UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 W. JACKSON BLVD
CHICAGO, IL 60604

MEMORANDUM

DATE: December 22, 2015

SUBJECT: ENFORCEMENT ACTION MEMORANDUM - Determination of Threat to Public Health or Welfare or the Environment at the Behr Dayton Thermal Products VOC Plume Site, Dayton, Montgomery County, Ohio (Site ID # B5FH)

FROM: Erik Hardin
Remedial Project Manager/On-Scene Coordinator

THRU: Joan Tanaka, Chief Rfwd for JT
Remedial Response Branch 1

Jason El-Zein, Chief for JT 12/22/15
Emergency Response Branch 1

TO: Richard C. Karl, Director
Superfund Division

I. PURPOSE

The purpose of this Action Memorandum is to document the determination of an imminent and substantial threat to public health or welfare or the environment posed by the presence of trichloroethylene (TCE) and tetrachloroethylene (PCE) contaminated groundwater at the Behr Dayton Thermal Products VOC Plume Site in Dayton, Ohio (the "Site"), and to document approval of the proposed non-time critical removal action (NTCRA) described herein.

Pursuant to a September 27, 2013, Administrative Order and Agreement on Consent (AOC) with U.S. Environmental Protection Agency, MAHLE Behr Dayton L.L.C.'s (Behr's) predecessor (Behr Dayton Thermal Products LLC) prepared an Engineering Evaluation/Cost Analysis (EE/CA) Report to evaluate removal action alternatives (RAAs) to address an area of TCE and PCE impacted groundwater (the "Area of Interest" or "AOI") located in the saturated zone at or near the southern boundary of Behr's facility located at 1600 Webster Street in Dayton, Ohio ("the Behr facility" or "the facility"). After reviewing and evaluating the six alternatives presented in the EE/CA, EPA submitted the options and preferred alternative for public comment

from November 20, 2014 through December 20, 2014. EPA's responded to the public comments received in the Responsiveness Summary attached to EPA's January 15, 2015 letter approving the EE/CA report as final (Attachment 1). This Action Memorandum selects the preferred alternative, air injection and treatment, as discussed below.

The response action proposed herein is necessary to mitigate threats to public health, welfare, and the environment posed by the presence of uncontrolled hazardous substances in the AOI. The presence of high concentrations of TCE and PCE in the AOI is documented in the EE/CA report that references data results from the Site Remedial Investigation (RI) being led by EPA (2009-present). The RI data and data generated by other parties before the RI began consistently shows groundwater TCE concentrations in the AOI in the 10 to 20 parts per million (ppm) range with the most recent results from a March 2014 sampling event as high as 11 ppm (see Table 3). PCE in the AOI has been as high as 10 ppm, and the highest result in the AOI from the March 2014 sampling event was 2.8 ppm.

Prior to the initiation of the RI, a number of houses to the south and southwest of the Behr facility were found by EPA to have indoor air concentration of TCE above the indoor air screening level recommended by the Ohio Department of Health in consultation with the Agency for Toxic Substances and Disease Registry (0.4 parts per billion or ppb for residences and 1.7 ppb for businesses). In 2007 through 2008, EPA documented a Completed Exposure Pathway from TCE[1] contaminated groundwater, soil gas, sub-slab sampling, and indoor air sampling. During a time critical removal action, EPA had Chrysler Corporation (Chrysler) install vapor mitigation systems (VMS) on houses and businesses with indoor air concentrations of TCE above these recommended screening levels (or subslab concentrations at 10 times the indoor screening values) pursuant to a December 19, 2006 AOC (the 2006 AOC). On July 17, 2009, EPA issued a unilateral administrative order to Behr to take over this monitoring and VMS installation work (the 2009 UAO). Behr continues this work to date. In total, more than 250 houses and businesses have been equipped with a VMS as part of this overall response.

The AOI represents the highest concentrations of TCE and PCE in the plume associated with the Site, and if left unabated, will likely continue to migrate and exacerbate the need for additional residential and commercial VMS. There is also a concern expressed by hydrogeologists with the City of Dayton familiar with the underlying aquifer that, under drought conditions, the contaminants from the Site could be drawn towards the city's municipal well field located in a normally upgradient direction.

The NTCRA proposed herein, Alternative 3 in the EE/CA report, consists of air sparging with soil vapor extraction (AS/SVE). EPA selects this alternative because it meets the Removal Action Objectives (RAOs), best complies with Applicable or Relevant and Appropriate Requirements (ARARs), effectively and safely abates the

[1] Though both PCE and TCE contamination is found in this plume, TCE has consistently been the sole driver for the need to install VMS.

contaminated groundwater, and is cost effective. In addition, these technologies and methods of abating volatile organic compounds from groundwater have been used successfully at similar clean-up sites in the same sand and gravel aquifer.

This response action will be conducted in accordance with CERCLA Section 104(a)(1), 42 U.S.C. § 9604(a)(1), to abate or eliminate the immediate threat posed to public health and/or the environment by the presence of the hazardous substances at the Site. The uncontrolled conditions of the hazardous substances present at the Site and the nature of the threats to human health support classifying this action be as a NTCRA. Because a planning period of at least six months was available before cleanup activities were required, an engineering evaluation/cost analysis (EE/CA) was conducted.

As one of the potentially responsible parties (PRPs) for the Site, Behr is prepared to conduct the NTCRA described in this Action Memorandum. See the attached Enforcement Memorandum for more details.

There are no nationally significant or precedent setting issues associated with the Site.

II. SITE CONDITIONS AND BACKGROUND

CERCLIS ID # OHN00051064
RCRA ID: None
STATE ID: None
Category: Non-time Critical Removal

The Site was added to the National Priorities List in April 2009 and consists of Behr's facility, Aramark Uniform Service's facility to the southwest, Gem City Chemical's facility to the northeast, and the surrounding area affected by groundwater contamination emanating from these facilities. The Site is located just north of downtown Dayton in a mixed residential and industrial area. The residential area surrounding the Behr facility (especially to the south where groundwater flows) consists of small city lots and contains a high concentration of houses in a small area. None of these residences are exposed to this groundwater contamination through private drinking water wells as they are all on municipal water. However, more than 250 of the houses and businesses in the area are now equipped with VMS due to TCE vapors from the groundwater that exceed EPA's action levels. EPA expects the number of homes and businesses with treatment systems could grow if impacted groundwater is not treated.

EPA has information suggesting that there were TCE and PCE releases at the facility as early as the 1980's, and Chrysler took several actions intended to remove the contamination and prevent its spread. However, around 2006, EPA learned the contamination had spread to the aquifer and contaminated groundwater was causing vapor intrusion (VI) issues in nearby residences. Shortly thereafter, EPA initiated a time-

critical removal action to address the VI issues that continues to this day. The 2006 AOC and 2009 UAO address that removal action.

In 2009, EPA began remedial investigation/feasibility study (RI/FS) negotiations with Chrysler, Behr, and two other potentially responsible parties (PRPs) associated with the Site (Gem City Chemicals and Aramark Uniform Services). EPA was not able to reach agreements with any of the PRPs, and initiated a fund-lead RI/FS in 2009.

The results of an August 2012 groundwater sampling event conducted as part of the RI/FS revealed relatively high concentrations of TCE (from 4,500 to 13,000 ppb) and PCE (as high as 3,000) in intermediate-depth wells located at or near the southern boundary of the Behr Facility. EPA compared these results to historical data collected while Chrysler was conducting clean-up actions at the facility, and determined samples from these wells have exhibited consistently elevated TCE and PCE concentrations since at least 2003. The level and consistency of the TCE concentrations are such that EPA believes there is still undissolved TCE material in this area, effectively feeding the groundwater plume and potentially affecting nearby residences through vapor intrusion.

In early 2013, EPA began discussing the AOI with Behr, Ohio EPA, and representatives from the City of Dayton's Department of Water and Environmental Advisory Board. All parties agreed that addressing the AOI as soon as possible and separately from the greater plume is the prudent course of action, and Behr expressed interest in leading an interim action to address the AOI. Behr has agreed to conduct this interim action as a non-time critical removal action. On June 7, 2013, EPA issued a memo approving the pursuit of an EE/CA for the AOI. EPA and Behr entered into an AOC requiring Behr to conduct the EE/CA on September 27, 2013.

A. Site Description

1. Removal site evaluation

Chrysler manufactured vehicle air conditioning and engine-cooling systems at its facility on the Behr Property from about 1937 until April of 2002, when it sold the facility and the Behr Property to Behr Dayton Thermal Products LLC, whose successor MAHLE Behr Dayton LLC currently owns and operates the Behr Property. During Chrysler's ownership of the Behr Property, hazardous substances, including the volatile organic compounds TCE and PCE were released at and from the Behr property. EPA is also aware of releases of TCE and other chlorinated solvents from at least two other facilities in the plume area. Historically, this part of Dayton (Old North Dayton) has been heavily industrialized.

The AOI that is the subject of this action is limited to the surficial aquifer in the near vicinity of the southern boundary of the Behr facility. The TCE and PCE concentrations in the AOI indicate releases of these contaminants in the area. Because the AOI is located at the furthest downgradient portion of the Behr facility, most, if not all, of the contamination would have originated from the Behr facility.

Groundwater samples taken from the AOI were analyzed as part of a fund-lead RI/FS in August 2012 and March 2014. That analysis revealed TCE concentrations as high as 13,000 ppb and 11,000 ppb, respectively, and PCE concentrations as high as 3,000 ppb and 2,800 ppb, respectively. Historical data going back to 2003 shows TCE and PCE concentrations from the same wells at similar concentrations. The TCE concentrations suggest the likely presence of undissolved TCE in or near the AOI (i.e. a "source). However, locating this non-aqueous phase liquid may not be possible and is not feasible in the short term. A more practical approach at this time is to mitigate the TCE from the highly concentrated groundwater and to reduce the downgradient contaminant concentrations primarily causing the VI issues.

The greater plume under investigation has not been fully delineated, but appears to be at least 2 miles long from roughly north to south and up to one mile wide from east to west. The AOI lies near the northernmost and easternmost edges of the plume. Groundwater flows to the south by southwest in this area.

2. Physical location

The Behr Dayton Thermal VOC Plume Site consists of a large groundwater plume in an area that ranges from approximately 1 to 3 miles northwest of downtown Dayton, Ohio and encompassing the neighborhoods of Old North Dayton and McCook Field. Though the full extent of the plume is still under investigation, EPA has found evidence that the plume extends from somewhere north of Stanley Avenue to somewhere near the confluence of the Greater Miami and Mad Rivers. Most of the plume appears to be flowing in a south by southwest direction. The eastern and western extents of the plume are still largely unknown.

Though the Site is currently thought to consist solely of the groundwater plume resulting from historic releases, EPA is continuing to investigate soils in the area to determine if contamination associated with the Site includes more recent releases still residing in the vadose zone. It is also important to note that vapors from the TCE plume have been migrating from the groundwater through the vadose zone into residences and businesses located above the plume (vapor intrusion).

The area within the estimated boundaries of the Site includes a roughly equal mix of residential as well as commercial and industrial uses. The AOI is the subsurface along the southern boundary of the Behr facility. However, the area directly to the south most impacted by the AOI includes both residences and commercial establishments. This includes dozens of houses within approximately 1,000 feet downgradient of the AOI and hundreds of houses within 2 miles downgradient of the AOI. As part of the time-critical removal action, Chrysler installed and Behr currently maintains and operates a soil vapor extraction (SVE) system directly across Leo Street (to the south) of the AOI (the Leo Street SVE system), though the zone of influence for this SVE system is not thought to be very large (approximately 4 to 6 square blocks). The purpose of the Leo Street SVE system was to enhance the residential VMS due to the overwhelming VOCs in this area.

In addition, the residences and businesses directly to the south of the AOI have been thoroughly investigated for vapor intrusion and most, if not all, have been equipped with individual VMS.

The Behr facility itself is located at 1600 Webster Street, and encompasses approximately 60 acres bordered by Leo Street to the south, Stanley Avenue to the north, Webster Street to the west, and a rail line to the east (located approximately 4 blocks east of Webster Street). The AOI lies in the intermediate depth of the upper groundwater aquifer (roughly 40 to 60 feet) below an area just north of Leo Street and extending roughly from the eastern to the western borders of the Behr facility. (See Figure B-1 identifying the AOI). The approximate center of the AOI lies at GPS coordinates $39^0$46'58.0" N by $84^0$10'45.6" W. The primary monitoring wells identifying the AOI can be found in Figures C-1 through C-3 including wells PZ-8I, PZ-10I, MWA-004, and MWB-003.

This part of Dayton has been heavily industrialized for over a century and one of the challenges of the overall remedial investigation has been distinguishing this TCE and PCE plume from other chlorinated solvent plumes. EPA has identified two other potentially responsible parties (PRPs) associated with the Site: Gem City Chemical, located adjacent to the northeast corner of the Behr facility and Aramark Uniform Services, located approximately 2.5 blocks south of the southwest corner of the Behr facility.

3. Site characteristics

The Facility remains an active facility, previously used to manufacture automotive parts. The AOI is below a portion of the Behr facility primarily used as a parking lot. Currently this parking lot is regularly used for loading and unloading.

The Facility was owned and operated by Chrysler before it was sold to Behr's predecessor in 2002. The facility has been used to manufacture automotive parts since the 1930's, though it produced some weapons during World War II.

Groundwater and subsurface contamination associated with the facility has been investigated by various parties going back as far as 1994, and some of these earlier investigations included the monitoring of groundwater extending off-site. Though EPA includes some results from the analyses of groundwater samples taken during these earlier investigations in Table 3 for historical perspective, EPA relies primarily on data gathered during its remedial investigation to make decisions regarding this action as well as the RI/FS for the Site.

Figures C-1 and C-2 are maps generated with data from the two site-wide groundwater sampling events associated with the RI/FS and conducted in August 2012 and March 2014.

A SVE system consisting of 12 extraction points was installed by Chrysler at a portion of the facility in 1998. This system was expanded to 117 total extraction points throughout the facility by 2003 and operated for another two years. It is estimated that this system extracted 900 pounds of VOCs from the vadose zone under the facility.

From 2004 through 2009, an in situ bioremediation and groundwater containment system was operated below the facility by Chrysler. It is estimated that 1,365 pounds of VOCs were removed from groundwater from this action. However, the Ohio EPA and contractors that worked for Chrysler (who now work for Behr) have differing opinions on the effectiveness of this treatment and whether it exacerbated the TCE and PCE contaminated groundwater flow from the facility.

This NTCRA is the second removal action at the Site. EPA previously required a removal action to install and monitor VMSs at residences at the Site, through the 2006 AOC and the 2009 UAO. As part of that earlier removal action, Chrysler also installed the Leo Street SVE system, to address vapor intrusion into certain residences whose vapor abatement mitigation systems were not lowering TCE below screening levels.

4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

The AOI to be addressed by this action is limited to a zone of elevated TCE and PCE contamination near the southern boundary of the Behr facility. TCE and PCE are both hazardous substances as defined in CERCLA Section 101(14). Each is a "listed hazardous substance" as that term is defined at 40 CFR § 302.4, and is included in Table 302.4 as a hazardous substance designated under Section 102(a) of CERCLA. TCE at a concentration of 0.5 mg/L (500 ug/L), using the Toxicity Characteristic Leaching Procedure (TCLP) test, exhibits the characteristic of toxicity and is considered a RCRA hazardous waste under 40 C.F.R. § 261.24, and given hazardous waste number D040. PCE at a concentration of 0.7 mg/L (700 ug/L), using the TCLP test, exhibits the characteristic of toxicity and is considered a RCRA hazardous waste under 40 C.F.R. § 261.24, and given hazardous waste number D039. As noted above, RI/FS sampling has found PCE levels as high as 2,800 ug/L (2.8 ppm), and TCE levels as high as 11,000 ug/L (11 ppm) in the AOI.

It is difficult to pinpoint a specific release of TCE and PCE that led to the currently observed contamination. However, TCE appears to continue to dissolve into groundwater in the AOI, feeding the VOC plume that is the subject of the greater NPL site investigation and potentially exacerbating the already large-scale threat this plume is posing. As the plume migrates to the south by southwest, vapors migrate into and accumulate in homes and businesses in the downgradient neighborhoods.

Though the full extent of the VOC plume has yet to be identified, the contaminants associated with the plume are primarily TCE and PCE. However, some of the various breakdown products (e.g. cis-1,2 dichloroethylene and vinyl chloride) have

been identified as well (see Table 3). The remedy to be selected should mitigate these compounds in addition to TCE and PCE.

5. NPL status

The AOI is a very small portion of the Behr Dayton Thermal VOC Plume Site. The Site was proposed on September 3, 2008, and added to the National Priorities List (NPL) on April 9, 2009.

6. Maps, pictures and other graphic representations

The following Figures and Tables are included as attachments:

- Figure A – Map of Behr facility and some of the surrounding area with a designation of the "AOI"
- Figure B-1 – AOI with Designation of Geological Cross Sections
- Figure B-2 – Geological Cross Section Details for A to A' (most relevant to the AOI)
- Figure B-3 – Geological Cross Section Details for B to B'
- Figure B-4 – Geological Cross Section Details for C to C'
- Figure C-1 – Map of Wells and Measured TCE Concentrations from a portion of the August 2012 RI/FS Groundwater Sampling Event (all depths)
- Figure C-2 – Contour Map of Intermediate Depth Wells and Measured TCE Concentrations from the March 2014 RI/FS Groundwater Sampling Event
- Figure C-3 – Map of Wells and Measured PCE Concentrations from a portion of the August 2012 RI/FS Groundwater Sampling Event (all depths)
- Table 1 Potentially Applicable and Appropriate Requirements (ARARs) provided by Ohio EPA
- Table 2 – Comparative Analysis Summary of the Action Alternatives evaluated in the EE/CA report
- Table 3 – Summary of Groundwater Sampling Results from Monitoring Wells in the AOI

B. Other Actions to Date

1. Previous actions

As discussed in Section A.3. above, the previous facility owner, Chrysler, conducted clean-up actions involving soil vapor extraction for the vadose zone, and groundwater treatment (enhanced bioremediation) and containment. While data gathered during the RI suggests that the vadose zone clean-up was effective, there is disagreement over the effectiveness of the groundwater action. However, neither of these actions were taken in response to a federal requirement. The Site consists of the contamination

(primarily groundwater) that these previous actions failed to capture and potentially comingled contamination from other sources.

After Ohio EPA began to investigate the contamination which had migrated away from the facility into the groundwater below the neighborhoods to the south and southwest of the facility, it requested the assistance of U.S. EPA in investigating whether TCE vapors from this contamination were migrating into homes and residences and accumulating in concentrations that pose an unacceptable risk to human health. EPA identified numerous houses and residences with air concentrations above screening levels set by the Ohio Department of Health, in consultation with the Agency for Toxic Substances and Disease Registry. EPA entered into the 2006 AOC, requiring Chrysler to conduct subsurface gas extent of contamination sampling at the Site and install vapor abatement systems in structures impacted by TCE subsurface contamination to meet applicable indoor air screening levels. Chrysler also installed the Leo Street SVE system as part of that removal. After Chrysler stopped work at the Site, EPA issued the 2009 UAO to Behr to continue the removal action.

2. Current actions

After EPA could not reach an agreement with the previous facility owner (Chrysler), Behr, or the other two named PRPs (Aramark Uniform Services and Gem City Chemical) to lead or participate in an RI/FS, EPA initiated a fund-led RI/FS in 2009. This investigation continues to date and has included several rounds of groundwater and soil sampling events. The plume is not yet fully delineated but appears to be several miles long (north to south) and at least 1 mile or more wide in places.

Behr continues to conduct the vapor intrusion investigation under the 2009 UAO. It continues to monitor the operation of existing abatement systems, test additional residences or businesses for indoor air or subslab TCE concentrations, and equip new abatement systems as needed.

The AOI has been relatively well investigated and consistently exhibits TCE concentrations in the 10 to 20 ppm range and PCE concentrations in the 3 to 10 ppm range. The location of the AOI suggests this contamination stems from releases at the Behr facility.

C. State and Local Authorities' Role

1. State and local actions to date

To date, State and local authorities have not taken any clean-up actions at the Site other than to request the assistance of EPA. A Notice of Violation Ohio EPA sent in May 2009, required Chrysler to suspend the reinjection process it was using with its enhanced bioremediation action at the facility because of concerns with the concentrations of contaminants being reinjected into the aquifer and the potential to exacerbate off-site migration of the groundwater contamination.

2. Potential for continued State/Local response

Since 2006, when Ohio EPA requested U.S. EPA's assistance, U.S. EPA has taken the lead on CERCLA response activities for the Behr Dayton Thermal VOC Plume Site. Initially, this was limited to a removal action under the 2006 AOC executed with Chrysler in response to vapor intrusion exposures caused by the Site. After Chrysler filed for bankruptcy and stopped work at the Site, U.S. EPA issued the 2009 UAO to Behr to continue the vapor intrusion monitoring and mitigation associated with the Site. In 2009, EPA began a fund-led RI/FS at the Site that is continuing on a parallel track with this action. EPA intends to continue to work in consultation with Ohio EPA on both the RI/FS and this action.

III. THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT, AND STATUTORYAND REGULATORY AUTHORITIES

The conditions present at the Behr Dayton Thermal VOC Plume Site pose an imminent and substantial threat to the public health, welfare, or the environment based upon the factors set forth in NCP Section 300.415(b)(2). These factors include, but are not limited to, the following:

Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

This factor is present at the Site because of the vapor intrusion pathway and a documented Completed Exposure Pathway in residential properties. More than 250 businesses or residences have been documented to have indoor air or subslab soil gas TCE concentrations that exceed the screening levels set by the Agency for Toxic Substances and Disease Registry and the Ohio Department of Health. Though mitigation systems have been installed on many businesses and residences in the plume's pathway, the high concentrations of TCE in the AOI continue to exacerbate the vapor intrusion impact, Behr has not been completely successful in obtaining access to all residences in the vicinity of the plume, and additional residences could be impacted.

In some locations, it has taken multiple attempts to design mitigation systems that effectively reduce TCE concentrations below screening levels. In addition, it is likely that not all residences and businesses with unacceptable indoor air TCE concentrations have been identified.

Actual or potential contamination of drinking water supplies or sensitive ecosystems.

Approximately 1.75 miles to the northeast of the AOI, the City of Dayton operates a municipal well field that regularly serves 100,000 businesses and residences and draws from the same aquifer system in which the AOI is located. Though a groundwater divide exists between the well field and the AOI, such that contamination from the AOI currently flows in the opposite direction of the well field, city

hydrogeologists believe extreme drought conditions could cause this groundwater divide to move to the south of the AOI as the well field continues to pump water while the aquifer is not recharged by precipitation.

EPA has promulgated maximum contaminant levels (MCLs) of 5 parts per billion (ppb) for both TCE and PCE under the Safe Drinking Water Act. The concentrations measured in the AOI in the most recent groundwater sampling event were as high as 11,000 ppb for TCE and 2,800 ppb for PCE.

TCE is a man-made chemical that is widely used as a cleaner to remove grease from metal parts. TCE is a nonflammable, colorless liquid with a sweet odor. Exposure to TCE at very high concentrations (particularly in closed, poorly ventilated areas) may cause headaches, lung irritation, dizziness, poor coordination (clumsy), and difficulty speaking. According to the Ohio Department of Health, the evidence that TCE is a human carcinogen has been under review by health organizations since 2001. The U.S. Department of Health and Human Services considers TCE to be "reasonably anticipated to be a human carcinogen" based on limited evidence of carcinogenicity from studies of humans and sufficient evidence of carcinogenicity from studies of laboratory animals. A report recently released by the National Academies of Science National Research Council (2006) has stated that "evidence on cancer and other health risks from TCE exposure has strengthened since 2001," pointing to studies of human populations that support "the conclusion that TCE is a potential cause of kidney cancer." Other epidemiological studies of communities exposed to TCE in drinking water supplies in Massachusetts, New Jersey, and North Carolina have suggested an association between these exposures and elevated levels of leukemia in the exposed population.

PCE is widely used for dry-cleaning fabrics and metal degreasing operations. Effects resulting from acute (short term) high-level inhalation exposure of humans to PCE include irritation of the upper respiratory tract and eyes, kidney dysfunction, and neurological effects such as reversible mood and behavioral changes, impairment of coordination, dizziness, headache, sleepiness, and unconsciousness. The primary effects from chronic (long term) inhalation exposure are neurological, including impaired cognitive and motor neurobehavioral performance. PCE exposure may also cause adverse effects in the kidney, liver, immune system and hematologic system, and on development and reproduction. Studies of people exposed in the workplace have found associations with several types of cancer including bladder cancer, non-Hodgkin lymphoma, and multiple myeloma. EPA has classified PCE as likely to be carcinogenic to humans.

IV. ENDANGERMENT DETERMINATION

Given the site conditions, the nature of the known and suspected hazardous substances on site, and the potential exposure pathways described in Sections II and III above, actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response actions selected in this Action Memorandum,

may present an imminent and substantial endangerment to public health, welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed action description:

The response actions described in this memorandum directly address actual or potential releases of hazardous substances on site that may pose an imminent and substantial endangerment to public health, or welfare, or the environment. Removal activities on site will include:

a. Develop and implement a Site-specific Health and Safety Plan, including an Air Monitoring Plan, and a Site Emergency Contingency Plan;

b. Prepare a detailed work plan to accomplish the project in the most effective, efficient, and safe manner;

c. In accordance with an EPA approved design plan, install a series of air sparging wells to introduce clean air into the aquifer just upgradient and just below the AOI.

d. In accordance with an EPA approved design plan, install a series of soil vapor extraction wells to capture all soil gas vapors released from the air sparging wells and remove them from the subsurface.

e. Treat soil gases collected using activated carbon systems or equivalent or better technology to ensure the cumulative emissions of air pollutants to the atmosphere from this action is less than either a) the "de minimis" threshold of 1 ton per year in the State of Ohio's permitting regulations at Ohio Administrative Code (OAC) § 3745-15-05; or b) a "permit by rule" threshold established for the Site pursuant to OAC § 3745-15-05.

f. Demonstrate that emissions of hazardous air pollutants (e.g., TCE and PCE) are below the de minimis threshold or a permit by rule threshold prior to operation and every 6 months of operation thereafter utilizing sampling and analytical procedures prescribed by EPA.

The removal actions will be conducted in a manner not inconsistent with the NCP. The threats posed by uncontrolled substances considered hazardous meet the criteria listed in NCP, at 40 C.F.R. § 300.415(b)(2), and the response actions proposed herein are consistent with any long-term remedial actions that may be required. The proposed removal of hazardous substances, pollutants, and contaminants that pose a substantial

threat of release is expected to minimize substantial requirements for post-removal site controls.

2. Contribution to remedial performance:

The proposed removal action will contribute to the efficient performance of the long-term remedial action for the Behr Dayton Thermal VOC Plume Site. A Record of Decision has not yet been written for the Site, but this action will be incorporated into the final remedy for the Site.

The response actions described in this memorandum directly address the actual or threatened release of hazardous substances, pollutants, or contaminants at the Site which may pose an imminent and substantial endangerment to public health or welfare or to the environment. These response actions do not impose a burden on affected property disproportionate to the extent to which that property contributes to the conditions being addressed. The removal actions described in this Action Memo will be implemented by MAHLE Behr Dayton L.L.C., a Potentially Responsible Party for the Behr Dayton Thermal VOC Plume Site, with oversight by the U.S. EPA. The cost associated with the implementation of this removal action has been estimated to be $3,000,000.

3. Engineering Evaluation/Cost Analysis (EE/CA):

The EE/CA was completed in November 2014 and released for public comment on November 20, 2014, in conjunction with an EPA fact sheet identifying AS/SVE as EPA's preferred alternative based upon the removal action objectives and site conditions identified above.

The EE/CA discussed other options, including pump and treat, enhanced reductive dechlorination, in-situ chemical oxidations, and installation of a permeable reactive barrier. Those alternatives were also evaluated for short and long-term aspects of the Removal Criteria: Effectiveness, Implementability, and Cost.

The alternative selected in this Action Memorandum meets all three of the Removal Criteria most effectively compared to the other alternatives. AS/SVE has already been demonstrated as effective at removing TCE from this aquifer, and is estimated to cost no more than any of the other active alternatives. This alternative can be implemented relatively quickly and much of the logistics have already been discussed with Behr to insure that it will minimize the impact to existing operations at the facility. Also, AS/SVE can be turned off simply by turning off power to the air sparging system in the event that something goes awry. This gives it a distinct advantage over the other alternatives.

4. Applicable or Relevant and Appropriate Requirements (ARARs):

All applicable or relevant and appropriate requirements (ARARs) of federal and State law will be complied with to the extent practicable. Table 1 contains a list of

possible ARARs; however, any additional ARARs identified in a timely manner (as determined by U.S. EPA) shall be complied with to the extent practicable.

The response actions described in this memorandum directly address the actual or threatened release of hazardous substances, pollutants, or contaminants at the Site which may pose an imminent and substantial endangerment to public health or welfare or to the environment. These response actions do not impose a burden on affected property disproportionate to the extent to which that property contributes to the conditions being addressed.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Given the site conditions, the nature of the hazardous substances and pollutants or contaminants documented on site, and the potential exposure pathways to nearby populations described in Section II, III, IV, and V above, actual or threatened releases of hazardous substances and pollutants or contaminants from this site, if not addressed by implementing the response action in this Action Memorandum, or if this response action is delayed, may present an imminent and substantial endangerment to public health, welfare, or the environment, increasing the potential that hazardous substances will be released, thereby threatening the environment and the health and welfare of nearby residents and other persons who are in proximity to the Site. Specifically, delaying or avoiding this action will allow for additional highly concentrated TCE and PCE to migrate off-site and exacerbate existing or create new exposures through the vapor intrusion pathway.

VII. OUTSTANDING POLICY ISSUES

None.

VIII. ENFORCEMENT

For administrative purposes, information concerning the enforcement strategy for the Site is contained in the Enforcement Confidential Addendum.

IX. RECOMMENDATION

This decision document represents the selected non-time critical removal action for the AOI at the Behr Dayton Thermal VOC Plume Site located in Dayton, Montgomery County, Ohio. This document has been developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP. This decision is based on the Administrative Record for the Site (see Attachment 2). Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a NTCRA, and we recommend your approval of the proposed action. You may indicate your decision by signing below.

APPROVE: Richard C Karl DATE: 12-22-15

Richard C. Karl, Director
Superfund Division

DISAPPROVE: _____ DATE: _____

Richard C. Karl, Director
Superfund Division

Enforcement Addendum

Figures:

- A – Map of Behr facility and some of the surrounding area with a designation of the "AOI"
- B-1 – AOI with Designation of Geological Cross Sections
- B-2 – Geological Cross Section Details for A to A' (most relevant to the AOI)
- B-3 – Geological Cross Section Details for B to B'
- B-4 – Geological Cross Section Details for C to C'
- C-1 – Map of Wells and Measured TCE Concentrations from a portion of the August 2012 RI/FS Groundwater Sampling Event (all depths)
- C-2 – Contour Map of Intermediate Depth Wells and Measured TCE Concentrations from the March 2014 RI/FS Groundwater Sampling Event
- C-3 – Map of Wells and Measured PCE Concentrations from a portion of the August 2012 RI/FS Groundwater Sampling Event (all depths)

Tables:

- 1 –Potential ARARs provided by Ohio EPA
- 2 – Comparative Analysis Summary of the Action Alternatives evaluated in the EE/CA report
- 3 – Summary of Groundwater Sampling Results from Monitoring Wells in the AOI

Attachments:

- 1 – January 16, 2015 Letter from EPA to Behr Approving the EE/CA Report as Final with an Attached Responsiveness Summary for the Public Comments Received
- 2 – Administrative Record Index
- 3 – Environmental Justice Analysis

cc: L. Williams, Ohio EPA, w/o Enf. Addendum

BCC PAGE HAS BEEN REDACTED

NOT RELEVANT TO SELECTION

OF REMOVAL ACTION

ENFORCEMENT ADDENDUM

HAS BEEN REDACTED – ONE PAGE

ENFORCEMENT CONFIDENTIAL

NOT SUBJECT TO DISCOVERY

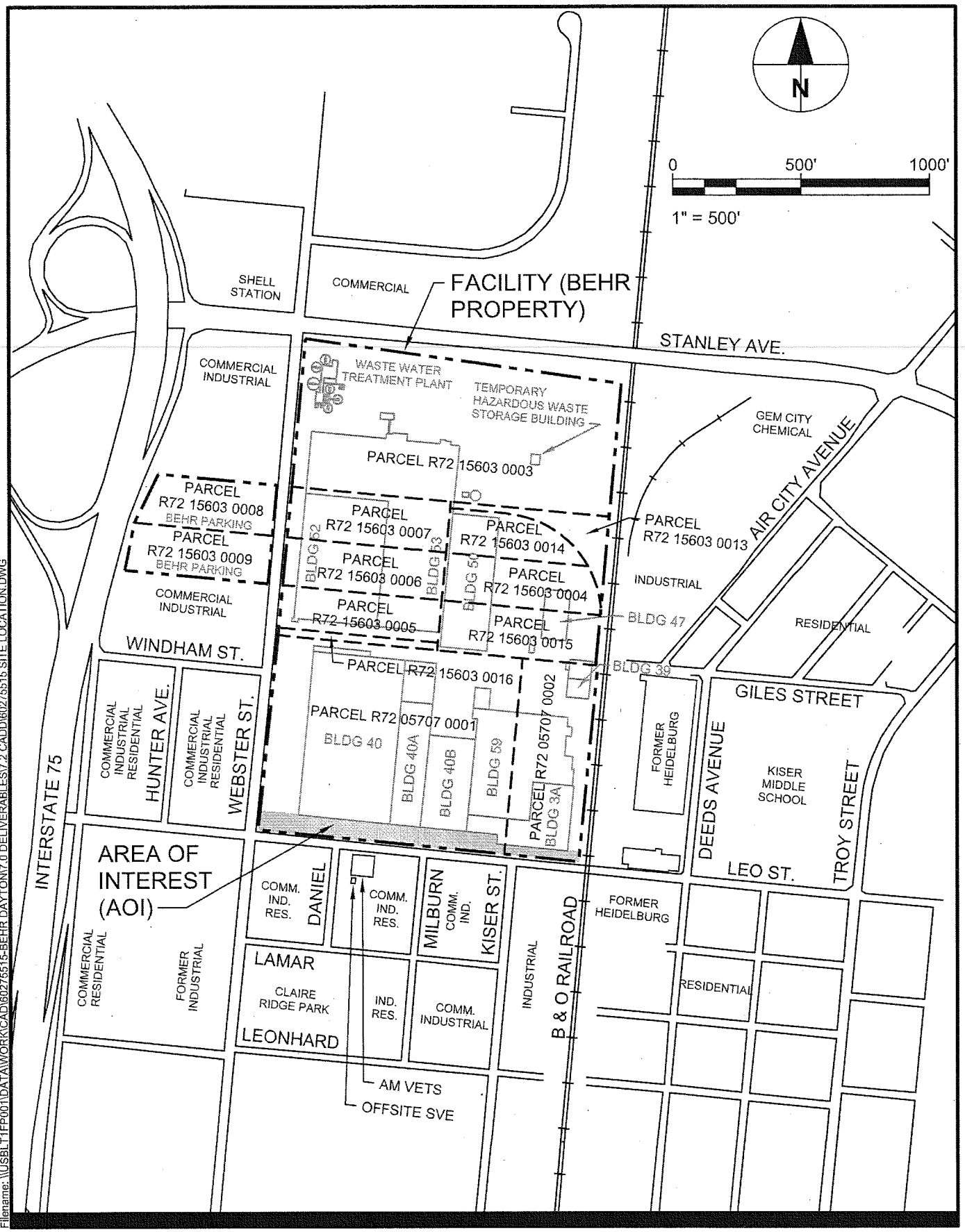
FOIA EXEMPT

NOT RELEVANT TO SELECTION

OF REMOVAL ACTION

Figure A

Map of Behr with AOI Designated



Project Management Initials: Designer: NLW Checked: RFR Approved:____ ANSI A 8.5" x 11"

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BEHR PROPERTY
DAYTON, OHIO

AOI LOCATION MAP

AECOM

Project No.: 60275515 Date: 2014-07-03

Figure: 2

Figure B-1

Map of AOI with Geological Cross Sections Marked

Last saved by: WILZBACHERN(2014-05-19) Last Plotted: 2014-05-21
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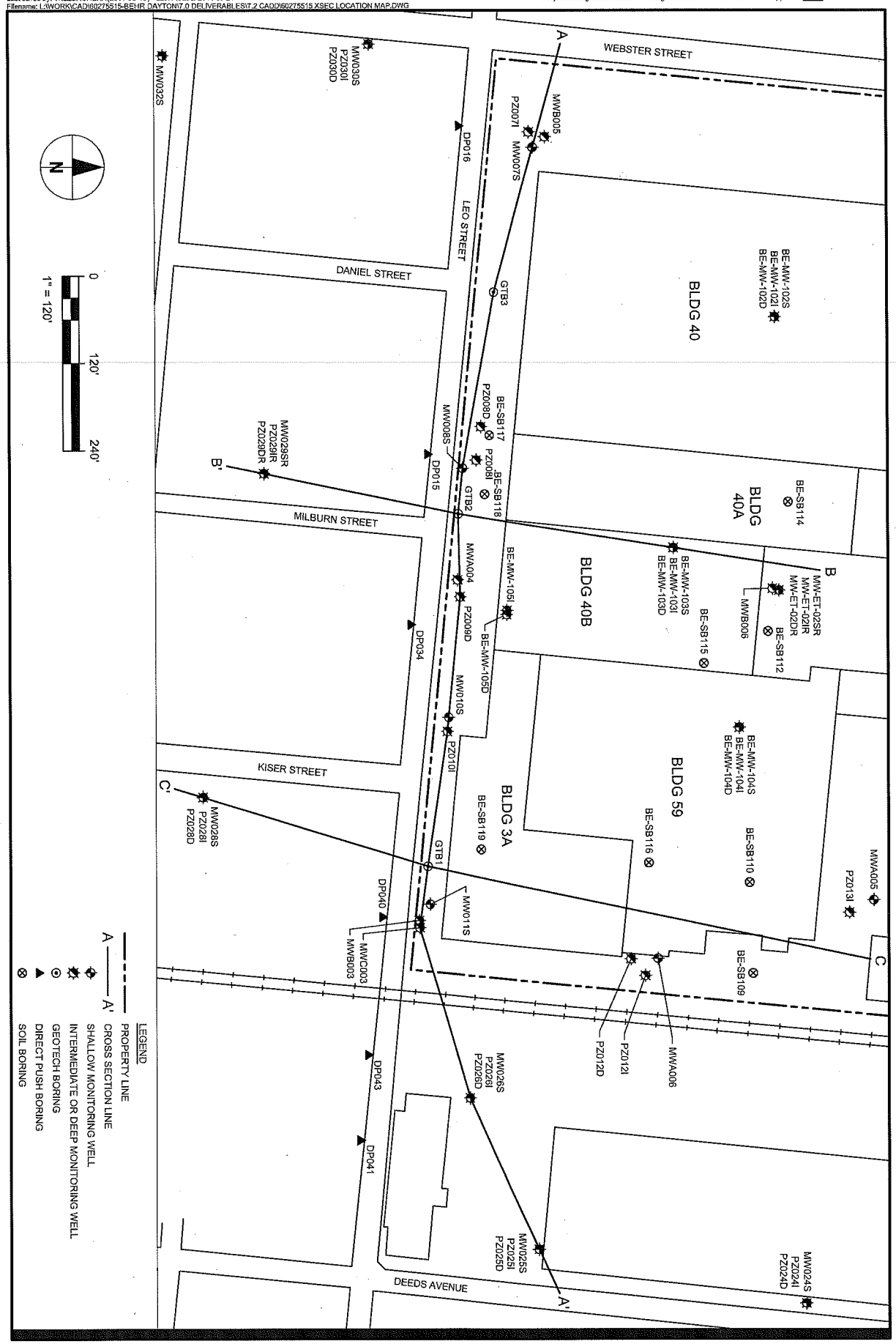
Project Management Initials: Designer: NLW Checked: RFR Approved:____ ANSI B 11" x 17"



BEHR PROPERTY
DAYTON, OHIO

CROSS-SECTION LOCATION MAP

AECOM

Project No.: 60275515 Date: 2014-05-19

Figure: 3

Figure B-2

Geological Cross Section Details for A to A'

Last saved by: WILZBACHERN(2014-07-01) Last Plotted: 2014-07-01
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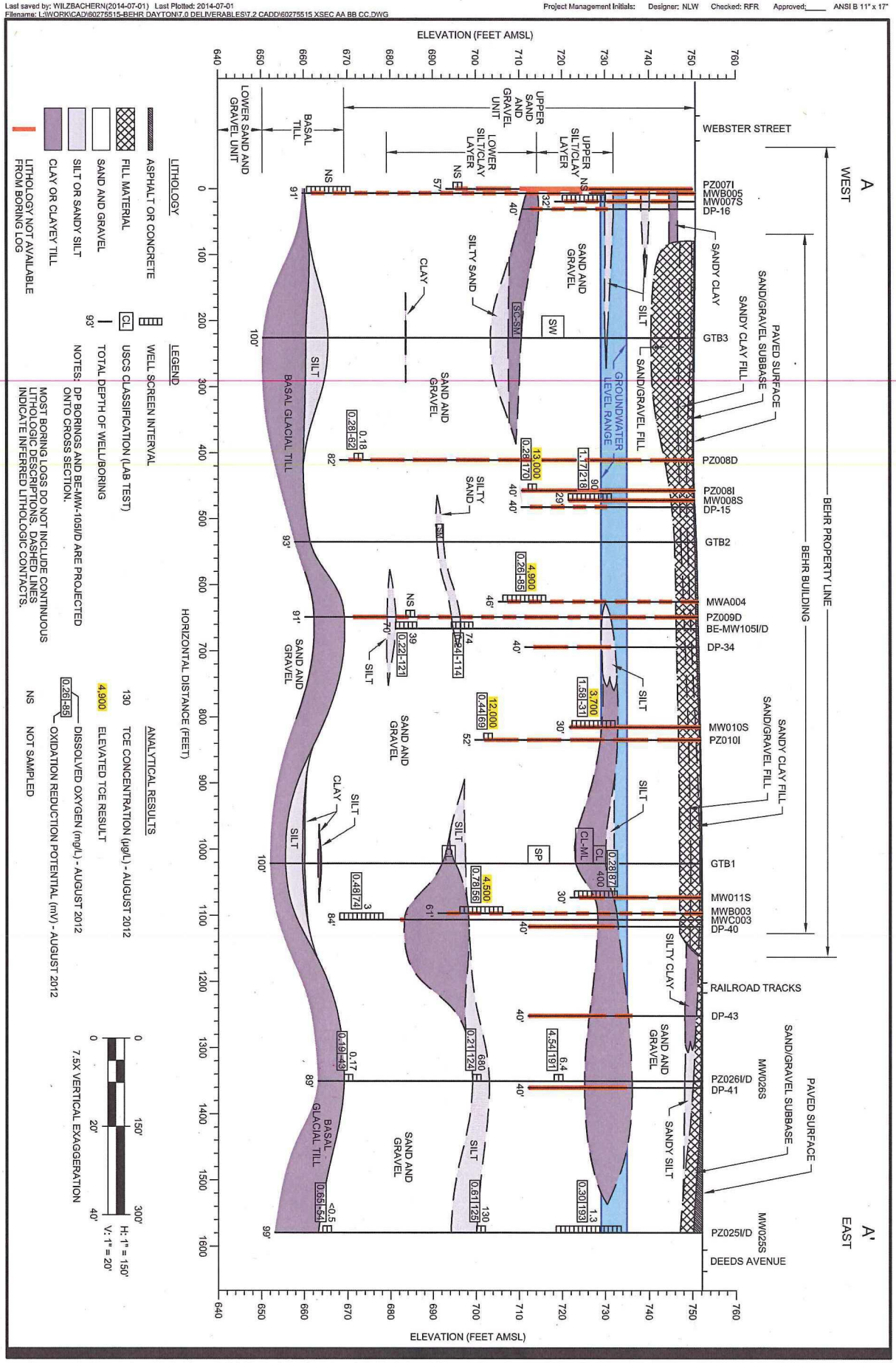

BEHR PROPERTY
DAYTON, OHIO

GEOLOGIC CROSS-SECTION A - A'

AECOM

Project No.: 60275515 Date: 2014-07-01

Figure: 4

Figure B-3

Geological Cross Section Details for B to B'

Last saved by: WILZBACHERN(2014-07-01) Last Plotted: 2014-07-01
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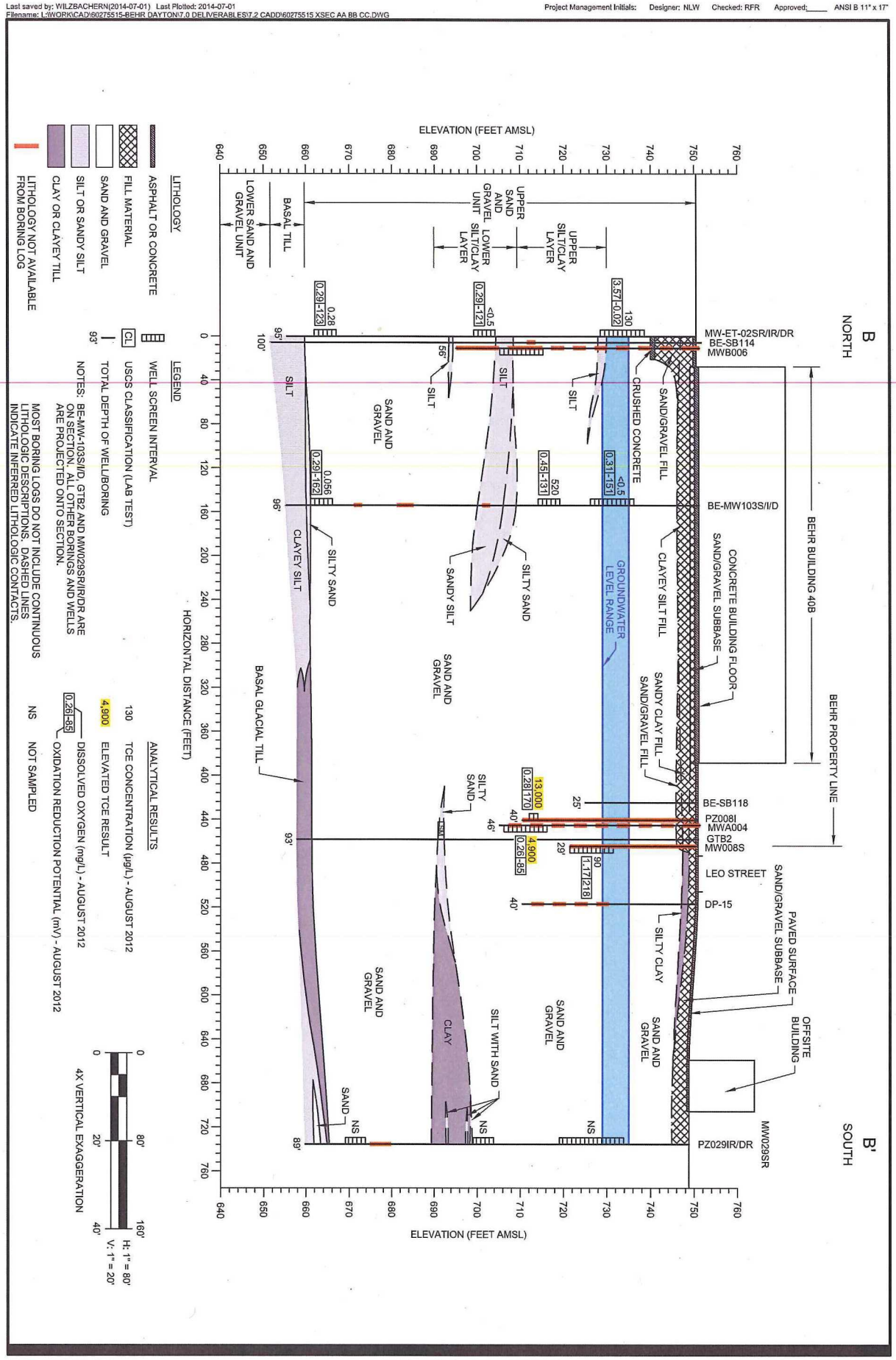
Project Management Initials: Designer: NLW Checked: RFR Approved:____ ANSI B 11" x 17"



BEHR PROPERTY
DAYTON, OHIO

GEOLOGIC CROSS-SECTION B - B'

AECOM

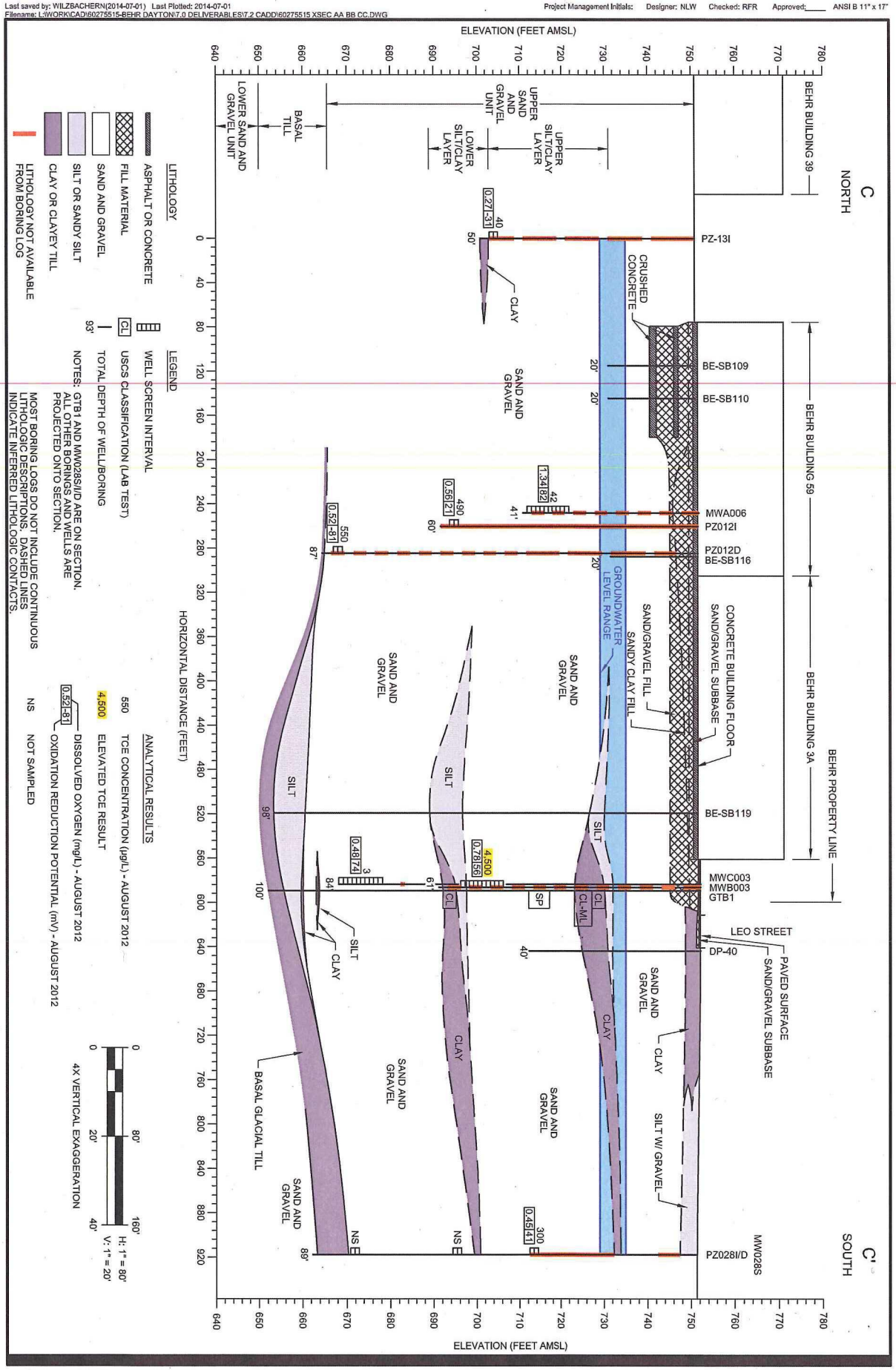
Project No.: 60275515 Date: 2014-07-01

Figure: 5

Figure B-4

Geological Cross Section Details for C to C'

Last saved by: WILZBACHERN(2014-07-01) Last Plotted: 2014-07-01
Filename: L:\WORK\CAD\60275515-BEHR DAYTON\7.0 DELIVERABLES\7.2 CADD\60275515 XSEC AA BB CC.DWG
Project Management Initials: Designer: NLW Checked: RFR Approved:____ ANSI B 11" x 17"



BEHR PROPERTY
DAYTON, OHIO

GEOLOGIC CROSS-SECTION C - C'

AECOM

Project No.: 60275515 Date: 2014-07-01

Figure: 6

Figure C-1

Map of Wells and Measured TCE Concentrations from August 2012 GW Sampling Event

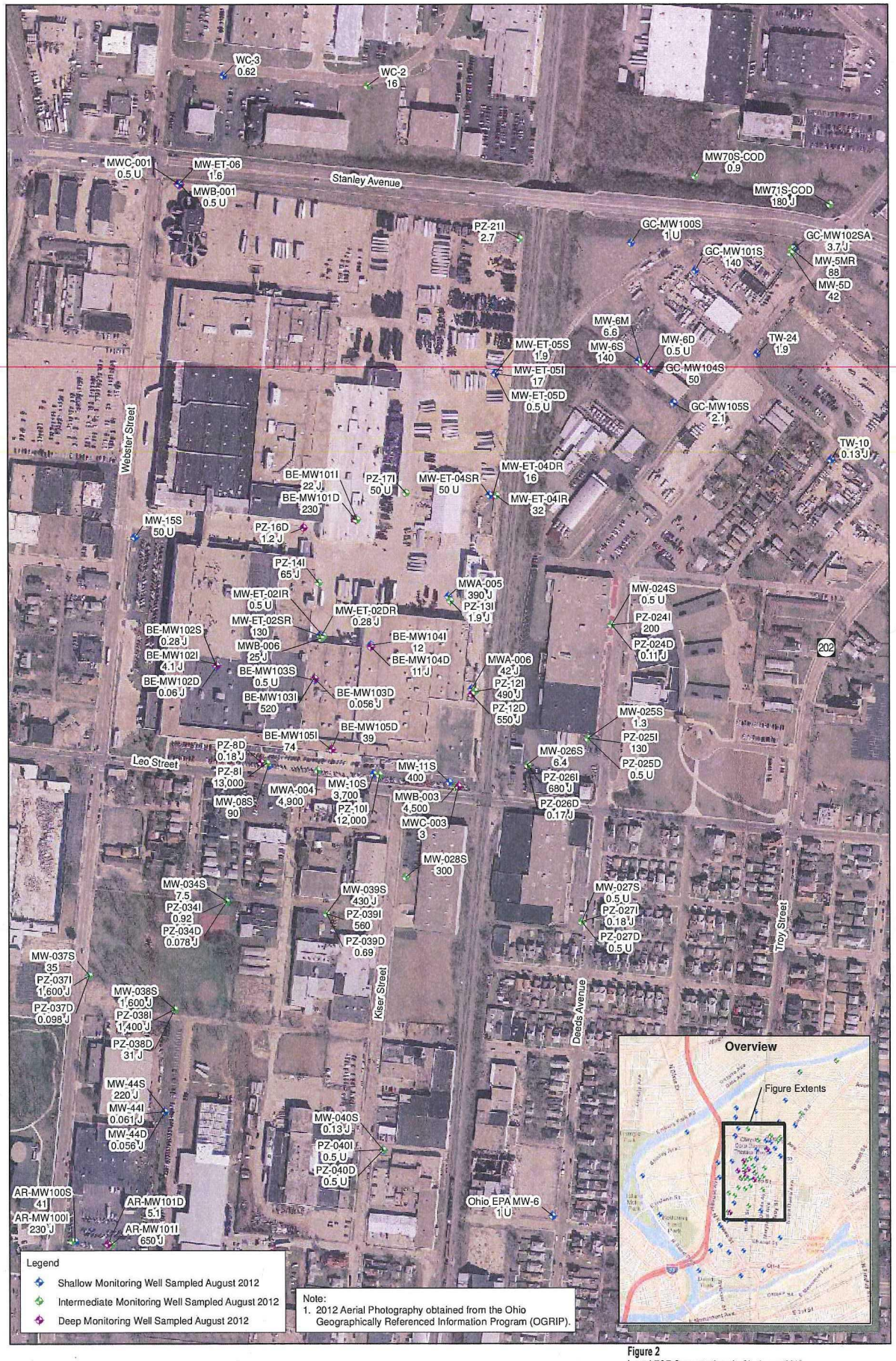


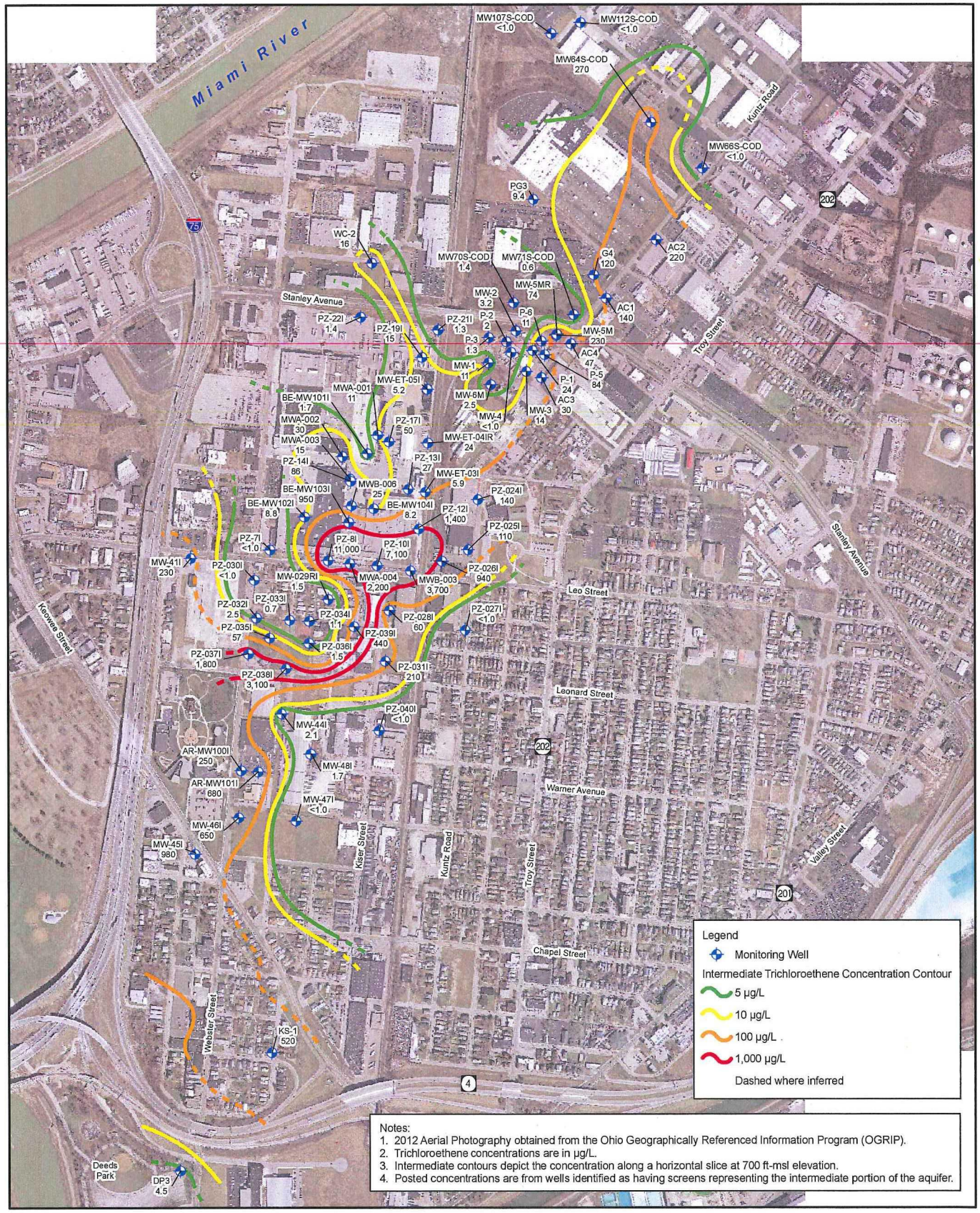
Figure 2
Inset 1 TCE Concentrations (ug/l) - August 2012
DATABASE PULL
Behr Dayton Thermal System VOC Plume Site
Dayton, Ohio

CH2MHILL

\\HERCULES\PROJ\USENVIRONMENTALPROTE\420125_BEHRDAYTONTHERMAL\MAPFILES\FIGURE 02 - INSET 1 - TCE.MXD JHANSEN1 5/7/2013 11:35:55 AM

Figure C-2

Preliminary, Draft Contour Map of Intermediate Depth Wells and Measured TCE Concentrations from March 2014 GW Sampling Event



N

0 1,000 2,000

Feet

PRELIMINARY DRAFT

Figure 1
Intermediate Trichloroethene Concentration Contours, Q2 2014
Behr Dayton Thermal System VOC Plume Site
Dayton, Ohio

I:\USENVIRONMENTALPROTE\420125_BEHRDAYTONTHERMAL\MAPFILES\2014\FIGURE XX - INTERMEDIATE TCE CONTOURS(2014 Q2)_2D_043015.MXD JHANSEN1 4/30/2015 12:07:34 PM

CH2MHILL

Figure C-3

Map of Wells and Measured PCE Concentrations from August 2012 GW Sampling Event

Figure 4
Inset 1 PCE Concentrations (ug/l) - August 2012
DATABASE PULL
Behr Dayton Thermal System VOC Plume Site
Dayton, Ohio

CH2MHILL

\\HERCULES\PROJ\USENVIRONMENTALPROTE\420125_BEHRDAYTONTHERMAL\MAPFILES\FIGURE 04 - INSET 1 - PCE.MXD JHANSEN1 5/7/2013 3:07:17 PM

Table 1

Potential ARARs as Provided by Ohio EPA

Ohio EPA
ARARs for Action Memorandum for the Behr VOC Plume
March 2015

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW APC	3734.02		(I)	AIR EMISSIONS FROM HAZARDOUS WASTE FACILITIES	NO HAZARDOUS WASTE FACILITY SHALL EMIT ANY PARTICULATE MATTER, DUST, FUMES, GAS, MIST, SMOKE, VAPOR OR ODOROUS SUBSTANCE THAT INTERFERES WITH THE COMFORTABLE ENJOYMENT OF LIFE OR PROPERTY OR IS INJURIOUS TO PUBLIC HEALTH.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE MANAGED SUCH THAT AIR EMISSIONS MAY OCCUR. CONSIDER FOR SITES THAT WILL UNDERGO MOVEMENT OF EARTH OR INCINERATION.
DSW	3767.14			PROHIBITION OF NUISANCES	PROHIBITION AGAINST THROWING REFUSE, OIL, OR FILTH INTO LAKES, STREAMS, OR DRAINS.	PERTAINS TO ALL SITES LOCATED ADJACENT TO LAKES, STREAMS, OR DRAINS.
DSW	6111.04			ACTS OF POLLUTION PROHIBITED	POLLUTION OF WATERS OF THE STATE IS PROHIBITED.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED ON-SITE GROUND OR SURFACE WATER OR WILL HAVE A DISCHARGE TO ON-SITE SURFACE OR GROUND WATER.
APC		3745-15-05	A-D	DE MINIMIS AIR CONTAMINANT SOURCE EXEMPTION	ESTABLISHES LIMITS BELOW WHICH AIR DISCHARGE PERMITS ARE NOT NEEDED	PERTAINS TO ANY SITE WHICH UTILIZES OR WILL UTILIZE AIR POLLUTION CONTROL EQUIPMENT ON-SITE.

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
APC		3745-15-07	A	AIR POLLUTION NUISANCES PROHIBITED	DEFINES AIR POLLUTION NUISANCE AS THE EMISSION OR ESCAPE INTO THE AIR FROM ANY SOURCES(S)) OF SMOKE, ASHES, DUST, DIRT, GRIME, ACIDS, FUMES, GASES, VAPORS, ODORS AND COMBINATIONS OF THE ABOVE THAT ENDANGER HEALTH, SAFETY OR WELFARE OF THE PUBLIC OR CAUSE PERSONAL INJURY OR PROPERTY DAMAGE. SUCH NUISANCES ARE PROHIBITED.	PERTAINS TO ANY SITE WHICH CAUSES, OR MAY REASONABLY CAUSE, AIR POLLUTION NUISANCES. CONSIDER FOR SITES THAT WILL UNDERGO EXCAVATION, DEMOLITION, CAP INSTALLATION, METHANE PRODUCTION, CLEARING AND GRUBBING, WATER TREATMENT, INCINERATION AND WASTE FUEL RECOVERY.
APC		3745-15-08	A	CIRCUMVENTION	FORBIDS DILUTION OR OTHER MEANS TO CONCEAL EMISSIONS WITHOUT ACTUAL REDUCTIONS	CONSIDER FOR SITES WITH EMISSIONS TO AIR, AIR STRIPPING, INCINERATION, SOIL VAPOR EXTRACTION ETC.
APC		3745-17-08	A1,A2,B,D	EMISSION RESTRICTIONS FOR FUGITIVE DUST	ALL EMISSIONS OF FUGITIVE DUST SHALL BE CONTROLLED.	PERTAINS TO SITES WHICH MAY HAVE FUGITIVE EMISSIONS (NON-STACK) OF DUST. CONSIDER FOR SITES THAT WILL UNDERGO GRADING, LOADING OPERATIONS, DEMOLITION, CLEARING AND GRUBBING AND CONSTRUCTION UTILIZE INCINERATION OR FUEL RECOVERY (WASTE FUEL RECOVERY)

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-270-07	A-E	TESTING, TRACKING, AND RECORDKEEPING REQUIREMENTS	TESTING, TRACKING, AND RECORDKEEPING REQUIREMENTS FOR GENERATORS, TREATERS, AND DISPOSAL FACILITIES.	CONSIDER FOR SITES AT WHICH WASTES ARE GENERATED, STORED, DISPOSED, OR TREATED
UIC		3745-34-07		NO MOVEMENT OF FLUID INTO UNDERGROUND DRINKING WATER	THE UNDERGROUND INJECTION OF FLUID CONTAINING ANY CONTAMINANT INTO AN UNDERGROUND SOURCE OF DRINKING WATER IS PROHIBITED IF THE PRESENCE OF THAT CONTAMINANT MAY CAUSE A VIOLATION OF THE PRIMARY DRINKING WATER STANDARDS OR OTHER WISE ADVERSELY AFFECT THE HEALTH OF PERSONS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC		3745-34-13		CLASS V WELLS	SPECIFIES REQUIREMENTS FOR CLASS V WELLS. SEE 3745-34-04 FOR DEFINITIONS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC		3745-34-26		CONDITIONS APPLICABLE TO ALL PERMITS	SPECIFIES MINIMUM CONDITIONS TO BE APPLIED TO ALL UNDERGROUND INJECTIONS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
UIC		3745-34-34		MECHANICAL INTEGRITY	SPECIFIES REQUIREMENTS TO BE MET TO ENSURE MECHANICAL INTEGRITY OF WELLS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
HW		3745-52-11	A-D	EVALUATION OF WASTES	ANY PERSON GENERATING A WASTE MUST DETERMINE IF THAT WASTE IS A HAZARDOUS WASTE (EITHER THROUGH LISTING OR BY CHARACTERISTIC).	PERTAINS TO SITES AT WHICH WASTES OF ANY TYPE (BOTH SOLID AND HAZARDOUS) ARE LOCATED.
HW		3745-52-12	A-C	GENERATOR IDENTIFICATION NUMBER	A GENERATOR MUST NOT STORE, TREAT DISPOSE OR TRANSPORT HAZARDOUS WASTES WITHOUT A GENERATOR NUMBER	PERTAINS TO SITES WHERE HAZARDOUS WASTE WILL BE TRANSPORTED OFF-SITE FOR TREATMENT, STORAGE OR DISPOSAL
HW		3745-52-20		HAZARDOUS WASTE MANIFEST - GENERAL REQUIREMENTS	REQUIRES A GENERATOR WHO TRANSPORTS OR OFFERS FOR TRANSPORTATION HAZARDOUS WASTE FOR OFF-SITE TREATMENT, STORAGE OR DISPOSAL TO PREPARE A UNIFORM HAZARDOUS WASTE MANIFEST	PERTAINS TO SITES WHERE HAZARDOUS WASTE WILL BE TRANSPORTED OFF-SITE FOR TREATMENT, STORAGE OR DISPOSAL
HW		3745-52-22		HAZARDOUS WASTE MANIFEST - NUMBER OF COPIES	SPECIFIES THE NUMBER OF MANIFEST COPIES TO BE PREPARED	PERTAINS TO SITES WHERE HAZARDOUS WASTE WILL BE TRANSPORTED OFF-SITE FOR TREATMENT, STORAGE OR DISPOSAL

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-52-23		HAZARDOUS WASTE MANIFEST - USE	SPECIFIES PROCEDURES FOR THE USE OF HAZARDOUS WASTE MANIFESTS INCLUDING A REQUIREMENT THAT THEY BE HAND SIGNED BY THE GENERATOR	PERTAINS TO SITES WHERE HAZARDOUS WASTE WILL BE TRANSPORTED OFF-SITE FOR TREATMENT, STORAGE OR DISPOSAL
HW		3745-52-30		HAZARDOUS WASTE PACKAGING	REQUIRES A GENERATOR TO PACKAGE HAZARDOUS WASTE IN ACCORDANCE WITH U.S. DOT REGULATIONS FOR TRANSPORTATION OFF-SITE.	PERTAINS TO ANY SITE WHERE HAZARDOUS WASTE WILL BE GENERATED BY ON-SITE ACTIVITIES AND SHIPPED OFF-SITE FOR TREATMENT AND/OR DISPOSAL.
HW		3745-52-31		HAZARDOUS WASTE LABELING	REQUIRES PACKAGES OF HAZARDOUS WASTE TO BE LABELED IN ACCORDANCE WITH U.S.DOT REGULATIONS FOR OFF-SITE TRANSPORTATION.	PERTAINS TO ANY SITE WHERE HAZARDOUS WASTE WILL BE GENERATED BY ON-SITE ACTIVITIES AND SHIPPED OFF-SITE FOR TREATMENT AND/OR DISPOSAL.
HW		3745-52-32		HAZARDOUS WASTE MARKING	SPECIFIES LANGUAGE FOR MARKING PACKAGES OF HAZARDOUS WASTE PRIOR TO OFF-SITE TRANSPORTATION	PERTAINS TO ANY SITE WHERE HAZARDOUS WASTE WILL BE GENERATED BY ON-SITE ACTIVITIES AND SHIPPED OFF-SITE FOR TREATMENT AND/OR DISPOSAL.
HW		3745-52-33		HAZARDOUS WASTE PLACARDING	GENERATOR SHALL PLACARD HAZARDOUS WASTE PRIOR TO OFF-SITE TRANSPORTATION.	PERTAINS TO ANY SITE WHERE HAZARDOUS WASTE WILL BE GENERATED BY ON-SITE ACTIVITIES AND SHIPPED OFF-SITE FOR TREATMENT AND/OR DISPOSAL.

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-52-34		ACCUMULATION TIME OF HAZARDOUS WASTE	IDENTIFIES MAXIMUM TIME PERIODS THAT A GENERATOR MAY ACCUMULATE A HAZARDOUS WASTE WITHOUT BEING CONSIDERED AN OPERATOR OF A STORAGE FACILITY. ALSO ESTABLISHES STANDARDS FOR MANAGEMENT OF HAZARDOUS WASTES BY GENERATORS.	PERTAINS TO A SITE WHERE HAZARDOUS WASTE WILL BE GENERATED AS A RESULT OF THE REMEDIAL ACTIVITIES.
HW		3745-52-40	A-D	RECORDKEEPING REQUIREMENTS, THREE YEAR RETENTION	SPECIFIES RECORDS THAT SHALL BE KEPT FOR THREE YEARS	CONSIDER FOR SITES AT WHICH HAZARDOUS WASTES ARE GENERATED
HW		3745-52-41	A,B	ANNUAL REPORT	REQUIRES GENERATORS TO PREPARE ANNUAL REPORT TO OEPA	APPLICABLE AT SITES GENERATING WASTES FOR OFF--SITE SHIPMENT
HW		3745-54-13	A	GENERAL ANALYSIS OF HAZARDOUS WASTE	PRIOR TO ANY TREATMENT, STORAGE OR DISPOSAL OF HAZARDOUS WASTES, A REPRESENTATIVE SAMPLE OF THE WASTE MUST BE CHEMICALLY AND PHYSICALLY ANALYZED.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-55-14		DISPOSAL/ DECON OF EQUIPMENT, STRUCTURES & SOILS	REQUIRES THAT ALL CONTAMINATED EQUIPMENT, STRUCTURES AND SOILS BE PROPERLY DISPOSED OF OR DECONTAMINATED. REMOVAL OF HAZARDOUS WASTES OR CONSTITUENTS FROM A UNIT MAY CONSTITUTE GENERATION OF HAZARDOUS WASTES.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN TREATED, STORED OR DISPOSED OF).
DW		3745-81-12	A,B,C	MAXIMUM CONTAMINANT LEVELS FOR ORGANIC CHEMICALS	PRESENTS MCLS FOR ORGANICS.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.
GW		3745-9-03	A-C	MONITORING WELL	STANDARDS FOR DESIGN AND CLOSURE OF WELLS, COMPLIANCE WITH DDAGW GUIDANCE	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975. WOULD PERTAIN DURING THE FS IF NEW WELLS ARE CONSTRUCTED FOR TREATABILITY STUDIES.

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
GW		3745-9-04	A,B	WELL SITING	MANDATES THAT GROUND WATER WELLS BE:A) LOCATED AND MAINTAINED SO AS TO PREVENT CONTAMINANTS FROM ENTERING WELL.B) LOCATED SO AS TO BE ACCESSIBLE FOR CLEANING AND MAINTENANCE.	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975. WOULD PERTAIN DURING THE FS IF NEW WELLS ARE CONSTRUCTED FOR TREATABILITY STUDIES.
GW		3745-9-05	A1,B-H	WELL CONSTRUCTION	SPECIFIES MINIMUM CONSTRUCTION REQUIREMENTS FOR NEW GROUND WATER WELLS IN REGARDS TO CASING MATERIAL, CASING DEPTH, POTABLE WATER, ANNULAR SPACES, USE OF DRIVE SHOE, OPENINGS TO ALLOW WATER ENTRY, CONTAMINANT ENTRY.	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975. WOULD PERTAIN DURING THE FS IF NEW WELLS ARE CONSTRUCTED FOR TREATABILITY STUDIES.
GW		3745-9-06	A	WELL CONSTRUCTION, SPECIFIC GEOLOGIC CONDITIONS	ESTABLISHES SPECIFIC REQUIREMENTS FOR WELLS IN DIFFERENT TYPES OF AQUIFERS	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975. WOULD PERTAIN DURING THE FS IF NEW WELLS ARE CONSTRUCTED FOR TREATABILITY STUDIES.

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
GW		3745-9-07	A-C	WELL GROUTING FOR CONSTRUCTION OF CLOSURE	ESTABLISHES SPECIFIC GROUTING PROCEDURES	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975. WOULD PERTAIN DURING THE FS IF NEW WELLS ARE CONSTRUCTED FOR TREATABILITY STUDIES.
GW		3745-9-10	A,B,C	ABANDONED WELL SEALING	PROCEDURES FOR CLOSING AND SEALING WELLS.	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975.
HW		3745-27-13	2(H), F	"DIGGING" WHERE HAZ OR SOLID WASTE FACILITY WAS LOCATED	FILLING, GRADING, EXCAVATING, BUILDING, DRILLING OR MINING ON LAND WHERE HAZARDOUS WASTE OR SOLID WASTE FACILITY WAS OPERATED	PERTAINS TO SITES WHERE CONSTRUCT ACTIVITIES WILL BE OCCURRING.
APC	3704.05		A-I	PROHIBITED ACTS.	PROHIBITS EMISSION OF ANY AIR CONTAMINANT IN VIOLATION OF 3704 OR ANY RULES, PERMITS OR VARIANCE ISSUES	PERTAINS TO ANY SITE THAT WHERE EMISSIONS OF AIR CONTAMINANTS OCCURS AS A RESULT OF REMEDIAL ACTIVITIES.
HW		3745-54-14	A-C	SECURITY FOR HAZARDOUS WASTE FACILITIES	HAZARDOUS WATE FACILITIES MUST BE SECURED SO THAT UNAUTHORIZED AND UNKNOWING ENTRY ARE MINIMIZED OR PROHIBITED	PERTAINS TO ANY SITE AT WHICH HAZARDOUS MATERIALS IS TO BE TREATED, STORED , OR DISPOSED OF

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
DAGW		3745-81-11	A, B, C	MAXIMUM CONTAMINANT LEVELS FOR INORGANICS	ESTABLISHES STATE OF OHIO MAXIMUM CONTAMINANT LEVELS (MCLS) FOR INORGANIC CONTAMINANTS FOR PUBLIC WATER SUPPLIES.	PERTAINS TO ANY SITE WITH GROUNDWATER CONTAMINATION AND GROUNDWATER REMEDIAL ACTIVITIES.
		3745-81-12	A, B, C	MAXIMUM CONTAMINANT LEVELS FOR ORGANICS	ESTABLISHES STATE OF OHIO MAXIMUM CONTAMINANT LEVELS (MCLS) FOR ORGANIC CONTAMINANTS FOR PUBLIC WATER SUPPLIES.	PERTAINS TO ANY SITE WITH GROUNDWATER CONTAMINATION AND GROUNDWATER REMEDIAL ACTIVITIES.
	6101.19			OHIO CONSERVANCY DISTRICT	TO PROTECT AND PRESERVE THE WORKS, IMPROVEMENTS, AND PROPERTIES OWNED OR CONTROLLED BY THE DISTRICT.	
NUISANCES	3767.13			PROHIBITED ACTS	PROHIBITS NOXIOUS EXHALATIONS OR SMELLS AND THE OBSTRUCTION OF WATERWAYS.	PERTAINS TO ANY SITE THAT MAY HAVE NOXIOUS SMELLS OR MAY OBSTRUCT WATERWAYS.
APC		3745-15-06	A1, A2	MALFUNCTION OF EQUIPMENT; SCHEDULED MAINTENANCE; REPORTING	ESTABLISHES SCHEDULED MAINTENANCE AND SPECIFIES WHEN POLLUTION SOURCE MUST BE SHUT DOWN DURING MAINTENANCE.	PERTAINS TO ANY SITE WHICH UTILIZES OR WILL UTILIZE AIR POLLUTION CONTROL EQUIPMENT ON-SITE.

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
UIC		3745-34-36		PLUGGING AND ABANDONING CLASS I WELLS	SPECIFIES REQUIREMENTS TO BE MET WHEN PLUGGING OR ABANDONING A CLASS I WELL. SEE 3745-34-04 FOR DEFINITIONS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC		3745-34-37		CONSTRUCTION REQUIREMENTS FOR CLASS I WELLS	SPECIFIES CONSTRUCTION AND SITING REQUIREMENTS FOR CLASS I WELLS. PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC		3745-34-38		OPERATING, MONITORING, AND REPORTING REQUIREMENTS FOR CLASS I WELLS	SPECIFIES OPERATING, MONITORING AND REPORTING REQUIREMENTS NECESSARY FOR CLASS I WELLS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND.

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-50-44	C2	CONTENTS OF "PART B" OF THE PERMIT APPLICATION	ESTABLISHES SUBSTANTIVE HAZARDOUS WASTE PERMIT REQUIREMENTS NECESSARY FOR OHIO EPA TO DETERMINE ADEQUACY OF TANK TREATMENT AND STORAGE UNITS. INCLUDES INFORMATION SUCH AS ASSESSMENT OF STRUCTURAL INTEGRITY, DETAILED PLANS OF TANK SYSTEM(S), DESCRIPTION OF SECONDARY CONTAINMENT SYSTEM, ETC. SEE OAC 3745- 55-90 THROUGH 3745-55-99 FOR ADDITIONAL REQUIREMENTS. THIS, ALONG WITH OTHER PARAGRAPHS OF THIS RULE AND OAC 3745-55-90 THROUGH 3745-55- 99, ESTABLISHES THE MINIMUM INFORMATION REQUIRED DURING THE REMEDIAL DESIGN STAGE.	PERTAINS TO ANY SITE AT WHICH STORAGE OR TREATMENT OF HAZARDOUS WASTE IN TANKS WILL OCCUR ON-SITE.

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-54-15	A, C	GENERAL INSPECTION REQUIREMENTS	HAZARDOUS WASTE FACILITIES MUST BE INSPECTED REGULARLY TO DETECT MALFUNCTIONS, DETERIORATIONS, OPERATIONAL ERRORS AND DISCHARGES. ANY MALFUNCTIONS OR DETERIORATIONS DETECTED SHALL BE REMEDIED EXPEDITIOUSLY.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW		3745-54-31		DESIGN AND OPERATION OF FACILITY	HAZARDOUS WASTE FACILITIES MUST BE DESIGNED, CONSTRUCTED, MAINTAINED AND OPERATED TO MINIMIZE THE POSSIBILITY OF FIRE, EXPLOSION OR UNPLANNED RELEASE OF HAZARDOUS WASTE OR HAZARDOUS CONSTITUENTS TO THE AIR, SOIL OR SURFACE WATER WHICH COULD THREATEN HUMAN HEALTH OR THE ENVIRONMENT.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-54-32	A-D	REQUIRED EQUIPMENT	ALL HAZARDOUS WASTE FACILITIES MUST BE EQUIPPED WITH EMERGENCY EQUIPMENT, SUCH AS AN ALARM SYSTEM, FIRE CONTROL EQUIPMENT AND A TELEPHONE OR RADIO. PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW		3745-54-33		TESTING AND MAINTENANCE OF EQUIPMENT	ALL HAZARDOUS WASTE FACILITIES MUST TEST AND MAINTAIN EMERGENCY EQUIPMENT TO ASSURE PROPER OPERATION. PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW		3745-54-34		ACCESS TO COMMUNICATIONS OR ALARM SYSTEM	WHENEVER HAZARDOUS WASTE IS BEING HANDLED, ALL PERSONNEL INVOLVED SHALL HAVE IMMEDIATE ACCESS TO AN INTERNAL ALARM OR EMERGENCY COMMUNICATION DEVICE.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-54-35		REQUIRED AISLE SPACE	ADEQUATE AISLE SPACE SHALL BE MAINTAINED TO ALLOW UNOBSTRUCTED MOVEMENT OF PERSONNEL, FIRE EQUIPMENT, SPILL CONTROL EQUIPMENT AND DECONTAMINATION EQUIPMENT INTO ANY AREA OF THE FACILITY OPERATION IN THE EVENT OF AN EMERGENCY.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF). CONSIDER FOR SITES WHERE WASTES WILL BE STORED IN CONTAINERS.
HW		3745-54-37	A, B	ARRANGEMENTS/ AGREEMENTS WITH LOCAL AUTHORITIES	ARRANGEMENTS OR AGREEMENTS WITH LOCAL AUTHORITIES, SUCH AS POLICE, FIRE DEPARTMENT AND EMERGENCY RESPONSE TEAMS MUST BE MADE. IF LOCAL AUTHORITIES WILL NOT COOPERATE, DOCUMENTATION OF THAT NON-COOPERATION SHOULD BE PROVIDED.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-54-52	A-F	CONTENT OF CONTINGENCY PLAN	HAZARDOUS WASTE FACILITIES MUST HAVE A CONTINGENCY PLAN THAT ADDRESSES ANY UNPLANNED RELEASE OF HAZARDOUS WASTES OR HAZARDOUS CONSTITUENTS INTO THE AIR, SOIL OR SURFACE WATER. THIS RULE ESTABLISHES THE MINIMUM REQUIRED INFORMATION OF SUCH A PLAN.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW		3745-54-53	A, B	COPIES OF CONTINGENCY PLAN	HAZARDOUS WASTE FACILITIES COPIES OF THE CONTINGENCY PLAN REQUIRED BY 3745-54-50 MUST BE MAINTAINED AT THE FACILITY AND SUBMITTED TO ALL LOCAL POLICE DEPARTMENTS, FIRE DEPARTMENTS, HOSPITALS LOCAL EMERGENCY RESPONSE TEAMS AND THE OHIO EPA.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-54-54	A	AMENDMENT OF CONTINGENCY PLAN	HAZARDOUS WASTE FACILITIES THE CONTINGENCY PLAN MUST BE AMENDED IF IT FAILS IN AN EMERGENCY, THE FACILITY CHANGES (IN ITS DESIGN, CONSTRUCTION, MAINTENANCE OR OPERATION), THE LIST OF EMERGENCY COORDINATORS CHANGE OR THE LIST OF EMERGENCY EQUIPMENT.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW		3745-54-55		EMERGENCY COORDINATOR	AT ALL TIMES THERE SHOULD BE AT LEAST ONE EMPLOYEE EITHER ON THE PREMISES OR ON CALL TO COORDINATE ALL EMERGENCY RESPONSE MEASURES.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW		3745-54-56	A-I	EMERGENCY PROCEDURES	SPECIFIES THE PROCEDURES TO BE FOLLOWED IN THE EVENT OF AN EMERGENCY.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW		3745-54-73	A, B	OPERATING RECORD	SPECIFIES RECORDS TO BE KEPT AT TSD FACILITIES.	CONSIDER FOR SITES WITH ON-SITE TREATMENT, STORAGE OR DISPOSAL.
HW		3745-54-77	A	ADDITIONAL REPORTS	REQUIRES FACILITIES TO REPORT FIRES, EXPLOSIONS OR OTHER MISHAPS.	CONSIDER AT SITES WITH TREATMENT, STORAGE OR DISPOSAL ON-SITE.

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-55-71		CONDITION OF CONTAINERS	CONTAINERS HOLDING HAZARDOUS WASTE MUST BE MAINTAINED IN GOOD CONDITION (NO RUST OR STRUCTURAL DEFECTS).	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STORED IN CONTAINERS.
HW		3745-55-72		COMPATIBILITY OF WASTE WITH CONTAINERS	HAZARDOUS WASTES PLACED IN CONTAINER MUST NOT REACT WITH THE CONTAINER MATERIAL OR LINER MATERIAL.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STORED IN CONTAINERS.
HW		3745-55-73		MANAGEMENT OF CONTAINERS	CONTAINERS HOLDING HAZARDOUS WASTE MUST BE CLOSED (EXCEPT TO ADD OR REMOVE WASTE) AND MUST NOT BE HANDLED IN A MANNER THAT MAY RUPTURE THE CONTAINER OR CAUSE IT TO LEAK.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STORED IN CONTAINERS.
HW		3745-55-74		INSPECTIONS	REQUIRES AT LEAST WEEKLY INSPECTIONS OF CONTAINER STORAGE AREAS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STORED IN CONTAINERS.
HW		3745-55-75	A-D	CONTAINMENT	REQUIRES THAT CONTAINER STORAGE AREAS HAVE A CONTAINMENT SYSTEM AND SPECIFIES THE MINIMUM REQUIREMENTS OF SUCH A SYSTEM.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STORED IN CONTAINERS.

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-55-91	A, B, D	ASSESSMENT OF EXISTING TANK SYSTEMS INTEGRITY	REQUIRES THAT EACH EXISTING TANK USED TO STORE OR TREAT HAZARDOUS WASTE THAT DOES NOT HAVE SECONDARY CONTAINMENT BE TESTED TO ASSURE TANK INTEGRITY.	PERTAINS TO ANY SITE WHICH HAS EXISTING HAZARDOUS WASTE TREATMENT OR STORAGE TANKS THAT LACK SECONDARY CONTAINMENT.
HW		3745-55-92	A-G	DESIGN AND INSTALLATION OF NEW TANK SYSTEMS OR COMPONENTS	REQUIRES A SECONDARY CONTAINMENT SYSTEM FOR TANKS AND ASSESSMENT TO DETERMINE TANK INTEGRITY. PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.
HW		3745-55-93	A-G, I	CONTAINMENT AND DETECTION OF RELEASES	REQUIRES SECONDARY CONTAINMENT AND LEAK DETECTION SYSTEMS FOR TANKS. PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.
HW		3745-55-94	A, B, C	GENERAL OPERATING REQUIREMENTS	SPECIFIES GENERAL OPERATING REQUIREMENTS FOR TANK SYSTEMS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.

CATEGORY	ORC	OAC	PARAGRAPH	CAPTION	TEXT	APPLICATION
HW		3745-55-95	A-D	INSPECTIONS	REQUIRES INSPECTIONS AT LEAST ONCE EACH OPERATING DAY.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.
HW		3745-55-96	A,B,C,E	RESPONSE TO LEAKS OR SPILLS AND DISPOSITION OF LEAKING OR UNFIT FOR USE TANK SYSTEMS	REQUIRES THAT UNFIT TANKS BE REMOVED FROM USE AND FURTHER RELEASES BE PREVENTED.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.

Table 2

Comparative Analysis of the Action Alternatives Evaluated in the EE/CA

Table 4
Comparative Analysis Summary by Removal Action Alternative
Behr Property, Dayton, Ohio

Criterion	Alternative					
	No Action	Pump and Treat	Air Sparging with Soil Vapor Extraction	Enhanced Reductive Dechlorination and Emulsified Zero Valent Iron	In-Situ Chemical Oxidation	Zero-Valent Iron Permeable Reactive Barrier
Effectiveness						
Overall Protection of Human Health and the Environment	This alternative provides a low to no degree of protection of human health and the environment.	Pump and Treat treatment will reduce contaminant concentrations in groundwater and, as a result, will provide a moderate degree of protection of human health and the environment.	AS/SVE treatment will reduce contaminant concentrations in groundwater and, as a result, will provide a high degree of protection of human health and the environment.	ERD and EZVI treatment will reduce contaminant concentrations in groundwater and, as a result, will provide a high degree of protection of human health and the environment.	ISCO treatment will reduce contaminant concentrations in groundwater and, as a result, will provide a high degree of protection of human health and the environment.	PRB treatment will reduce contaminant concentrations in shallow groundwater downstream of the site and, as a result, will provide a high degree of protection of human health and the environment. Deeper groundwater is not treated.
Compliance with ARARs	Compliance with ARARs would not be achieved in a reasonable time frame.	Compliance with ARARs not likely, but EE/CA objectives likely achieveable (assume 5 years).	Compliance with ARARs not likely, but EE/CA objectives likely achieveable using an AS/SVE system (assume 5 years).	Compliance with ARARs not likely achieveable, but EE/CA objectives likely achieveable using an ERD and EZVI system (assume 5 years).	Compliance with ARARs not likely achieveable, but EE/CA objectives likely achieveable using ISCO (assume 5 years).	Compliance with ARARs not likely achieveable, but EE/CA objectives likely achieveable using a PRB system (assume 5 years).
Long-Term Effectiveness and Permanence	Not effective or permanent in the long-term; unacceptable risk to human receptors.	Long term effectiveness is not likely to be achieved for a very long time.	AS/SVE treatment will permanently remove contaminants from groundwater; however some rebound may occur over time.	ERD and EZVI treatment will permanently destroy contaminants in groundwater; however some rebound may occur over time or off-site ERD stall may occur.	ISCO treatment will permanently destroy contaminants in groundwater.	Contaminants in groundwater flowing through a PRB will be permanently destroyed until the reactive material is spent.
Short-Term Effectiveness	Because no action is taken, workers and the community would not be adversely affected in the short-term.	Installation of pumping wells and infrastructure for a P&T system would present very little risk for workers and the community. Risks of operation of the P&T system would be minimal.	Installation of AS/SVE wells and infrastructure for an AS/SVE system would present very little risk for workers and the community. Risks of operation of the AS/SVE system would be low.	Installation of injection wells for an ERD and EZVI system would present very little risk for workers and the community. Some low risk of handling chemicals could occur during injection operations.	Installation of injection wells for an ISCO system would present very little risk for workers and the community. Handling of oxidant may present a risk of exposure to workers during injection operations.	Installation of PRB would present very little risk for workers and the community. Some low risk of handling chemicals during installation; no risks of operation.
Reduction of Toxicity, Mobility, and Volume	There is no reduction of toxicity, mobility, or volume.	Toxicity of contaminants would not be reduced (transferred to another phase); mobility and volume would be reduced.	Toxicity of contaminants would not be completely reduced (transferred to another phase); mobility and volume would be reduced.	Mobility and volume of contaminants would be reduced. Toxicity could increase if VC production were to occur.	Toxicity, mobility, and volume of contaminants would be reduced.	Toxicity, mobility, and downstream volume of contaminants would be reduced in shallow groundwater only.

Table 4 (cont.)
Comparative Analysis Summary by Alternative
Behr Property, Dayton, Ohio

Criterion	Alternative					
	No Action	Pump and Treat	Air Sparging with Soil Vapor Extraction	Enhanced Reductive Dechlorination and Emulsified Zero Valent Iron	In-Situ Chemical Oxidation	Permeable Reactive Barrier
Implementability						
Technical Feasibility	There are no technical feasibility concerns.	P&T is technically feasible at the site with some effort. Construction techniques and materials are readily available, effective monitoring is easily achieved, and additional remedial actions could be implemented with this alternative.	AS/SVE is technically feasible at the site but will require considerable construction efforts due to the large amount of infrastructure required. Construction techniques and materials are readily available, effective monitoring is easily achieved, and additional remedial actions could be implemented with this alternative.	ERD and EZVI is technically feasible at the site. Construction techniques and materials are readily available, effective monitoring is easily achieved, and additional remedial actions could be implemented with this alternative.	ISCO is technically feasible at the site. Construction techniques and materials are readily available, effective monitoring is easily achieved, and additional remedial actions could be implemented with this alternative.	Construction of a PRB using one-pass trenching technique is specialized but available; limitation of depth means full treatment deeper than 40' is not feasible without alternate technology use. Effective monitoring is easily achieved, and additional remedial actions could be implemented with this alternative.
Regulatory Acceptance	Not likely to be acceptable to regulatory agencies.	This alternative is likely to be accepted by EPA and OEPA.	This alternative is likely to be accepted by EPA and OEPA.	This alternative is likely to be accepted by EPA and OEPA.	This alternative is likely to be accepted by EPA and OEPA.	This alternative is likely to be accepted by EPA and OEPA.
Community Acceptance	Not likely to be acceptable to the community.	This alternative is likely to be accepted by the community.	This alternative is likely to be accepted by the community.	This alternative is likely to be accepted by the community.	This alternative is likely to be accepted by the community.	This alternative is likely to be accepted by the community.
Cost						
Capital	$0	$1,000,000	$1,500,000	$2,000,000	$1,500,000	$3,500,000
O&M	$0	$2,000,000	$1,500,000	$1,000,000	$2,500,000	$500,000
Present Worth	$0	$3,000,000	$3,000,000	$3,000,000	$4,000,000	$4,000,000

NOTE: Costs presented above have been determined based on the current information set, and a specific operational timeframe. Should additional information be obtained, or modified cleanup goals be set, these costs will need to be updated.

Table 3

Summary of Historical GW Sampling Results from Wells in the AOI

Table 3

Summary of Relevant Groundwater Sample Results (in micrograms per liter) from the Area of Interest

Location	Date Sampled	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride
MWA004	Mar-14	3.7	16	4.3	<0.4	180	<0.4	2200	15
MWB003	Nov-03	320	65	76	65	1900	<4	4800	16
MWB003	Apr-05	89	20 J	19 J	<5	970	<4	3100	12
MWB003	Jul-05	69	21	20	<2	1000	<2	2800	15
MWB003	Nov-05	74	18 J	21 J	<5	900	<4	2900	13
MWB003	Mar-06	46	15 J	18 J	<5	720	<4	2800	10
MWB003	Oct-06	35	15	11	3 J	560	<2	1900	9
MWB003	Jan-07	30	13	10 J	3 J	530	<2	2400	5
MWB003	Jul-07	27	11 J	11 J	3 J	460	<2	1900	4
MWB003	Feb-08	27.2	19 J	16.9 J	<5.7	752	<5.6	2610	<4.5
MWB003	Sep-11	20 J	<25	18 J	<25	830	<25	1900	<25
MWB003	Aug-12	78 J	<250	<250	<250	720	21 J	4500	<250
MWB003	Mar-14	100	20	27	2.9	450	2.8	3700	3.8
PZ008I	Nov-03	76	43 J	8 J	<10	280	9900	7700	68
PZ008I	Apr-05	17 J	46 J	11 J	<10	720	8700	10000	33
PZ008I	Jul-05	19 J	36 J	11 J	<10	640	7200	10000	32
PZ008I	Nov-05	<16	31 J	<16	<20	630	8500	11000	23
PZ008I	Nov-06	9 J	34 J	11 J	<10	620	7500	11000	51
PZ008I	Jan-07	8 J	22 J	8 J	<10	560	7200	11000	37
PZ008I	Jul-07	<16	61 J	<16	<20	820	5700	11000	64
PZ008I	Feb-08	<15	45.3 J	20 J	<14	682	4100	8330	56.1
PZ008I	Aug-12	<830	210 J	<830	<830	690	3000	13000	<830
PZ008I	Mar-14	0.7J	190	53J	0.8J	700	2800	11000	59J
PZ010I	Nov-03	<8	<10	11 J	<10	2400	<8	8300	<10
PZ010I	Apr-05	24 J	9 J	11 J	<5	1800	<4	3000	59
PZ010I	Jul-05	23	31	31	<2	4100	<2	2900	52
PZ010I	Nov-05	26 J	55	64	<10	8200	26 J	3700	43 J
PZ010I	Mar-06	10 J	57	130	<10	7800	<8	2400	23 J
PZ010I	Nov-06	45	33	180	<5	3800	<4	1700	52
PZ010I	Jan-07	110	30	120	4 J	2500	<2	2100	24
PZ010I	Jul-07	140	33 J	100	<20	3600	<16	11000	44 J
PZ010I	Feb-08	120	36.7 J	124	<11	1490	<11	5340	77.5
PZ010I	Aug-12	510 J	<830	710 J	<830	840	<830	12000	<830
PZ010I	Mar-14	390	32	270	0.4J	540	<0.4	7100	22

All results prior to September 2011 are not EPA data. Reprinted for comparison purposes only.

Attachment 1

January 16, 2015 Letter from EPA to Behr Approving EE/CA Report as Final with Responsiveness Summary from the Public Comments

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

SR-6J

January 15, 2015

Via Certified and Electronic Mail

Boris Nodel, Facilities Manager
MAHLE Behr Dayton L.L.C.
1600 Webster Street
Dayton, Ohio 45404

RE: Behr Dayton Thermal VOC Plume Site, Dayton, Montgomery County, Ohio
Approval of the Final Engineering Evaluation/Cost Analysis and Response to Public Comments

Dear Mr. Nodel:

Pursuant to paragraph 16.b. of the Administrative Settlement Agreement and Order on Consent for Engineering Evaluation/Cost Analysis, V-W-13-C-020 (the EECA AOC), EPA hereby approves the Engineering Evaluation/Cost Analysis (EE/CA) report dated November 11, 2014 for the Behr Dayton Thermal VOC Plume Site in Dayton, Ohio.

A public comment period for the EE/CA report occurred from November 20, 2014 until December 20, 2014. EPA received three comments and is enclosing a response to comments that summarizes them.

If you have any questions regarding this approval or EPA's responses to the public comments, please call or email me at (312) 886-2402 or hardin.erik@epa.gov.

Sincerely,

Erik Hardin
Remedial Project Manager

Enclosure

cc (via email only): Ron Roelker, AECOM
Leslie Williams, Ohio EPA
James Shoemaker, City of Dayton, Department of Water
David Kearns, CH2M Hill

EPA Responses to Public Comments Received Regarding the Engineering Evaluation/Cost Analysis Report and EPA's Selected Remedy for a Non-time Critical Removal Action at the Behr Dayton Thermal VOC Plume Site

1) **Public Comment:** Two of the three commenters indicated a preference for the Air Sparging/Soil Vapor Extraction (AS/SVE) clean-up option.

   EPA Response: We agree that this is the least time-consuming most effective cleanup option.

2) **Public Comment:** One commenter recommended that no clean-up be selected but that property owners in the area instead be compensated for lost property values. A second commenter also expressed concerns about property values and houses that have been abandoned in the area.

   EPA Response: The laws and regulations under which EPA requires clean-ups such as these do not prescribe compensation for changes in real estate values. EPA investigates risks associated with contaminant releases such as those associated with the Behr Dayton Thermal VOC Plume Site (the Behr Dayton Superfund Site) and conducts or requires the clean-up of this contamination where risks are identified.

   That being said, EPA does attempt in its clean-ups to address the ultimate reuse of the areas associated with the site.

3) **Public Comment:** One commenter expressed an opinion that effectiveness is the most important factor in selecting a clean-up while another expressed concern with expediency.

   EPA Response: EPA and its consultants believe that the AS/SVE option will be at least as, if not more, effective than the other options in the timeframe discussed in the report. Note that this is an interim action for a specific subset of the Behr Dayton Superfund Site and is intended to eventually tie in with or be replaced by the final clean-up option(s) selected for the entire site.

   EPA and the responsible party involved in the EE/CA selected the option of pursuing this clean-up under EPA's non-time critical removal action process as it is the quickest available option for cleaning up this particular area of contamination.

4) **Public Comment:** Two of the commenters commented on costs. One said costs should not be a concern. The other proposed that half of the projected costs of cleanup be divided amongst property owners.

EPA Response: Cost is one of factors EPA considers to guide the development and screening of remedial alternatives in feasibility studies under 40 C.F.R. § 300.430(e)(7), and the remedy EPA selects based on the EECA must to the extent practicable contribute to the efficient performance of any anticipated long-term remedial action selected based on the remedial investigation and feasibility study at the Site. Moreover, EPA's guidance on *The Use of Non-Time Critical Removal Authority in Superfund Response Actions* recommends that we consider the likely cost of the action. The projection estimates the costs to conduct the remedy.

Attachment 2

Administrative Record Index

ATTACHMENT II

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION

ADMINISTRATIVE RECORD
FOR THE
BEHR DAYTON THERMAL SYSTEM VOC PLUME SITE
DAYTON, MONTGOMERY COUNTY, OHIO

UPDATE 3
SEPTEMBER, 2015

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	917551	1/1/12	U.S. EPA	Public	Fact Sheet: What You Should Know About the Problem of Vapor Intrusion	2
2	917550	6/25/12	Ohio Department of Health	Public	Fact Sheet for Trichloroethylene (TCE)	2
3	917549	7/25/12	Ohio Department of Health	Public	Fact Sheet for Tetrachloroethylene (PCE)	2
4	902700	1/22/13	U.S. EPA	File	Spreadsheet: Summary of All Data from the August 2012 Groundwater Sampling at the Behr Dayton Thermal Systems VOC Plume Site	16
5	455517	6/7/13	Hardin, E., U.S. EPA	Karl, R., U.S. EPA	Engineering Evaluation/Cost Analysis Approval Memorandum for a Proposed Non-Time Critical Removal Action at the Behr Dayton Thermal VOC Plume NPL Site	5
6	917555	11/1/14	U.S. EPA	Public	Fact Sheet - U.S. EPA Proposes Cleanup Options for Industrial Site	4
7	917548	11/11/14	Kelley, J., and Roelker, R., AECOM	U.S. EPA	Engineering Evaluation/Cost Analysis for the Behr Dayton Thermal Products Plant	360
8	917547	1/15/15	Hardin, E., U.S. EPA	Nodel, B., Behr Dayton LLC	Letter re: Approval of Final Engineering Evaluation/Cost Analysis and Response to Public Comments	3

Attachment 3

Environmental Justice Analysis

Attachment III

Environmental Justice (EJ) Analysis

Region 5 has reviewed environmental and demographic data for the area surrounding the Behr Dayton Thermal VOC Plume Site at 1600 Webster Street in Dayton, Ohio, and determined there is a high potential for EJ concerns at this location. The following is a screening of the surrounding area used Region 5's EJ Screen Tool.

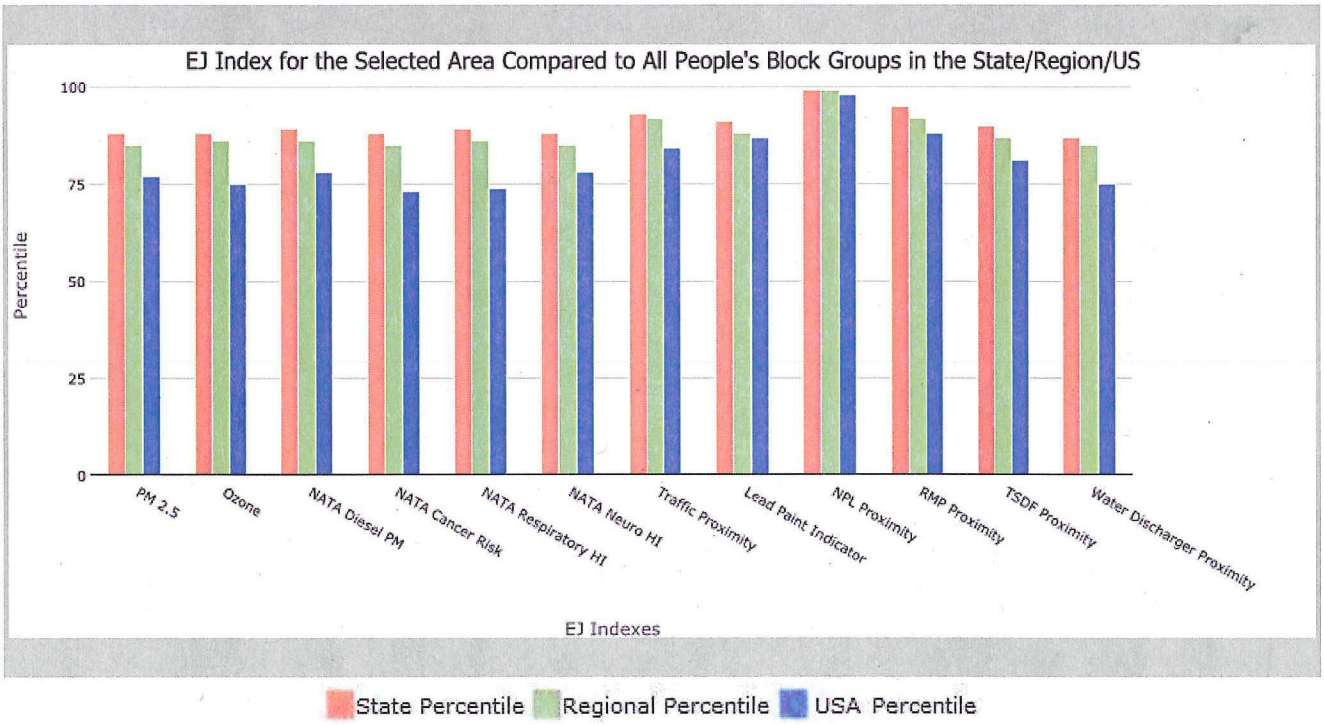
EJSCREEN Report

for 1 mile Ring Centered at 39.782969,-84.179441, OHIO, EPA Region 5

Approximate Population: 5722

Behr Dayton

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	88	85	77
EJ Index for Ozone	88	86	75
EJ Index for NATA Diesel PM	89	86	78
EJ Index for NATA Air Toxics Cancer Risk	88	85	73
EJ Index for NATA Respiratory Hazard Index	89	86	74
EJ Index for NATA Neurological Hazard Index	88	85	78
EJ Index for Traffic Proximity and Volume	93	92	84
EJ Index for Lead Paint Indicator	91	88	87
EJ Index for Proximity to NPL sites	99	99	98
EJ Index for Proximity to RMP sites	95	92	88
EJ Index for Proximity to TSDFs	90	87	81
EJ Index for Proximity to Major Direct Dischargers	87	85	75



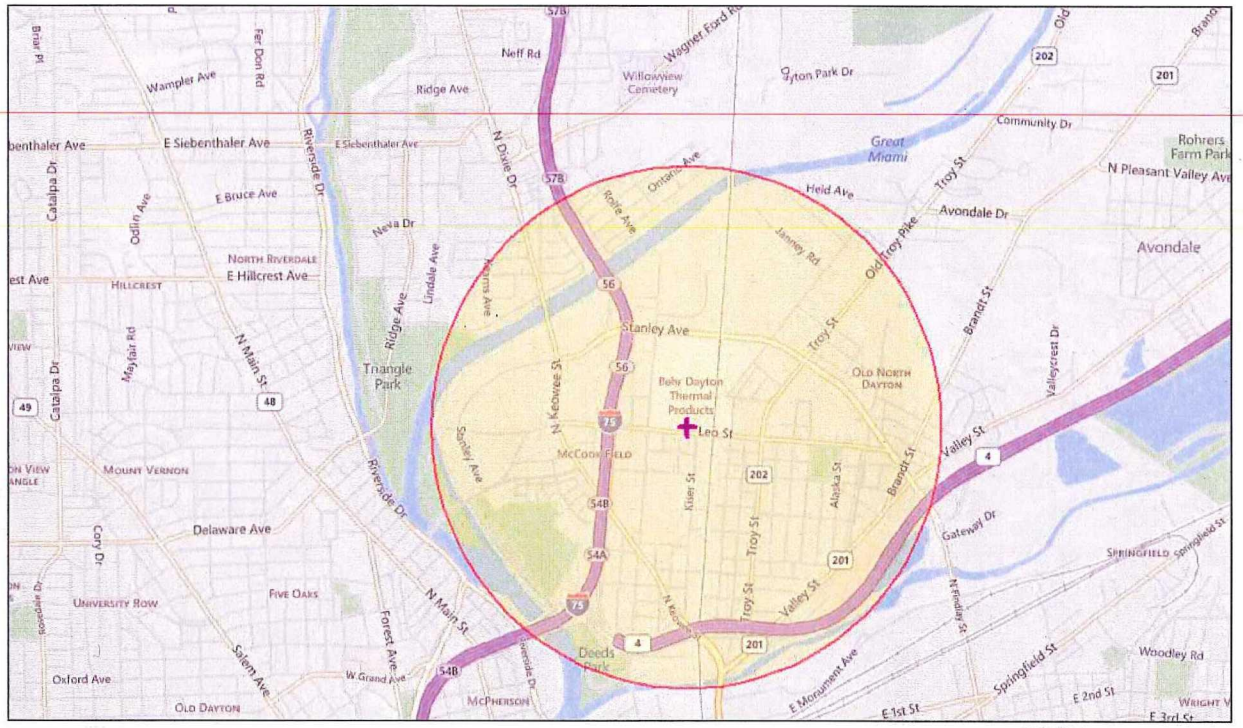
This report shows environmental, demographic, and EJ indicator values. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report

for 1 mile Ring Centered at 39.782969,-84.179441, OHIO, EPA Region 5

Approximate Population: 5722

Behr Dayton



EJSCREEN Report

for 1 mile Ring Centered at 39.782969,-84.179441, OHIO, EPA Region 5

Approximate Population: 5722

Behr Dayton

Selected Variables	Raw Data	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	14	13.6	63	13.3	73	10.7	94
Ozone (ppb)	52.2	49.7	88	45	97	46.3	84
NATA Diesel PM (µg/m³)*	1.19	0.609	87	0.712	80-90th	0.824	70-80th
NATA Cancer Risk (lifetime risk per million)*	53	41	86	42	70-80th	49	60-70th
NATA Respiratory Hazard Index*	2.3	1.4	91	1.5	80-90th	2.3	60-70th
NATA Neurological Hazard Index*	0.084	0.079	86	0.067	80-90th	0.063	80-90th
Traffic Proximity and Volume (daily traffic count/distance to road)	250	74	94	69	94	110	90
Lead Paint Indicator (% Pre-1960 Housing)	0.76	0.41	82	0.39	83	0.3	89
NPL Proximity (site count/km distance)	1.2	0.069	99	0.085	99	0.096	99
RMP Proximity (facility count/km distance)	0.9	0.3	92	0.33	90	0.31	91
TSDF Proximity (facility count/km distance)	0.055	0.056	72	0.051	76	0.054	75
Water Discharger Proximity (facility count/km distance)	0.15	0.23	52	0.23	56	0.25	56
Demographic Indicators							
Demographic Index	46%	26%	84	28%	82	35%	71
Minority Population	25%	19%	76	24%	69	36%	48
Low Income Population	67%	34%	91	32%	92	34%	91
Linguistically Isolated Population	1%	1%	74	3%	65	5%	50
Population With Less Than High School Education	34%	12%	96	12%	95	15%	90
Population Under 5 years of age	8%	6%	71	6%	69	7%	67
Population over 64 years of age	12%	14%	39	13%	44	13%	49

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: http://www.epa.gov/ttn/atw/natamain/index.html.

For additional information, see: www.epa.gov/environmentaljustice