologist/Engineer	1	Garrett Page, Rebecca Pitcock, Chris Schoo, Conner Curry
H&S Officer	1	Mandy Hall
Equipment Operator	0	N/A
Technician	1	Dewy White, Jason Lasley, or Dane Danner
Other	0	N/A

B. Contractors

Contractor 1

Pre-qualified (Y/N)? Y

Innovative Environmental Technologies (IET)
(Name)

3958 N SR 3, Suite B
(Address)

Sunbury, OH 43074
(City/State)

Wade Meese (740-965-6100)
(Contact Name & Phone Number)

Scope of Work:

Supply injection equipment, labor for ISCR/ISCO installation, supply ISCR/ISCO materials and drilling equipment. IET will conduct/implement the on-site injection activities (including property to west of the Site).

Training Required:

40-Hour HAZWOPER and Annual 8-Hour Refreshers

Each Subcontractor must provide documentation of training at a minimum.

Subcontractor received required training (Y/N)? Y

Documented (Y/N)? Y

If no, why:

Contractor 2

Pre-qualified (Y/N)? Y

Regenesis Remediation Services
(Name)

1011 Celle Sombra #100
(Address)

San Clemente, California
(City/State)

Brett Hicks (765-256-0272)
(Contact Name & Phone Number)

Scope of Work:

Supply of injection equipment, labor for PRBs/ISCR installation, supply of ISCR/carbon substrate materials and drilling subcontractors. Regenesis will conduct/implement the off-site injection activities.

Training Required:

40-Hour HAZWOPER and Annual 8-Hour Refreshers

Each Subcontractor must provide documentation of training at a minimum.

Subcontractor received required training (Y/N)? Y

Documented (Y/N)? Y

If no, why:

Contractor 3

Pre-qualified (Y/N)? Y

Mason Locating Services
(Name)

401 W Karn St, Ste A
(Address)

Pittsboro, Indiana 46167
(City/State)

Chris Mason (888-316-3933)
(Contact Name & Phone Number)

Scope of Work:

To provide private utility locating services prior to injection activities. Work activities to occur both on-site and off-site.

Training Required:

40-Hour HAZWOPER and Annual 8-Hour Refreshers

Each Subcontractor must provide documentation of training at a minimum.

Subcontractor received required training (Y/N)? Y

Documented (Y/N)? Y

If no, why:

IV. EQUIPMENT (DESCRIBE TYPE)

N	Decon/Shower	Y	Fork Truck
N	Manlift	N	Crane
N	Backhoe	N	Compressor
Y	Generator	N	Pressure Washer
N	Hydraulic Ram	N	Dump Truck
N	Excavator	N	Compactor
Y	Pump(s)	N	Vacuum Tanker
N	Demolition Saw	N	Concrete Truck
Y	Drill Rig ***(Geoprobe)***	N	Torches
N	Other	Y	Other ***(Skid Steer)***

Is any special training required?

40 Hour OSHA

Any task being performed for which an SOP is in place? If yes, list SOP training.

NUMBER	TRAINING TYPE	APPLICATION	TRAINING COMPLETED	TRAINING REQUIRED
1.	Locating Utilities	Yes	Yes	Yes
2.	Trenching and Excavating	No	N/A	N/A
3.	Confined Space Entry	No	N/A	N/A
4.	Grounding & Bonding	No	N/A	N/A
5.	Line Breaking	No	N/A	N/A
6.	Lockout/Tagout/Tryout	No	N/A	N/A
7.	Labelling	No	N/A	N/A
8.	Pressure Washer Operations	No	N/A	N/A
9.	Container Management	No	N/A	N/A
10.	Heavy Equipment Decontamination	Yes	Yes	Yes
11.	Scrap Metal Decontamination	No	N/A	N/A
12.	PCB Wipe Sampling	No	N/A	N/A
13.	Manifesting Procedures	No	N/A	N/A
14.	Guzzler Vacuum Truck Operating	No	N/A	N/A
15.	Operation of Squeeze Filter Presses	No	N/A	N/A
16.	Project File Management	No	N/A	N/A
17.	Scaffolding	No	N/A	N/A
18.	Modutank Setup	No	N/A	N/A

V. LEVELS OF PROTECTION:

Special protective equipment for each level of protection is as follows:

Level A:

- Fully-encapsulating chemical resistant suit
- pressure demand atmosphere supplying respirator
- inner chemical resistant gloves
- radio communications
- chemical resistant safety boots/shoes
- cooling unit *
- coveralls *
- hard hat *
- disposable gloves and boot covers

Level B:

- Pressure demand, atmosphere supplying respirator
- chemical resistant, protective clothing
- inner and outer chemical resistant gloves
- chemical resistant safety boots/shoes
- hard hat *
- radio communications
- coveralls *
- disposable boot covers *
- face shield *
- long cotton underwear *

Level C:

- Chemical resistant protective clothing
- face shield *
- full face piece air purifying respirator
- inner and outer chemical resistant gloves
- escape mask *
- chemical resistant safety boots/shoes
- long cotton underwear *
- coveralls *
- hard hat *
- disposable gloves and boot covers

Level D:

- Escape mask*
- Safety glasses or goggles*
- face shield*
- inner and outer chemical resistant gloves*
- chemical resistant safety boots/shoes
- hard hat *
- coveralls *
- earplugs *

Safety glasses and safety boots are *recommended* on all sites, without respect to the work being performed. Hardhats should be worn during installation, construction, drilling, or when other overhead hazards are present. Earplugs *should* be worn during drilling, jackhammering, and during other such loud activities. In addition, safety vests or other high visibility attire are advised (& may be required) during gauging and/or sampling activities.

* Optional depending upon the task being completed

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVALS OF THE SAFETY COORDINATOR AND THE HYDROGEOLOGIST AT A MINIMUM

VI. WORKER PROTECTION

Please complete a form for **each** work task

A. Task Description: Injection Activities

Protection Level: D

B. Respiratory Protection (check type which applies)

N	Air Purifying*	N/A	Full Mask	N/A	Cartridge Type	N/A	Dust Mask
N	Supplied Air	N/A	SCBA	N/A	Airline	N/A	Escape Bottle

Other:

Breathing Air Certificate on file (Y/N)? N/A

If no, breathing air tested(Y/N)? N/A

C. Protective Clothing

Hard Hat (Y/N)? Y

Eye Protection

N	Full face respirator	Y	Safety glasses
N	Chemical resistant goggle	N	Face shield

Other:

Bodysuit

N	Tyvek*	N	Hooded	N	Sewn seam
N	Polytyvek	N	Hooded	N	Sealed seam
N	Saranex/CPF	N	Hooded	N	Strapped seam
N	Rain gear (PVC)	N	Hooded	--	N/A
N	Proshield (polypropylene)	N	Hooded	--	N/A

Other:

Gloves (Indicate "O" for Outer, "I" for Inner)

I	Inner nitrile (4 mil)	O	Leather for manual handling
N	Outer nitrile (11 mil)*	N	Cotton
N	Butyl rubber	N	PVC
N	Neoprene	N	Viton
N	Neoprene (milled)	N	Silvershield
N	Other	N	Other

Boots

Y	Leather - steel toed	N	PVC booties
N	PVC - Steel Toed	N	Tyvek booties*
N	Neoprene - steel toed	N	Poly booties
Y	Rubber slush boots (as needed for working in water)	N	Latex (Nuke) booties
N	Other	N	Other

Hearing Protection

Y	Ear muffs *(as needed for equipment ops)*	Y	Ear plugs *(as needed for heavy equipment operation*	N	Other:

Note: This page may be duplicated for additional tasks

VI. WORKER PROTECTION

Please complete a form for **each** work task

A. Task Description: Soil Boring/Monitoring Well Installation

Protection Level: D

B. Respiratory Protection (check type which applies)

N	Air Purifying*	N/A	Full Mask	N/A	Cartridge Type	N/A	Dust Mask
N	Supplied Air	N/A	SCBA	N/A	Airline	N/A	Escape Bottle

Other:

Breathing Air Certificate on file (Y/N)? N/A

If no, breathing air tested(Y/N)? N/A

C. Protective Clothing

Hard Hat (Y/N)? Y

Eye Protection

N	Full face respirator	Y	Safety glasses
N	Chemical resistant goggle	N	Face shield

Other:

Bodysuit

N	Tyvek*	N	Hooded	N	Sewn seam
N	Polytyvek	N	Hooded	N	Sealed seam
N	Saranex/CPF	N	Hooded	N	Strapped seam
N	Rain gear (PVC)	N	Hooded	--	N/A
N	Proshield (polypropylene)	N	Hooded	--	N/A

Other:

Gloves (Indicate "O" for Outer, "I" for Inner)

I	Inner nitrile (4 mil)	O	Leather for manual handling
N	Outer nitrile (11 mil)*	N	Cotton
N	Butyl rubber	N	PVC
N	Neoprene	N	Viton
N	Neoprene (milled)	N	Silvershield
N	Other	N	Other

Boots

Y	Leather - steel toed	N	PVC booties
N	PVC - Steel Toed	N	Tyvek booties*
N	Neoprene - steel toed	N	Poly booties
N	Rubber slush boots (as needed for working in water)	N	Latex (Nuke) booties
N	Other	N	Other

Hearing Protection

Y	Ear muffs	Y	Ear plugs *(as needed during drilling activities)*	N	Other:

Note: This page may be duplicated for additional tasks

VI. WORKER PROTECTION

Please complete a form for **each** work task

A. Task Description: Soil/Groundwater/Soil Vapor/Indoor Air Sampling

Protection Level: D

B. Respiratory Protection (check type which applies)

N	Air Purifying*	N/A	Full Mask	N/A	Cartridge Type	N/A	Dust Mask
N	Supplied Air	N/A	SCBA	N/A	Airline	N/A	Escape Bottle

Other:

Breathing Air Certificate on file (Y/N)? N/A

If no, breathing air tested(Y/N)? N/A

C. Protective Clothing

Hard Hat (Y/N)? Yes, as needed, when overhead hazards present.

Eye Protection

N	Full face respirator	Y	Safety glasses
N	Chemical resistant goggle	N	Face shield

Other:

Bodysuit

N	Tyvek*	N	Hooded	N	Sewn seam
N	Polytyvek	N	Hooded	N	Sealed seam
N	Saranex/CPF	N	Hooded	N	Strapped seam
N	Rain gear (PVC)	N	Hooded	--	N/A
N	Proshield (polypropylene)	N	Hooded	--	N/A

Other:

Gloves (Indicate "O" for Outer, "I" for Inner)

O	Inner nitrile (4 mil)	N	Leather for manual handling
N	Outer nitrile (11 mil)*	N	Cotton
N	Butyl rubber	N	PVC
N	Neoprene	N	Viton
N	Neoprene (milled)	N	Silvershield
N	Other	N	Other

Boots

Y	Leather - steel toed	N	PVC booties
N	PVC - Steel Toed	N	Tyvek booties*
N	Neoprene - steel toed	N	Poly booties
N	Rubber slush boots (as needed for working in water)	N	Latex (Nuke) booties
N	Other	N	Other

Hearing Protection

N	Ear muffs	Y	Ear plugs *(as needed)*	N	Other:

Note: This page may be duplicated for additional tasks

VI. WORKER PROTECTION

Please complete a form for **each** work task

A. Task Description: GPR Survey

Protection Level: D

B. Respiratory Protection (check type which applies)

N	Air Purifying*	N/A	Full Mask	N/A	Cartridge Type	N/A	Dust Mask
N	Supplied Air	N/A	SCBA	N/A	Airline	N/A	Escape Bottle

Other:

Breathing Air Certificate on file (Y/N)? N/A

If no, breathing air tested(Y/N)? N/A

C. Protective Clothing

Hard Hat (Y/N)? Yes, as needed, when overhead hazards present.

Eye Protection

N	Full face respirator	Y	Safety glasses
N	Chemical resistant goggle	N	Face shield

Other:

Bodysuit

N	Tyvek*	N	Hooded	N	Sewn seam
N	Polytyvek	N	Hooded	N	Sealed seam
N	Saranex/CPF	N	Hooded	N	Strapped seam
N	Rain gear (PVC)	N	Hooded	--	N/A
N	Proshield (polypropylene)	N	Hooded	--	N/A

Other:

Gloves (Indicate "O" for Outer, "I" for Inner)

N	Inner nitrile (4 mil)	O	Leather for manual handling
N	Outer nitrile (11 mil)*	N	Cotton
N	Butyl rubber	N	PVC
N	Neoprene	N	Viton
N	Neoprene (milled)	N	Silvershield
N	Other	N	Other

Boots

Y	Leather - steel toed	N	PVC booties
N	PVC - Steel Toed	N	Tyvek booties*
N	Neoprene - steel toed	N	Poly booties
N	Rubber slush boots (as needed for working in water)	N	Latex (Nuke) booties
N	Other	N	Other

Hearing Protection

N	Ear muffs	N	Ear plugs	N	Other:

Note: This page may be duplicated for additional tasks

VII. CONTAMINATION REDUCTION AND DECONTAMINATION

A. Describe how work zones will be set up and maintained:

Traffic cones and traffic signage will be used to delineate the work area in traffic areas. If working within a right-of-way (ROW), ROW permits will be obtained and the proper traffic controls will be utilized.

B. Decontamination Procedures:

Personnel and equipment leaving an identified Exclusion Zone, (indicate in Section VI.A.) shall be thoroughly decontaminated. The standard level "C" decontamination protocol shall be used with the following decontamination approach:

1) Wash gloves and/or boot covers using decon and water rinse.
2) Remove securing tape from wrists and ankles.
3) Remove disposable tyvek/or coveralls (without boots).
4) Remove boot covers and/or outer gloves.
5) Remove face mask respirator.
6) Remove inner gloves.

For Level "D," dress-down, follow steps 1,3,4,& 6, if protective equipment is worn.

Describe personnel decontamination procedures, if the procedures described above are not used:

Gloves will be removed and disposed of.

Describe equipment decontamination procedures:

Rinsed with alconox wash and water.

How is contaminated equipment disposed?

In trash bags

Describe storage of reusable protective gear:

In gear bags

Describe laundering procedure for uniforms:

N/A

Locker room facility provided (Y/N)? N

Will a decon trailer be on site (Y/N)? N

If no, how will crew change clothing and shower?

At home

Describe provision for drinking water:

Available in the company truck and in the adjacent Grayson Thermal Systems and Miller Chemical Buildings.

Describe provision for restrooms:

Portable restroom north of system building, along southside of Site.

Respirator cleaning and inspection procedures may be found in the Respiratory Protection Program.

VIII. SAFETY EQUIPMENT

Check the items that will be stationed on the project site:

N	Proshield (polypropylene)	N	Hooded
N	Proshield (polypropylene)	N	Hooded
N	Proshield (polypropylene)	N	Hooded
N	Proshield (polypropylene)	N	Hooded
N	Proshield (polypropylene)	N	Hooded
N	Proshield (polypropylene)	N	Hooded
N	Proshield (polypropylene)	N	Hooded
N	Proshield (polypropylene)	N	Hooded
N	Ground/bonding cables	Y	Fire extinguishers (types & sizes) *5-10 lb ABC in vehicle*
N	Spill Control Supplies (describe)	N	Other Safety Items:

IX. COMMUNICATION SYSTEMS

Describe on-site communication systems:

Verbal communications & hand signals/cell phone

X. MONITORING AMBIENT AIR MONITORING

The following equipment (check off appropriate ones and circle use) shall be used at intervals as specified:

N	Radiation Meter	N	Continuous/Hourly/2x Daily/Other
N	Combustible Gas/O2 Meter	N	Continuous/Hourly/2x Daily/Other
N	Colorimetric Tubes)	N	Continuous/Hourly/2x Daily/Other
N	Photo-ionization Detector (type)	N	Continuous/Hourly/2x Daily/Other
N	OVA/FID	N	Continuous/Hourly/2x Daily/Other
N	H2S Monitor	N	Continuous/Hourly/2x Daily/Other
N	CO Monitor	N	Continuous/Hourly/2x Daily/Other
N	Dust Monitor (type)	N	Continuous/Hourly/2x Daily/Other
N	Personal Monitors (list)	N	Continuous/Hourly/2x Daily/Other
N	Other: Air sampling pump	N	Continuous/Hourly/2x Daily/Other
N	Other: Particulate air monitors	N	Continuous/Hourly/2x Daily/Other

Methodology/Frequency: No air monitoring required.

Calibration:

**Note: Appendix D contains results of real-time air monitoring surveys.*

Air Permits

List of Air Permits required: N/A

GUIDELINES FOR AIR MONITORING GASOLINE HAZARDS (1)

Monitoring Instruments	Hazards	Measured Level	Action
CGI-Combustible Gas Indicator (% Lower) Explosive Limit of combustible Gases	Explosive Atmosphere in immediate work area	< 10% LEL	Investigation with caution.
CGI (LEL Continued)	Explosive Atmosphere in immediate work area	> 10% LEL	Explosion hazard. Withdraw from area immediately.
Explosion hazard.	Explosion hazard.	Explosion hazard.	Monitor while wearing SCBA. **Note:** combustible gas readings are not valid in atmospheres with < 19.5% Oxygen
Withdraw from area immediately.	Withdraw from area immediately.	Withdraw from area immediately.	Continue investigation with caution.
Explosion hazard.	Explosion hazard.	Explosion hazard.	Discontinue investigation monitoring. Fire hazard potential. Consult H&S Coordinator.
Withdraw from area immediately.	Withdraw from area immediately.	Withdraw from area immediately.	Level D Protection (2)
Explosion hazard.	Explosion hazard.	Explosion hazard.	Level C Protection (2)
Withdraw from area immediately.	Withdraw from area immediately.	Withdraw from area immediately.	Level B Protection (2)
Explosion hazard.	Explosion hazard.	Explosion hazard.	**Evaluate exposure source** Consult H&S Coordinator

Actions taken are based on sustained or frequent readings.

(1) Gasoline is used for this guideline based on its higher volatility.

(2) Meter readings are not the sole criteria for selecting the level of protection. These are only generalized guidelines.

XI. HAZARDOUS WASTE OPERATION CONTINGENCY PLAN

Generator's Name: Former Bendix Facility

Location, description and route to site:

Travel South on I-65 to Interchange 90. Turn right (west) on SR 44 to Forsythe Street. Turn right (north) on Forsythe Street. Go to the “T” intersection and turn right (east) on Hamilton Avenue. The site is on the left. The entrance is on Hurricane Road.

Contact: Erika Frank (Amphenol Corporation): Phone No: 717-938-7266

Client Project Manager: Brad Gentry

Police: 911 or alternate number ( ) -

Fire: 911 or alternate number ( ) -

Hospital Name: Johnson County Memorial Hospital

Phone/Address/Route to: 317-736-3300; 1125 W. Jefferson Street, Franklin, IN. Go west on Hamilton Avenue to Forsythe Street. Turn left (south) on Forsythe Street to SR 44 (Jefferson Street). Turn right (west) on SR 44 and go through the town of Franklin, across US31, and the hospital will be on the south side of SR 44, approximately 1 mile west of US 31. Approximately 7-10 minutes from the site.

Contact:

Alternate Contact:

Ambulance: 911

Interplant Medical:

Key Personnel: Office Resources - Phone Numbers

IWM Consulting Office

Hydrogeologist / Engineer:	**Chris Parks**	(317) 347-1111, Ext. 127 / Cell Phone (317) 847-2600
Project Manager:	**Brad Gentry**	(317) 347-1111, Ext. 123 / Cell Phone (317) 435-8877
Operations Manager:	N/A	N/A
Office H&S Coordinator:	**Mandy Hall**	(317) 347-1111, Ext. 136/ Cell Phone (317) 565-1618

Emergency Contact:	**Medical and Health**	(317) 642-8011
USEPA Environmental Agency:	**Valarie Voisin**	(312) 886-5877
Emergency Response 24 hour action hotline	N/A	(317) 233-7745
Poison Information Center	N/A	(800) 962-1253

Emergency Information

Has a copy of contingency plan been received by hospital listed (Y/N)? N/A
Explain: Not required

Is it documented (Y/N)? N/A
Explain: Not required

Has the hospital been notified of job site activities and chemical hazards (Y/N)? N
Explain: Not required

Emergency Medical Provider Route Map:

Attach a map with written directions to the hospital and local medical provider as part of Appendix E.

Evacuation Rote/Emergency Equipment Station Map:

Attach a site-specific map indicating evacuation route, location, and description of emergency safety equipment as part of Appendix A.

Evacuation Alarm Description:

Verbal warning and hand signals to all personnel

Evacuation Route Description:

To an area upwind of the problem area.

Assembly Area Description:

Assemble at entrance to Site or the corresponding off-site property being worked on if upwind of the problem area.

HASP AND CONTINGENCY PLAN SIGN-OFF

Name: Garrett Page Date: April 24, 2024

Person who completed plan

Customer Name: Amphenol Corporation Job Site: Former Bendix Facility 980 Hurricane Rd. Franklin, IN

All site personnel (employees and their subcontractors) have reviewed the attached HASP and Contingency Plan. This plan provides site personnel with an orientation to the job task including:

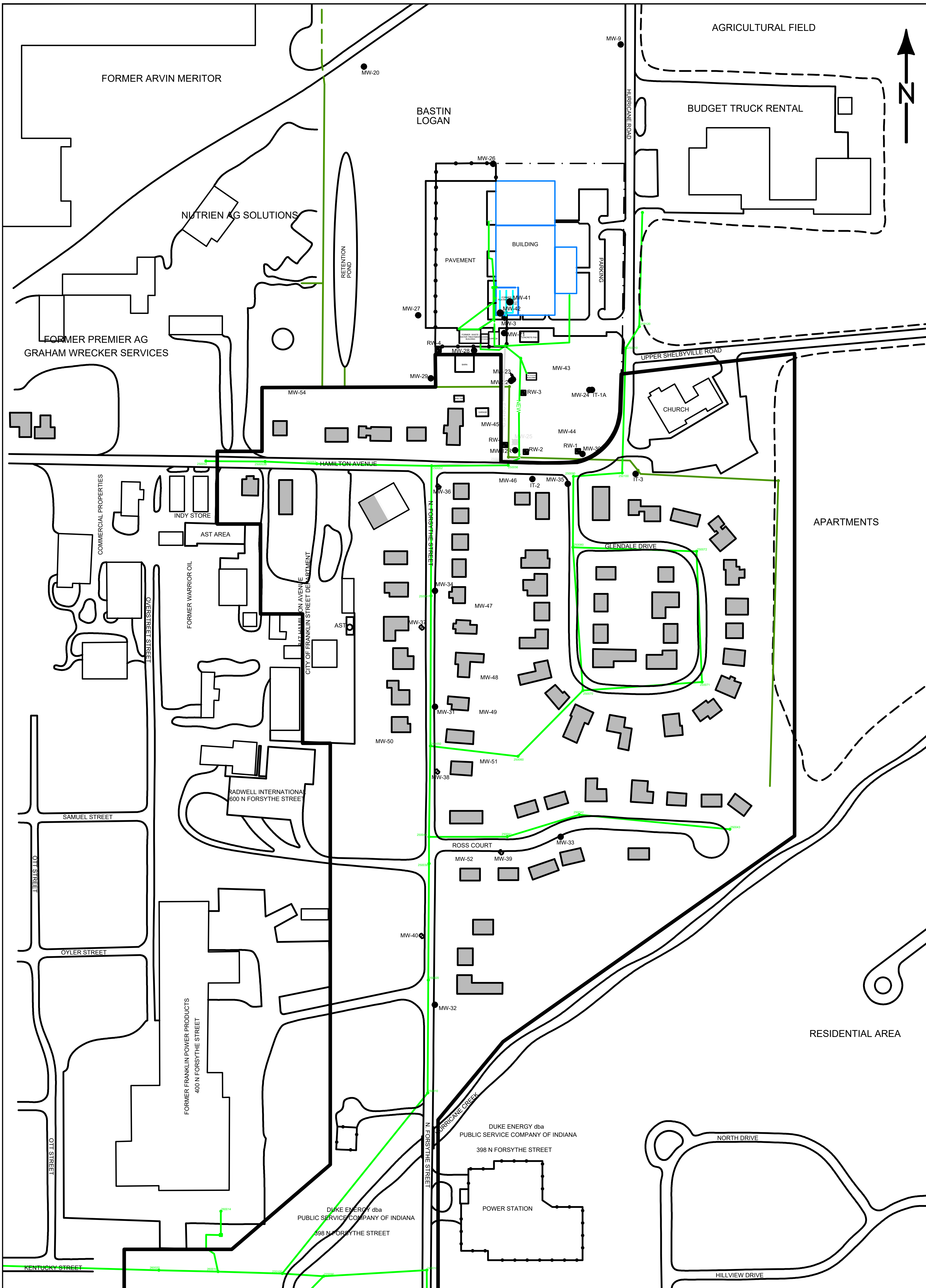
Y Site Overview
Y Emergency Response Procedures
Y Potential Physical & Health Hazards of on-site hazardous materials
Y PPE Requirements
Y Site Security
Y Hazards of Confined Spaces
N Site-specific environmental regulatory requirements

All sub-contracted employees have also been provided a written work plan.

Print Name	Signature	Date	Company Affiliation

APPENDIX A

SITE MAPS



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- STEEL-CASED MONITORING WELL
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- STUDY AREA BOUNDARY

0' 200'
SCALE IN FEET

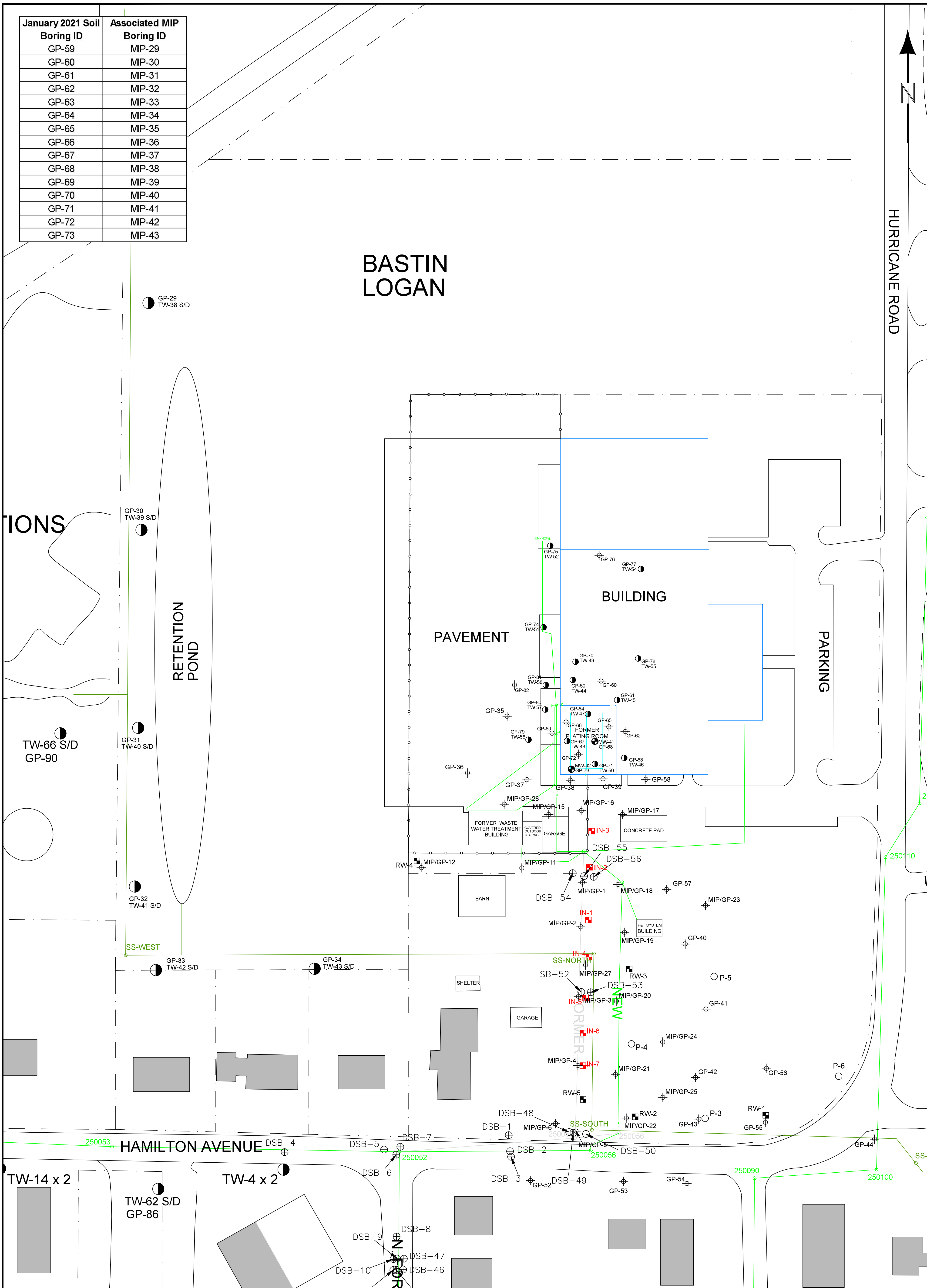
DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 05/16/2023
HWPA #111291-01
DWG. NO. 111291S1

FIG 1-2
SITE VICINITY MAP

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP

January 2021 Soil Boring ID	Associated MIP Boring ID
GP-59	MIP-29
GP-60	MIP-30
GP-61	MIP-31
GP-62	MIP-32
GP-63	MIP-33
GP-64	MIP-34
GP-65	MIP-35
GP-66	MIP-36
GP-67	MIP-37
GP-68	MIP-38
GP-69	MIP-39
GP-70	MIP-40
GP-71	MIP-41
GP-72	MIP-42
GP-73	MIP-43



LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL
- RECOVERY WELL
- PIEZOMETERS
- MIP/GEOPROBE BORING
- PROPERTY LINE (APPROXIMATE)
- STORM SEWER
- SANITARY SEWER
- STEEL-CASED MONITORING WELL
- RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- NON-RESIDENTIAL STRUCTURE
- PRIMARY BUILDING WALLS
- TEMPORARY WELL/SOIL BORING LOCATION
- DSB SOIL BORING LOCATION
- INJECTION WELL

0' 80'
SCALE IN FEET

DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 05/30/2023
HWPA #111291-01
DWG. NO. 111291S1

FIGURE 2-3
SITE PLAN

FORMER BENDIX FACILITY RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP

APPENDIX B

IWM CONSULTING

Site Name: Former Bendix Facility
Site Location: Franklin, IN
Address: 980 Hurricane Road
Date: 5/31/2023

Major Tasks/Activities	Hazards	Precautionary Measures/Controls
Soil Boring Installation	See Attached JSA	See Attached JSA
Monitoring Well Installation	See Attached JSA	See Attached JSA
Soil Sampling	See Attached JSA	See Attached JSA
Groundwater Sampling (Low-Flow)	See Attached JSA	See Attached JSA
GPR Surveys	See Attached JSA	See Attached JSA
In-Situ Injections	See Attached JSA	See Attached JSA
Soil Gas and Indoor Air Sampling	See Attached JSA	See Attached JSA

Job Safety Analysis

Drilling/Well Installation

Principal Steps	Potential Hazards	Recommended Controls
Review H&S plan and put on PPE	Neighborhood and weather conditions, traffic	Prepare away from traffic. If weather is unsuitable for work then reschedule. Be aware of your surroundings.
Establish traffic controls	Auto traffic	Block Entrances
Make sure that utilities are marked and disconnected	Explosion, electrocution	If utilities are not marked, call in for immediate marking.
Perform Soil Boring Installation	See Soil Boring JSA	See Soil Boring JSA: Follow Subsurface Disturbance Protocol
Perform Well Installation	Lifting Injuries, Hand Abrasions; Injuries From Equipment – Turning Augers; Loose clothing, lack of gloves, eye protection; equipment position; Falling trees, brush, slip trip fall, poison ivy.	Determine the perimeter with ground crew. Maintain eye protection, hand protection hard hat and steel toe boot requirements. All personnel must maintain proper clearance during drilling activities. Maintain proper clearance from swing radius. Operator and ground crew must be diligent of each other. Work slowly. Operator must face in the direction that the drill rig is moving. Ground personnel must stay out of the forward and reverse paths of the drill rig while moving. No one can approach the drill rig without acknowledgement from the operator. No one is to approach the drill rig while out of view of the operator.
Housekeeping	Auto traffic and drill rig, and pinch hazard for hands, debris, abrasions from debris, slip, trip and fall, back strain	Handle one container at a time. Wear safety glasses, steel toed boots, and gloves. Maintain traffic control and awareness. Work deliberately. Do not overexert yourself when lifting.
Installation of well tops and manholes.	Auto traffic and pinch hazard for hands and feet.	Maintain traffic control and awareness. Methodically seal off and lock well head. Place, lock and bolt down manhole covers.
Prepare field reports	Auto traffic and neighborhood conditions.	Complete paperwork in vehicle and away from traffic area. Maintain neighborhood awareness.
Staging Drums	Equipment injury, Back Injury, Foot injury, Hand Injury	None listed

Job Safety Analysis

Drilling/Well Installation

Equipment to be Used	Inspection Requirements	Training Requirements
Drill Rig/Push Probe Sampler	Check hydraulics for leaks. Check condition of tracks. Check controls for proper operation. Emergency Shut offs	Experience with operating and maintaining drilling equipment.
Lifting cables or straps	Make sure it has sufficient load rating to carry the object; Inspect for frays prior to use	None listed

Job Safety Analysis

Ground Penetrating Radar

Principal Steps	Potential Hazards	Recommended Controls
Work Zone Set-Up	Traffic, slip trip fall	Traffic control (barricades and/ or cones) Face flow of traffic and use appropriate cones, flags, and/or tape. Block off designated data collection area. Be aware of surroundings and use good housekeeping methods.
Work Zone Set-Up (continued)	Sharp debris/heavy brush on worksite	Safety glasses, steel toe shoes, protective gloves & hard hat as necessary
Data collection	Traffic, slip trip fall	See above. Maintain awareness of traffic movement.
Data collection (continued)	Shock hazards (especially when using Inductive Trace equipment)	Avoid contact with exposed utility lines, boxes, and switches
Clean Up	Traffic, slip trip fall	See above.
Clean Up (continued)	Weather	Pay attention to predicted and current weather conditions
Clean Up (continued)	Hot weather	Drink plenty of fluids (preferably water and/or sports drinks) wear light colored clothing, take rest breaks when necessary
Clean Up (continued)	Cold weather	Wear plenty of layered clothing, take breaks when necessary
Clean Up (continued)	Severe weather Thunderstorms	Take shelter, lower any raised equipment, cease work if lightning strikes present
Clean Up (continued)	Tornado	Move inside building or vehicle, take appropriate shelter in building or ditch

Equipment to be Used	Inspection Requirements	Training Requirements
Sensors and Software GPR Smart Cart	Visual inspection of cables, connectors, battery, antenna, and data collector	General operational instruction from an experienced user

Job Safety Analysis

Groundwater Gauging & Sampling

Principal Steps	Potential Hazards	Recommended Controls
Groundwater Gauging	Auto Traffic	Follow Traffic Control SOP; wear Hi-Visibility safety vests; utilize buddy system; remain aware of surroundings.
Groundwater Gauging (continued)	Dissolved VOCs on the electronic water level indicator	Wear appropriate PPE. Utilize decon solutions to clean water level indicator of all VOCs.
Groundwater Gauging (continued)	Pinch (hand); debris (cuts/puncture); Biological	Use tools to open the well vault and clear wellhead area of debris liquids or biological hazards. Wear leather gloves while opening vault and clearing debris.
Low-Flow Purging	Exposure; Back Strain; Hand injury	Use even footing on firm ground. Avoid twisting body. Stand close to and over the well. Wear PPE to avoid contact with dissolved VOCs.
Low-Flow Purging (continued)	Spill/Splash	Wear nitrile gloves and eye protection.
Low-Flow Purging (continued)	Installing/removing pump	position to avoid repetitive motion and avoid twisting back. Do not use excessive force.
Low-Flow Purging (continued)	Slip, trip & fall; back strain	When transporting and disposing purge water, use proper lifting techniques and avoid twisting the body.
Groundwater Sampling	Breakage and acid	Work slowly and handle only one container at a time. Wear safety glasses and gloves. Inspect sample containers for cracks prior to handling and removing/installing the lid. Do not over tighten the sample container.

Equipment to be Used	Inspection Requirements	Training Requirements
Electronic Water Level Indicator	Inspect water level indicator to verify that there are no frayed wires or loose connections.	Not applicable
Low-Flow Pump and Regulator	Inspect pump wiring for frayed wires or loose connections	Not applicable

Job Safety Analysis

In-Situ Injection via GeoProbe

Principal Steps	Potential Hazards	Recommended Controls
Review H&S plan and put on PPE	Neighborhood and weather conditions, traffic	Prepare away from traffic. If weather is unsuitable for work then reschedule. Be aware of your surroundings.
Establish traffic controls	Auto traffic	Block Entrances
Make sure that utilities are marked and disconnected	Explosion, electrocution	If utilities are not marked, call in for immediate marking.
Perform Direct Push Boring Installation	See Soil Boring JSA	See Soil Boring JSA: Follow Subsurface Disturbance Protocol
Material Mixing and Material Injection	Eye and Respiratory Injury During Injection; Injuries from Equipment – moving parts.	Material can be delivered as a fine powder or liquid. Operator should work upwind of the product or have adequate ventilation as well as use appropriate safety equipment - Maintain eye protection, hand protection, hard hat and steel toe boot requirements. All personnel must maintain proper clearance during injection activities. Operator and ground crew must be diligent of each other. Operator must be observant and monitor injection rate and control equipment. Ground personnel must maintain reasonable distance from injection point.
Housekeeping	Auto traffic and drill rig, daylighting of injected amendments, pinch hazard for hands, debris, abrasions from debris, slip, trip and fall, back strain	Handle one container at a time. Wear safety glasses, steel toed shoes/boots, and gloves. Maintain traffic control and awareness. Work deliberately. Do not overexert yourself when lifting. Quickly recover and cleanup any amendments that daylight during the injection activities.

Equipment to be Used	Inspection Requirements	Training Requirements
Drill Rig/Push Probe Sampler	Check hydraulics for leaks. Check condition of tracks. Check controls for proper operation. Emergency Shut offs	Experience with operating and maintaining drilling equipment.
Injection Material	Ensure proper product to be injected has been received.	Experienced with injection material and injection procedures.

Job Safety Analysis

Soil Boring Installation

Principal Steps	Potential Hazards	Recommended Controls
Work Zone Set-Up	Traffic	Traffic control (barricades and/ or cones) Face flow of traffic and use appropriate cones, flags, and/or tape per client and/or IWM protocols. Block off designated sampling area.
Work Zone Set-Up (continued)	Overhead utilities	Look up before setting up equipment, spotter
Work Zone Set-Up (continued)	Sharp debris in sample	Wear thick gloves
Boring Installation	Underground utilities	Call in utilities for markout; private and public Verify utilities are marked Advance a hand probe ahead of the hand auger
Boring Installation (continued)	Back Injury	Perform warm up and stretching exercises prior to probing activities. Use proper technique while lifting rods, team up, cycle shifts and take breaks
Boring Installation (continued)	Carpel Tunnel	Ergonomics - adjust hand position to reduce nerve irritation, take breaks
Boring Installation (continued)	Repetitive Stress	Ergonomics - adjust hand position to avoid repetitive motion. Take breaks
Sample collection	Chemical contact with skin	Nitrile gloves
Clean Up	Traffic, slip trip fall,	See above. Be aware of surroundings and use good housekeeping methods.
Clean Up (continued)	Weather	Pay attention to predicted and current weather conditions
Clean Up (continued)	Hot weather	Drink plenty of fluids (preferably water and/or sports drinks) wear light colored clothing, take rest breaks when necessary
Clean Up (continued)	Cold weather	Wear plenty of clothing, take breaks when necessary
Clean Up (continued)	Severe weather Thunderstorms	Take shelter, lower any raised equipment,
Clean Up (continued)	Tornado	Move inside building or vehicle, take appropriate shelter in building or ditch

Job Safety Analysis

Soil Boring Installation

Equipment to be Used	Inspection Requirements	Training Requirements
Drill Rig/Push Probe Sampler	Check hydraulics for leaks. Check condition of tracks. Check controls for proper operation. Emergency Shut offs	Experience with operating and maintaining drilling equipment.

Job Safety Analysis

Soil Gas & Indoor Air Sampling

Principal Steps	Potential Hazards	Recommended Controls
Work Zone Set-Up	Vehicular Traffic (if work is outside near roads or driveways)	Traffic control (barricades and/ or cones) Face flow of traffic and use appropriate cones, flags, and/or tape per client and/or IWM Consulting protocols. Block off designated sampling area.
Work Zone Set-Up (continued)	Pedestrian Traffic	Identify sampling canisters with sampling ID tag, notify property owner and occupants of building of the location and purpose of the sampling, inform occupants to stay clear of the sampling canisters/work area
Clean Up	Traffic, slip trip fall,	See above. Be aware of surroundings and use good housekeeping methods.
Clean Up (continued)	Weather	Pay attention to predicted and current weather conditions
Clean Up (continued)	Hot weather	Drink plenty of fluids (preferably water and/or sports drinks) wear light colored clothing, take rest breaks when necessary
Clean Up (continued)	Cold weather	Wear plenty of layered clothing, take breaks when necessary
Clean Up (continued)	Severe weather Thunderstorms	Take shelter, lower any raised equipment, temporarily cease outside work activities if lightning observed/present
Clean Up (continued)	Tornado	Move inside building or vehicle, take appropriate shelter in building or ditch

Equipment to be Used	Inspection Requirements	Training Requirements
Vacuum canisters	Visual inspect canisters to ensure no defects or damage	None required

APPENDIX C

MATERIAL SAFETY DATA SHEETS

Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Trichloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Trichloroethylene

Catalog Codes: SLT3310, SLT2590

CAS#: 79-01-6

RTECS: KX4560000

TSCA: TSCA 8(b) inventory: Trichloroethylene

CI#: Not available.

Synonym:

Chemical Formula: C2HCl3

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Trichloroethylene	79-01-6	100

Toxicological Data on Ingredients: Trichloroethylene: ORAL (LD50): Acute: 5650 mg/kg [Rat]. 2402 mg/kg [Mouse]. DERMAL (LD50): Acute: 20001 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 420°C (788°F)

Flash Points: Not available.

Flammable Limits: LOWER: 8% UPPER: 10.5%

Products of Combustion: These products are carbon oxides (CO, CO_2), halogenated compounds.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the

product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Carcinogenic, teratogenic or mutagenic materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 50 STEL: 200 (ppm) from ACGIH (TLV)
TWA: 269 STEL: 1070 (mg/m3) from ACGIH
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 131.39 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 86.7°C (188.1°F)

Melting Point: -87.1°C (-124.8°F)

Critical Temperature: Not available.

Specific Gravity: 1.4649 (Water = 1)

Vapor Pressure: 58 mm of Hg (@ 20°C)

Vapor Density: 4.53 (Air = 1)

Volatility: Not available.

Odor Threshold: 20 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, acetone.

Solubility:
Easily soluble in methanol, diethyl ether, acetone.
Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity:
Extremely corrosive in presence of aluminum.
Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 2402 mg/kg [Mouse].
Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH.
The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in human. Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Trichloroethylene : UN1710 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Trichloroethylene
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Trichloroethylene
Pennsylvania RTK: Trichloroethylene
Florida: Trichloroethylene
Minnesota: Trichloroethylene
Massachusetts RTK: Trichloroethylene
New Jersey: Trichloroethylene
TSCA 8(b) inventory: Trichloroethylene
CERCLA: Hazardous substances.: Trichloroethylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).
CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R36/38- Irritating to eyes and skin.
R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:54 PM

Last Updated: 10/10/2005 08:54 PM

Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet
Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolvel; Tetrachloroethene; Tetraleno; Tetralex; Tetravec; Tetroguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C2-Cl4

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:
Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 25 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States] TWA: 170 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Miscible with alcohol, ether, chloroform, benzene, hexane. It dissolves in most of the fixed and volatile oils. Solubility in water: 0.015 g/100 ml @ 25 deg. C It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Oxidized by strong oxidizing agents. Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium , barium. Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2629 mg/kg [Rat]. Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:
Lowest Publishe Lethal Dose/Conc: LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg LDL [Dog] - Route: Oral; Dose: 4000 mg/kg LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects(teratogenic). May affect genetic material (mutagenic). May cause cancer.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation with possible dermal blistering or burns. Symtoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts. Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain. Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorentiation, seizures, enotional instability, stupor, coma). It may cause pulmonary edema Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation. Ingestion/Inhalation: Chronic exposure can affect the liver(hepatitis,fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/ central nervous system/peripheral nervous system (impaired memory, numbness of extremeties, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fatthead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene Connecticut hazardous material survey.: Tetrachloroethylene Illinois toxic substances disclosure to employee act: Tetrachloroethylene Illinois chemical safety act: Tetrachloroethylene New York release reporting list: Tetrachloroethylene Rhode Island RTK hazardous substances: Tetrachloroethylene Pennsylvania RTK: Tetrachloroethylene Minnesota: Tetrachloroethylene Michigan critical material: Tetrachloroethylene Massachusetts RTK: Tetrachloroethylene Massachusetts spill list: Tetrachloroethylene New Jersey: Tetrachloroethylene New Jersey spill list: Tetrachloroethylene Louisiana spill reporting: Tetrachloroethylene California Director's List of Hazardous Substances: Tetrachloroethylene TSCA 8(b) inventory: Tetrachloroethylene TSCA 8(d) H and S data reporting: Tetrachloroethylene: Effective date: 6/1/87; Sunset date: 6/1/97 SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R40- Possible risks of irreversible effects. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S23- Do not breathe gas/fumes/vapour/spray S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37- Wear suitable gloves. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: g

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:29 PM

Last Updated: 06/09/2012 12:00 PM

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Chemicals & Laboratory Equipment

Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
1,1,1-Trichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,1,1-Trichloroethane

Catalog Codes:

CAS#: 71-55-6

RTECS: KJ2975000

TSCA: TSCA 8(b) inventory: 1,1,1-Trichloroethane

CI#: Not available.

Synonym:

Chemical Formula: CH3CCl3

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{1,1,1-}Trichloroethane	71-55-6	100

Toxicological Data on Ingredients: 1,1,1-Trichloroethane: ORAL (LD50): Acute: 9600 mg/kg [Rat]. 6000 mg/kg [Mouse]. DERMAL (LD50): Acute: 15800 mg/kg [Rabbit]. VAPOR (LC50): Acute: 18000 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of ingestion. Hazardous in case of skin contact (irritant, permeator), of inhalation. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 537°C (998.6°F)

Flash Points: Not available.

Flammable Limits: LOWER: 7.5% UPPER: 12.5%

Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds.

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of oxidizing materials, of acids, of alkalis.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive to explosive in presence of oxidizing materials, of acids, of alkalis.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 350 STEL: 440 CEIL: 440 (ppm) from ACGIH (TLV) [1995] TWA: 1900 STEL: 2460 CEIL: 2380 (mg/m3) from ACGIH [1995]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 133.41 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 74.1°C (165.4°F)

Melting Point: -32.5°C (-26.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.3376 (Water = 1)

Vapor Pressure: 100 mm of Hg (@ 20°C)

Vapor Density: 4.6 (Air = 1)

Volatility: Not available.

Odor Threshold: 400 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 6000 mg/kg [Mouse]. Acute dermal toxicity (LD50): 15800 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 18000 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant, permeator), of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : 1,1,1-Trichloroethane : UN2831 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: 1,1,1-Trichloroethane Massachusetts RTK: 1,1,1-Trichloroethane TSCA 8(b) inventory: 1,1,1-Trichloroethane SARA 313 toxic chemical notification and release reporting: 1,1,1-Trichloroethane CERCLA: Hazardous substances.: 1,1,1-Trichloroethane

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC):
R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:31 PM

Last Updated: 05/21/2013 12:00 PM

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: CIS-1,2-DICHLOROETHYLENE

TRADE NAMES/SYNONYMS:
CIS-ACETYLENE DICHLORIDE; 1,2-DICHLOROETHYLENE; C2H2CL2; MAT05125; RTECS KV9420000

CHEMICAL FAMILY: halogenated, aliphatic

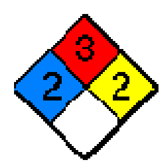
CREATION DATE: Jan 24 1989
REVISION DATE: Dec 11 2008

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: CIS-1,2-DICHLOROETHYLENE
CAS NUMBER: 156-59-2
PERCENTAGE: 100.0

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=2



EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: liquid
ODOR: pleasant odor
MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression
PHYSICAL HAZARDS: Flammable liquid and vapor. Vapor may cause flash fire. May react on contact with air, heat, light or water.

POTENTIAL HEALTH EFFECTS:
INHALATION:

SHORT TERM EXPOSURE: irritation, nausea, vomiting, drowsiness, symptoms of drunkenness
LONG TERM EXPOSURE: no information on significant adverse effects
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: same as effects reported in short term exposure
EYE CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: same as effects reported in short term exposure
INGESTION:
SHORT TERM EXPOSURE: symptoms of drunkenness
LONG TERM EXPOSURE: no information on significant adverse effects

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN: For ingestion, consider gastric lavage. Consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Moderate explosion hazard. Vapor/air mixtures are explosive above flash point. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water may be ineffective.

FLASH POINT: 39 F (4 C) (CC)
LOWER FLAMMABLE LIMIT: 9.7%
UPPER FLAMMABLE LIMIT: 12.8%
FLAMMABILITY CLASS (OSHA): IB

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
CIS-1,2-DICHLOROETHYLENE:
1,2-DICHLOROETHYLENE (ALL ISOMERS):
200 ppm (790 mg/m3) OSHA TWA
200 ppm ACGIH TWA
200 ppm (790 mg/m3) NIOSH recommended TWA 10 hour(s)

VENTILATION: Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
2000 ppm
Any supplied-air respirator operated in a continuous-flow mode.
Any powered, air-purifying respirator with organic vapor cartridge(s).
Any air-purifying respirator with a full facepiece and an organic vapor canister.
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.
Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
Emergency or planned entry into unknown concentrations or IDLH conditions -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

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9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
COLOR: colorless
ODOR: pleasant odor
MOLECULAR WEIGHT: 96.94
MOLECULAR FORMULA: C2-H2-CL2
BOILING POINT: 140 F (60 C)
FREEZING POINT: -114 F (-81 C)
VAPOR PRESSURE: 400 mmHg @ 41 C
VAPOR DENSITY (air=1): 3.34
SPECIFIC GRAVITY (water=1): 1.2837
WATER SOLUBILITY: insoluble
PH: Not available
VOLATILITY: Not available
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not available

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: acetone, benzene, ether, alcohol

10. STABILITY AND REACTIVITY

REACTIVITY: May decompose on contact with air, light, moisture, heat or storage and use above room temperature. Releases toxic, corrosive, flammable or explosive gases.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.

INCOMPATIBILITIES: bases, metals, combustible materials, oxidizing materials, acids

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION: May polymerize. Avoid contact with incompatible materials.

11. TOXICOLOGICAL INFORMATION

CIS-1,2-DICHLOROETHYLENE:
TOXICITY DATA: 13700 ppm inhalation-rat LC50
LOCAL EFFECTS:
Irritant: inhalation, skin, eye
ACUTE TOXICITY LEVEL:
Slightly Toxic: inhalation
TARGET ORGANS: central nervous system
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: respiratory disorders
MUTAGENIC DATA: Available.

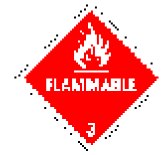
12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION



U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: 1,2-Dichloroethylene
ID NUMBER: UN1150
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: II
LABELING REQUIREMENTS: 3

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: 1,2-Dichloroethylene
UN NUMBER: UN1150
CLASS: 3
PACKING GROUP/CATEGORY: II

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
1,2-DICHLOROETHYLENE (ALL ISOMERS)

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: BD2

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

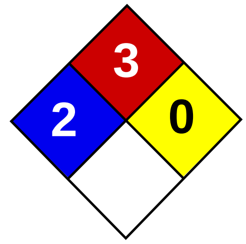
TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

MATHESON TRI-GAS, INC. MAKES NO EXPRESS OR IMPLIED WARRANTIES, GUARANTEES OR REPRESENTATIONS REGARDING THE PRODUCT OR THE INFORMATION HEREIN, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR USE. MATHESON TRI-GAS, INC. SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY, PROPERTY OR OTHER DAMAGES OF ANY NATURE, WHETHER COMPENSATORY, CONSEQUENTIAL, EXEMPLARY, OR OTHERWISE, RESULTING FROM ANY PUBLICATION, USE OR RELIANCE UPON THE INFORMATION HEREIN.

Chemicals & Laboratory Equipment



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
1,2-Dichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,2-Dichloroethane

Catalog Codes: SLD2521, SLD3721

CAS#: 107-06-2

RTECS: KH9800000

TSCA: TSCA 8(b) inventory: 1,2-Dichloroethane

CI#: Not available.

Synonym: Ethylene dichloride

Chemical Formula: C2H4CL2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{1,2-}Dichloroethane	107-06-2	100

Toxicological Data on Ingredients: 1,2-Dichloroethane: ORAL (LD50): Acute: 670 mg/kg [Rat]. 413 mg/kg [Mouse]. DERMAL (LD50): Acute: 2800 mg/kg [Rabbit]. VAPOR (LC50): Acute: 1414.2 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Extremely hazardous in case of ingestion. Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant). Corrosive to skin and eyes on contact. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
Very hazardous in case of ingestion, of inhalation. CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. Classified 2 (Reasonably anticipated.) by NTP. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 413°C (775.4°F)

Flash Points: CLOSED CUP: 13°C (55.4°F). OPEN CUP: 18°C (64.4°F).

Flammable Limits: LOWER: 6.2% UPPER: 15.6%

Products of Combustion: These products are carbon oxides (CO, CO_2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks. Slightly flammable to flammable in presence of oxidizing materials.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive to explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Corrosive liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep container dry. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 10 CEIL: 75 (ppm) from ACGIH (TLV) TWA: 40 CEIL: 300 (mg/m3) from ACGIHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 98.96 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 83.5°C (182.3°F)

Melting Point: -35.3°C (-31.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.2351 (Water = 1)

Vapor Pressure: 61 mm of Hg (@ 20°C)

Vapor Density: 3.42 (Air = 1)

Volatility: Not available.

Odor Threshold: 26 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, n-octanol, acetone.

Solubility:
Easily soluble in methanol, diethyl ether, n-octanol, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 413 mg/kg [Mouse]. Acute dermal toxicity (LD50): 2800 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 1414.2 ppm 4 hour(s) [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. Classified 2 (Reasonably anticipated.) by NTP. The substance is toxic to lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:
Extremely hazardous in case of ingestion. Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in animal. Excreted in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Ethylene dichloride : UN1184 PG: II

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: 1,2-Dichloroethane California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: 1,2-Dichloroethane Pennsylvania RTK: 1,2-Dichloroethane Massachusetts RTK: 1,2-Dichloroethane TSCA 8(b) inventory: 1,2-Dichloroethane CERCLA: Hazardous substances.: 1,2-Dichloroethane

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):
R11- Highly flammable. R20/22- Harmful by inhalation and if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:17 PM

Last Updated: 05/21/2013 12:00 PM

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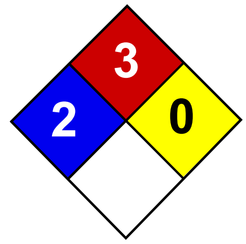
Chemicals & Laboratory Equipment



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
1,1-Dichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,1-Dichloroethane

Catalog Codes: SLD3280

CAS#: 75-34-3

RTECS: KI0175000

TSCA: TSCA 8(b) inventory: 1,1-Dichloroethane

CI#: Not available.

Synonym:

Chemical Name: 1,1-Dichloroethane

Chemical Formula: C2-H4-Cl2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{1,1-}Dichloroethane	75-34-3	100

Toxicological Data on Ingredients: 1,1-Dichloroethane: ORAL (LD50): Acute: 725 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified 2 (Reasonably anticipated.) by NTP. A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to kidneys, lungs, liver, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 458°C (856.4°F)

Flash Points: CLOSED CUP: -17°C (1.4°F). OPEN CUP: -6°C (21.2°F).

Flammable Limits: LOWER: 5.6% UPPER: 11.4%

Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as oxidizing agents, alkalis.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 250 (ppm) from ACGIH (TLV) [1999] TWA: 100 (ppm) from OSHA (PEL) Australia: TWA: 200 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Oily liquid.)

Odor: Chloroform like odor (Slight.)

Taste: Not available.

Molecular Weight: 98.96 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 57.3°C (135.1°F)

Melting Point: -96.9°C (-142.4°F)

Critical Temperature: 261.5°C (502.7°F)

Specific Gravity: 1.175 (Water = 1)

Vapor Pressure: 180 mm of Hg (@ 20°C)

Vapor Density: 3.44 (Air = 1)

Volatility: Not available.

Odor Threshold: 120 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties:
Partially dispersed in diethyl ether. See solubility in water, diethyl ether.

Solubility: Partially soluble in diethyl ether.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, alkalis.

Corrosivity: Corrosive in presence of aluminum.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Will attack some forms of plastic and rubber

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 725 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2 (Reasonably anticipated.) by NTP. A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to kidneys, lungs, liver, central nervous system (CNS).

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:
CLASS 3: Combustible liquid with a flash point greater than 37.8C (100F). Marine pollutant

Identification: : 1,1-Dichloroethane : UN2362 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65 (no significant risk level): 1,1-Dichloroethane California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: 1,1-Dichloroethane Rhode Island RTK hazardous substances: 1,1-Dichloroethane Pennsylvania RTK: 1,1-Dichloroethane Florida: 1,1-Dichloroethane Minnesota: 1,1-Dichloroethane Massachusetts RTK: 1,1-Dichloroethane New Jersey: 1,1-Dichloroethane New Jersey spill list: 1,1-Dichloroethane TSCA 8(b) inventory: 1,1-Dichloroethane TSCA 8(a) PAIR: 1,1-Dichloroethane TSCA 8(d) H and S data reporting: 1,1-Dichloroethane: June 1999 TSCA 12(b) one time export: 1,1-Dichloroethane SARA 313 toxic chemical notification and release reporting: 1,1-Dichloroethane: 1% CERCLA: Hazardous substances.: 1,1-Dichloroethane: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R22- Harmful if swallowed. R37/38- Irritating to respiratory system and skin. R41- Risk of serious damage to eyes. R52- Harmful to aquatic organisms.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:07 PM

Last Updated: 05/21/2013 12:00 PM

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SAFETY DATA SHEET

Creation Date 27-Jan-2010 **Revision Date** 17-Jan-2018 **Revision Number** 6

1. Identification

Product Name	**Methylene chloride**
Cat No. :	**D37-1; D37-4; D37-20; D37-200; D37-200LC; D37-500; D37FB-19; D37FB-50; D37FB-115; D37FB-200; D37POP-19; D37POPB-50; D37POPB-200; D37RB-19; D37RB-50; D37RB-115; D37RB-200; D37RS-19; D37RS-28; D37RS-50; D37RS-115; D37RS-200; D37SK-4; D37SK-4LC; D37SS-28; D37SS-50; D37SS-115; D37SS-200; D37SS-1350; D37RS1000ASME; NC1485726; D37RE200ASME; NC1568702; NC1641358; XXMECLDOW2000; XXMECLDOW200LI**
CAS-No	75-09-2
Synonyms	Dichloromethane; DCM
Recommended Use	Laboratory chemicals.
Uses advised against	Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA:
800-424-9300
CHEMTREC®, Outside the USA:
001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Liver, Kidney, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
Causes skin irritation
Causes serious eye irritation
May cause drowsiness or dizziness
May cause cancer
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)

WARNING. Cancer - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Methylene chloride	75-09-2	>99.5

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get

	medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Move to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water.
Most important symptoms and effects	None reasonably foreseeable. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	556 °C / 1032.8 °F
Explosion Limits	
Upper	23 vol %
Lower	13 vol %
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2) Hydrogen chloride gas Phosgene
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	0	N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment. Ensure adequate ventilation.
Environmental Precautions	Should not be released into the environment.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling	Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Ensure adequate ventilation.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Methylene chloride	TWA: 50 ppm	(Vacated) TWA: 500 ppm (Vacated) STEL: 2000 ppm (Vacated) Ceiling: 1000 ppm TWA: 25 ppm STEL: 125 ppm	IDLH: 2300 ppm	TWA: 50 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Long sleeved clothing.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	sweet
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-97 °C / -142.6 °F
Boiling Point/Range	39 °C / 102.2 °F
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	23 vol %
Lower	13 vol %
Vapor Pressure	350 mbar @ 20°C
Vapor Density	2.93 (Air = 1.0)
Specific Gravity	1.33
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	556 °C / 1032.8 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C H2 Cl2
Molecular Weight	84.93

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Strong oxidizing agents, Strong acids, Amines

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Hydrogen chloride gas, Phosgene

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information
Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Methylene chloride	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rat)	53 mg/L (Rat) 6 h 76000 mg/m³ (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Methylene chloride	75-09-2	Group 2A	Reasonably Anticipated	A3	X	A3

IARC: (International Agency for Research on Cancer)

IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects Mutagenic effects have occured in microorganisms.

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)
STOT - repeated exposure Liver Kidney Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects Tumorigenic effects have been reported in experimental animals.

12. Ecological information

Ecotoxicity

.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Methylene chloride	EC50:>660 mg/L/96h	Pimephales promelas: LC50:193 mg/L/96h	EC50: 1 mg/L/24 h EC50: 2.88 mg/L/15 min	EC50: 140 mg/L/48h

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Methylene chloride	1.25

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Methylene chloride - 75-09-2	U080	-

14. Transport information

DOT

UN-No UN1593
Proper Shipping Name DICHLOROMETHANE
Hazard Class 6.1
Packing Group III

TDG

UN-No UN1593
Proper Shipping Name DICHLOROMETHANE
Hazard Class 6.1
Packing Group III

IATA

UN-No UN1593
Proper Shipping Name Dichloromethane
Hazard Class 6.1
Packing Group III

IMDG/IMO

UN-No UN1593
Proper Shipping Name Dichloromethane
Hazard Class 6.1
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Methylene chloride	75-09-2	X	ACTIVE	R

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Methylene chloride	75-09-2	X	-	200-838-9	X	X	X	X	KE-23893

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Methylene chloride	75-09-2	>99.5	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Methylene chloride	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Methylene chloride	X		-

OSHA - Occupational Safety and Health Administration

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Methylene chloride	125 ppm STEL 12.5 ppm Action Level 25 ppm TWA	-

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Methylene chloride	1000 lb 1 lb	-

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Methylene chloride	75-09-2	Carcinogen	200 µg/day 50 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Methylene chloride	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date	27-Jan-2010
Revision Date	17-Jan-2018
Print Date	17-Jan-2018
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: TRANS-1,2-DICHLOROETHYLENE

TRADE NAMES/SYNONYMS:
MTG MSDS 196; TRANS-ACETYLENE DICHLORIDE; TRANS-DICHLOROETHYLENE; TRANS-1,2-DICHLOROETHENE; 1,2-DICHLOROETHYLENE; RCRA U079; C2H2CL2; MAT23670; RTECS KV9400000

CHEMICAL FAMILY: halogenated, aliphatic

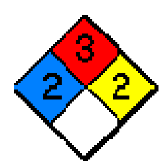
CREATION DATE: Jan 24 1989
REVISION DATE: Dec 11 2008

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TRANS-1,2-DICHLOROETHYLENE
CAS NUMBER: 156-60-5
PERCENTAGE: 100.0

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=2



EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: liquid
ODOR: pleasant odor
MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression
PHYSICAL HAZARDS: Flammable liquid and vapor. Vapor may cause flash fire. May react on contact with air, heat, light or water.

POTENTIAL HEALTH EFFECTS:

INHALATION:
SHORT TERM EXPOSURE: irritation, nausea, vomiting, drowsiness, symptoms of drunkenness
LONG TERM EXPOSURE: no information on significant adverse effects
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: same as effects reported in short term exposure
EYE CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: same as effects reported in short term exposure
INGESTION:
SHORT TERM EXPOSURE: symptoms of drunkenness
LONG TERM EXPOSURE: no information on significant adverse effects

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN: For ingestion, consider gastric lavage. Consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Vapor/air mixtures are explosive above flash point. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water may be ineffective.

FLASH POINT: 36 F (2 C) (CC)
LOWER FLAMMABLE LIMIT: 9.7%
UPPER FLAMMABLE LIMIT: 12.8%
AUTOIGNITION: 860 F (460 C)
FLAMMABILITY CLASS (OSHA): IB

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
TRANS-1,2-DICHLOROETHYLENE:
1,2-DICHLOROETHYLENE (ALL ISOMERS):
200 ppm (790 mg/m3) OSHA TWA
200 ppm ACGIH TWA
200 ppm (790 mg/m3) NIOSH recommended TWA 10 hour(s)

VENTILATION: Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
2000 ppm
Any supplied-air respirator operated in a continuous-flow mode.
Any powered, air-purifying respirator with organic vapor cartridge(s).
Any air-purifying respirator with a full facepiece and an organic vapor canister.
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.
Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
Emergency or planned entry into unknown concentrations or IDLH conditions -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
COLOR: colorless
ODOR: pleasant odor
MOLECULAR WEIGHT: 96.94
MOLECULAR FORMULA: C2-H2-CL2
BOILING POINT: 118 F (48 C)
FREEZING POINT: -58 F (-50 C)
VAPOR PRESSURE: 400 mmHg @ 31 C
VAPOR DENSITY (air=1): 3.34
SPECIFIC GRAVITY (water=1): 1.2565
WATER SOLUBILITY: slightly soluble

PH: Not available
VOLATILITY: Not available
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not available
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: ethanol, ether

10. STABILITY AND REACTIVITY

REACTIVITY: May decompose on contact with air, light, moisture, heat or storage and use above room temperature. Releases toxic, corrosive, flammable or explosive gases.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.

INCOMPATIBILITIES: bases, metals, combustible materials, oxidizing materials, acids

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION: May polymerize. Avoid contact with incompatible materials.

11. TOXICOLOGICAL INFORMATION

TRANS-1,2-DICHLOROETHYLENE:
IRRITATION DATA: 500 mg/24 hour(s) skin-rabbit moderate; 10 mg eyes-rabbit moderate
TOXICITY DATA: 24100 ppm inhalation-rat LC50; >5 gm/kg skin-rabbit LD50; 1235 mg/kg oral-rat LD50
LOCAL EFFECTS:
Irritant: inhalation, skin, eye
ACUTE TOXICITY LEVEL:
Moderately Toxic: ingestion
Slightly Toxic: inhalation
TARGET ORGANS: central nervous system
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: respiratory disorders
MUTAGENIC DATA: Available.
REPRODUCTIVE EFFECTS DATA: Available.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
INVERTEBRATE TOXICITY: <110000 ug/L 48 hour(s) (Mortality) Water flea (Daphnia magna)

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U079.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Trichlorobenzenes, liquid
ID NUMBER: UN2321
HAZARD CLASS OR DIVISION: 6.1
PACKING GROUP: III
LABELING REQUIREMENTS: 6.1

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Trichlorobenzenes, liquid
UN NUMBER: UN2321
CLASS: 6.1
PACKING GROUP/CATEGORY: III

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
1,2-DICHLOROETHYLENE (ALL ISOMERS)

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: VINYL CHLORIDE

TRADE NAMES/SYNONYMS:
MTG MSDS 97; 1-CHLOROETHYLENE; 1-CHLOROETHENE; CHLOROETHYLENE; CHLOROETHENE; CHLORETHENE; CHLORETHYLENE; ETHYLENE MONOCHLORIDE; MONOCHLOROETHYLENE; MONOCHLORO ETHENE; MONOCHLOROETHENE; VINYL CHLORIDE MONOMER; VINYL CHLORIDE, INHIBITED; VINYL C MONOMER; RCRA U043; UN 1086; C2H3Cl; MAT24940; RTECS KU9625000

CHEMICAL FAMILY: halogenated, aliphatic

CREATION DATE: Jan 24 1989
REVISION DATE: Dec 11 2008

2. COMPOSITION, INFORMATION ON INGREDIENTS

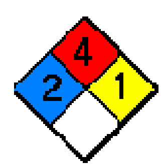
COMPONENT: VINYL CHLORIDE
CAS NUMBER: 75-01-4
PERCENTAGE: >99.9

COMPONENT: PHENOL
CAS NUMBER: 108-95-2
PERCENTAGE: <0.1

COMPONENT: INHIBITORS
CAS NUMBER: Not assigned.
PERCENTAGE: <0.1

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=4 REACTIVITY=1



EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: gas
ODOR: faint odor, sweet odor
MAJOR HEALTH HAZARDS: harmful if swallowed, skin irritation, eye irritation, central nervous system depression, cancer hazard (in humans)
PHYSICAL HAZARDS: Flammable gas. May cause flash fire. May polymerize. Containers may rupture or explode.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation, nausea, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, disorientation, joint pain, loss of coordination, hearing loss, lung congestion
LONG TERM EXPOSURE: impotence, bluish skin color, blood disorders, liver damage, cancer
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation, blisters
LONG TERM EXPOSURE: irritation, blisters
EYE CONTACT:
SHORT TERM EXPOSURE: irritation, eye damage
LONG TERM EXPOSURE: irritation, eye damage
INGESTION:
SHORT TERM EXPOSURE: frostbite
LONG TERM EXPOSURE: cancer

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4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SKIN CONTACT: If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

EYE CONTACT: Wash eyes immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains. Get medical attention immediately.

INGESTION: If a large amount is swallowed, get medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

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5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Severe explosion hazard. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Stop leak if possible without personal risk. Let burn unless leak can be stopped immediately. For smaller tanks or cylinders, extinguish and isolate from other flammables. Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Evacuate if fire gets out of control or containers are directly exposed to fire. Evacuation radius: 500 meters (1/3 mile). Consider downwind evacuation if material is leaking.

FLASH POINT: -108 F (-78 C) (CC)
LOWER FLAMMABLE LIMIT: 3.6%
UPPER FLAMMABLE LIMIT: 33%
AUTOIGNITION: 882 F (472 C)

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6. ACCIDENTAL RELEASE MEASURES

WATER RELEASE:
Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed spaces before entering. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

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7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store outside or in a detached building. Inside storage: Store in a cool, dry place. Store in a well-ventilated area. Avoid heat, flames, sparks and other sources of ignition. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. See original container for storage recommendations. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
VINYL CHLORIDE:
1.0 ppm OSHA TWA
5 ppm OSHA STEL 15 minute(s)
0.5 ppm OSHA action level 8 hour(s)
1 ppm ACGIH TWA
NIOSH TWA (lowest feasible concentration)

VENTILATION: Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: For the gas: Wear appropriate chemical resistant gloves. For the liquid: Wear insulated gloves.
OSHA REGULATED SUBSTANCES: U.S. OSHA 29 CFR 1910.1017.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
OSHA Standard:
Respirator selection should comply with 29 CFR 1910.134, 29 CFR 1910.1017, and the final rule published in the Federal Register on August 24, 2006.
NIOSH Recommendations:
At any detectable concentration -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern.
Any appropriate escape-type, self-contained breathing apparatus.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: gas
COLOR: colorless
ODOR: faint odor, sweet odor
MOLECULAR WEIGHT: 62.50
MOLECULAR FORMULA: C-H2-C-H-Cl
BOILING POINT: 9 F (-13 C)
FREEZING POINT: -245 F (-154 C)
VAPOR PRESSURE: 2515.6 mmHg @ 21.1 C
VAPOR DENSITY (air=1): 2.2
SPECIFIC GRAVITY (water=1): 0.9106
WATER SOLUBILITY: 0.25%
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: 260 ppm
EVAPORATION RATE: Not applicable
VISCOSITY: 0.01072 cP @ 20 C
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable
SOLVENT SOLUBILITY:
Soluble: alcohol, ether, carbon tetrachloride, benzene

10. STABILITY AND REACTIVITY

REACTIVITY: May polymerize. Avoid contact with light or storage and use above room temperature.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: metal carbide, metals, oxidizing materials, peroxides

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: halogenated compounds, oxides of carbon, phosgene

POLYMERIZATION: May polymerize. Avoid contact with heat, light, air, water or incompatible materials. Closed containers may rupture violently.

11. TOXICOLOGICAL INFORMATION

VINYL CHLORIDE:
TOXICITY DATA: 18 pph/15 minute(s) inhalation-rat LC50; 500 mg/kg oral-rat LD50
CARCINOGEN STATUS: OSHA: Carcinogen; NTP: Known Human Carcinogen; IARC: Human Sufficient Evidence, Animal Sufficient Evidence, Group 1; ACGIH: A1 -Confirmed Human Carcinogen;

EC: Category 1
LOCAL EFFECTS:
Irritant: skin, eye
ACUTE TOXICITY LEVEL:
Toxic: ingestion
Relatively Non-toxic: inhalation
TARGET ORGANS: central nervous system
TUMORIGENIC DATA: Available.
MUTAGENIC DATA: Available.
REPRODUCTIVE EFFECTS DATA: Available.
ADDITIONAL DATA: Stimulants such as epinephrine may induce ventricular fibrillation. May cause birth defects.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: 388000 ug/L 10 month(s) LETH (Mortality) Northern pike (Esox lucius)

INVERTEBRATE TOXICITY: 41.74 ug/L 72 day(s) (Residue) Mosquito (Culex pipiens quinquefasciata)

ALGAL TOXICITY: 41.74 ug/L 72 day(s) (Residue) Green algae (Oedogonium cardiacum)

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Hazardous Waste Number(s): D043. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 0.2 mg/L. U043.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Vinyl chloride, stabilized
ID NUMBER: UN1086
HAZARD CLASS OR DIVISION: 2.1
LABELING REQUIREMENTS: 2.1
QUANTITY LIMITATIONS:
PASSENGER AIRCRAFT OR RAILCAR: Forbidden
CARGO AIRCRAFT ONLY: 150 kg

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Vinyl chloride, stabilized
UN NUMBER: UN1086
CLASS: 2.1

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
Vinyl chloride: 1 LBS RQ
PHENOL: 1000 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):
ACUTE: Yes
CHRONIC: Yes
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: Yes

SARA TITLE III SECTION 313 (40 CFR 372.65):
Vinyl chloride

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65:
Known to the state of California to cause the following:
Vinyl chloride
Cancer (Feb 27, 1987)

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: ABD2

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

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APPENDIX D

MONITORING RESULTS

Instrument	Date/Time	Readings	Location

APPENDIX E

SAFETY PLAN AMENDMENTS

SAFETY PLAN AMENDMENTS

Site Name: ______________________ **Start Date:** __________ **End Date:** __________

Scope of Work/Change/Amendment/Update/Modification Made to the Plan:

Reason for Amendment:

Hazard Evaluation:

Level of Protection:

Air Monitoring:

Person Requesting Amendment:

(Name)

(Title)

(Date)

(Signature)

Approval:

(Name)

(H&S Director)

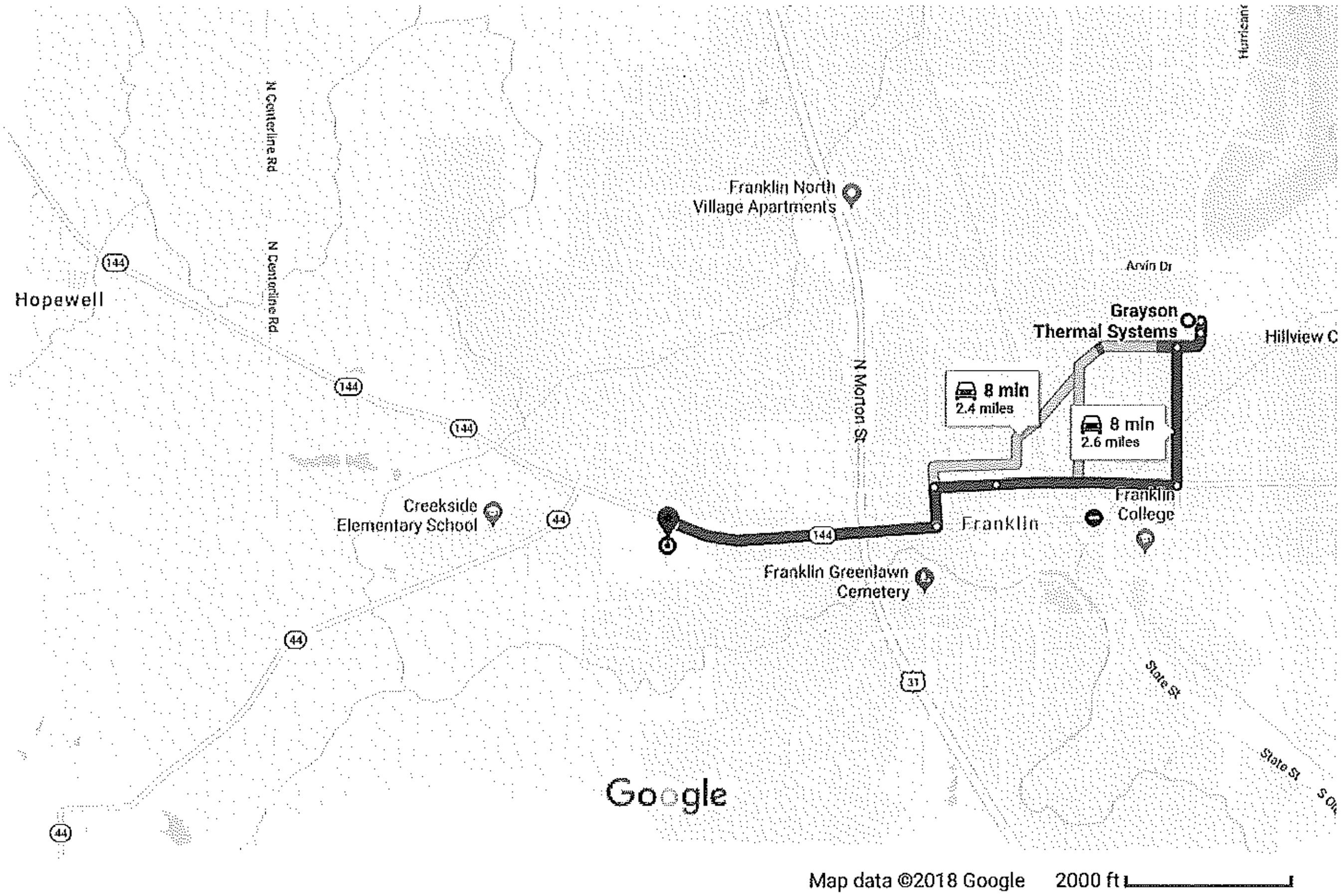
(Date)

(Signature)

APPENDIX F

HOSPITAL AND LOCAL MEDICAL PROVIDER MAPS

Google Maps Grayson Thermal Systems to Johnson Memorial Hospital Drive 2.6 miles, 8 min



Grayson Thermal Systems

980 Hurricane Rd, Franklin, IN 46131

1. Head south on County Rd 350 E/Hurricane Rd toward E 100 N/Upper Shelbyville Rd — 233 ft
2. Continue onto Hamilton Ave — 0.1 mi
3. Turn left onto N Forsythe St — 0.5 mi
4. Turn right onto E King St — 0.6 mi
5. Continue straight onto W King St — 0.2 mi
6. Turn left onto Walnut St — 0.1 mi
7. Turn right onto W Jefferson St — 0.9 mi

Johnson Memorial Hospital

1125 W Jefferson St, Franklin, IN 46131

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Appendix E

Cost Estimate

Estimated Short-Term Costs for Selected Corrective Measure

Former Bendix Facility

EPA ID # IND 044 587 848

Franklin, IN 46131

Tasks	Estimated Direct Capital Costs
In-Situ Injections (**On-Site** Treatment Area and/or PRBs)	$3,239,078
PRB/ISCR Injections (**Off-site**)	$1,284,588
Total Capital Costs	$4,523,666
Initial Implementation Monitoring & Rptg Costs (up to 4 years of post-injection quarterly monitoring) - Years 0-4	---
Groundwater Monitoring (19 events)	$409,077
Reporting (9 semi-annual reports)	$55,000
Total Qtly Monitoring & Rptg Costs (4 years)	$464,077
Annual Monitoring & Rptg Costs - Year 5	---
Groundwater Monitoring (1 event)	$16,531
Reporting (1 annual report)	$3,500
Total Annual Monitoring & Rptg Costs (1 year)	$20,031
Combined Total	$5,007,773

Note: Estimate above includes anticipated costs to complete proposed remediation activities and up to 5 years of groundwater sampling and reporting as outlined in the Second Supplemental Corrective Measure Implementation Work Plan dated June 2, 2023.

Appendix F

Schedule

Former Bendix Facility, Franklin, IN - Anticipated Second Supplemental Corrective Measure Work Plan Implementation Project Schedule (Initial Reporting & Injection Schedule)

Main Task	Sub-task Description	Estimated Date of Completion	12/8/2023	12/15/2023	12/22/2023	1/5/2024	4/15/2024	5/6/2024	5/17/2024	5/24/2024	5/31/2024	6/7/2024	6/14/2024	6/21/2024	6/28/2024	7/5/2024	7/12/2024	7/19/2024	7/26/2024	8/2/2024	8/9/2024	8/16/2024	8/23/2024	8/30/2024	9/6/2024	9/13/2024	11/1/2024	11/29/2024	2/7/2025	3/7/2025	6/20/2025
Second Supplemental Corrective Measure Implementation Work Plan (2SCMIWP) Development & QAPP	Quality Assurance Project Plan (QAPP) Finalization and submittal to EPA	1/3/2024	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2SCMIWP Development & QAPP	EPA Draft Approval of Work Plan & QAPP	4/17/2024	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2SCMIWP Development & QAPP	Work Plan Finalization/Submittal to EPA	5/6/2024	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2SCMIWP Development & QAPP	508 Compliant Work Plan and QAPP Submittal to EPA	6/7/2024	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Site In-situ Injections	Confirmatory Monitoring Well Installation	6/21/2024	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Site In-situ Injections	Baseline Groundwater Sampling Event	6/28/2024	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Site In-situ Injections	Obtain All Off-Site Access/Right of Way Permits	7/12/2024	-	-	-	-	-	-	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Site In-situ Injections	Install Permeable Reactive Barrier (PRB) on Southside of Hamilton Avenue (estimate 1-2 weeks to complete)	7/26/2024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-
Off-Site In-situ Injections	Continue In-Situ Chemical Injection Activities (estimate up to 45-days to complete)	9/6/2024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-	-
On-Site In-Situ Injections	Confirmatory Monitoring Well Installation	6/21/2024	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-Site In-Situ Injections	Baseline Groundwater Sampling Event	6/28/2024	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-Site In-Situ Injections	Deactivate Onsite Pump & Treat System (remove submersible pumps and temporarily cap wells to minimize short circuiting into recovery wells)	7/19/2024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
On-Site In-Situ Injections	Install PRB on southside of Site/north of Hamilton Avenue (estimate 1-2 weeks to complete)	7/26/2024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-
On-Site In-Situ Injections	On-Site In-Situ Chemical Oxidation (ISCO) Injection Activities (estimate up to 30-days for initial injection event)	8/30/2024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X	-	-	-	-	-	-	-
On-Site In-Situ Injections	Conduct initial source area performance sampling activities (starting 9/2/24)	9/13/2024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
On-Site In-Situ Injections	Initiate Supplemental ISCO Injection event #1 (weather permitting and if required) - starting 15-days after performance sampling results received - estimate 15 days to complete	11/1/2024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-
On-Site In-Situ Injections	Conduct supplemental source area performance sampling activities (weather permitting) - starting 10/21/24	11/29/2024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-
On-Site In-Situ Injections	Initiate Supplemental ISCO Injection event #2 (if required) - starting 30-days after performance sampling results received - estimate 30 days to complete	2/7/2025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
On-Site In-Situ Injections	Conduct supplemental source area performance sampling activities	3/7/2025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-
On-Site In-Situ Injections	Install on-site In-Situ Chemical Reduction (ISCR) Treatment Area Injections and/or PRBs (~ 45 days after performance sampling results are received - estimate 30 days to complete	6/20/2025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X

Assumptions

1) Schedule is dependent on successfully obtaining off-site access for injection and well installation activities & subcontractor/product availability.

2) Onsite pump and treat system recovery wells will be deactivated sequentially during the installation of the southernmost onsite PRB have been installed and after northern most offsite PRB has been installed.

3) ISCO and On-Site ISCR injection schedule are dictated by success of initial ISCO in-situ injection program. Performance sampling results will determine if additional in-situ injections are necessary and the length of each successive injection event.

4) The estimated injection schedule (length and start dates) are approximate only and based on the anticipated work schedule and contractor/product availability. The exact length of time for each injection event may also alter from what is proposed based upon weather, access/logistical issues, and the exact scope of each successive injection event.

Former Bendix Facility, Franklin, IN - Anticipated Second Supplemental Corrective Measure Work Plan Implementation Project Schedule (Performance Monitoring, Site Restoration, and Reporting)

Main Task	Sub-task Description	Comments/Frequency	3Q2024	10/4/2024	11/3/2024	12/8/2024	1Q2025	2Q2025	3Q2025	7/20/2025	8/24/2025	9/28/2025	4Q2025	1Q2026	2Q2026	3Q2026	4Q2026	1Q2027	2Q2027	3Q2027	4Q2027	1Q2028	2Q2028	3Q2028	2Q2029	3Q2029
Off-Site Post-Remediation Monitoring	Initial Off-site Performance Groundwater Monitoring Events (3 months total sampling duration)	30, 60, & 90 days post PRB injection event	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Site Post-Remediation Monitoring	Secondary Off-Site Performance Groundwater Monitoring Events (starts ~3 months after the conclusion of the initial 3-month performance monitoring period & will last for 3 additional quarters)	Quarterly	-	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Site Post-Remediation Monitoring	[1]Short-term Off-Site Plume Stability Groundwater Monitoring Events (starts ~3 months after the conclusion of the secondary performance monitoring period & will last for 8 additional quarters)	Quarterly	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X	-	-	-	-	-	-
Off-Site Post-Remediation Monitoring	[1]Long-term Off-Site Plume Stability Groundwater Monitoring Events (starts ~ 1 year after the conclusion of the short-term plume stability monitoring period & will last until the long-term Corrective Action Objectives are achieved)	Annually	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X
On-Site Post-Remediation Monitoring	Initial On-Site Performance Groundwater Monitoring Events (after In-Situ Chemical Reduction) - 3 months total sampling duration	30, 60, & 90 days post ISCR injection event	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-Site Post-Remediation Monitoring	Secondary On-Site Performance Groundwater Monitoring Events (starts ~3 months after the conclusion of the initial 3-month performance monitoring period & will last for 3 additional quarters)	Quarterly	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-
On-Site Post-Remediation Monitoring	[1]Short-term On-Site Plume Stability Groundwater Monitoring Events (starts ~3 months after the conclusion of the secondary performance monitoring period & will last for 8 additional quarters)	Quarterly	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X	-	-	-
On-Site Post-Remediation Monitoring	[1]Long-term On-Site Plume Stability Groundwater Monitoring Events (starts ~1 year after the conclusion of the short-term plume stability monitoring period & will last until the long-term Corrective Action Objectives are achieved)	Annually	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-
Site Restoration	Restore Off-site Properties post Permeable Reactive Barrier installation (weather permitting and within ~ 2 weeks of completion of injection activities)	September 2024	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Site Restoration	Restore On-site property post In-Situ Chemical Reduction installation (weather permitting and within ~3 weeks of completion of In-Situ Chemical Reduction injection activities)	July 2025	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reporting	Draft Environmental Restrictive Covenant	TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reporting	Bi-weekly Progress reporting (only during field implementation of the in-situ injection activities)	Bi-Weekly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reporting	Initial Progress Report (after remedy is implemented and all initial/secondary performance monitoring is completed - anticipated to be submitted in October 2025)	60-days after the last round of initial performance monitoring results are received	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reporting	Progress Reports (starts after short-term plume stability monitoring is initiated, 1st report anticipated to be submitted in April 2026)	Semi- Annually	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reporting	Annual Reports - starts when Site transitions to long-term Plume Stability monitoring program	TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Closure	Site Closure Request	TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Closure	EPA Review - Approval of Closure Request	TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Closure	Pump & Treat System Decommission (building & wells)	TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Closure	Well Network Abandonment	TBD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Assumptions

1) Per the SSCMIWP, select wells may be sampled on a reduced schedule if previous sampling results indicate short or long term CAOs have already been achieved.

2) The above schedule is an estimate only with respect to when the initial sampling events will be conducted, and the project dates will be adjusted accordingly once the initial sampling events are conducted.