FOURTH FIVE-YEAR REVIEW REPORT FOR CALDWELL TRUCKING SUPERFUND SITE

ESSEX COUNTY, NEW JERSEY

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York

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Date

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LIST OF ABBREVIATIONS & ACRONYMS

AISB	Accelerated In-situ Biological
CEA	Classification Exception Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLA	Central Lagoon Area
DNAPL	Dense Non-Aqueous Phase Liquid
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Difference
FFS	Focused Feasibility Study
FYR	Five-Year Review
GETS	O'Connor Drive groundwater extraction and treatment system
GWQS	Groundwater Quality Standards
GWTT	Groundwater Treatment and Technology Inc.
ICs	Institutional Controls
MCLs	National Primary Drinking Water Standard Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NJDPES	New Jersey Pollutant Discharge Elimination System
NLA	North Lagoon Area
NPL	National Priorities List
OU	Operable Unit
O&M	Operation and Maintenance
PCB	Polychlorinated Biphenyl
PPB	Parts per billion
PRB	Permeable Reactive Barrier
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Levels
SWQS	Surface Water Quality Standards
SVE	Soil Vapor Extraction
SVOC	Semi-volatile Organic Compound
TCA	1,1,1-trichloroethane
TCE	Trichloroethylene
TI	Technical Impractibility
UAO	Unilateral Administrative Order
UU/UE	Unlimited Use/Unrestricted Exposure
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Caldwell Trucking Superfund Site (Site). The triggering action for this statutory review is the completion date of the previous FYR, August 22, 2012. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of two operable units (OUs), and both OUs will be addressed in this FYR. Operable unit 1 (OU1) focused on soil contamination at the Site, as well as public and private potable water contamination. All work on the OU1 remedy has been completed. Operable unit 2 (OU2) addresses remediation of contaminated groundwater at the Site. Remedial activities are still ongoing for OU2.

The Site FYR was led by Diane Salkie, EPA remedial project manager (RPM). Other EPA participants included Sharissa Singh (hydrogeologist), Julie McPherson (human health risk assessor), Mindy Pensak (ecological risk assessor) and Natalie Loney (community involvement coordinator). Non-EPA participants are Gwen Zervas from New Jersey Department of Environmental Protection (NJDEP) and Chris Young of *de maximis, inc.*, representing the responsible parties. The review began on 1/5/2017.

Site Background

The Caldwell Trucking Company Site consists of Lot 17 of Block 2201 and Lots 7, 18 and 20 of Block 2302 in the Township of Fairfield, Essex County, New Jersey. The 11.25-acre property is located in the eastern portion of the Township, between O'Connor Drive and Sherwood Lane, immediately east of Passaic Avenue. Approximately 45 small businesses are situated within one mile of the Site and the nearest residential area is approximately 100 feet to the northeast.

Deepavaal Brook and the Passaic River are significant surface water bodies in the vicinity of the Site. Deepavaal Brook flows to the northeast and discharges to the Passaic River. A groundwater seep is located approximately 0.75-mile northeast of the Site and feeds an unnamed tributary that flows in a northerly direction into Deepavaal Brook. The Passaic Valley Water Commission has a water intake located on the Passaic River, approximately 2.2 miles downstream of its confluence with Deepavaal Brook. See Figure 1 of Appendix B.

The Site is located in a mixture of light industrial, commercial and residential areas and is surrounded by various industries. About 500 single family homes are located within one mile of the Site and the West Essex Regional High School is located adjacent to the southeastern boundary. Fairfield Township is located at the extreme northern edge of the Buried Valley Aquifer System recharge zone.

The recharge zone of this aquifer system underlies the central basin of the Passaic River in western Essex and southeastern Morris Counties. This aquifer system is designated as a sole-source aquifer, a designation that indicates that it is the sole or principal source of drinking water in the area. However, at present, it is no longer being used as a source of drinking water in the area. Groundwater in the area generally flows in a northerly direction toward the Passaic River. Four distinct hydrogeologic zone have been identified underlying the Site. In descending order, the units are: an upper unconsolidated layer consisting mainly of silty sand (A Zone) that exists above a clay layer that is present north of Kingsbridge Road, an overburden layer (B-Zone) below the clay layer consisting of silt, sand, and gravel, and an upper bedrock groundwater zone including weathered bedrock and cobbles (C-Zone). The hornfels layer, or D Zone, represents an "interflow" sedimentation period between basalt flows. The D Zone was the primary source of drinking water for the municipal water system prior to the Township of Fairfield decision to abandon its municipal well system and instead purchase water from the Passaic Valley Water Commission.

The Caldwell Trucking Company disposed of residential and commercial septic waste, as well as industrial waste, in unlined lagoons on the Site from the early 1950s until about 1973. When the lagoons were full, they were backfilled and a new series of lagoons were excavated, sometimes over pre-existing lagoons. Liquids from the lagoons were transported to the northwestern portion of the property where they were pumped to a large seepage area. In 1988, the company ceased the trucking operations and went out of business.

In the 1970s, chlorinated hydrocarbons were discovered in an industrial well near the Site. Private potable wells on Orlando Drive shown to be contaminated with carbon tetrachloride and trichloroethylene (TCE) were closed. In 1981, NJDEP found significant concentrations of solvents in on-site lagoons and noted spillage of solvents on the neighboring General Hose property. Monitoring wells installed by the Caldwell Trucking Company on its property indicated substantial groundwater contamination.

On September 8, 1983, EPA placed the Site on the National Priorities List (NPL).

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Caldwell Trucking Site		
EPA ID: NJD048798953		
Region: 2	**State:** NJ	**City/County:** Township of Fairfield, Essex County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** No	
REVIEW STATUS		

Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**
Author name (Federal or State Project Manager): Diane Salkie
Author affiliation: EPA, Region 2
Review period: 1/5/2017 - 8/22/2017
Date of site inspection: 4/4/2017
Type of review: Statutory
Review number: 4
Triggering action date: 8/22/2012
Due date *(five years after triggering action date)*: 8/22/2017

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Disposal in the unlined lagoons resulted in the contamination of on-site soil and groundwater. During the Remedial Investigation/Feasibility Study (RI/FS), EPA identified a variety of hazardous substances at the Site in soil, lagoon sludge and groundwater. Heavy metals, especially lead, and a variety of volatile and semi-volatile organic substances were identified in the soils and sludge. TCE, 1,1,1-trichloroethane (TCA), chloroform and other volatile organic compounds (VOCs) were found in the groundwater. The Caldwell Trucking Company's tanks contained lead, VOCs and semi-volatile organic compounds (SVOCs) and some polychlorinated biphenyls (PCBs). Groundwater contamination, consisting primarily of chlorinated VOCs, extends approximately 4000 feet downgradient from the Site to the Passaic River. Contaminated groundwater discharges to a surface seep approximately 3000 feet downgradient of the Site into an unnamed tributary which then feeds into Deepavaal Brook, a tributary to the Passaic River.

The RI concluded that the major health risk stemming from the Site is associated with ingestion or domestic use of contaminated groundwater. Although no residents or workers in the plume area were at risk, localized pumping influences or dispersion of the contaminant plume may change the risk. Downgradient groundwater was the focus of OU2. It was noted that the groundwater was discharging to the Passaic River but did not impact surface water. In addition, surface water and sediments in the vicinity of the Site were contaminated to varying degrees with contaminants similar to those detected at the Site. However, all but one of these locations are most likely contaminated from sources other than the Caldwell Trucking Site. The report also indicated that environmental receptors (biota) also may be at risk from contamination in Site soils. Inorganic compounds are the primary contaminants of concern for aquatic biota while PCBs and lead in on- and off-site surface soil could potentially affect terrestrial biota.

The RI/FS for the OU2 Record of Decision (ROD) found that TCE was the primary contaminant in the groundwater. Based on the concentrations found in groundwater and that the affected population would be provided with a public water supply, the risks associated with contaminated groundwater involve the use of it for non-potable purposes. Based on the RI/FS, there also continued to be a potential risk associated with contact to the seep and the tributary of Deepavaal Brook.

Response Actions

In 1982, NJDEP recommended that the Township of Fairfield put residents located in the area between the Site and the Passaic River on public water. Most of the residents with contaminated water connected to the public water supply.

In 1990, EPA implemented several interim measures to reduce the potential for exposure to Site contaminants. Chain-link gates and fences were installed at critical points to restrict Site access. The exposed lagoon and the four underground storage tanks were covered and surrounded with snow fencing. Portions of the access road were covered with geo-textile fabric and stone to minimize exposure of trespassing dirt bike riders to the lead-contaminated surface soils. EPA also posted warning signs on the fences and at the entrance to the Site.

On June 29, 1993, EPA issued a unilateral administrative order (UAO) to 15 potentially responsible parties (PRPs) to conduct studies to evaluate the hydrologic conditions in the contaminated groundwater aquifers and effects the Site may have on the Passaic River. In 1994, EPA, NJDEP and the U.S. Department of Interior signed a consent decree with nine PRPs (that formed the Caldwell Trucking Superfund Site Trust (Trust)). The Trust agreed to perform the remedial work necessary to contain the contaminated groundwater plume, in addition to the Site work being done according to the UAOs.

In January 2002, EPA entered into a consent decree with the Site owners, the OKON Corporation and the O'Connor family. OKON agreed in this consent decree to provide the Trust and EPA access to the Site for all remedial efforts. It also agreed to place a deed notice on the property when requested to do so by EPA. The O'Connors have granted and filed an easement to the Trust and EPA along the access road to the property.

OU1 (ROD)

In September 1986, EPA signed a ROD selecting a remedy for OU1. Based on the RI, the following three remedial components were addressed for OU1:

1. Findings related to Municipal Well Number 7;
2. Findings related to the downgradient plume, surface water and sediments; and
3. Findings related to or impacting the Site.

Eleven remedial action alternatives were evaluated and the selected remedial action included:

- Restoring a lost potable water resource by providing well-head treatment, via air stripping, of Municipal Water Supply Well No. 7;
- Removing people from risk in the downgradient plume by providing municipal well hook-ups and taking private wells out of service; and
- Effectively sealing off the Caldwell property as a source of future groundwater contamination.

The Township of Fairfield subsequently decided not to use Municipal Well No. 7, relying instead on the Passaic Valley Water Commission as an alternative potable water supply for the entire community. Accordingly, EPA issued an Explanation of Significant Differences (ESD) in May 1991, to delete the provision of well-head treatment for Municipal Well No. 7 as a component of the remedy.

During the remedial design, additional treatment before disposal was necessary to conform to Resource Conservation and Recovery Act (RCRA) disposal regulations. In February 1993, EPA issued an ESD to explain modifications to this component of the 1986 OU1 ROD, and to identify the increased costs. The modified remedy included:

- Off-site treatment and disposal of certain waste materials called "California List Wastes";
- Stabilization/solidification of the lead contaminated soils to meet RCRA disposal regulations; and,
- Deletion of low temperature thermal treatment for VOC-contaminated soil from the OU1 ROD.

OU1 ROD Amendment

In April 1993, EPA issued a UAO to 11 PRPs to implement this modified remedy. In 1994, the PRPs prepared a focused feasibility study (FFS) to evaluate an alternative remedy for the remaining soil contamination at the Site. The FFS concluded that a hazardous waste landfill would no longer be necessary because the off-site disposal of highly contaminated wastes, together with on-site stabilization/solidification of the remaining contaminated wastes, would be protective of human health and the environment.

In 1995, EPA signed a ROD Amendment, formally changing the 1986 OU1 ROD remedy to the alternate remedy. The remedial action objectives of the 1995 OU1 ROD Amendment are as follows:

- Prevent exposure through dermal contact with and/or ingestion of California List waste materials.
- Prevent exposure through dermal contact with and/or ingestion of contaminated soil with VOCs greater than 100 milligrams per kilogram (mg/kg).
- Prevent exposure through dermal contact with and/or ingestion of contaminated soil containing heavy metals, such as lead, cadmium, and mercury.
- Inhibit leaching of Site contaminants from the soil into the groundwater by stabilizing all contaminated soil with concentrations of lead greater than 1000 mg/kg, and cadmium greater than 3 mg/kg.
- Mitigate any unacceptable risks to human or ecological receptors from the inhalation of contaminants released from soil on the Site to the air.

The remedies selected for the 1995 OU1 ROD Amendment are as follows:

- Excavation and off-site disposal of 1650 cubic yards of California List waste material;
- Excavation and off-site treatment and disposal of all soils with concentrations of VOCs over 100 mg/kg;
- In-situ stabilization of 29,500 cubic yards and 5200 cubic yards of contaminated soil in the central lagoon area and north lagoon area, respectively, to form a low permeability concrete solidified mass; and,
- Placement of two feet of clean soil over the solidified mass followed by re-vegetation of the areas to limit contact with the treated materials and erosion of the soil cover.

OU2 ROD

In September 1989, EPA issued the second ROD for the Site selecting a remedy for OU2. The OU2 ROD addressed contaminated groundwater downgradient from the Site. The selected remedy for the 1989 OU2 ROD requires:

- The installation of groundwater recovery wells at 15 locations throughout the study area to intercept the entire contaminated groundwater plume, treat through an air stripper and discharge to the Passaic River;
- Due to the length of time required to reach the state's drinking water standard of 1 part per billion (ppb) for TCE, the alternative would be implemented for 30 years to achieve an interim cleanup level which allows for potable use of the groundwater with minimal treatment;
- A contingency remedy if EPA could not obtain access to the properties needed for implementation of the selected containment remedy; and
- The ROD concluded that due to the extent and concentration of the groundwater plume, and the impact of other sources in the Fairfield area, it would take more than 100 years to clean the aquifer to drinking water standards. Accordingly, a waiver was invoked under the OU2 ROD based on technical impracticability (TI).

In 1993, local property owners would not provide the necessary access to implement the selected remedy to install groundwater recovery wells at15 locations throughout the study area. EPA then issued an August 1993 ESD explaining its intent to implement the contingency remedy. The contingency remedy selected in the 1989 OU2 ROD includes:

- Groundwater recovery wells at seven locations to intercept contaminated groundwater within the 10,000 ppb TCE contour in the lower water table aquifer (B Zone) and the upper bedrock aquifer (Upper C Zone);
- An air stripper at the Site and effluent pipes discharging to the Passaic River;
- Remediation of the seep and the tributary to the Brook by adjusting the placement and operation of the groundwater pumping and treatment system;
- An enclosed pathway (French drain or culvert) from the unnamed tributary to Deepavaal Brook; and,
- A long-term monitoring program for surface water sampling.

Status of Implementation

OU1 - Residential Wells, Site Security, and Soil Remediation

Residential Wells

In the summer of 1989, EPA connected 55 homes and nine commercial establishments, which had been using water from the contaminated groundwater plume, to the municipal water system. Within the last five years, three residents along the eastern edge of the plume (Carlos Drive), outside of the Classification Exception Area (CEA), continued to utilize private wells. In 2016, the Trust once again offered to close these remaining private wells and connect them to municipal water. One resident agreed and was connected to public water in 2016. The second resident refused connection and the remaining resident has not responded to requests for sampling or public water connection since 2005. The Trust will continue to offer sampling to these two properties. The Trust also offered to abandon any remaining non potable private wells within the CEA and, as a result, abandoned six wells in 2016.

Site Security

In May 1994, the Trust installed a seven-foot high security fence around the entire Site. The fence is maintained and inspected by the Trust.

Soil Remediation

In September 1994, the Trust excavated and disposed of off-site approximately 1650 cubic yards of contaminated soil and waste materials from the central lagoon area (CLA). Construction of the soil stabilization phase began in August 1995, however, in October 1995, the Trust suspended the stabilization activities because of high levels of odors and emissions coming from the soils. With EPA approval in June 1996, the Trust initiated a soil vapor extraction (SVE) system to reduce the levels of odors and emissions during stabilization activities. The SVE system operated from June 1996 to March 1997, and removed over 25,000 pounds of VOCs from the soil. In March 1997, the Trust restarted stabilization activities and completed the work in September 1997, stabilizing approximately 40,000 cubic yards of contaminated soils. In October 1997, the Site owner informed EPA of a newly identified area of contamination near the CLA which resulted in stabilization of an additional 1,000 cubic yards of lead-contaminated soils. Once completed, EPA approved the remedial action completion and certification report summarizing the on-site soil stabilization remedy in the CLA, the north lagoon area (NLA), newly identified area and the East fence area.

In February 2001, the Trust found additional lead-contaminated soils in the NLA of the Site. In July 2003, EPA approved the remedial action work plan addendum to excavate and stabilize the remaining lead-contaminated soils and restore the wetlands in the area. Approximately 2,500 cubic yards of soil were excavated and stabilized from this area. The Trust completed construction in early 2004, and EPA approved completion of the soils remedial action completion report in September 2004. During FY 2005, the Trust's contractor completed a number of wetlands restoration tasks identified after initial wetlands restoration activities were completed, and began monitoring in January 2007. Continuation of proper wetlands monitoring and maintenance supported development of wetlands diversity and control of invasive species. The final mitigation project monitoring report, dated February 2011 indicated that the wetlands have continued to develop with increased wetlands diversity. A November 09, 2010 letter submitted by NJDEP approved completion of the wetlands mitigation project.

<u>OU2 Groundwater and Groundwater Seep</u>

Groundwater Remediation

In October 2000, the Trust requested permission to pilot test accelerated in-situ biological (AISB) treatment in the CLA which was conducted from January 2001 to July 2002. The study focused on the contaminated groundwater plume and included installing wells to create a test zone into which both nutrients and microorganisms could be injected. Results from the AISB treatment pilot test indicated that it appeared to be reducing the levels of VOCs in the groundwater injection sites. In January 2004, the Trust submitted a FFS for the purpose of amending the current groundwater extraction and treatment system remedy. EPA and NJDEP did not approve the FFS as submitted due to a number of deficiencies and instructed the Trust to begin implementing the original pump and treat remedy. The Trust initiated a dispute resolution. In November 2004, EPA and the Trust agreed to hold the dispute resolution in abeyance while efforts were made to try and work out a compromise. A compromise was reached and in March 2005, EPA approved the Trust's work plan for the installation of piezometers and recovery wells and required extensive hydraulic testing including pump tests and the collection of analytical data.

The installation of the groundwater extraction wells was completed in June 2007 and results from hydraulic testing of the wells were evaluated by EPA and NJDEP. EPA approved the remedial design for the extraction and treatment system to hydraulically contain contaminated groundwater in excess of

10,000 ppb TCE. The groundwater treatment facility, also known as the O'Connor Drive groundwater extraction and treatment system (GETS), began operating in late December 2008.

As a result of the pilot test in the CLA, the Trust began injecting AISB amendments into a series of wells in order to promote breakdown of contaminants. The injections continue to occur in conjunction with the ongoing GETS system. Adjustments have been made over the years to the type of material injected and the wells utilized for injection.

NLA Pilot Study

In 2005, high concentrations of TCE indicating the possible existence of a dense non-aqueous phase liquid (DNAPL) was discovered in the NLA, an area not addressed by the groundwater extraction and treatment system. Between 2005 and 2014, the Trust completed delineation of the groundwater in the NLA with the installation of 14 monitoring wells, finding TCE above 10,000 ppb in three wells, MW-C33, MW-C47 and MW-C55. In 2015, the EPA approved a plan for an AISB injection pilot study which consisted of installing three new injection wells and two new monitoring wells. The study began with baseline sampling in May 2015, and consists of extraction from a well in the NLA, adding biological amendments and injecting in five wells, and monitoring in eight wells every few weeks and additional wells every quarter. Injections began in November 2015 and are still ongoing.

Seep Mitigation

During the 1986 RI, environmental risks were assessed in the Passaic River, Deepavaal Brook and unnamed tributary. The report indicated that only cadmium, chromium, lead and silver in surface water collected during the investigation had a possible chronic effect on aquatic biota. However, since OU1 remedial actions have been completed, inorganic levels in the surface water have declined to below drinking water standards in the unnamed tributary. The 1989 OU2 ROD indicated that there are no known endangered species or critical habitats located in the plume area. In February 1997, EPA permitted the Trust to test the effectiveness of an innovative technology, a permeable reactive barrier (PRB) containing iron with the goal of intercepting and treating the contaminated groundwater before it discharges at the surface water seep. Monitoring results indicated that the PRB reduced the VOC concentrations in the groundwater but not to acceptable levels at the seep. In February 2002, the Trust completed installation of the “supplemental seep remediation system” including an air stripper to further reduce the levels of contamination reaching the surface water bodies.

In early 2006, the Trust upgraded the seep treatment system in order to meet the New Jersey Pollutant Discharge Elimination System (NJDPES) requirements. A larger air stripper unit and larger vapor phase carbon units were installed to provide extra capacity required for the treatment of the contaminated groundwater emanating from the seep and for a newly identified area of contaminated groundwater from near the unnamed tributary. Although the effluent meets the NJDPES requirements, downstream levels of VOCs remain elevated. In 2013, the Trust designed an interceptor trench system to address these levels. Based on pre-design investigations via piezometer wells, the system consists of a barrier wall, five French drain “legs”, a collection vault and pump station. The new system has been active since January 2014 and has demonstrated a reduction in VOC levels. The Trust has maintained and upgraded the new system since operations began.

Vapor Intrusion

Vapor intrusion is the migration of volatile chemicals from the subsurface into overlying buildings and is assessed through the collection of sub-slab air and indoor air samples. In fall of 2006, the Trust, with EPA approval, began preliminary vapor intrusion study work on approximately ten properties located in an area along Pier Lane where the clay layer is absent, resulting in localized contamination of the surface aquifer (A Zone). Based on EPA recommendations, the Trust submitted an amended expanded vapor intrusion investigation work plan for an additional 120 properties. In accordance with this expanded work plan, the Trust began sampling residential and commercial properties downgradient of the Site in April 2007. By August 2010, the Trust had completed initial and follow-up sampling with EPA oversight at nearly 100 residential properties included in the study area. Currently there are 20 properties where mitigation systems have been installed and are being monitored. Sampling of vapor intrusion from commercial/industrial properties and schools in the area is complete. The Trust provides property owners with an EPA-approved letter compiling and explaining the data from their respective residence or business.

Institutional Control (IC) Summary Table 2: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	No	Contaminated plume area	Restrict installation of ground water wells and ground water use	Classification Exemption Area 01/08/2003
Soil	Yes	Yes*	Block 2201, Lot 17 and Block 2301, Lot 20	Restricts land areas and maintains engineering controls	Deed Notice 07/26/2012

* As per the 2001 Consent Decree Regarding O'Connor Related Parties, Civil Action No. 95-2732

Systems Operations/Operation & Maintenance (O&M)

OU1

The O&M plan was approved as part of the remedial action report which marked the completion of all soils remediation. O&M activities include inspecting the stabilized soil and soil cover, the integrity of the drainage channels, access road, and erosion control measures, as well as completing wetland restoration and maintenance activities.

OU2

Groundwater

The GETS has been operating since the end of December 2008. In February 2009, an operations and maintenance (O&M) manual for the groundwater extraction and treatment system by the subcontractors, Ground/Water Treatment & Technology Inc. (GWTT), was completed. GWTT performs monthly

monitoring of the system which includes the amount of groundwater treated per month; recovery well operations; VOC data from combined influent, mid-carbon and individual recovery wells; and well, pump and system maintenance. Every year since 2008, the Trust submits groundwater extraction and treatment system annual reports to monitor the effectiveness of the system and provide system maintenance activities that occur over the year. As stated earlier, the Trust is conducting a pilot study in the NLA that consists of injected biological amendments into a series of wells and monitoring for VOC degradation.

According to the design report and the system O&M manual, the treatment system effluent is monitored in accordance with the Two Bridges Sewerage Authority discharge permit.

Groundwater data is obtained from all monitoring wells and piezometers wells on an annual basis and the data is summarized in area-wide groundwater evaluation reports. In May 2016, the Trust completed the most recent area-wide groundwater monitoring event report from May and July of 2015 which included 142 water level measurements and sampling of 116 monitoring wells, including the AISB and groundwater extraction system networks. The remaining two residential properties on Carlos Drive that allowed access in 2015 were sampled as part of this sampling event. As stated earlier, in 2016 one of those residences was connected to public water. A third residence on Carlos Drive does not respond to sampling requests.

Seeps and Surface Water

The Trust's monthly monitoring of the supplemental seep treatment system discharge and downstream surface water is also conducted. This program includes monthly reporting under a NJPDES permit equivalent for the effluent and collecting surface water samples downstream from the unnamed tributary and Deepavaal Creek. Currently, the Trust conducts inspections of the Site on a quarterly basis.

The Trust is expected to submit an O&M plan for upkeep of the 20 vapor intrusion mitigation systems and monitoring for EPA approval.

The wetlands monitoring program was completed in 2010 and is no longer required.

Potential site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change near the Site.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the 2012 FYR as well as the recommendations from the 2012 FYR and the current status of those recommendations.

Table3: Protectiveness Determinations/Statements from the 2012 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The implemented actions (OU1) taken at the Site protect human health and the environment. A Deed Notice was filed with the Township of Fairfield in 2012 and, once approved, will assure long-term protection of the source remedy and prevent improper use of the property.
2	Will be Protective	The remedy at OU2 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas by containing highly contaminated groundwater on the property, treatment of the groundwater seep, and implementation of a Classification Exception Area (CEA) preventing groundwater consumption within the area of the plume.
Sitewide	Will be Protective	The remedies at the Caldwell Trucking Site are expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas by remediating the source area, containing groundwater on the property, and implementing of a CEA preventing groundwater consumption within the area of the plume.

There were no issues or recommendations from the last five-year review report.

A deed notice was filed with the Township of Fairfield on July 26, 2012 restricting land areas and maintaining engineering controls for Block 2201, Lot 17 and Block 2301, Lot 20.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On November 14, 2016, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 38 Superfund sites in New York and New Jersey, including the Caldwell Trucking Site. The announcement can be found at the following web address: https://www.epa.gov/sites/production/files/2016-11/documents/five_year_reviews_fy2017_final.pdf.

In addition to this notification, a public notice was made available in the Fairfield Township website, http://www.fairfieldnj.org/, on 6/21/2017, stating that there was a FYR and inviting the public to submit any comments to the U.S. EPA. The results of the review and the report will be made available at the Site information repository located at the Fairfield Town Hall Building, Engineering Department at 230 Fairfield Road, Fairfield, NJ 07004 or the EPA Region 2, Superfund Records Center at 290 Broadway, 18th Floor, New York, New York 10007. Additional information can also be found on the following website: https://www.epa.gov/superfund/caldwell-trucking .

Data Review

Seep Data and Surface Water Data

The Trust is continuing to monitor the performance of the upgraded seep remediation system by sampling of the treatment system discharge and downstream surface water. This program reports monthly under a NJPDES Permit equivalent. In summary, since the 2013 upgrade, effluent samples continue to meet the NJPDES permit requirements, However, seep and downgradient surface water samples from the unnamed tributary and Deepavaal Creek continue to show TCE contamination (as compared to the NJDEP Surface Water Quality Standards (SWQS) for screening purposes). Although TCE levels remain elevated, overall, the levels of contaminants in the unnamed tributary have decreased.

Groundwater Data

Since the last five-year review in 2012, three groundwater monitoring events have been completed and reported upon; 2013, 2014 and 2015. Refer to Figure 2 of Appendix B for a map of the wells. In summary, all monitoring reports showed that the concentrations of groundwater contaminants within the TI zone have been decreasing but remain elevated above Ground Water Quality Standards (GWQS).

The most recent groundwater data presented in the 2015 area-wide report indicates that all A zone TCE concentrations continue to remain below 10,000 µg/L, with seasonal fluctuations in the selected wells that are sampled.

The most recent groundwater data presented in the 2015 area-wide report indicates that the B zone TCE concentrations in the past five years have mostly remained below 10,000 µg/L, with the exception of MW-B22 (11,000 µg/L), which is located in the CLA (upgradient of the hydraulic capture system). MW-B22 has generally shown TCE levels between 1000 and 10,000 µg/L.

The most recent groundwater data presented in the 2015 area-wide report indicates that the C zone TCE concentrations in the past five years have remained above 10,000 µg/L in some monitoring wells within the CLA (upgradient of the hydraulic capture system). Specifically, the new well, RW-58, located in the AISB area of the CLA had a concentration of 180,000 µg/L in 2015.

D zone wells are sampled every three years. The most recent groundwater samples were collected in 2014. Analytical results indicate that all D zone TCE concentrations are below 10,000 µg/L in the selected wells that are sampled.

In general, the trend is for the more highly chlorinated contaminant, TCE, to break down to lower chlorinated compounds in all water bearing zones. The Trust continues to inject AISB amendments into a series of monitoring wells in the CLA. In addition, pilot studies are underway in the NLA for AISB amendments and results to date indicate active biodegradation of VOCs at all injection wells and at monitoring well MW-C62, with dechlorination of TCE to cis-1,2-DCE at all of these wells. (Golder Associates, March 07, 2017). The Trust has submitted one baseline report and three quarterly progress reports and the study is currently on-going.

Historically, TCE concentrations in the B and C zones that exceeded 10,000 micrograms per liter (µg/L) were detected in an area extending from the CLA to north of Kingsbridge Road. In addition, an area in excess of 5,000 µg/L extended to the pre-seep area. The 2015 area-wide report indicated that, overall,

pre-seep monitoring wells VOC concentrations have decreased between 66% in B-Zone and 82% in C-Zone monitoring wells. Also, C-zone monitoring wells downgradient of the GETS extraction wells and piezometers had TCE concentrations ranging from 560-3,700 µg/L. Chloroethene daughter products of biodegradation are present in the plume core of the B-zone. The compound, cis-1,2-DCE, the direct daughter product of TCE via reductive dechlorination, is present throughout the off-property plume core and downgradient plume areas at concentrations similar to but slightly lower than TCE, ranging from 3.9 µg/L to 1,500 µg/L. Chloroethene daughter products of biodegradation are present in the C-zone plume core and downgradient areas, including the area downgradient of the NLA/former General Hose property. In the plume core overall, concentrations of cis-1,2-DCE range between approximately 160 µg/L and 1,200 µg/L. (Golder Associates, May 2016). Overall, the intermediate daughter products of degradation exhibit stable to decreasing concentration trends. Refer to Figures 5 and 7 of Appendix B from the 2015 Area-Wide Groundwater Evaluation, May 2016, for isoconcentraion contour maps of the B and C zone.

Multiple lines of evidence were considered to evaluate the extent of hydraulic containment, consistent with EPA's capture zone guidance. Concentration trends show 96% to 99% reductions in TCE concentrations in piezometers that had baseline levels at or near 10,000 µg/L. Concentration trends in monitoring wells downgradient of the capture zone also show downward trends consistent with their hydraulic isolation from source areas due to the pumping system. Groundwater equipotentials contoured with multiple methods prove continued containment of the target capture zone. The average pumping rate for the year was within the range of estimates of natural average groundwater flux through the target capture zone.

In 2015, VOC samples were collected at two of the three remaining residences with private wells on Carlos Drive. The third residence was last sampled in June 2005 because the residence has either been vacant or requests for access have not been returned. The VOC results are non-detect, with the exception of estimated detections below reporting limits for xylenes at one location. As part of the biennial certification for the CEA, one of the three residences at Carlos Drive was connected to public water in 2016.

Vapor Intrusion Air Data

The Trust submits the properties' indoor air and/or sub-slab air sample results to each resident through an EPA-approved memo. The initial round of vapor intrusion sampling data collected from residences from within the CEA is complete. Currently, there are 20 properties where mitigation systems have been installed.

Site Inspection

The inspection of the Site was conducted on 4/4/2017. In attendance from the regulatory agencies were the EPA RPM, Diane Salkie, EPA hydrogeologist, Sharissa Singh and EPA risk assessors, Mindy Pensak and Julie McPherson. In attendance from the responsible parties were Chris Young and Matt Grubb of *de maximis, inc*., Allen Kane and Marie Lewis of Golder Associates, Inc., and Lindsay Cambron of Brach Eichler, LLC. The purpose of the inspection was to assess the protectiveness of the remedy.

The O'Connor Drive GETS building was toured. The group was able to witness AISB amendments injecting into well MW-C22 in the CLA. The vegetation covering the stabilized piles appears to be

intact and flourishing. The new wetland area in the NLA was also flourishing. The seep area showed high levels of water due to recent precipitation events. The group discussed the status of the NLA pilot study as well as planned upgrades to the seep, including a new air stripper. No issues arose from the Site inspection.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

OU1 - Municipal Well #7; Downgradient Plume; Soil and Sludge Contamination at the Site
The final remedy selected for OU1 included: connecting homes to the municipal water supply and decommissioning private wells; excavation and treatment of soils and solidification/stabilization of soils. The township chose not to use Municipal Well #7 as a potable water supply and that component of the remedy was removed.

Fifty-five residential homes and nine commercial establishments downgradient of the Site were connected to the municipal water supply by the summer of 1989. In 2016, the Trust offered to close three remaining private wells and connect them to municipal water. One resident agreed and was connected to public water in 2016. The second resident refused connection and the remaining resident has not responded to requests for sampling or public water connection since 2005. The Trust will continue to offer sampling to these two properties. The Trust also offered to abandon any remaining non potable private wells within the CEA and, as a result, abandoned six wells in 2016.

Soil and Sludge Contamination at the Site: Excavation and solidification/stabilization addressed VOC and inorganic soil contamination. Since the stabilized/solidified areas are covered by a soil cover, direct exposure to contaminated materials has been interrupted via this exposure pathway. In addition, a fence surrounds the property which prevents unauthorized access to the Site.

OU2 Groundwater

Overall, the groundwater extraction and treatment system is effectively containing groundwater exceeding 10,000 µg/L of TCE. The GETS for the CLA was installed and, since December 2008 when operations began, it has extracted and treated 34.7 million gallons of contaminated groundwater. The Trust continues to add biodegradation amendments to the groundwater in the CLA to reduce VOC concentrations and data indicates significant decreases in total CVOCs, and the transformation of parent compounds to daughter products.

As discussed earlier, the Trust is conducting a pilot study in the NLA that consists of injected biological amendments into a series of wells and monitoring for VOC degradation.

In addition, residential wells in the vicinity of the plume that are not connected to municipal water supply continue to be monitored. To date, sampling results show no impact to these wells.

The Trust is currently operating a treatment system to address groundwater seeps. An upgrade to this system occurred in 2013. The Trust's monthly monitoring of the system effluent meets the requirements of a NJPDES permit equivalent. However, surface water sampling indicates that TCE contaminated groundwater is still discharging to the unnamed tributary above SWQS.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Some chemical-specific toxicity values and exposure assumptions have changed since the Site was originally assessed. In order to account for changes in toxicity values and exposure assumptions since the RI was initiated on the Site, the concentrations of the contaminants of potential concern identified during the 2012-2015 sampling events were compared to their respective Regional Screening Levels (RSLs), GWQS, and their respective National Primary Drinking Water Standard Maximum Contaminant Levels (MCLs). The MCL is the highest level of contaminant that is allowed in drinking water. MCLs are promulgated standards that apply to public water systems and are intended to protect human health by limiting the levels of contaminants in drinking water. RSLs are a human health risk-based value that is equivalent to a cancer risk of 1×10^{-6} or a hazard index of 1.

The soil cleanup goals established for lead and cadmium in the soil are still valid based on current and anticipated future land use.

The concentrations of constituents in the seep and the unnamed tributary have been reviewed to determine if the unnamed tributary continues to be impacted by site-related contaminants. The concentrations of site-related constituents were compared to their respective RSLs, MCLs and GWQS since the surface water area is considered a potable water supply (FW2-NT). The results of this sampling event indicate that site-related contaminants exceed their respective RSLs, MCLs, and GWQS and continue to impact the unnamed tributary and Deepavaal Brook. However, since the surface water is not currently used as a drinking water source, this pathway is incomplete. In addition, in 2002, the Trust sampled the unnamed tributary and Deepavaal Brook and performed a risk assessment based on the resulting data. The risk calculations indicate that the excess cancer risk for a child wading in the unnamed tributary is $7x10^{-8}$ which is below the EPA acceptable risk range of $1x10^{-4}$ to $1x10^{-6}$ and the hazard index for non-carcinogenic effects is 0.04, which is below the threshold of 1. Risks for an adult are lower. For Deepavaal Brook, the Trust's risk assessment calculations indicate for swimming exposures an excess cancer risk of $1x10^{-9}$ and a hazard index of 0.004 for a child. Therefore, direct contact with surface water is not currently a concern if concentrations remain constant or decrease.

For the Passaic River, the Trust used actual 1993 and 1994 data measured in the Passaic River just downstream of the confluence with the Deepavaal Brook. The Trust's calculated risk for potable water indicates a hazard index of 0.2 and an excess cancer risk of $1x10^{-6}$, both within EPA's acceptable risk range. Since the contaminant levels have decreased since 2002, EPA believes the conclusions of the risk assessment, as it relates the Passaic River, are still valid.

During the 1986 RI, environmental risks were assessed in the Passaic River, Deepavaal Brook and unnamed tributary. The report indicated that only cadmium, chromium, lead and silver in surface water collected during the investigation had a possible chronic effect on aquatic biota. However, since OU1 remedial actions have been completed, none of the surface water samples contain SVOCs or inorganics above the drinking water standards (Offsite Remedial Investigation Report, Ebasco Services, 1989). In addition, as part of the NJPDES permit equivalent, quarterly toxicity testing was conducted on effluent samples from the seep treatment system from 2001 to 2003. None of the results exceeded the permit limitation for toxicity results. Therefore, exposure to ecological receptors is not a concern.

Beginning in April 2007, the Trust conducted an expanded vapor intrusion investigation to address the potential for related contaminants volatizing and accumulating in homes located above the plume

downgradient of the Site. The Trust has completed the sampling of the properties whose owners signed access agreements allowing the Trust to take samples. Based on the current information, some of the homes that were not sampled, either because access was denied or there was no response, are adjacent to homes that have been impacted by the vapor intrusion pathway.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

In 2015, the Trust sampled four additional NLA wells for 1,4-dioxane; all results were non-detect. The 2015 evaluation concluded that 1,4-dioxane is not extensive. EPAs RSL for 1,4-dioxane in groundwater is 0.46 µg/l (1 x 10-6) and 57 µg/l (HI=1). The NJDEP interim GWQS for 1,4-dioxane is 0.4 µg/l.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None

It is recommended that a more comprehensive evaluation of 1,4-dioxane be conducted during the site-wide sampling event in CLA, NLA and the extent of the plume. Based on the information from that sampling event, further sampling may be recommended to include surface water.

VII. PROTECTIVNESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: OU 1	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The implemented actions (OU1) taken at the Site protect human health and the environment.		
Operable Unit: OU 2	*Protectiveness Determination:* Will be Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy at OU2 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas by containing highly contaminated groundwater on the property, treatment of the groundwater seep, and implementation of a CEA preventing groundwater consumption within the area of the plume.		

VIII. NEXT REVIEW

The next FYR report for the Caldwell Trucking Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Ground/Water Treatment and Technology. Various Dates: October 2012 – February 2017. *Operations Summary – The Caldwell Trucking Superfund Site Groundwater Extraction and Treatment System, Fairfield, NJ*

Ground/Water Treatment and Technology. Various Dates: October 2012 – February 2017. *Performance Sampling Event Report – Surface Water Discharge Permit Equivalent Dated April 3, 2001, Caldwell Trucking Superfund Site Seep Area, Fairfield, NJ*

Golder Associates. October 2013. *Groundwater Extraction and Treatment System Annual Report 2012, Caldwell Trucking Superfund Site, Fairfield, New Jersey*. Project No. 003-6045

Golder Associates. February 2014. *2013 Area-Wide Groundwater Investigation, Caldwell Trucking Superfund Site, Fairfield, New Jersey*. Project No. 003-6045

Golder Associates. April 23, 2014. *Caldwell Trucking Superfund Site, Fairfield, New Jersey, Former North Lagoon Area Progress Report, Additional Delineation and Proposed Pilot Testing*. Project No. 003-6045

Golder Associates. June 2014. *Groundwater Extraction and Treatment System Annual Report 2013, Caldwell Trucking Superfund Site, Fairfield, New Jersey*. Project No. 003-6045

Golder Associates. November 24, 2014. *Caldwell Trucking Superfund Site, Fairfield, New Jersey, Former North Lagoon Area Progress Report, Additional Delineation and Proposed Pilot Testing. Revised Based on EPA Comments Dated September 25, 2014.* Project No. 003-6045

Golder Associates. March 2015. *2014 Area-Wide Groundwater Investigation, Caldwell Trucking Superfund Site, Fairfield, New Jersey*. Project No. 003-6045

Golder Associates. June 2015. *Groundwater Extraction and Treatment System Annual Report 2014, Caldwell Trucking Superfund Site, Fairfield, New Jersey*. Project No. 003-6045

Golder Associates. July 2015. *AISB Pilot Study – Baseline Activities Report, Former North Lagoon Area, Caldwell Trucking Superfund Site, Fairfield, New Jersey*. Project No. 003-6045

Golder Associates. May 2016. *2015 Area-Wide Groundwater Investigation, Caldwell Trucking Superfund Site, Fairfield, New Jersey*. Project No. 003-6045

Golder Associates. July 2016. *Groundwater Extraction and Treatment System Annual Report 2015, Caldwell Trucking Superfund Site, Fairfield, New Jersey*. Project No. 003-6045

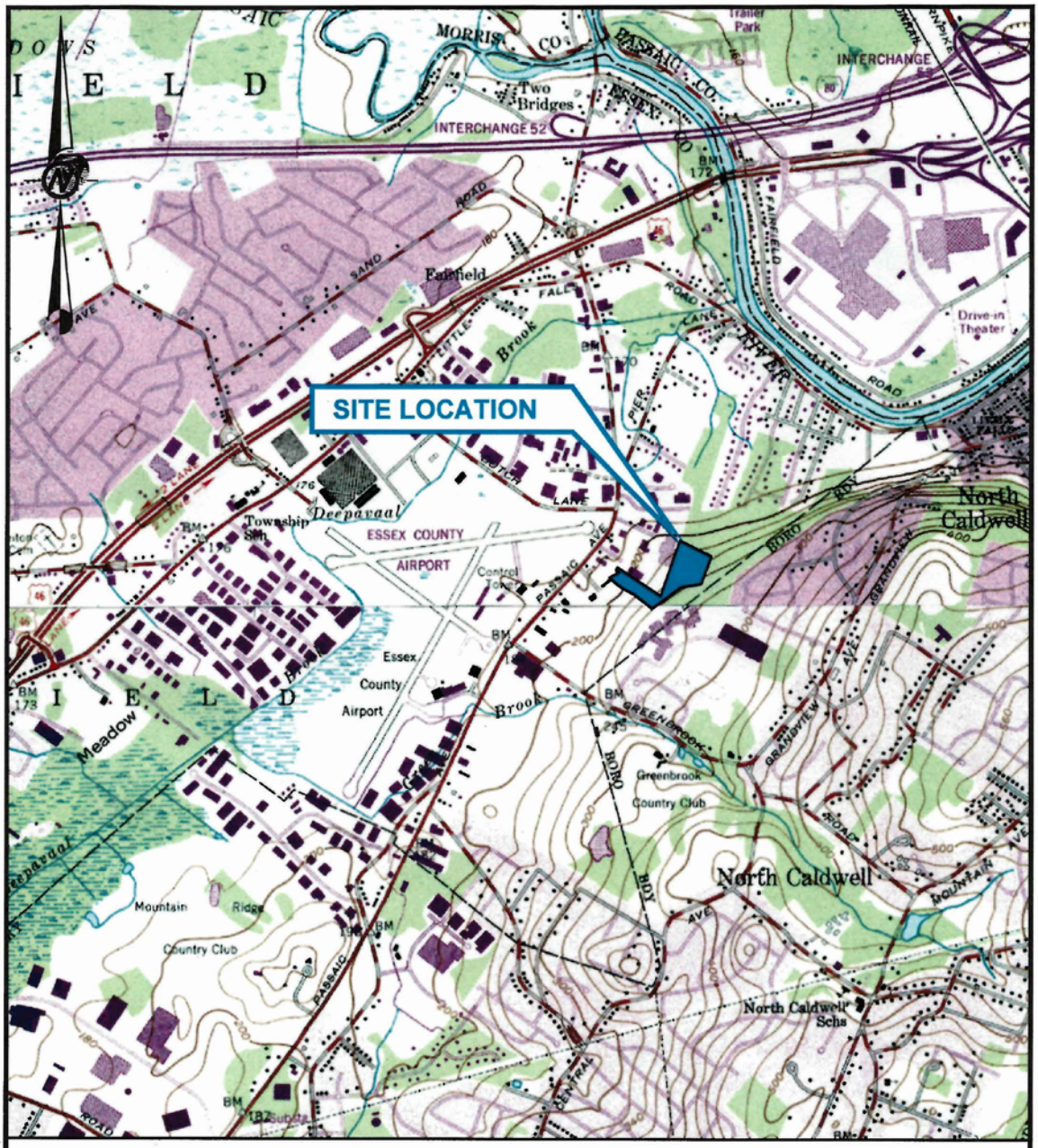
Golder Associates. August 26, 2016. *NLA AISB Pilot Study Status Update – June 2016 Caldwell Trucking Company Superfund Site, Fairfield, New Jersey*

Golder Associates. November 11, 2016. *NLA AISB Pilot Study Status Update – October 2016 Caldwell Trucking Company Superfund Site, Fairfield, New Jersey*

APPENDIX A – REFERENCE LIST

Golder Associates. March 07, 2017. *NLA AISB Pilot Study Status Update – Through January 2017, Caldwell Trucking Company Superfund Site, Fairfield, New Jersey*

APPENDIX B – Figures



REFERENCE

1.) BASE MAP TAKEN FROM U.S.G.S. 7.5 MINUTE QUADRANGLES OF POMPTON PLAINS, NJ, DATED 1955 AND CALDWELL, NJ, DATED 1954.

2000 0 2000
SCALE FEET

NJ Authorization #24GA28029100

Golder Associates
Mt. Laurel, New Jersey

SCALE	AS SHOWN
DATE	05/13/16
DESIGN	MLL
CADD	RG
CHECK	MLL
REVIEW	ACK

FILE No.	0036045AQ01
PROJECT No.	003-6045
REV.	0

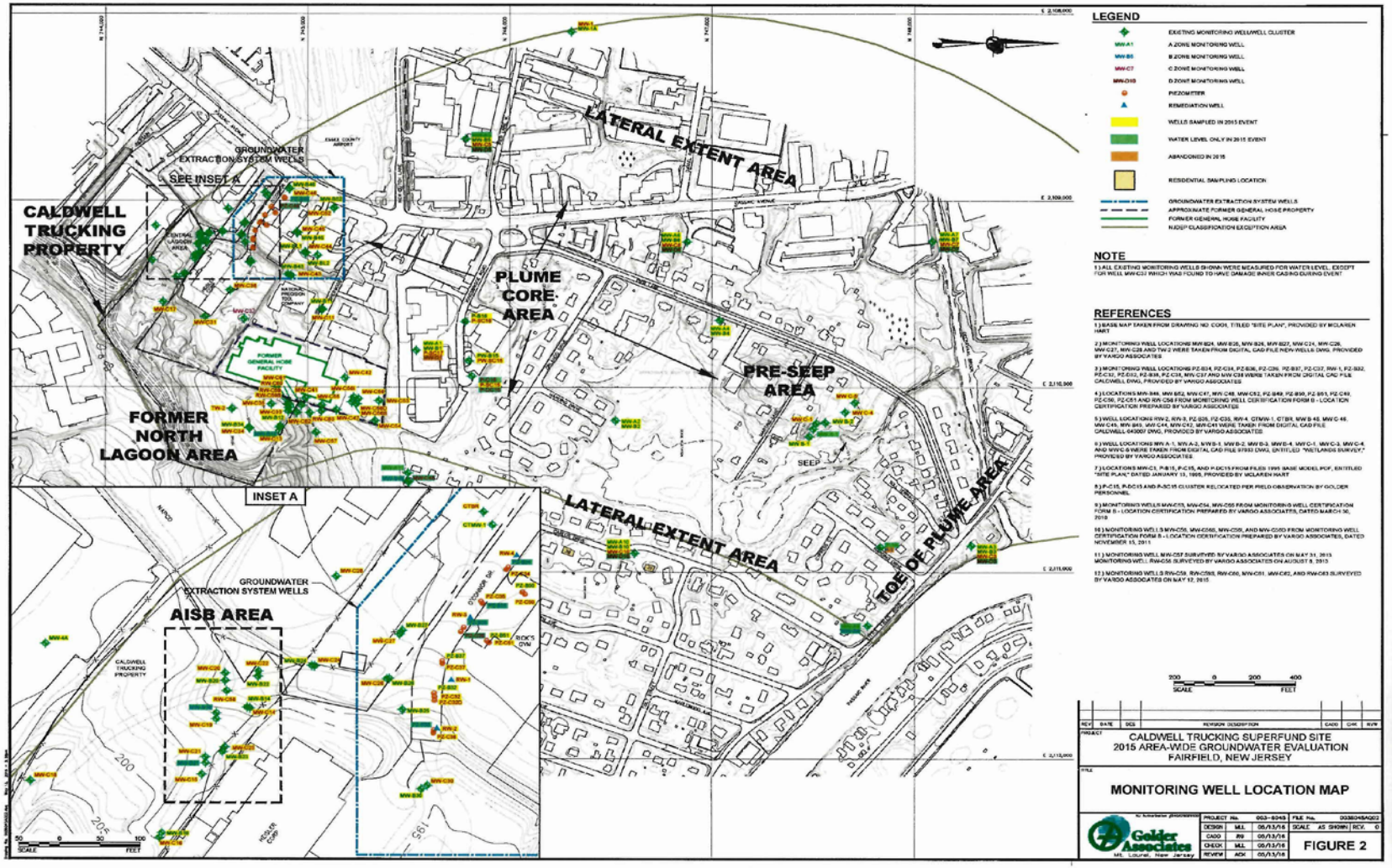
TITLE

SITE LOCATION MAP

CALDWELL TRUCKING SUPERFUND SITE

FIGURE 1

Drawing file: 0036045AQ01.dwg May 13, 2016 - 3:37pm


CALDWELL TRUCKING PROPERTY
FORMER NORTH LAGOON AREA
PLUME CORE AREA
PRE-SEEP AREA
LATERAL EXTENT AREA
LATERAL EXTENT AREA
TOE OF PLUME AREA
SEE INSET A
INSET A
GROUNDWATER EXTRACTION SYSTEM WELLS
AISB AREA
SEEP
LEGEND
NOTE
REFERENCES
SCALE
FEET
CALDWELL TRUCKING SUPERFUND SITE
2015 AREA-WIDE GROUNDWATER EVALUATION
FAIRFIELD, NEW JERSEY
MONITORING WELL LOCATION MAP
Golder Associates
FIGURE 2

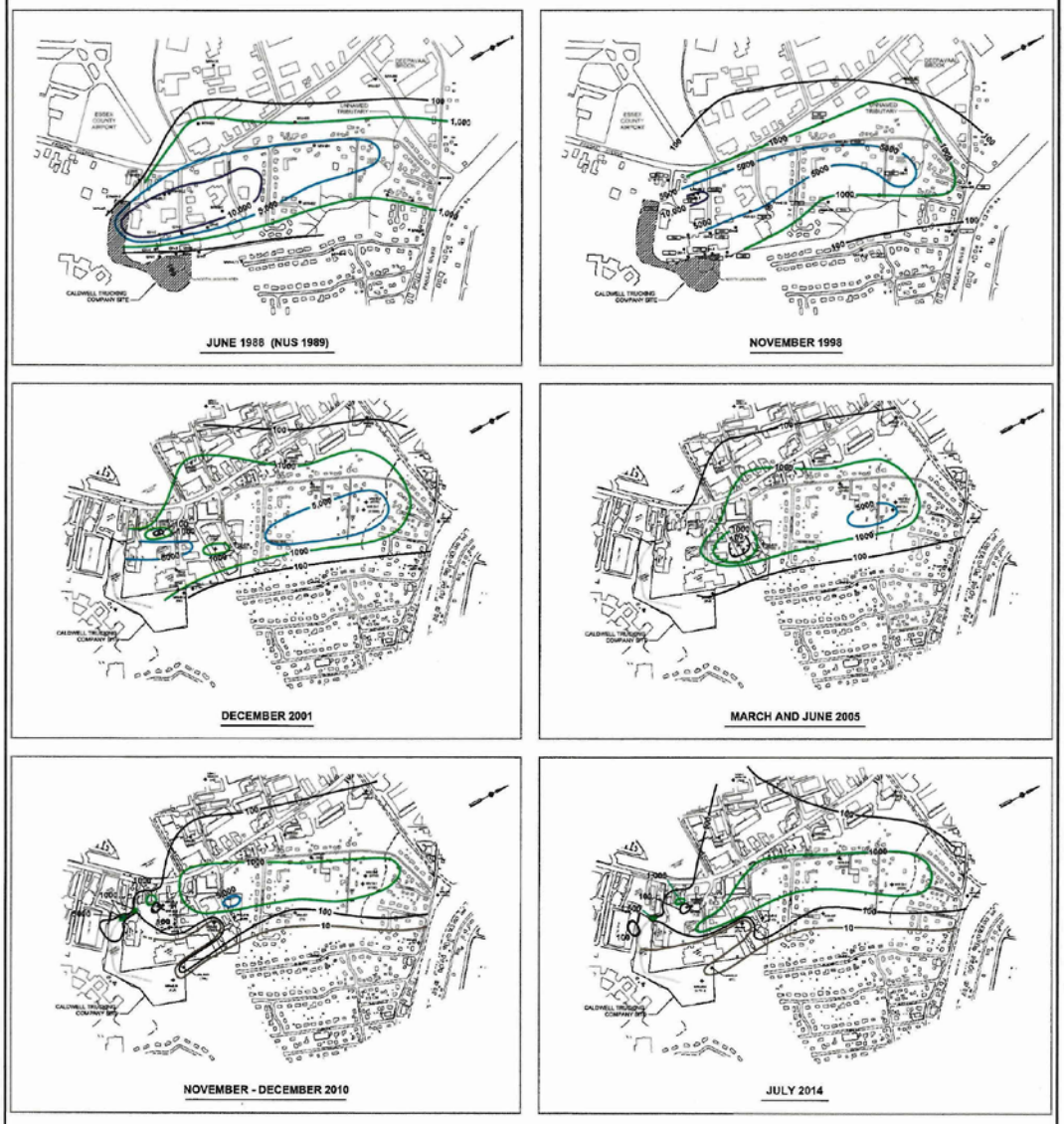
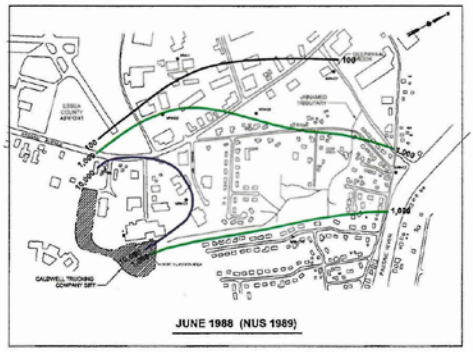


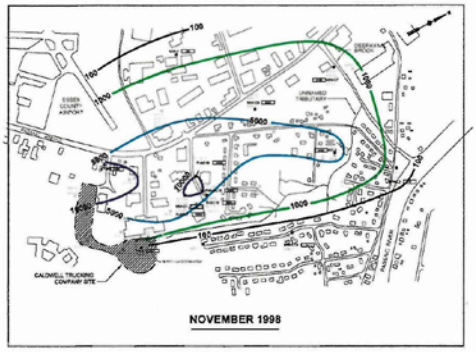
FIGURE 5

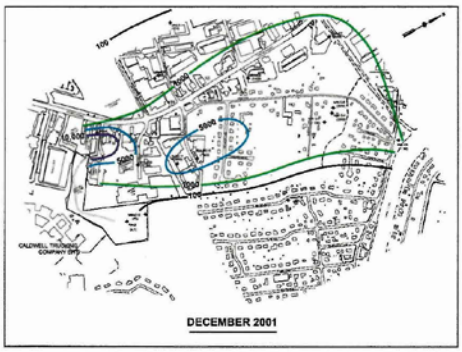
INTERPRETED TCE ISOCONCENTRATION CONTOURS IN THE B-ZONE - 1988 TO 2013

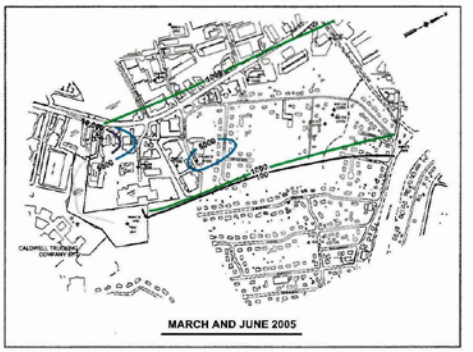
CALDWELL TRUCKING SUPERFUND SITE
2015 AREA-WIDE GROUNDWATER EVALUATION
FAIRFIELD, NEW JERSEY

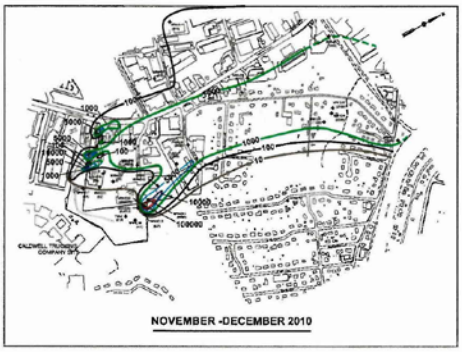
Golder Associates
Mt. Laurel, New Jersey

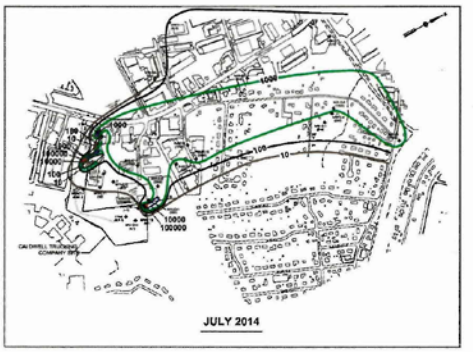












LEGEND

100,000 ppb TCE ISOCONCENTRATION CONTOUR
10,000 ppb TCE ISOCONCENTRATION CONTOUR
5,000 ppb TCE ISOCONCENTRATION CONTOUR
1,000 ppb TCE ISOCONCENTRATION CONTOUR
100 ppb TCE ISOCONCENTRATION CONTOUR
10 ppb TCE ISOCONCENTRATION CONTOUR

600 0 600 1200
APPROXIMATE SCALE FEET

FIGURE 7

INTERPRETED TCE ISOCONCENTRATION CONTOURS IN THE C-ZONE - 1988 TO 2014

CALDWELL TRUCKING SUPERFUND SITE
2015 AREA-WIDE GROUNDWATER EVALUATION
FAIRFIELD, NEW JERSEY

Golder Associates
Mt. Laurel, New Jersey