Stericycle
Environmental Solutions

November 17, 2016

Mr. David Slayton
Michigan Department of Environmental Quality
Permits and Corrective Action Unit
Hazardous Waste Section
PO Box 30241
Lansing, MI 48909

Subject: **Corrective Measures Study Report**
Petro-Chem Processing Group of Nortru, LLC
Detroit, MI MID 980 615 298

Dear Mr. Slayton:

Pursuant to Part VI.G of the Petro-Chem Processing Group of Nortru, LLC Operating License, enclosed is the Corrective Measures Study Report (CMS). The CMS identifies and evaluates potential remedial alternatives for implementation at the Petro-Chem facility.

If you have any questions, please contact me at 425-227-6170.

Sincerely,

Andy Maloy
Director, Environmental Liability Management

cc: Ed Burke, Stericycle
Kellie Wing, Bureau Veritas

Corrective Measures Study
Nortru, LLC
Petro-Chem Processing Group Facility
421 Lycaste Street, Detroit, MI

November 17, 2016

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

John A. Maloy
Director, EH&S Risk Management

Corrective Measures Study

Stericycle Environmental Solutions, Inc.
Petro-Chem Processing Group of Nortru, LLC
421 Lycaste Street
Detroit, Michigan 48214

November 17, 2016
Project No. 11016-000171.00

Prepared for
Stericycle Environmental Solutions, Inc.
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421 Lycaste Street
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1.0 INTRODUCTION

This Resource Conservation and Recovery Act (RCRA) Corrective Measures Study (CMS) was prepared on behalf of Stericycle Environmental Solutions, Inc. (Stericycle) and Petro-Chem Processing Group of Nortru, LLC (PCPG) for its Facility located at 421 Lycaste Street in Detroit, Michigan. The purpose of the CMS is to develop and evaluate corrective measure alternatives for soil and groundwater contamination at this Facility.

1.1 SITE LOCATION AND DESCRIPTION

The PCPG Facility is situated on an estimated 8-acre parcel in an industrial and residential area approximately 0.5 miles north of the Detroit River. The facility is surrounded by industrial properties to the north; Lycaste Street to the east, Freud Avenue to the south, and Old St. Jean Avenue to the west. See Figure 1 for site location.

The PCPG facility consists of the following buildings:

- Two-story Office Building
- Laboratory
- Maintenance Office
- Container Management Building
- Electrical Room
- Technical Center
- Employee Locker Room and Restroom
- Electrical Building
- SBS Building
- Operations Building

See Figure 2 for a site map.

The facility is secured by a 6-foot-high chain-link security fence topped with barbed wire. A driveway on the east side of the facility is used for incoming and outgoing traffic at the facility. Other facility features include an employee and visitor parking area, aboveground storage tanks (ASTs), a drum storage area, and support facilities.

PCPG is a RCRA Hazardous Waste Management Facility, which is permitted to store, treat, transfer, and recycle hazardous wastes. PCPG currently operates a fuel blending and solvent recycling plant. Spent solvents, rags, fuel sludges, and tank bottoms are processed and are either cleaned and recycled, or sold as fuel to cement kilns. Materials that cannot be recycled are sent offsite for disposal.

1.2 BACKGROUND

On June 16, 1999, the Michigan Department of Environmental Quality (MDEQ) issued a Hazardous Waste Treatment and Storage Facility Operating License (Operating License) for this facility (MID 980 615 298). PCPG is permitted to receive a wide range of waste codes that include halogenated and non-halogenated volatile organic compounds (VOCs).

Environmental studies have been conducted at the Facility since 1982. See Figure 3 for a site map showing previous sampling locations.

PCPG began "detection"-based semi-annual groundwater monitoring in September 1999 in compliance with specifications of the Operating License. Based on the results of monitoring and soil boring sampling, the Facility is required to conduct corrective action for releases of a contaminant from a Waste Management Unit (WMU) to protect human health and the environment in accordance with R 299.9629.

On December 18, 2012, the MDEQ issued a new Operating License for the Facility. This CMS is intended to comply with Operating License conditions VI.G and VI.K for the purpose of developing and evaluating response activity alternatives necessary to address the release of hazardous substances and the waste management units and areas of concern (AOC) that are identified in the approved Corrective Action Investigation (CAI) Report as requiring final response activities.

In accordance with MDEQ's *Review of Corrective Action Investigation Report*, dated October 27, 2015, the CMS must address:

- AOC-1/AOC2 – Soil and groundwater volatilization to indoor air criteria
- AOC-3 – Methyl *tert* butyl ether (MtBE) in groundwater
- WMU-15 – Former Container Processing Unit
- WMU-17 – Northwest Tank Farm
- WMU-18 – Super Blender/SBS Blending Building (detections of VOCs in BSB-13, 36, and 38)

1.3 ORGANIZATION OF CMS REPORT

The CMS report is presented in the following sections:

- Section 2 summarizes the results of previous investigations and identifies contaminants and locations that require evaluation of corrective action alternatives.
- Section 3 establishes the cleanup objectives for soil and groundwater.
- Section 4 identifies and describes potential corrective action alternatives that are then screened using threshold criteria.
- Section 5 presents the evaluation of the corrective action alternatives in light of the balancing criteria.
- Section 6 presents the conclusions of this CMS and recommends a final corrective measure alternative.
- Section 7 lists the references used in this CMS.

2.0 DESCRIPTION OF CURRENT CONDITIONS

PCPG continues to operate a fuel blending and solvent recycling plant in accordance with the current Operating License, dated December 18, 2012. Facility conditions have not changed since the time that the Corrective Action Investigation (CAI) and CMS Investigations were conducted.

2.1 GEOLOGY AND HYDROGEOLOGY

This section presents a summary of the geologic and hydrogeologic conditions that currently exist at the Facility and the results of previous investigations that exceed applicable cleanup criteria. A more detailed description of site conditions is presented in the CAI report.

2.1.1 Geology

The stratigraphy at the Facility consists of an uppermost layer of sandy silt and silty sand (historic fill material) with some clay to a depth that ranges from one to 13 feet. In some areas, shards of glass and brick fragments were noted in the fill material.

A layer of natural peat underlies the uppermost layer of fill material and silty sand layer across the site. The thickness of the peat layer ranges from several inches near the northwest property boundary to four feet along the southern property boundary. In some locations, the peat is underlain by a thin silty sand lens, but at most locations, the peat is underlain by natural silty-clay.

See Figures 4 and 5 for cross-sections showing site stratigraphy.

The water-bearing peat layer overlies a thick, dry, and continuous layer of silty clay till. The silty clay till layer uniformly underlies the site and most of the surrounding Detroit area. Although the onsite thickness of the clay till unit is not known (at least 30 feet thick), regionally, soil boring logs from the North Jefferson Chrysler plant (located approximately 0.5 mile to the north) depict the same clay layer from a depth of 10 to 103 feet (WWE, 1991 with revisions, 1993).

During the CAI, soil samples were collected from above the water table and analyzed for grain size, density and porosity. The soil was classified as a fine- to medium-grained sand with silt and trace limestone, and a Unified Soil Classification System (USCS) designation of SP (i.e., poorly graded sand). The density ranged from 93 to 99 pounds per cubic foot, and the porosity ranged from 41 to 45 percent.

2.1.2 Hydrogeology

Groundwater was collected from the shallow water bearing unit contained within the peat and/or underlying silty sand layer. The moist or damp layer is present at depths ranging from approximately 7 to 12 feet.

In January 1991, a bail-down slug test was performed at Monitoring Well MW-7. The transmissivity was calculated to be 6×10^{-3} cm^2/sec and the groundwater flow rate was calculated to be 2×10^{-2} cm/sec.

The permeability of the homogeneous clay layer at a depth of 13 to 15 feet in the deep boring DB-1A was measured using the triaxial cell method and was found to be $8.5X10^{-9}$ cm/sec, indicating a very tight and dense lean clay (WWE, 1991 with revisions in 1993).

The ubiquitous silty clay layer acts as an impermeable barrier to infiltrating surface water. All surface water that infiltrates the fill or peat is contained in a thin perched water bearing zone associated with the peat or underlying silty sand.

No aquifer is known to exist at, or near, the Facility. The thick, dry, silty clay layer represents an impermeable barrier that prevents the downward migration of the perched groundwater. The perched water zone does not produce sufficient water to sustain pumping. During semi-annual monitoring, 9 of the 12 monitoring wells (except MW-2D, MW-3 and MW-9) pump dry and do not quickly recharge.

Groundwater flow maps have been prepared following each semi-annual compliance monitoring event. Groundwater measurements indicate a divide in the flow direction. See Figure 6 for a site map showing groundwater flow. The highest groundwater elevations are found near the current Container Management Building, in the location of the former Container Processing System (WMU-15). Groundwater west of the divide generally flows westward and groundwater east of the divide generally flows eastward. The direction and pattern of groundwater flow has remained consistent since 1982 (WWE, 1991 with revisions in 1993).

2.2 RELEVANT EXPOSURE PATHWAYS AND APPLICABLE CRITERIA

The purpose of this section is to summarize the relevant exposure pathways and to identify applicable cleanup criterion for constituents of concern (COCs) that exist at the Facility.

To identify hazardous substances in soil and groundwater that require corrective action, Bureau Veritas compared the results of soil and groundwater to generic non-residential cleanup criteria (R299.49). Generic non-residential cleanup criteria are the most appropriate criteria for this Facility because the property is zoned and utilized for industrial purposes.

Restrictive Covenant to Reliably Restrict Exposure as Described in Section 4.3. To ensure that the Facility remains zoned and utilized for industrial purposes, PCPG will record a Declaration of Restrictive Covenant with the Wayne County Register of Deeds. Restrictive covenants are legal controls that reduce the potential for exposure by limiting land use.

See Appendix A for a draft version of the MDEQ's Restrictive Covenant template.

PCPG will record a Restrictive Covenant that limits land-use in the following manner:

- Limit the use of the property for non-residential purposes
- Prohibit the use of shallow water for drinking water purposes
- Prohibit the construction of habitable structures over the top of (or near) contamination that exceeds indoor air inhalation criteria
- Maintain the onsite pavement

Relevant Pathways and Applicable Criterion. Based on the Part 201 definitions for "relevant pathway"[1] (i.e., Rule 299.2[g]), and "applicable criterion"[2] (i.e., Rule 299.1[d]):

- The drinking water exposure pathway is not a "relevant pathway" for this Facility because the shallow perched groundwater beneath the site is not an "aquifer". The Facility is underlain by a very thick sequence of silty clay and wells drilled into the bedrock formations usually yield water that is too highly mineralized for most uses. Based on Bureau Veritas' professional judgment, the drinking water exposure pathway is not relevant because there is no reasonable potential for exposure to occur via ingestion of drinking water. Because the exposure pathway is not relevant, the drinking water (DW) and drinking water protection (DWP) cleanup criteria are not "applicable criterion" for this Facility.

- The surface water pathway is not a relevant pathway for this Facility because the nearest surface water (i.e., the Detroit River) is 750 feet away and, if the perched groundwater were to flow into surrounding storm sewers, the sewers discharge to a City of Detroit waste water treatment plant (WWTP) and not to surface water. Based on these reasons and the results of previous investigations, Bureau Veritas has concluded that hazardous substances in groundwater are not reasonably expected to vent to surface water in concentrations that exceed the generic groundwater surface water interface (GSI) criteria. Because the surface water pathway is not a relevant pathway, the GSI and GSI protection cleanup criteria are not "applicable criterion" for this Facility.

The exposure pathways that are considered relevant for the facility include:

- Groundwater Contact – Groundwater contact criteria (GCC) and groundwater contact protection (GCP) criteria are applicable.

- Soil Direct Contact – Soil direct contact criteria (DCC) are applicable.

- Volatilization to Indoor Air Inhalation - Soil and groundwater volatilization to indoor air inhalation criteria (SVIAIC and GVIIC) are applicable for locations where a habitable structure overlies or is near the source of contamination.

- Volatilization to Ambient Air Inhalation – Infinite source soil volatilization to ambient air inhalation criteria (VSIC) are applicable unless it can be demonstrated that the source of hazardous substance is 5 meters thick or less. If the source of hazardous substances is 5 meters thick or less, then the applicable ambient air inhalation criterion is the 5-meter source VSIC or the 2-meter source VSIC.

- Particulate Inhalation – Particulate inhalation criteria are applicable for soil.

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[1] "Relevant pathway" means an exposure pathway that is reasonable and relevant because there is a reasonable potential for exposure to a hazardous substance to occur to a human or nonhuman receptor. The components of an exposure pathway are a source or release of a hazardous substance, an exposure point, and, if the exposure point is not the source or point of release, a transport medium. The existence of a municipal water supply, exposure barrier, or other similar feature does not automatically make an exposure pathway irrelevant (R299.2(g)). For GSI, the pathway shall be considered a relevant pathway when a remedial investigation or application of best professional judgment leads to the conclusion that a hazardous substance in groundwater is reasonably expected to vent to surface water in concentrations that exceed the generic GSI criteria.

[2] "Applicable criterion" means a cleanup criterion for a relevant pathway. A criterion is not an applicable criterion if the exposure pathway is not a relevant pathway at the facility or if the exposure it addresses is reliably restricted by a restrictive covenant or institutional control or other mechanism allowed for under part 201 of the act and these rules (R299.1(d)).

Applicable Cleanup Criteria and Screening Levels for Soil. Based on the exposure pathway evaluation summarized in Table 1, the following cleanup criteria are applicable for this Facility:

- Health-based non-residential (1) GCP, (2) DCC, (3) SVIAIC, (4) infinite source VSIC (unless the source is demonstrated to be 5 meters or less), and (5) particulate inhalation.

- The soil saturation concentration screening level (Csat) is an applicable screening level for soil.

Table 1
Summary of Relevant Exposure Pathways for Soil

Exposure Pathway	Description	Relevant Pathway	Applicable Criterion
Drinking Water Protection	This pathway involves contaminants that may leach to groundwater in an aquifer, or groundwater that is not in an aquifer but that may transport contaminants into an aquifer. The drinking water exposure pathway is not relevant because the groundwater is not in an aquifer and there is no reasonable potential for exposure to hazardous substances to occur via ingestion of groundwater. The shallow perched water is present in granular fill and peat across the site in a lens that is less than or equal to five feet thick at depths of 7 to 12 feet bgs. The uppermost water bearing zone is directly underlain by dry silty clay that is present to a minimum depth of 30 feet. Regional soil boring data suggests that the homogeneous clay with a permeability of 8.5x10-9 cm/sec exists at depths up to 105 feet bgs. Regionally, lacustrine deposits are known to be present at depths up to 150 meters. The onsite wells generally bail dry during sampling and drinking water in the Detroit metro area is provided by the regional publicly operated treatment works, the Detroit Water and Sewerage Department (DWSD). The DWSD obtains water from the Great Lakes and their connecting waters, not from groundwater. The main pumping station for the DWSD is located northwest and upstream of the Facility.	**NO**	**NO**
Groundwater /Surface Water Interface Protection	This pathway involves contaminants that may leach to groundwater that is hydraulically connected to a surface water body. This pathway is not relevant because there are no surface water bodies in the direction of groundwater flow and the onsite storm sewers discharge to the municipal wastewater treatment plant, the DWSD. There is no known direct pathway from the perched uppermost water bearing zone at the facility to the Detroit River, which is the nearest receiving surface water body. The Detroit River is located southeast of and not directly downgradient from the Facility. Groundwater flow velocity at the Facility is very slow at 1.6x10-6 cm/sec.	**NO**	**NO**
Groundwater Contact Protection	This pathway involves contaminants that may leach to groundwater that has the potential to collect in a utility excavation or any subsurface excavation.	**YES**	**YES**
Direct Contact	This pathway involves long-term ingestion and dermal exposure to contaminated soil and is relevant for this property. The majority of the property is covered with pavement that minimizes dermal exposure to contamination.	**YES**	**YES**
Soil Volatilization to Indoor Air Inhalation Criteria	This pathway involves potential exposure to volatile indoor air contaminants from vapor intrusion resulting from soil contamination.	**YES**	**YES**
Soil Volatilization to Ambient Air Inhalation Criteria	This pathway involves potential exposure to volatile outdoor air contaminants from vapor intrusion resulting from soil contamination.	**YES**	**YES**

Applicable Criteria and Screening Levels for Groundwater. Based on the exposure pathway evaluation summarized in Table 2, the following non-residential cleanup criteria are, or may be, applicable for groundwater at the facility:

- The applicable health-based cleanup criteria for groundwater at this facility include GCC and GVIIC.

- The flammable and explosive screening level (FESL) and the Acute Inhalation Screening Level (AISL) are applicable screening levels for groundwater.

Table 2
Summary of Relevant Exposure Pathways for Groundwater

Exposure Pathway	Description	Relevant Pathway	Applicable Criterion
Drinking Water	This pathway involves contaminants in groundwater in an aquifer, or groundwater that is not in an aquifer but that may transport contaminants into an aquifer. The drinking water exposure pathway is not relevant because the groundwater is not in an aquifer and there is no reasonable potential for exposure to hazardous substances to occur via ingestion of groundwater.	**NO**	**NO**
Groundwater /Surface Water Interface	This pathway involves contaminants in groundwater that is hydraulically connected to a surface water body. This pathway is not relevant because the groundwater is not reasonably expected to vent to surface water and the surrounding storm sewers discharge to a City of Detroit WWTP.	**NO**	**NO**
Groundwater Volatilization to Indoor Air Inhalation Criteria	This pathway is relevant for volatile contaminants in groundwater if and when a habitable structure overlies the contaminated area and vapor intrusion issues are encountered from the uppermost water bearing zone at the Facility.	**YES**	**YES**
Groundwater Contact Protection	This pathway involves contaminants in groundwater that has the potential to collect in a utility excavation or any subsurface excavation.	**YES**	**YES**
Flammability and Explosivity Screening Level	This screening level involves contaminants in groundwater that have the potential for explosive vapor levels to accumulate in a building or utility systems.	**YES**	**YES**

The MDEQ Office of Waste Management and Radiological Protection (OWMRP) has adopted a previous version of the Part 201 cleanup criteria, dated September 28, 2012, for evaluating the need for corrective action and establishing appropriate cleanup levels.

For some of the hazardous substances detected at this facility (e.g., toluene, ethylbenzene, xylenes, and 1,2,4-trimethylbzene), the applicable health-based cleanup criteria (that were published by MDEQ on September 28, 2012) default to the soil saturation concentration (Csat) to indicate the potential for non-aqueous phase liquids (NAPL) to exist. The exceedance of Csat are noted and addressed in the following sections.

To further evaluate the risk associated with exposure to concentrations of hazardous substances exceeding Csat, Bureau Veritas additionally compared the detected concentrations to health-based cleanup criteria published by MDEQ. For toluene, ethylbenzene, xylenes, and 1,2,4-trimethylbzene, these health-based criteria are higher than the Csat screening level. The health based criteria existed when the 2012 cleanup criteria were established (i.e., available by contacting the MDEQ toxicologist or by using the promulgated algorithms) and are currently published in MDEQ's newer, December 30, 2013, version of the criteria.

2.3 RESULTS OF PREVIOUS INVESTIGATIONS

The following sections summarize each previous investigation to identify specific hazardous substances and locations where one or more of the applicable non-residential soil and groundwater cleanup criteria or screening levels have been exceeded. See Appendices B through F for analytical summary tables associated with each phase of investigation.

The hazardous substances that exceed applicable cleanup criteria will be addressed in Section 4.0 when evaluating corrective action alternatives.

2.3.1 2008 Closure of Eight CMUs

In 2008, Tetra Tech conducted concrete and soil sampling to support the closure of eight Container Management Units (CMUs). The results of this investigation were summarized in the following report:

- *Summary of Concrete and Soil Sampling in Eight Container Management Units*, prepared by Tetra Tech, May 21, 2008,

Tetra Tech collected samples of concrete and shallow soil at 27 locations in accordance with an MDEQ-approved sampling plan. The samples were analyzed for VOCs using USEPA Method 8260B and semi-volatile organic compounds (SVOCs) using USEPA Method 8270C.

Table 3 summarizes the locations where Tetra Tech detected hazardous substances in excess of applicable cleanup criteria.

Table 3
Hazardous Substances Detected in Soil Exceeding Applicable Cleanup Criteria
2008 Soil Sampling for Closure of Eight Container Management Units

Hazardous Substance	Maximum Soil Concentration Detected (µg/kg)	Applicable Criterion (or Screening Level) Exceeded	Locations of Exceedances
Benzo(a)pyrene	26,000	DCC	13S, 15S, 21S
Ethylbenzene	370,000	Csat	16S, 24S
Tetrachlorethene	1,000,000	GCP, DCC, SVIAIC, Infinite Source VSIC, Csat	14S
Toluene	980,000	Csat	16S, 24S
Trichloroethene	78,000	SVIAIC	14S
1,2,4-Trimethylbenzene	160,000	Csat	16S, 24S
Xylenes	2,400,000	Csat	14S, 16S, 24S

Csat = Soil saturation concentration
DCC = Direct contact criteria
SVIAIC = Soil volatilization to indoor air inhalation criteria
VSIC = Soil volatilization to ambient air inhalation criteria

Since the only soil that was excavated after collection of these 27 soil samples was related to the construction of the footings for the Container Management Building, the 2008 exceedances of applicable criteria remain to be addressed and are discussed below.

Results of Investigation. The following hazardous substances were detected above applicable cleanup criteria (dated September 28, 2012) and will be further evaluated in Section 4.0 – Screening of Corrective Measure Technologies:

- Benzo(a)pyrene at three locations (13S,15S, 21S) exceeding soil DCC. These locations are currently beneath concrete pavement and are expected to remain beneath concrete pavement.

The following hazardous substances were detected above current applicable cleanup criteria (dated September 28, 2012), but corrective measures are not necessary for reasons provided below:

- Ethylbenzene, toluene, 1,2,4-trimethybenzene, and xylenes in soil at three locations (14S, 16S, and 24S) at concentrations exceeding the Csat screening level; but not exceeding any of the applicable health-based cleanup criteria. Corrective actions are not necessary at these locations because:
    - Concentrations do not exceed any of the applicable health-based cleanup criteria.
    - The Container Management Building overlies the location of two samples (16S and 24S) and concrete pavement overlies the location of the third sample (14S). The presence of pavement prevents water infiltration and minimizes the potential for contaminant migration to groundwater. This is supported by the fact that the same contaminants were not detected in groundwater samples collected from nearby locations BSB19, BSB-20, and MW-4.
- PCE in soil above Csat and SVIAIC and trichloroethene (TCE) in soil above SVIAIC at one location (14S) near the elevated container storage building slab. Although the extent of contamination appears to be very limited and the presence of elevated levels of contamination could not be verified in adjacent Soil Boring BSB-19, this exceedance does not require additional evaluation to ensure that the risk vapor intrusion to indoor air is permanently reduced because:
    - There is no habitable structure on top of, or within 100 feet of, the location where this contamination was detected. The only building located within 100 feet of these sample locations is the Container Management Building. The lab and locker room and are situated greater than 100 feet from the source of contamination.
    - The same hazardous substances (i.e., PCE and TCE) are currently processed at the facility and controls have been established to prevent inhalation exposure. In accordance with the intent of Section 20120a(18)(c), a person may demonstrate compliance with indoor air inhalation criteria complying with the Michigan occupational safety and health act, 1974 PA 154, MCL 408.1001 to 408.1094, and the rules promulgated under that act applicable to the exposure to the hazardous substance, including, but not limited to, the occupational health standards for air contaminants, R 325.51101 to R 325.51108 of the Michigan administrative code. PCE and TCE are included in the facility's hazard communication and ambient air monitoring programs. In the July 27, 2016, conference call, MDEQ indicated that these regulations can be used to look at a snapshot-in-time human exposures controlled determination (CA725) under the federal Resource Conservation and Recovery Act of 1976, as amended, but not for a long-term corrective action measure since the human exposure assumptions may not be the same.

- For long-term corrective action, the vapor intrusion pathway will be reliably restricted by recording a Restrictive Covenant. The vapor intrusion pathway is reliably restricted because the deed restriction will prohibit the construction of new structures, unless such construction incorporates engineering controls designed to eliminate the potential for subsurface vapor phase hazardous substances to migrate into the new structure at concentrations greater than applicable criteria; or, unless prior to construction of any structure, an evaluation of the potential for any hazardous substances to volatilize into indoor air assures the protection of persons who may be present in the buildings and is in compliance with Section 20107a of the NREPA.

- PCE above the Infinite Source VSIC at one location (14S).

  The "infinite source" VSIC is not an applicable criterion for VOCs at this location because the source is small and surficial. Bureau Veritas attempted to verify the presence of PCE and TCE in Soil Sample 14S by installing Soil Boring BSB-19 adjacent to this location. Only very low levels of PCE were detected in the 3-5 foot deep soil sample and PCE and TCE were not detected in the 5-7 foot deep soil sample at that location. Based on this finding, the "2-meter source" VSIC (not the infinite source VSIC) is the appropriate cleanup criteria for evaluating the risk of exposure for ambient air inhalation pathway.

  Because the extent of PCE is limited and its concentration in soil sample 14S does not exceed the 2 meter source VSIC, no corrective actions are necessary for the ambient air inhalation pathway.

2.3.2 2010 RCRA Facility Investigation

A RCRA Facility Investigation (RFI) was conducted at the Facility in October 2010 in accordance with a MDEQ-approved sampling plan and the RFI report was submitted to the MDEQ on February 16, 2011. The purpose of the investigation was to further evaluate the horizontal extent of VOCs in soil and groundwater on the property and in the adjacent right-of-ways. The investigation included 10 soil borings (BSB-1 through BSB-10) and the analysis of 20 soil and 10 water samples to evaluate the extent of contamination.

VOCs were detected in soil and groundwater at concentrations exceeding their method detection limits at locations surrounding the Facility and the highest concentrations of contaminants in soil and groundwater were detected in Soil Boring BSB-7, located along the western property boundary.

Tables 4 and 5 summarize the hazardous substances detected during the 2010 investigation that exceed applicable cleanup criteria; however, no hazardous substances were detected above applicable cleanup criteria or screening levels.

Table 4
Hazardous Substances Detected in Soil Exceeding Applicable Cleanup Criteria
2010 RCRA Facility Investigation

Hazardous Substance	Maximum Soil Concentration Detected (µg/kg)	Applicable Criterion (or Screening Level) Exceeded	Locations of Exceedances
None	Not applicable	None	None

Table 5
Hazardous Substances Detected in Groundwater Exceeding Applicable Cleanup Criteria
2010 RCRA Facility Investigation

Hazardous Substance	Maximum Groundwater Concentration Detected (µg/L)	Applicable Criterion (or Screening Level) Exceeded	Locations of Exceedance
None	Not applicable	None	None

2.3.3 2013 Corrective Action Investigation

As part of the 2012 Operating License, PCPG was required to conduct a Corrective Action Investigation (CAI) to determine if a release had occurred from the following:

- WMU-15 (Former Container Processing System)
- AOC-1 (Soil Volatilization to Indoor Air Exceedances)
- AOC-2 (Soil Volatilization to Ambient Air Exceedances)
- AOC-3 (MTBE Release to Site Wide Groundwater)

WMU-15 – Former Container Processing System. To further evaluate the soil contamination previously detected within the Former Container Processing System, groundwater samples were collected from locations surrounding WMU-15. Although significant levels of VOCs were detected in shallow soil samples by Tetra Tech (Section 2.3.1); no contaminants were detected in the surrounding groundwater samples at concentrations exceeding applicable cleanup criteria or screening levels.

AOC-1/AOC-2 – Indoor Air. Soil and groundwater samples were collected from soil borings, temporary monitoring wells, and permanent monitoring wells. At the time that the CAI was conducted, concentrations of contaminants exceeded Csat and/or SVIAIC at several locations (i.e., BSB-12 and BSB-24). The contamination detected in Soil Boring BSB-12 has been targeted for corrective action. The contamination detected in Soil Boring BSB-24 could not be confirmed during the subsequent Corrective Measures Study Investigation (see Section 2.3.4).

AOC-3 - MtBE. To address AOC-3, soil borings were advanced across the entire Facility and on adjacent properties. Groundwater was collected from temporary monitoring wells when sufficient volume of groundwater was present for sampling. MtBE was detected above laboratory detection limits at most locations across the Facility. Concentrations ranged from slightly above the detection limit of 1.0 microgram per liter (µg/L) to 27,000 µg/L. The highest concentrations of

MtBE were encountered in the western portion of the Facility, in the vicinity of the SBS Solids Building.

Concentrations of MtBE in soils and perched groundwater do not exceed applicable nonresidential cleanup criteria. Groundwater monitoring data collected at the Facility on a semi-annual basis indicate that MtBE is present at three monitoring well locations (MW-4 [upgradient], MW-6 and MW-9); but, the concentrations of MtBE in groundwater do not exceed applicable groundwater criteria.

PCPG will continue to monitor groundwater at established compliance points for evidence of new releases in accordance with the Facility Operating License. Concentrations of VOCs in semi-annual groundwater samples have been trending downward since 2009. Current concentration trends in groundwater detection demonstrate that applicable nonresidential clean up criteria (direct contact, SVIAIC, or SVIC) have not been exceeded at the Facility.

Analytical Results Exceeding Applicable Cleanup Criteria. See Tables 6 and 7 for a summary of contaminants exceeding applicable cleanup criteria.

The following hazardous substances were detected at concentrations exceeding applicable cleanup criteria and will be addressed for corrective action:

- Ethylbenzene, toluene, and xylenes above Csat and trichloroethene above SVIAIC in soil samples from Soil Boring BSB-12 (adjacent to the Western Berm) will be addressed with corrective actions.

- Tetrahydrofuran, toluene and xylenes above FESL in the groundwater samples from BSB-13 (near the Western Berm) will be addressed with corrective actions.

The following hazardous substances were detected above applicable cleanup criteria, but corrective measures are not necessary for reasons provided below:

- 1,2,4-Trimethylbenzene above Csat in Soil Boring BSB-24, but not above any of the applicable health-based criteria. This exceedance will not be addressed because it represents a small area of contamination that could not be verified by subsequent soil sampling. Bureau Veritas attempted to verify the concentration of 1,2,4-trimethybenzene at BSB-24 by advancing soil boring BSB-39 at an adjacent location and collecting groundwater samples from nearby Monitoring Well MW-12. 1,2,4-Trimethybenzene was not detected in soil from BSB-39 or in groundwater from Monitoring Well MW-12. Since no health-based criteria have been exceeded and only “slightly positive” NAPL was detected in BSB-39, this contamination will not be addressed by corrective measures.

Table 6
Hazardous Substances Detected in Soil Exceeding Applicable Cleanup Criteria
2013 Corrective Action Investigation

Hazardous Substance	Maximum Soil Concentration Detected (µg/kg)	Applicable Criterion (or Screening Level) Exceeded	Locations of Exceedances
Ethylbenzene	180,000	Csat	BSB-12 (10-12)
Toluene	350,000	Csat	BSB-12 (10-12)
Trichloroethene	2,200	SVIAIC	BSB-12 (8-10)
1,2,4-Trimethylbenzene	220,000	Csat	BSB-24(7.5-8.5)
Xylenes	750,000	Csat	BSB-12 (10-12)

Csat = Soil saturation concentration
SVIAIC = Soil volatilization to indoor air inhalation criterion

Table 7
Hazardous Substances Detected in Groundwater Exceeding Applicable Cleanup Criteria
2013 Corrective Action Investigation

Hazardous Substance	Maximum Groundwater Concentration Detected (µg/L)	Applicable Criterion (or Screening Level) Exceeded	Locations of Exceedances
Tetrahydrofuran	85,000	FESL	BSB-13
Toluene	99,000	FESL	BSB-13
Xylenes	91,000	FESL	BSB-13

FESL = Flammable and Explosive Screening Level

2.3.4 2015 Corrective Measures Study Investigation

In accordance with MDEQ's request for additional evaluation (MDEQ; October 27, 2015), the CMS investigation was conducted to further evaluate the horizontal extent of soil and groundwater impact on the Facility and western adjacent properties and to further evaluate the potential presence of NAPL.

Results of NAPL Evaluation. Potential evidence of NAPL was noted in samples collected from the following soil borings:

- BSB-39/MW-12 (Near BSB-24) - A soil test kit indicated a "slightly positive hydrocarbon in soil" at a depth of 5 to 7.5 feet.
- BSB-42 (Western Berm) – A soil test kit indicated a "slightly positive hydrocarbon in soil" in the saturated zone from 10 to 12.5 feet.
- BSB-43/MW-11 (Western Berm) - A soil test kit indicated a "slightly positive hydrocarbon in soil" in the saturated zone from 12.5 to 15 feet.

Analytical Results Exceeding Applicable Cleanup Criteria. As summarized in Tables 8 and 9, VOCs were detected in soil and groundwater at concentrations exceeding MDEQ nonresidential cleanup criteria and/or screening levels (dated September 28, 2012).

The contamination in the Western Berm area (BSB-42, BSB-43, BSB-44, BSB-45, and MW-11) will be addressed with corrective actions.

The chlorinated solvent contamination detected in offsite Soil Boring BSB-48 will not be addressed because it has been adequately demonstrated that the contamination was caused by the dry cleaner that formerly occupied that property.

Table 8
Hazardous Substances Detected in Soil Exceeding Applicable Cleanup Criteria
2015 Corrective Measures Study Investigation

Hazardous Substance	Maximum Soil Concentration Detected (µg/kg)	Applicable Criterion (or Screening Level) Exceeded	Locations of Exceedance
Ethylbenzene	490,000	Csat	BSB-43 (10-12), BSB-45 (13-15)
Tetrachlorethene	28,000	SVIAIC	BSB-48 (3-5)
Toluene	930,000	Csat	BSB-43 (10-12)
Trichloroethene	8,500	SVIAIC	BSB-48 (3-5), BSB-48 (5-7)
Xylenes	2,300,000	Csat	BSB-43 (10-12), BSB-45 (13-15)

Csat = Soil saturation concentration
SVIAIC = Soil volatilization to indoor air inhalation criterion

Table 9
Hazardous Substances Detected in Groundwater Exceeding Applicable Cleanup Criteria
2015 Corrective Measures Study Investigation

Hazardous Substance	Maximum Groundwater Concentration Detected (µg/L)	Applicable Criterion (or Screening Level) Exceeded	Locations of Exceedance
Toluene	130,000	FESL	BSB-42, BSB-44, BSB-45, MW-11
Xylenes	85,000	FESL	BSB-42, BSB-44

FESL = Flammable and Explosive Screening Level

The highest concentrations of cis-1,2-dichloroethene, PCE, TCE, and vinyl chloride in soil were detected in Soil Boring BSB-48 (3-5 feet), which was located offsite and west of Old St. Jean Avenue. The highest concentrations of petroleum hydrocarbons were noted in Soil Boring BSB-43, located within the Western Berm.

Potential evidence of NAPL (but not potentially mobile NAPL) was identified in Soil Borings BSB-39, BSB-42, and BSB-43. This evidence consisted of soil test kits indicating “slightly positive hydrocarbon in soil” and sheen on the water in the saturated zone.

Analytical Results Exceeding Applicable Criteria. The following hazardous substances were detected above applicable cleanup criteria and will be addressed with corrective measures:

- Ethylbenzene, toluene, and xylenes above Csat (and SVIAIC) in areas near the Western Berm will be addressed for corrective action because the berm and underlying soil represents the largest and most significant onsite source of contamination.

The following hazardous substances were detected above current applicable cleanup criteria (dated September 28, 2012), but corrective measures are not necessary for reasons provided below:

- PCE and TCE above SVIAIC in offsite Soil Boring BSB-48 will not be addressed for corrective measures because, based on PCPG's evaluation (August 3, 2016 letter to MDEQ) and MDEQ's concurrence, this contamination is believed to have been caused by the previous dry cleaner occupant of that property.

2.3.5 2016 Semi-Annual Groundwater Monitoring Results

There are currently 12 groundwater monitoring wells (MW-1 through MW-12) that are sampled on a semi-annual basis. The results from the most recent monitoring event were described in the 2016 1st Semi-Annual Environmental Monitoring Report (Bureau Veritas, 2016).

Based on a review of historical analytical results, no hazardous substances have been detected in groundwater at concentrations exceeding the applicable groundwater cleanup criteria or screening levels (i.e., GCC, GVIAIC, and FESL). Refer to Table 10.

Table 10
Hazardous Substances Detected in Groundwater Exceeding Applicable Cleanup Criteria
2009 to 2016 Semi-Annual Groundwater Monitoring

Hazardous Substance	Maximum Groundwater Concentration Detected (µg/L)	Applicable Criterion (or Screening Level) Exceeded	Locations of Exceedance
None	Not applicable	None	None

2.4 SUMMARY OF HAZARDOUS SUBSTANCES THAT REQUIRE CORRECTIVE ACTION

Based on the combined results of previous site investigations, the hazardous substances listed in Tables 11 and 12, and shown on Figures 7 and 8, will be addressed for corrective action in Section 4.0. There are two general areas of contamination that will be addressed for corrective action:

(1) The western soil berm area (where samples from BSB-12, BSB-13, BSB-42, BSB-43, BSB-44, BSB-45, and MW-11 were collected) represents the largest and most significant

source of onsite soil and groundwater contamination; exhibiting the highest potential for mobile NAPL.

(2) The soil near the former CPS Building (WMU-15) has been covered with pavement and buildings will be addressed using controls (recorded in the Restrictive Covenant) to reliably restrict exposure via dermal contact and inhalation.

Table 11
Combined Summary of Hazardous Substances Detected in Soil
Require Corrective Action

Hazardous Substance	Maximum Soil Concentration Detected (µg/kg)	Applicable Criterion Exceeded	Screening Level) Exceeded	Locations of Exceedance
Benzo(a)pyrene	26,000	DCC	None	13S, 15S, 21S
Ethylbenzene	370,000	None	Csat	16S, 24S, BSB-12 (10-12), BSB-43 (10-12), BSB-45 (13-15)
Tetrachlorethene	1,000,000	GCP, DCC, SVIAIC, VSIC	Csat	14S, BSB-48 (3-5)
Toluene	980,000	None	Csat	16S, 24S, BSB-12 (10-12), BSB-43 (10-12)
Trichloroethene	78,000	SVIAIC	None	14S, BSB-12 (8-10), BSB-48 (3-5)
1,2,4-Trimethylbenzene	160,000	None	Csat	16S, 24S, BSB-24 (7.5-8.5)
Xylenes	2,400,000	None	Csat	14S, 16S, 24S, BSB-12 (10-12), BSB-43 (10-12), BSB-45 (13-15)

Table 12
Combined Summary of Hazardous Substances Detected in Groundwater
Requiring Corrective Action

Hazardous Substance	Maximum Groundwater Concentration Detected (µg/L)	Applicable Criterion (or Screening Level) Exceeded	Locations of Exceedances
Tetrahydrofuran	85,000	FESL	BSB-13
Toluene	130,000	FESL	BSB-13, BSB-42, BSB-44, BSB-45, MW-11
Xylenes	91,000	FESL	BSB-13, BSB-42, BSB-44, MW-11

3.0 CORRECTIVE MEASURE CLEANUP OBJECTIVES

The purpose of the CMS is to develop corrective measure alternatives that may be implemented at the site to address releases of hazardous wastes. Each corrective measure alternative was selected and evaluated with the general objective of protecting human health and the environment from exposure to impacted soil and groundwater.

A wide range of corrective measure technologies were initially evaluated for their effectiveness to meet the following remedial action objectives:

- Minimize future potential human health risks due to ingestion and direct contact with soil and groundwater.
- Reduce the potential future movement of the COCs in the vadose zone to groundwater.
- Prevent human exposure by inhalation of indoor air concentrations above applicable risk criteria.

3.1 SOIL CLEANUP OBJECTIVES

Based on the relevant exposure pathways identified for this Facility, the applicable non-residential cleanup criteria and screening levels for soil are listed below. The selected numerical cleanup objective for each hazardous substance is italicized and highlighted in green in Table 13.

Table 13
Summary of Non-Residential Soil Cleanup Objectives

Hazardous Substance	Groundwater Contact Protection	Volatilization to Indoor Air	Volatilization to Ambient Air (Infinite Source)	Volatilization to Ambient Air (2 Meter Source)	Direct Contact	Soil Saturation Screening Level	Performance Objective
Ethylbenzene	140,000 C	140,000 C	2,400,000	6,500,000	140,000 C	*140,000*	No Visible NAPL
Toluene	250,000 C	250,000 C	3,300,000	36,000,000	250,000 C	*250,000*	No Visible NAPL
Trichloroethene	440,000	1,900	*14,000*	58,000	500,000 C,DD	500,000	None
1,2,4-Trimethylbenzene	110,000 C	110,000 C	25,000,000	600,000,000	110,000 C	*110,000*	No Visible NAPL
Xylenes	150,000 C	150,000 C	54,000,000	130,000,000	150,000 C	*150,000*	No Visible NAPL

C= Criterion defaults to soil saturation concentration

3.2 GROUNDWATER CLEANUP OBJECTIVES

Based on the applicable cleanup criteria for the Facility, the applicable non-residential cleanup criteria and screening levels for groundwater are listed below. The selected numerical cleanup objective for each hazardous substance is italicized and highlighted in green in Table 14.

Table 14
Summary of Non-Residential Groundwater Cleanup Objectives

Hazardous Substance	Volatilization to Indoor Air	Groundwater Contact	Flammability and Explosivity Screening Level	Performance Objective
Tetrahydrofuran	16,000,000	1,600,000	*60,000*	No Visible NAPL or Sheen
Toluene	530,000 S	530,000 S	*61,000*	No Visible NAPL or Sheen
Xylenes	190,000 S	190,000 S	*70,000*	No Visible NAPL or Sheen

3.3 OTHER OBJECTIVES – MAINTAIN THE INTEGRITY OF PEAT LAYER

PCPG has preferentially evaluated corrective action alternatives that preserve the presence and integrity of the peat layer that underlies the Facility. Although the peat layer is known to be contaminated, especially in the western berm area, the presence of the peat layer has significant beneficial properties that allow VOCs to adsorb to the organic material and thereby retard the potential for migration.

3.4 SUMMARY OF CORRECTIVE ACTIONS INTENDED TO MEET OBJECTIVES

Based on the results of previous investigations and the corrective measure objectives outlined above, Table 15 is a summary of areas where hazardous substances have been detected above applicable cleanup criteria and whether or not corrective measures are necessary to meet the objectives.

Table 15
Summary of Areas Where Hazardous Substances Exceed Applicable Cleanup Criteria or Screening Levels

AOC / Target Area	Hazardous Substances Above Applicable Criteria	Applicable Criterion (or Screening Level) Exceeded	Locations of Exceedances	Retain for Corrective Action?	Health-Based Cleanup Objective	Other Corrective Action Objectives
AOC-1 and AOC-2 - Volatilization to Indoor Air – Western Berm Area	Tetrahydrofuran, toluene, ethylbenzene, TCE, and xylenes	Soil: Csat, SVIAIC, GW: FESL	Western Berm Area BSB-12, BSB-13, BSB-42, BSB-43, BSB-44, BSB-45, MW-11	**YES**	None exceeded	Remove/reduce source concentrations Csat; NAPL; FESL
AOC-1 - Volatilization to Indoor Air – Former Container Processing Area	PCE and TCE	Soil: Csat, SVIAIC (also GCP and DCC)	14S	**YES**	Criteria not applicable after RC is recorded	Restrictive Covenant – Prohibit Habitable Structures over Contamination
AOC- 3 – MtBE in Groundwater	None	None	None	NO	NA	Continued Groundwater Monitoring
WMU-15 - PAHs in Soil – Former Container Processing Building	Benzo(a)pyrene	Soil: Direct Contact	13S, 15S, 21S	**YES**	Criterion not applicable after RC is recorded	Restrictive Covenant – Maintain Existing Exposure Barriers
WMU-15 - VOCs in Soil - Former Container Processing Building	Toluene, ethylbenzene, and xylenes	Csat only	14S, 16S, 24S	NO	None exceeded	Restrictive Covenant

RC= Restrictive Covenant

4.0 SCREENING OF CORRECTIVE MEASURE TECHNOLOGIES

This section identifies and evaluates potential remedial technologies that may be appropriate response actions at this facility. Bureau Veritas initially considered many potentially applicable technologies so that possible techniques were not overlooked. Proposed corrective measure technologies, can be composed of a single alternative or a combination of alternatives.

4.1 CORRECTIVE ACTION TECHNOLOGIES INITIALLY CONSIDERED

Prior to screening and further evaluation using balancing criteria, the following corrective measure technologies were initially considered:

- Restrictive Covenant – Implement site-specific controls such as erecting fences, groundwater use restriction, preparing deed restrictions, or posting notices or warnings at the facility. PCPG proposed to record a restrictive covenant that reliably restricts many of the potential exposures that exist.

- No Action – No remedial action would be implemented.

- Monitored Natural Attenuation (MNA) – Rely on natural processes to decrease contaminant concentrations and achieve remediation objectives. Progress is monitored via groundwater sampling.

- Removal (Soil Excavation and Dewatering) – Excavate high-concentrations in soil to remove the source and reduce the potential for future movement of COCs from soil to groundwater. Dewater contaminated groundwater from the excavation pit.

- Containment (Includes covers, barriers, trenches and hydraulic control)

- In-Situ Treatment – Dual Phase Extraction – A combination of groundwater pumping and soil vapor extraction. This method will reduce the overall mass of COCs in the vadose zone soil and reduce the potential for future mobility from soil to groundwater.

- In-Situ Treatment – ISCO – Inject chemically reductive additives (e.g., sodium permanganate) into the groundwater to degrade organic compounds.

- In-Situ Treatment - Enhanced Bioremediation – Introduce cultured microorganisms, an organic source, or nutrients into the subsurface to promote the biodegradation of soil and groundwater contaminants.

- In-Situ Treatment - Thermal Destruction – Apply electric current to electrodes to heat the contaminated soil and/or groundwater in the ground. The heat destroys or volatilizes organic compounds and can be used in conjunction with a vacuum extraction system to capture vapors.

- In-Well Treatment (Air Sparging and Soil Vapor Extraction) – Inject air into groundwater enabling VOCs to volatilize. This measure is typically used in conjunction with a soil vacuum extraction system to remove VOCs in vapor form.

- Groundwater Extraction (Pump and Treat) – Extract groundwater and treat or discharge.

4.2 SCREENING OF CORRECTIVE ACTION TECHNOLOGIES

The comprehensive list of remedial technologies was narrowed by screening each technology to determine its suitability based on site-specific characteristics, USEPA threshold criteria, and technology limitations. See Table 16 for a summary of this screening process.

Each technology was initially eliminated, or retained for further evaluation, based on:

(1) **Site-Specific Characteristics** - First, corrective measure technologies were screened to eliminate technologies that are not appropriate, or infeasible, based on the types of wastes and site-specific characteristics. For this Facility, Bureau Veritas eliminated the following technologies from consideration:

a. Each of the *Ex-situ* Treatment processes that require removal of soil because spatial constraints prevent the processing and treating of solid wastes onsite. Since each of the ex-situ soil treatment options require excavation, offsite treatment options are far less efficient, more costly, and present a higher risk of exposure than transportation and disposal of “non-hazardous” soil.

b. In-Situ Chemical Oxidation (ISCO) because the following site-specific conditions limit the feasibility and potential effectiveness of this measure:

i. The contaminants consist predominantly or petroleum hydrocarbons with lesser concentrations of chlorinated alkanes and alkenes. As a result, an oxidant with high kinetics (e.g., catalyzed persulfate, catalyzed peroxide, or ozone) would be the only viable chemical alternative. High kinetic oxidants are extremely short-lived and typically require multiple applications to be effective.

ii. The geology is very heterogeneous, which will prevent oxidant distribution and contaminant contact.

iii. Organic fill material and peat are two of the most difficult soil types to treat with ISCO because they consist of a very large mass of double bonded functional groups (e.g., humic acids, fulvic acids, and humin) which compete for the oxidation reaction.

iv. The double-bonded functional groups adsorb petroleum based compounds and retard the transport of these compounds within the groundwater. It is highly likely that this corrective measure would oxidize these functional groups and mobilize a large portion of the contamination. Due to the proximity of the target area to the property boundary (Old St. Jean Ave.), the mobilization would be difficult to control.

(2) **Threshold Criteria** - Second, potential technologies were screened using USEPA’s performance standards (i.e., threshold criteria) to eliminate options that do not meet RCRA

Table 16
Corrective Measure Technology Screening Results

Remedial Technologies	Type	Corrective Measures Screening Criteria						Retain Alternative for Evaluation?	Comments / Rationale
		Site-Specific Conditions	USEPA Performance Thresholds				Technology Limitations		
			Protection of Human Health and Environment	Attainment of Cleanup Objectives	Control the Release	Waste Mgt.			
None	No corrective action	PASS	PASS	**FAIL**	**FAIL**	PASS	YES	NO	Not suitable to address current conditions
None	Restrictive Covenant	PASS	PASS	PASS	PASS	PASS	PASS	YES	Restrictive Covenant to be recorded for Facility
None	Long-term Monitoring	PASS	PASS	PASS	PASS	PASS	PASS	YES	Semi-Annual monitoring required by Operating Permit will continue
Infiltration	Impermeable Cover	PASS	PASS	PASS	**FAIL**	PASS	PASS	NO	Will not control migration
Barriers	Grout Injection	PASS	PASS	**FAIL**	PASS	PASS	PASS	NO	NAPL remains in-place
	Trench	PASS	PASS	**FAIL**	PASS	PASS	PASS	NO	NAPL remains in-place
	Sheet piling	PASS	PASS	**FAIL**	PASS	PASS	PASS	NO	NAPL remains in-place
	Permeable Reactive Wall	PASS	PASS	**FAIL**	PASS	PASS	PASS	NO	NAPL remains in-place
	Groundwater extraction	PASS	PASS	**FAIL**	PASS	PASS	PASS	NO	NAPL remains in-place
	Groundwater recovery trenches	PASS	PASS	**FAIL**	PASS	PASS	PASS	NO	NAPL remains in-place
Excavation/ Dewatering	Excavation/ Dewatering	PASS	PASS	PASS	PASS	PASS	PASS	YES	Alternative 1 - Feasible technology for soil source removal
Groundwater Pump and Treat	Extraction wells	PASS	PASS	**FAIL**	PASS	PASS	PASS	NO	Will not reduce soil source; however, pump and treat is a component of DPE
Physical	Dual Phase Extraction (DPE)	PASS	PASS	PASS	PASS	PASS	PASS	YES	Alternative 2 - Only technology that simultaneously addresses soil, groundwater, and potential free-phase contaminants
	Air Sparging / Soil Vapor Extraction	PASS	PASS	PASS	PASS	PASS	YES	YES	Alternative 3 - Considered in contrast to DPE
Chemical	Oxidation (ISCO)	**FAIL**	PASS	PASS	PASS	PASS	PASS	NO	Eliminated based on soil types, heterogeneity, and potential destruction of peat layer
Biologicial	Enhanced bioremediation	PASS	PASS	PASS	PASS	PASS	**FAIL**	NO	Poor preformance in heterogeneous fill material and peat
Physical	Air Stipping	**FAIL**	Not considered	Not considered	Not considered	Not considered	Not considered	NO	Ex-situ soil treatment options are not practical for this Facility
	Carbon Adsorption	**FAIL**	Not considered	Not considered	Not considered	Not considered	Not considered	NO	Ex-situ soil treatment options are not practical for this Facility
Chemical	UV/Chemical Oxidation	**FAIL**	Not considered	Not considered	Not considered	Not considered	Not considered	NO	Ex-situ soil treatment options are not practical for this Facility
	Ozone	**FAIL**	Not considered	Not considered	Not considered	Not considered	Not considered	NO	Ex-situ soil treatment options are not practical for this Facility
	Fenton's Reagent / Hydrogen Peroxid	**FAIL**	Not considered	Not considered	Not considered	Not considered	Not considered	NO	Ex-situ soil treatment options are not practical for this Facility
	Potassium / Sodium Permanganate	**FAIL**	Not considered	Not considered	Not considered	Not considered	Not considered	NO	Ex-situ soil treatment options are not practical for this Facility
	Reactive iron (ZVI)	**FAIL**	Not considered	Not considered	Not considered	Not considered	Not considered	NO	Ex-situ soil treatment options are not practical for this Facility
Biologicial	Aerobic Bioreactor	**FAIL**	Not considered	Not considered	Not considered	Not considered	Not considered	NO	Ex-situ soil treatment options are not practical for this Facility
	Anaerobic Bioreactor	**FAIL**	Not considered	Not considered	Not considered	Not considered	Not considered	NO	Ex-situ soil treatment options are not practical for this Facility
Discharge	City of Detroit - POTW	PASS	PASS	PASS	PASS	YES	YES	YES	Considered for groundwater that is treated with other technologies

corrective action process objectives. Each potential alternative was evaluated using the four standards listed below:

a. Be protective of human health and the environment.

b. Attain media cleanup standards.

c. Control the source(s) of releases in order to reduce or eliminate, to the extent practicable, further releases of hazardous wastes (including hazardous constituents) that may pose a threat to human health and the environment.

d. Comply with applicable standards for management of wastes.

(3) **Technology Limitations** - Third, technologies with significant limitations have been excluded from further evaluation. For this site, Bureau Veritas eliminated the following technology from consideration based on its limitations:

a. In-situ Bioremediation was eliminated from consideration because this technology, by itself, has a poor track record in achieving soil and groundwater remediation goals within a reasonable time frame and the heterogeneous soil types will likely prevent or minimize microbial/contaminant contact.

The technologies that are carried forward through the preliminary screening process are selected, or combined with other technologies, as corrective measures alternatives.

4.3 IDENTIFICATION OF CORRECTION MEASURE ALTERNATIVES

Corrective measure alternatives consist of one or more technologies combined with deed restrictions and groundwater monitoring.

As described in Section 2.2, PCPG will record a Declaration of Restrictive Covenant intended to reliably restrict exposure to existing contamination. The Restrictive Covenant will:

- Limit the use of property for industrial purposes.
- Restrict the use of groundwater.
- Restrict the construction of new “habitable” buildings over the top of contamination that exceeds Csat or indoor air inhalation criteria.
- Maintain exposure barrier (pavement) over known areas of contamination.
- Identify areas where NAPL may be present.

After the Restrictive Covenant is recorded with Wayne County Register of Deeds, then:

- The soil DCC criteria will no longer be “applicable” for hazardous substances located beneath existing pavement or buildings. As a result, the risk of exposure to benzo(a)pyrene in the area beneath the old Container Processing Building (WMU-15) will be reliably restricted. After the Restrictive Covenant is filed, no additional corrective actions for benzo(a)pyrene are necessary.

- The SVIAIC criteria will no longer be “applicable” criterion for PCE and TCE because the risk of inhalation exposure will be reliably restricted by preventing the construction of habitable structures without first demonstrating that the risk is acceptable. After the Restrictive Covenant is filed, no further corrective actions for PCE and TCE beneath the pavement at 14S are necessary.

Following the filing of the Restrictive Covenant, the contamination detected within the Western Berm Area (i.e., AOC1/AOC2) is the only area of the Facility that requires corrective action.

Following screening of various potential remedial technologies, three correction action alternatives have been identified and retained as appropriate and feasible to attain the cleanup objectives.

The following corrective action alternatives were found to satisfy each of the threshold criteria, as well as, other site specific and technology-specific factors:

- Alternative 1 – Soil Excavation and Disposal (with possible dewatering) with Restrictive Covenant and Groundwater Monitoring

- Alternative 2 – Dual Phase Extraction with Restrictive Covenant and Groundwater Monitoring

- Alternative 3 – Air Sparging and Soil Vapor Extraction with Restrictive Covenant and Groundwater Monitoring

Each of these corrective measure alternatives are further evaluated in the following section.

5.0 EVALUATION OF CORRECTIVE MEASURE ALTERNATIVES

Corrective measure alternatives represent integrated approaches that are intended to satisfy the remedial objectives. Each of the proposed corrective measure alternatives is capable of achieving the remedial objectives. This section compares the alternatives using established criteria to determine which alternative is most appropriate.

In addition to the restrictive covenant that will reliably restrict exposure to most of the contamination detected onsite and continued groundwater monitoring, the proposed corrective measure alternatives focus on the Western Berm Area to reduce contaminant concentrations and potential mobility.

- Alternative 1 – Soil Excavation and Disposal (with possible dewatering)
- Alternative 2 – Dual Phase Extraction
- Alternative 3 – Air Sparging and Soil Vapor Extraction

The corrective measure alternatives are evaluated in Section 5.2.

5.1 CORRECTIVE MEASURE ALTERNATIVES – BALANCING CRITERIA

The corrective action alternatives were evaluated using the following balancing criteria:

- Long-term Effectiveness – Each alternative is evaluated based on its expected effectiveness, reliability, and risk of failure of the alternatives.

- Reduction in the Toxicity, Mobility or Volume of Wastes – PCPG prefers to implement a remedy which employs techniques, such as treatment technologies, that are capable of eliminating or substantially reducing the inherent potential for the wastes in the contaminated media to cause future environmental releases or other risks to human health and the environment. The evaluation of alternatives includes an estimate of how much the corrective measures alternatives will reduce the waste, toxicity, volume and/or mobility.

- Short-term Effectiveness - Each alternative is evaluated based on short-term issues such as protection of community, protection of workers, environmental impacts, and duration of construction activities.

- Implementability – Each alternative is evaluated for ease of installation and the time required to achieve a given level of response. Implementability encompasses both the technical and administrative feasibility of implementing a technology or process. As discussed in Section 3.0, technical implementability was used as the third screening process to eliminate technologies that are clearly ineffective or infeasible at this Facility. This evaluation of implementability places greater emphasis on aspects such as access issues, the ability to obtain necessary permits, the availability and capacity of treatment, storage, and disposal services, and the availability of necessary equipment and skilled workers to implement the technology.

- Cost – Bureau Veritas estimated the cost of each corrective measures alternative. All three corrective measure alternatives include a restrictive covenant and groundwater monitoring.

Corrective action alternatives are evaluated based on the balancing criteria to determine which corrective action alternative is most suitable for Facility conditions and objectives.

Tables 17 and 18 summarize the results of this comparison.

5.2 ALTERNATIVE 1 – SOIL EXCAVATION AND DISPOSAL (WITH DEWATERING) WITH RESTRICTIVE COVENANT AND GROUNDWATER MONITORING

Soil excavation and disposal has been identified as a suitable alternative provided that the waste soil is classified as "non-hazardous" and is suitable for acceptance in Type II landfill.

Based on the results of investigations, the soil berm is considered to be the most significant source of hazardous substances onsite. The berm is approximately 200 feet in length, by 30 feet in width, by 4 feet in height (but the contaminated soil extends wider and at least 10 feet below grade). See Figure 9 for a site map summarizing Corrective Measure Alternative 1.

Dewatering of the excavation pit is likely to be a necessary component of this alternative; however the volume of groundwater that is expected to infiltrate into the excavation pit cannot be reliably estimated. Contaminated groundwater, if characterized as non-hazardous waste, will be disposed at a licensed facility.

Long-term Reliability and Effectiveness. Excavation and disposal is considered one of the most reliable and effective corrective measures possible; however, the site-specific limitation of this alternative is that the peat layer will remain in-place to retain its beneficial properties. Some of the highest concentrations of soil and groundwater contamination were detected in the saturated peat layer. Although dewatering of the excavation pit will be conducted, the long-term effectiveness of this method on existing groundwater contamination cannot be estimated.

Following excavation, this alternative includes paving the former berm area with asphalt.

Reduction in the Toxicity, Mobility or Volume of Wastes. Although the contaminated peat layer and the contaminated groundwater will remain in-place, the removal of contaminated fill material above the peat layer is expected to result in a significant reduction in toxicity, mobility, and volume of the waste. The remaining peat layer is expected to continue to adsorb VOCs and retard mobility.

Short-term Effectiveness. Short-term risks to excavation workers and community (primarily an industrial area) exist, but are considered to be manageable with appropriate planning. This corrective action can be completed within a two week time frame resulting in minimal disruption to facility operations and surrounding area activities. There are various alternatives for traffic flow when excavation begins.

Implementability. Soil excavation and disposal is relatively easy to implement. The primary limitation is site access due to PCPG's day-to-day operations.

Cost. The volume of contaminated soil that will be removed is estimated to be 4,000 cubic yards. Based on typical costs for excavation, transportation, and non-hazardous contaminated soil and groundwater disposal costs for the Detroit area, Alternative 1 is estimated to be the lowest cost alternative. See Table 18 for a summary of costs.

A very quick completion time results in overall reduced costs compared to active remediation systems with significant operation and maintenance (O&M) costs and unknown durations.

Table 17
Comparison of Corrective Measure Alternatives

Alternative	USEPA Balancing Criteria					Ranking	Discussion
	Long - Term Effectiveness	Reduction in TMV of Wastes	Short - Term Effectiveness	Implementability	Cost		
Alternative 1 - Excavation and Disposal (with dewatering) with Restrictive Covenant and Groundwater Monitoring	Fair: Very effective for permanent removal soil source; however, significant mass of contamination in peat layer and groundwater will remain in place	Good: Soil source removed; remaining contamination in peat and groundwater could be addressed with natural attenuation.	Excellent: Complete within a relatively short time frame. Significant, but manageable, impact to nearby occupants.	Very Good: Easy to implement if western fence can be removed during excavation activities.	Very Good: <$500,000 assuming classification of soil as non-hazardous waste.	**18**	Excellent alternative for uppermost soil contamination. Contaminated peat layer to remain undisturbed leaving some soil contamination in place. groundwater contamination may remain.
ALTERNATIVE 1 Rank	**2**	**3**	**5**	**4**	**4**		
Alternative 2 - Dual Phase Extraction with Restrictive Covenant and Groundwater Monitoring	Very Good: An effective and proven alternative. Deemed most suitable for types of VOCs and soil types.	Excellent: Permanent and significant reduction in toxicity, mobility, and volume of both soil and groundwater contamination.	Very Good: Alternative 2 poses minimal risk or disruption to the public, site employees, or contractors.	Very Good: Installation and onsite treatment present some challenge based on current spatial constraints and operations. Require discharge permits.	Fair: <$900,000	**20**	Excellent alternative for addressing soil, groundwater, and potential free-phase contamination with one technology. Treatment options for groundwater and vapor to be considered following completion of a pilot test.
ALTERNATIVE 2 Rank	**4**	**5**	**4**	**4**	**3**		
Alternative 3 - Air Sparging and Soil Vapor Extraction with Restrictive Covenant and Groundwater Monitoring	Very Good: A proven alternative that should be effective for achieving cleanup objectives.	Fair: Hydraulic containment and air sparging will signficantly reduce contaminant volume; however, the introduction of air into perched groundwater may unintentially increase mobility.	Very Good: Alternative 3 poses minimal risk or disruption to the public, site employees, or contractors.	Very Good: Installation and onsite treatment present some challenge based on current spatial constraints and operations. Require discharge permits.	Fair: <$900,000	**17**	Appears to be less suitable than Alternative 2 due to soil types and potential for sparging to moblize contamination beyond western and southern property boundaries.
ALTERNATIVE 3 Rank	**4**	**2**	**4**	**4**	**3**		

Ranking - 1 = poor, 2= fair, 3 = good or average, 4 = very good or above average, and 5 = excellent or significantly exceeding average

Table 18
Summary of Costs for Corrective Measure Alternatives

Alternative	COST CATEGORY								TOTAL (with 10% Contingency)
	Site Preparation	Engineering Design and Specifications	Excavation or Installation	Disposal and Treatment	Operation and Maintenance	Sampling and Reporting	Semi-Annual Groundwater Monitoring	SUB-TOTAL	
Alternative 1 - Excavation and Disposal (with dewatering) with Restrictive Covenant and Groundwater Monitoring	Remove fences, meetings, signage; CMI Work Plan	Bid specifications	Excavation and transporation of 4,000 cubic yards of contaminated soil; field oversight; backfill to grade	Landfill disposal of 4,000 cubic yards of non-hazardous soil at $25/cubic yard	None; but capping with asphalt upon completion	Confirmation sampling; CMI Report	$28,000 per year for 3 years	Not selected because action will be incomplete if contaminated peat layer remains in place.	
Estimate	**$10,000**	**$10,000**	**$130,000**	**100,000**	**50,000**	**$40,000**	**$84,000**	**$424,000**	**$ 466,400.00**
Alternative 2 - Dual Phase Extraction with Restrictive Covenant and Groundwater Monitoring	Pilot test; Remove fences, re-grade berm and pave with asphalt, CMI Work Plan	Design and bid specifications	Based on installation of 30 extraction wells; water and vapor treatment system; field oversight	Disposal of upper 4 feet from soil berm plus soil generated during installation	2 years; Vapor and groundwater treatment and disposal or discharge; repairs	Vapor monitoring; Confirmatory soil and water sampling; CMI Report	$28,000 per year for 3 years	**Preferred Option**	
Estimate	**$125,000**	**$30,000**	**$325,000**	**30,000**	**120,000**	**60,000**	**84,000**	**$774,000**	**$ 851,400.00**
Alternative 3 - Air Sparging and Soil Vapor Extraction with Restrictive Covenant and Groundwater Monitoring	Pilot test; Remove fences, re-grade berm and pave with asphalt, CMI Work Plan	Design and bid specifications	Based on installation of 30 extraction and 30 sparge wells; vapor treatment system; field oversight	Disposal of upper 4 feet from soil berm plus soil generated during installation	3 years; Vapor treatment and disposal or discharge cost; repairs	Vapor monitoring; Confirmatory soil and water sampling; CMI Report	$28,000 per year for 3 years	Not selected because sparging could cause hazardous substances to mobilize beyond property boundary.	
Estimate	**$125,000**	**$30,000**	**$325,000**	**30,000**	**150,000**	**60,000**	**$84,000**	**$804,000**	**$ 884,400.00**

5.3 ALTERNATIVE 2 – DUAL-PHASE EXTRACTION WITH RESTRICTIVE COVENANT AND GROUNDWATER MONITORING

Dual phase extraction (DPE) is appropriate for VOCs and fuels (e.g., LNAPL). Also known as multi-phase extraction or bioslurping, DPE is a technology that uses a high vacuum system to remove various combinations of contaminated ground water, free-phase petroleum, and hydrocarbon vapors from the subsurface. DPE incorporates the process of soil vapor extraction (SVE), groundwater extraction, and biodegradation and works best for permeable sand-silt mixtures.

DPE is more effective than SVE for heterogeneous clays and fine sands. However, it is not recommended for lower permeability formations due to the potential to leave isolated lenses of undissolved product in the formation. DPE requires both water treatment and vapor treatment so discharge permits may be necessary.

This alternative would consist of a series of extraction wells with trailer-mounted treatment systems. Groundwater would be extracted from each well by the use of drop tubes resulting in a lower groundwater table. With a lower water table, the contaminants in the resulting smear zone are more available for removal by SVE. See Figure 10 for a site map summarizing Corrective Measure Alternative 2.

Long-term Reliability and Effectiveness. DPE is considered to be a reliable corrective measure technology that permanently removes contaminants. The system is expected to operate for a time frame ranging from 6 months to 2 years depending on the severity of limitations associated with heterogeneous soil types. If selected, a pilot test is necessary to optimize the design and maximize its effectiveness.

Reduction in the Toxicity, Mobility or Volume of Wastes. This alternative will result in a significant reduction in toxicity, mobility, and volume of waste. The wastes (treated air and treated water) will be discharged in accordance with applicable regulations. This alternative has the added benefit of removing significant levels of VOCs from the peat layer while maintaining its integrity.

Short-term Effectiveness. Short-term risks to installation workers and the community exist, but are considered to be very manageable with appropriate planning. The initial installation of this corrective measure alternative can be completed in less than a one month time frame with very little disruption to facility operations and surrounding area activities. The area will first be prepared by leveling the berm (disposing of potentially contaminated soil) and paving the area with asphalt.

The quick installation time frame is offset by duration of long-term operation typically measured in many months or years. The cost is based on two years.

Cost. The cost for Alternative 2 is estimated in Table 18.

5.4 ALTERNATIVE 3 – AIR SPARGING AND SOIL VAPOR EXTRACTION WITH RESTRICTIVE COVENANT AND GROUNDWATER MONITORING

Air sparging (for groundwater) combined with SVE (for soil) are appropriate corrective measures for VOCs and fuels (e.g., LNAPL).

Air sparging is an in situ technology in which air is injected into the saturated zone enabling a transfer of hydrocarbons from dissolve phase to vapor phase. The injected air helps to flush (bubble) the contaminants up into the vadose zone where a vapor extraction system is installed to remove the vapor phase contamination. This technology is designed to operate at high flow rates to maintain increased contact between ground water and soil and strip more ground water by sparging. Air sparging with SVE has a medium to long duration which may last up to a few years.

SVE is an in situ unsaturated zone technology in which a vacuum is applied to an array of extraction wells to induce the flow of air and to remove VOCs from the soil. The soil vapor is typically treated to recover or destroy the contaminants. The SVE process also results in increased oxygen in subsurface soil thereby increasing the potential for natural biodegradation.

See Figure 10 for a site map summarizing Corrective Measure Alternative 3

Air injection is effective for facilitating extraction of deep contamination, contamination in low permeability soils, and contamination in the saturated zone. The duration of operation and maintenance for in situ SVE is typically medium- to long-term.

Long-term Reliability and Effectiveness. Air sparging and SVE are considered to be moderately reliable corrective measures, but will operate for an unknown time frame due to limitations associated with heterogeneous soil types. To be effective, air must be evenly distributed throughout the water column to strip the contaminants from groundwater. An unintended consequence of introducing a large volume of air into the groundwater is that the water table could mound and spread the contamination laterally.

Reduction in the Toxicity, Mobility or Volume of Wastes. This alternative will result in a significant reduction in toxicity and volume of waste, but the introduction of air into the subsurface will increase its mobility. The air sparging system is intended to mobilize contaminants from dissolved to vapor phase and these vapors are typically captured, but since the berm area is in close proximity to the western property boundary, it may not be possible to control the increased mobility.

Short-term Effectiveness. Short-term risks to installation workers and community (primarily an industrial area) exist, but are considered to be very manageable. The initial installation of this corrective action can be completed within a one month time frame with almost no disruption to facility operations and surrounding area activities. The area will first be prepared by leveling the berm (disposing of potentially contaminated soil) and paving the area with asphalt.

The quick installation time frame is followed by an unknown duration of operation that is typically measured in years. The cost is based on three years.

Cost. The cost for Alternative 3 is estimated in Table 18.
.

6.0 RECOMMENDED CORRECTIVE MEASURE ALTERNATIVE AND RATIONALE

The recommended corrective action alternative is Alternative 2 – Dual Phase Extraction with Restrictive Covenant and Groundwater Monitoring

Alternative 2 (DPE with restrictive covenant and groundwater monitoring) is the recommended alternative because:

- DPE simultaneously extracts both soil and groundwater (and potential NAPL) for treatment.
- Despite limitations in heterogeneous soils, DPE is expected to be effective in removing VOCs and NAPL from fine-grained soils and reducing hazardous substance levels to below cleanup objectives.
- Despite its higher cost, DPE is expected to be more effective than Alternative 1 (excavation and disposal) because it will result in the removal of VOCs from the contaminated peat layer without removing the peat layer or destroying its integrity and DPE provides for an increased level of groundwater cleanup.
- DPE is expected to be more effective than Alternative 3 (air sparging and SVE) because it provides for the hydraulic control of groundwater contamination. Air sparging is expected to increase the mobility of VOCs near the property boundary. DPE is also considered more appropriate for fine grained soil type and potential presence of multi-phase contamination.

PCPG proposes to conduct a pilot test to confirm the effectiveness of the recommended action and to provide additional data (i.e., radius of influence) necessary to design and optimize recovery.

7.0 REFERENCES

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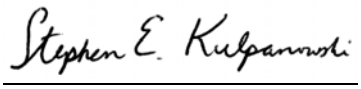
Corrective Measures Study
for
Petro-Chem Processing Group of Nortru, LLC Facility
421 Lycaste Street
Detroit, Michigan

Bureau Veritas Project No. 11016-000171.00

This report prepared by: 

Steve Kulpanowski
Senior Geologist
Health, Safety, and Environmental Services
Detroit Regional Office

This report reviewed by: 

Kellie L. Wing
Project Manager
Health, Safety and Environmental Services
Detroit Regional Office

November 17, 2016

FIGURES

MICHIGAN

QUADRANGLE LOCATION

Scale 1:24000

0 1/2 1 MILE

1000 0 1000 2000 3000 FEET

(SOURCE OF MAP IS USGS 7.5 MINUTE QUADRANGLE MAP, BELLE ISLE(1980), MICHIGAN)

CHECK BY	KLW
DRAWN BY	JL
DATE	January 7, 2014
SCALE	AS SHOWN
CAD NO.	109200.02_A
PRJ NO.	11016-000171.00

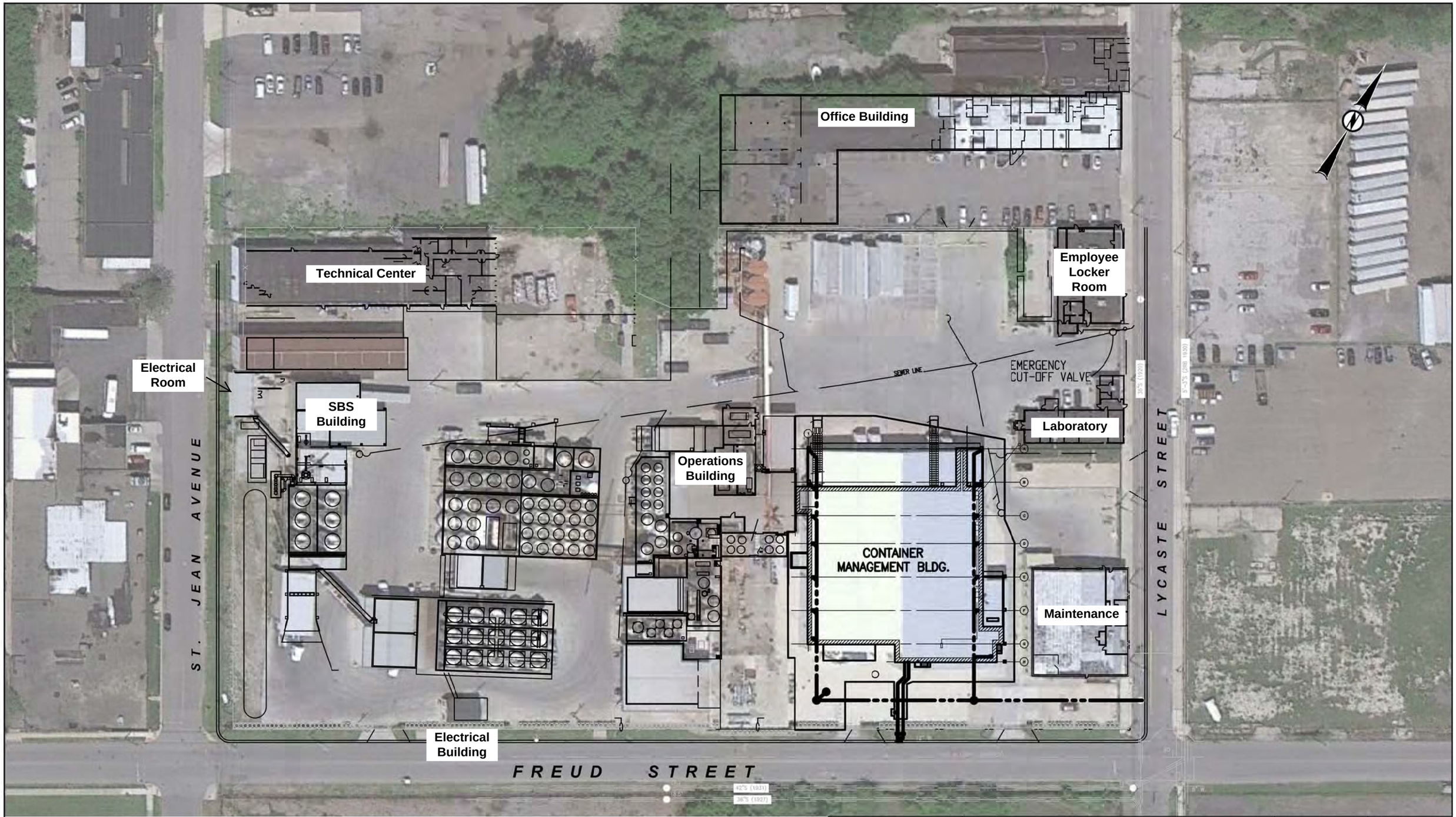
SITE LOCATION MAP

PETRO–CHEM PROCESSING GROUP
421 LYCASTE STREET
DETROIT, MICHIGAN

BUREAU VERITAS

FIGURE

1



SCALE IN FEET

0 50 100 200

CHECK BY	KW
DRAWN BY	JL
DATE	11/24/2015
SCALE	AS SHOWN
CAD NO.	11.15.255.00b
PRJ NO.	11015-000255.00

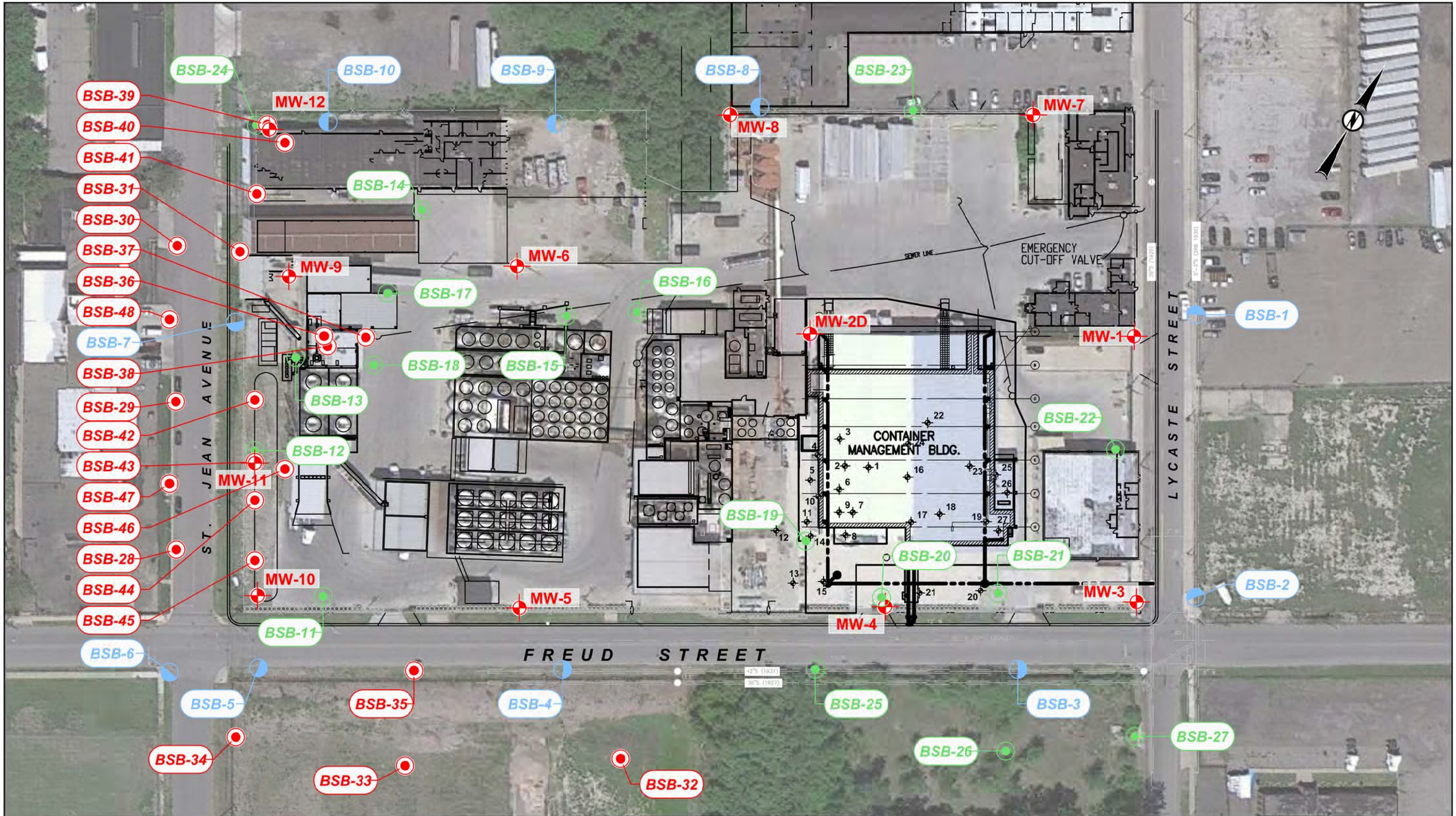
SITE LAYOUT

PETRO-CHEM PROCESSING GROUP
421 LYCASTE STREET
DETROIT, MICHIGAN

BUREAU VERITAS

FIGURE

2



LEGEND

MW-# MONITORING WELL

BSB-# 2014 SOIL BORING

BSB-# 2013 SOIL BORING

BSB-# 2010 SOIL BORING

2008 SAMPLE

SCALE IN FEET

0 40 80 160

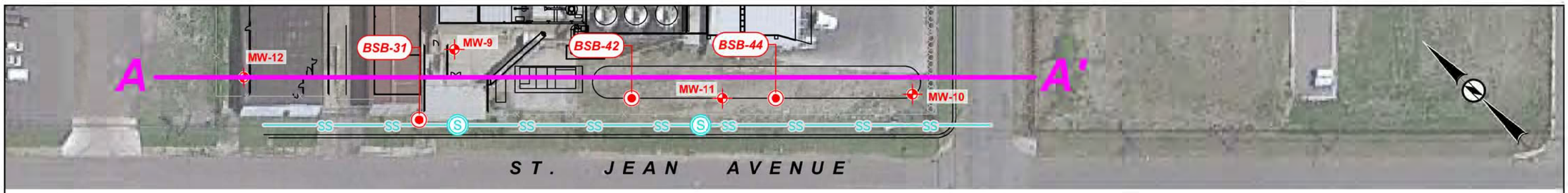
CHECK BY	KW
DRAWN BY	JL
DATE	10/10/2016
SCALE	AS SHOWN
CAD NO.	11.16.171.00sb
PRJ NO.	11016-000171.00

SOIL BORING AND MONITORING WELL LOCATIONS

PETRO-CHEM PROCESSING GROUP
421 LYCASTE STREET
DETROIT, MICHIGAN

BUREAU VERITAS

FIGURE 3



NORTHWEST

A

SOUTHEAST

A'

MW-12 (579.55)

BSB-31 (580.19)

MW-9 (580.31)

BSB-42 (583.20)

MW-11 (584.20)

BSB-44 (584.50)

MW-10 (579.70)

NW MANHOLE

SW MANHOLE

24" STORM SEWER

GRADE SURFACE LEVEL

585

580

575

570

565

560

555

550

6.58

9.0

7.21

9.5

11.4

6.0

6.96

ELEVATION (FEET) ABOVE MEAN SEA LEVEL
VERTICAL EXAGGERATION X10

LEGEND

WELL/BORING IDENTIFICATION (GROUND ELEVATION LEVEL)

6.58 GROUNDWATER ELEVATION (FT.)

WELL SCREENING

WELL/BORING DEPTH

FILL

SILT

PEAT

SAND

CLAY

NOTE: CROSS SECTION IS BASED ON BEST PROFESSIONAL JUDGMENT USING AVAILABLE DATA. THE THICKNESS AND EXTENT OF THE LITHOLOGIC UNITS ARE APPROXIMATED AND GEOLOGIC CONTACTS BETWEEN WELL LOCATIONS ARE INFERRED.

LEGEND

MW-# MONITORING WELL

BSB-# SOIL BORING LOCATION

SS S SS STORM SEWER/MANHOLE

SCALE IN FEET

0 30 60 120

CHECK BY	KW
DRAWN BY	JL
DATE	9/6/2016
SCALE	AS SHOWN
CAD NO.	11.16.171x1
PRJ NO.	11016-000171.00

CROSS SECTION A–A'

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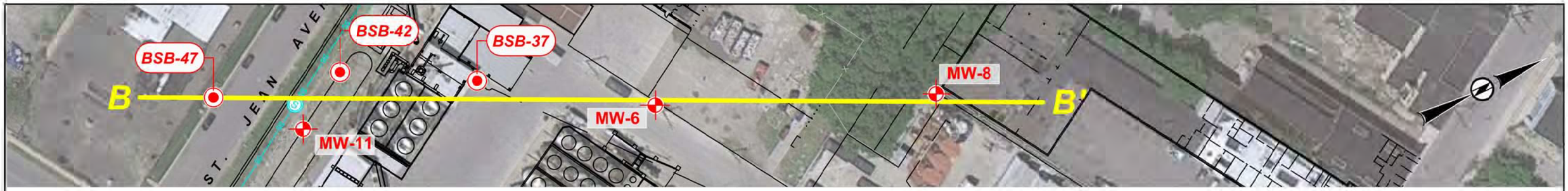
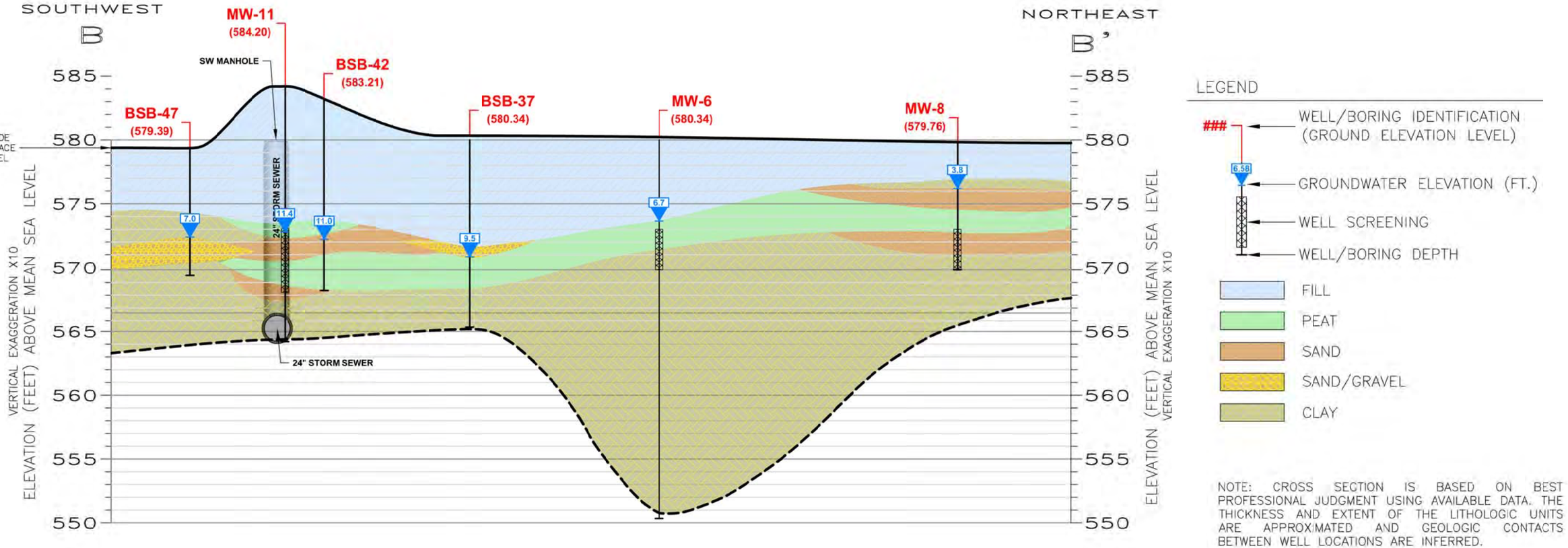
421 LYCASTE STREET
DETROIT, MICHIGAN

BUREAU VERITAS

FIGURE

4





NOTE: CROSS SECTION IS BASED ON BEST PROFESSIONAL JUDGMENT USING AVAILABLE DATA. THE THICKNESS AND EXTENT OF THE LITHOLOGIC UNITS ARE APPROXIMATED AND GEOLOGIC CONTACTS BETWEEN WELL LOCATIONS ARE INFERRED.

LEGEND

- MW-# MONITORING WELL
- BSB-# SOIL BORING LOCATION
- SS-S-SS STORM SEWER/MANHOLE

SCALE IN FEET

0 40 80 160

CHECK BY	KW
DRAWN BY	JL
DATE	9/6/2016
SCALE	AS SHOWN
CAD NO.	11.16.171x1
PRJ NO.	11016-000171.00

CROSS SECTION B–B'

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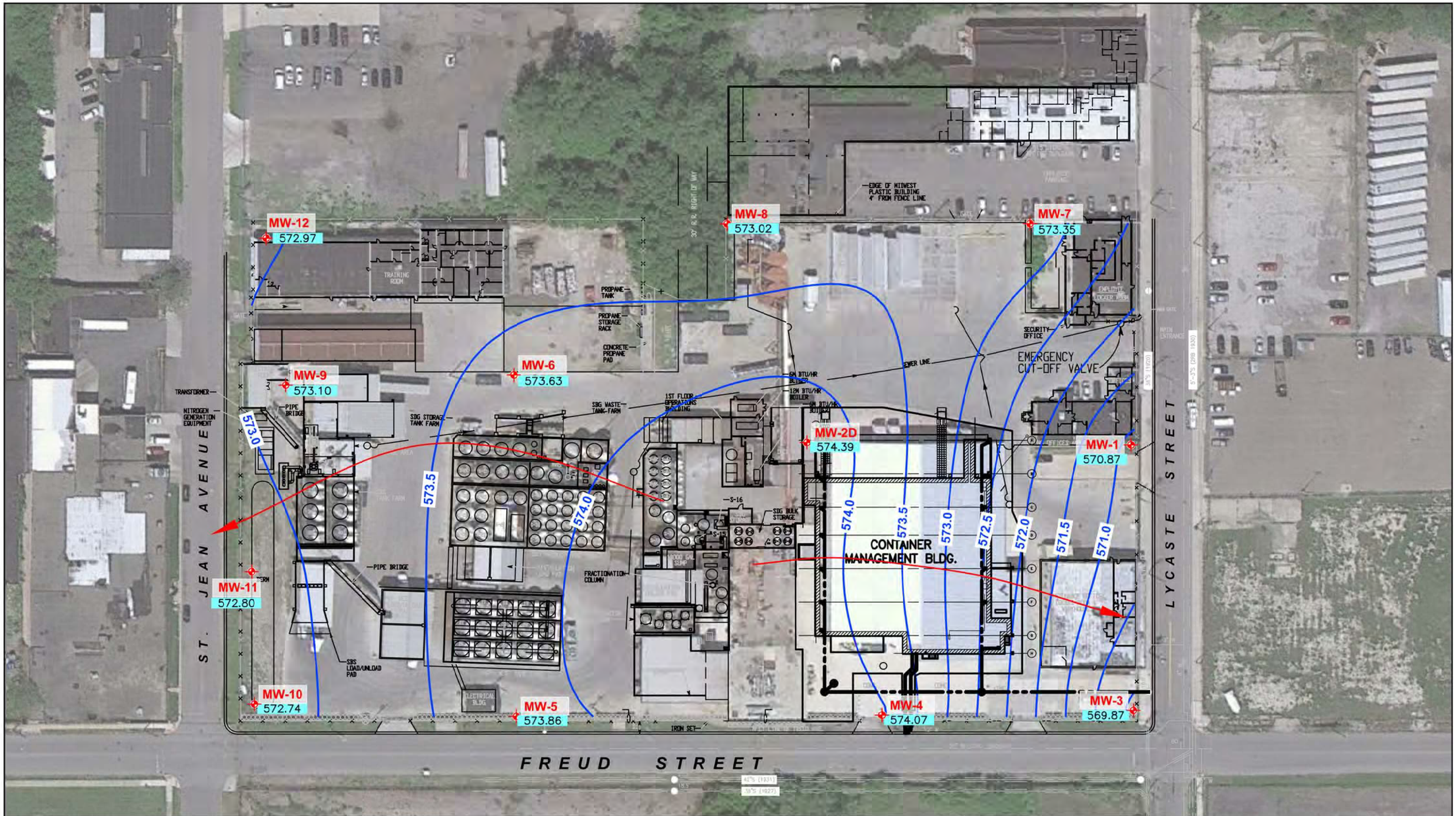
BUREAU VERITAS

FIGURE 5



LEGEND

-570.0- GROUNDWATER CONTOUR

570.87 GROUNDWATER ELEVATION (FT.)

GROUNDWATER FLOW

SCALE IN FEET

0 40 80 160

CHECK BY	KW
DRAWN BY	JL
DATE	9/26/2016
SCALE	AS SHOWN
CAD NO.	143.00_gw6-16
PRJ NO.	11016-000143.00

GROUNDWATER ELEVATION CONTOURS
JUNE 16, 2016

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DETROIT, MICHIGAN

BUREAU VERITAS

FIGURE 6

BSB-12		
µg/kg	8-10'	10-12'
ETHYLBENZENE	-	180,000
TOLUENE	-	350,000
TRICHLOROETHENE	2,200	-
XYLENES	-	750,000

BSB-43	
µg/kg	10-12'
ETHYLBENZENE	490,000
TOLUENE	930,000
XYLENES	2,300,000

BSB-45	
µg/kg	13-15'
ETHYLBENZENE	260,000
TOLUENE	930,000
XYLENES	1,200,000

24S	
µg/kg	
ETHYLBENZENE	240,000
TOLUENE	650,000
1,2,4-TRIMETHYLBENZENE	130,000
XYLENES	1,400,000

16S	
µg/kg	
ETHYLBENZENE	370,000
TOLUENE	980,000
1,2,4-TRIMETHYLBENZENE	160,000
XYLENES	2,400,000

14S	
µg/kg	
TETRACHLOROETHENE	960,000
TRICHLOROETHENE	78,000
XYLENES	180,000

15S	
µg/kg	
BENZO(a)PYRENE	14,000

21S	
µg/kg	
BENZO(a)PYRENE	26,000

13S	
µg/kg	
BENZO(a)PYRENE	14,000

LEGEND

MW-# MONITORING WELL

BSB-# 2014 SOIL BORING

BSB-# 2013 SOIL BORING

BSB-# 2010 SOIL BORING

2008 SAMPLE

SCALE IN FEET

0 50 100 200

CHECK BY	KW
DRAWN BY	JL
DATE	10/17/2016
SCALE	AS SHOWN
CAD NO.	11.16.171.00s1
PRJ NO.	11016-000171.00

SUMMARY OF HAZARDOUS SUBSTANCES IN SOIL THAT REQUIRE CORRECTIVE ACTION

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DETROIT, MICHIGAN

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FIGURE 7

BSB-13	
mg/kg	
TOLUENE	85,000
TETRAHYDROFURAN	99,000
XYLENES	91,000

BSB-42	
mg/kg	
TOLUENE	94,000
XYLENES	85,000

MW-11	
mg/kg	
TOLUENE	110,000

BSB-44	
mg/kg	
TOLUENE	130,000
XYLENES	85,000

BSB-45	
mg/kg	
TOLUENE	84,000

BSB-24 BSB-10 BSB-9 BSB-8 BSB-23
MW-12 MW-8 MW-7
BSB-39 BSB-40 BSB-41 BSB-31 BSB-30 BSB-37 BSB-36 BSB-48 BSB-7 BSB-38 BSB-29 BSB-42 BSB-43 BSB-47 BSB-46 BSB-28 BSB-44 BSB-45 BSB-6
BSB-14
MW-9 MW-6
BSB-17 BSB-16
BSB-18 BSB-15
BSB-13
BSB-12
MW-11
MW-10
BSB-11
MW-5
MW-4
MW-2D
MW-1
MW-3
BSB-1
BSB-2
BSB-22
BSB-19
BSB-20
BSB-21
BSB-5 BSB-35 BSB-4 BSB-25 BSB-3 BSB-27
BSB-34 BSB-33 BSB-32 BSB-26

ST. JEAN AVENUE
LYCASTE STREET
FREUD STREET
SEWER LINE
EMERGENCY CUT-OFF VALVE
CONTAINER MANAGEMENT BLDG.

LEGEND

MW-# MONITORING WELL
BSB-# 2014 SOIL BORING
BSB-# 2013 SOIL BORING
BSB-# 2010 SOIL BORING
2008 SAMPLE

SCALE IN FEET
0 50 100 200

CHECK BY	KW
DRAWN BY	JL
DATE	10/14/2016
SCALE	AS SHOWN
CAD NO.	11.16.171.00w1
PRJ NO.	11016-000171.00

SUMMARY OF HAZARDOUS SUBSTANCES IN WATER THAT REQUIRE CORRECTIVE ACTION

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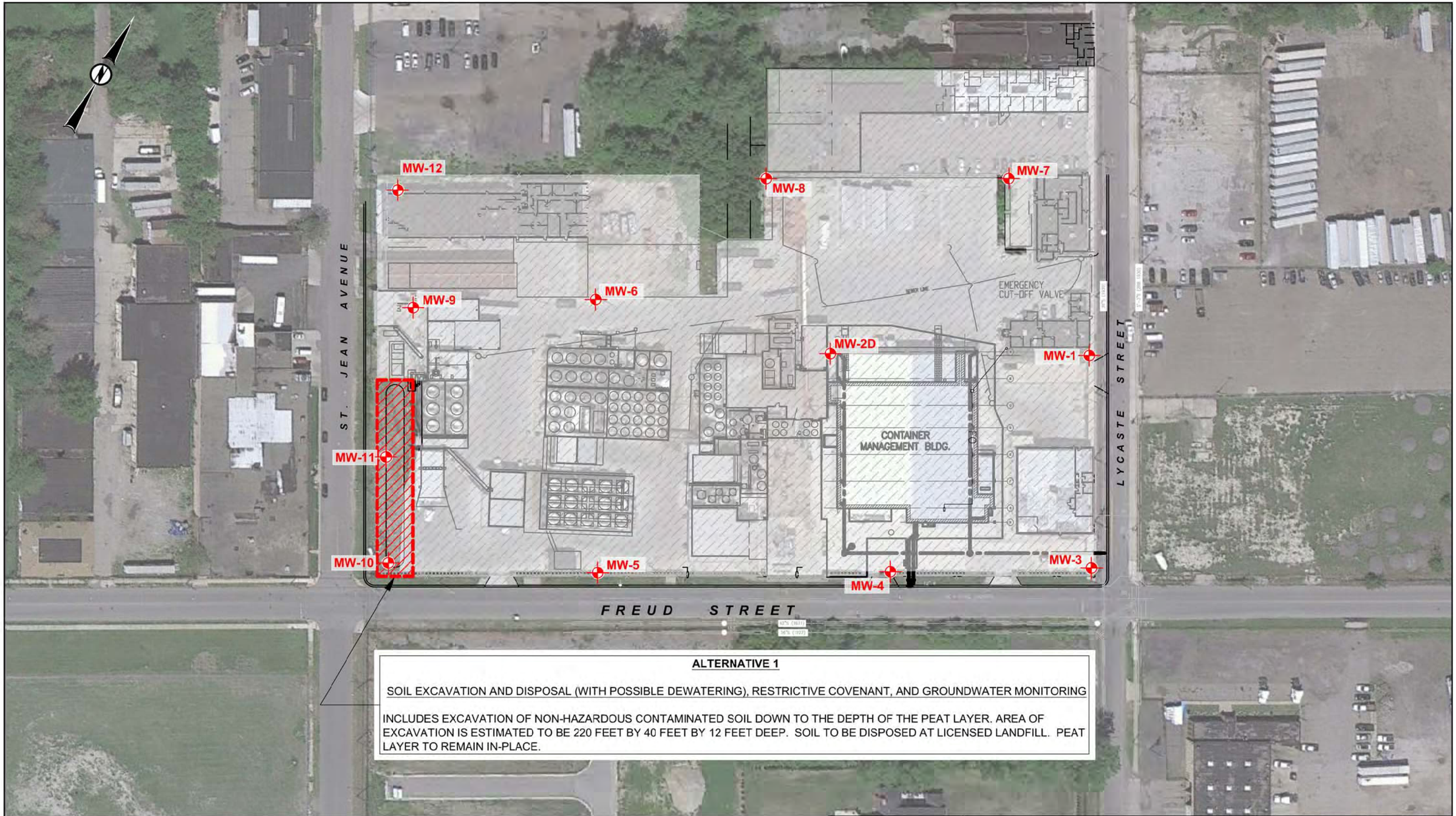
421 LYCASTE STREET
DETROIT, MICHIGAN

BUREAU VERITAS

FIGURE
8



ALTERNATIVE 1

SOIL EXCAVATION AND DISPOSAL (WITH POSSIBLE DEWATERING), RESTRICTIVE COVENANT, AND GROUNDWATER MONITORING

INCLUDES EXCAVATION OF NON-HAZARDOUS CONTAMINATED SOIL DOWN TO THE DEPTH OF THE PEAT LAYER. AREA OF EXCAVATION IS ESTIMATED TO BE 220 FEET BY 40 FEET BY 12 FEET DEEP. SOIL TO BE DISPOSED AT LICENSED LANDFILL. PEAT LAYER TO REMAIN IN-PLACE.

LEGEND

MW-# MONITORING WELL

IMPERVIOUS AREAS

EXCAVATION AREA

SCALE IN FEET

0 50 100 200

CHECK BY	SK
DRAWN BY	JL
DATE	11/12/2016
SCALE	AS SHOWN
CAD NO.	11.16.171.00a1
PRJ NO.	11016-000171.00

SUMMARY OF CORRECTIVE MEASURE ALTERNATIVES
ALTERNATIVE 1

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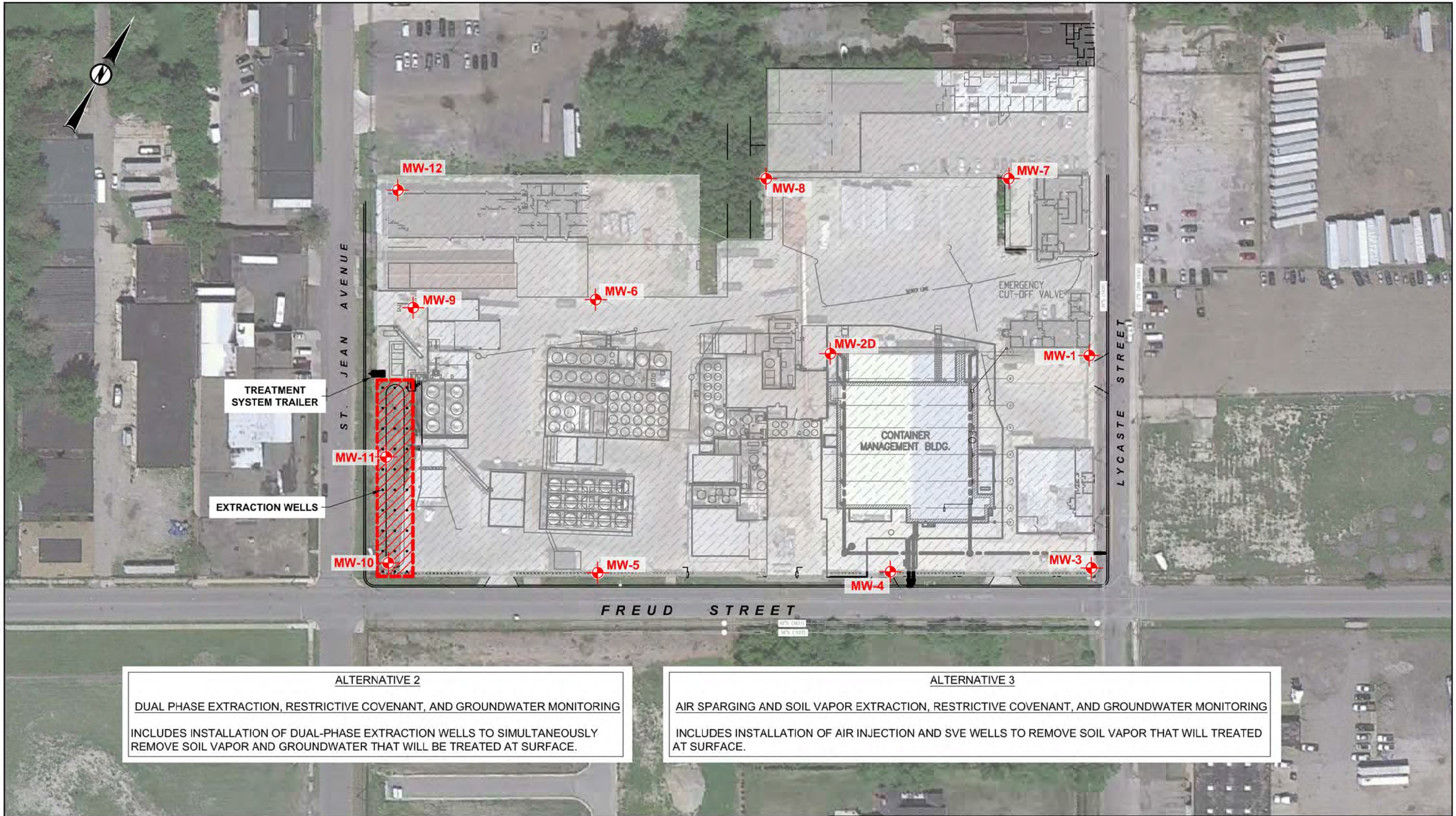
DETROIT, MICHIGAN

BUREAU VERITAS

FIGURE 9



ALTERNATIVE 2

DUAL PHASE EXTRACTION, RESTRICTIVE COVENANT, AND GROUNDWATER MONITORING

INCLUDES INSTALLATION OF DUAL-PHASE EXTRACTION WELLS TO SIMULTANEOUSLY REMOVE SOIL VAPOR AND GROUNDWATER THAT WILL BE TREATED AT SURFACE.

ALTERNATIVE 3

AIR SPARGING AND SOIL VAPOR EXTRACTION, RESTRICTIVE COVENANT, AND GROUNDWATER MONITORING

INCLUDES INSTALLATION OF AIR INJECTION AND SVE WELLS TO REMOVE SOIL VAPOR THAT WILL TREATED AT SURFACE.

LEGEND

MW-# MONITORING WELL

IMPERVIOUS AREAS

REMEDIATION AREA

SCALE IN FEET

0 50 100 200

CHECK BY	SK
DRAWN BY	JL
DATE	11/14/2016
SCALE	AS SHOWN
CAD NO.	11.16.171.00a2
PRJ NO.	11016-000171.00

SUMMARY OF CORRECTIVE MEASURE ALTERNATIVES
ALTERNATIVES 2 AMD 3

PETRO-CHEM PROCESSING GROUP
421 LYCASTE STREET
DETROIT, MICHIGAN

BUREAU VERITAS

FIGURE

10

APPENDIX A

RESTRICTIVE COVENANT

10/13/2015

Michigan Department of Environmental Quality
Office of Waste Management and Radiological Protection

INSTRUCTIONS FOR THE ATTACHED MODEL DOCUMENT ENTITLED:

DECLARATION OF RESTRICTIVE COVENANT

THIS IS A MODEL DOCUMENT WHICH IS SUBJECT TO REVISION. IT IS PROVIDED TO THE PUBLIC AS PRELIMINARY GUIDANCE AS TO THE CONTENT, FORMAT AND TERMS OF THIS DOCUMENT. IT IS NOT INTENDED, NOR CAN IT BE RELIED UPON, TO CREATE ANY RIGHTS, SUBSTANTIVE OR PROCEDURAL, BY ANY OTHER PARTY. PLEASE CONTACT HAZARDOUS WASTE SECTION, OFFICE OF WASTE MANAGEMENT AND RADIOLOGICAL PROTECTION, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, TO RECEIVE THE MOST RECENT DRAFT OF THIS DOCUMENT OR IN CASES THAT DO NOT FIT THE MODEL ASSUMPTIONS.

NOTE: There are recording requirements for instruments filed with Michigan county register of deeds offices which are contained in Section 1 of the Recording Requirements Act, 1937 PA 103, as amended, Michigan Compiled Laws (MCL) 565.201 *et seq.* (Act 103), link to Act 103.

INTRODUCTORY GUIDANCE

This Declaration of Restrictive Covenant (Restrictive Covenant) model document is to be used for hazardous waste facilities that do NOT require closure as a landfill, but have soil and/or groundwater contamination that requires the preparation of a restrictive covenant to comply with Part 111, Hazardous Waste Management, MCL 324.11101 et seq. (Part 111), of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), and the administrative rules promulgated pursuant to that part, MAC 299.9101 et seq. (Part 111 rules). This document is only appropriate for use with corrective actions approved by the MDEQ, Office of Waste Management and Radiological Protection under the limited or site-specific cleanup criteria allowed for under Part 111, R 299.9629.

The following Exhibits (1-4) must be attached to the Restrictive Covenant form:

EXHIBIT 1: LEGAL DESCRIPTION OF PROPERTY. This exhibit shall contain a legal description of the Property. In addition to the legal description, Exhibit 1 shall also include the parcel identification number(s) of the Property.

EXHIBIT 2: LEGAL DESCRIPTION AND SURVEY OF RESTRICTED AREAS OF THE PROPERTY. This exhibit shall include a survey of the entire Property identified in the legal description provided in Exhibit 1. The survey shall depict any permanent markers which are part of the CMIP. If land use and resource use restrictions of this Restrictive Covenant apply to the whole Property, the initial survey is sufficient. If the land use and resource use restrictions of this Restrictive Covenant apply to discrete portions of the Property, then those areas need to be legally described, surveyed individually, and identified on the survey of the Property above. Areas of the Property that are restricted for groundwater use must be identified.

EXHIBIT 3: LIST OF **[CONTAMINANTS OR HAZARDOUS WASTES OR HAZARDOUS SUBSTANCES]** ABOVE CRITERIA IN SOILS OR GROUNDWATER. Exhibit 3 shall include a list of all hazardous wastes, contaminants, or hazardous substances which are over the cleanup criteria in soils and/or groundwater.

EXHIBIT 4: DESCRIPTION OF ALLOWABLE USES. Exhibit 4 shall include the allowable uses of the Property that are considered consistent with the exposure assumptions for the chosen cleanup criteria.

The following Exhibits (W-Z) may be attached to the Restrictive Covenant depending upon the facts pertinent to the Property that is being restricted:

EXHIBIT W: CONSENT OF OWNER. This exhibit shall include written authorization from the Owner to the recording of this restrictive covenant. This authorization is required in cases where the Grantor is not the sole Owner or current Owner of the Property upon which the restricts are imposed.

EXHIBIT X: CONSENT OF EASEMENT HOLDERS. This exhibit shall include written authorization from any easement holder to the conditions of the restrictive covenant.

EXHIBIT Y: CONSENT OF LEASEHOLDER. This exhibit shall include written authorization from any leaseholder to the conditions of the restrictive covenant.

EXHIBIT Z: ADJACENT AFFECTED PROPERTIES. This exhibit shall include a map of off-site adjacent properties affected by contamination if the contamination originates from the property identified in Exhibit 1.

At the time of Corrective Measures Implementation Plan (CMIP) approval, the MDEQ will assign a reference number to the Restrictive Covenant and CMIP approval date. The person responsible for CMIP implementation then has 21 days from the completion of the final corrective measures construction or in accordance with the CMIP schedule to file for recording or cause to be filed for recording the Restrictive Covenant with the Register of Deeds for the county in which the Property is located.

The final format of the document shall comply with Section 1 of Act 103 to allow for recordation by the Register of Deeds.

MODEL DOCUMENT LEGEND

1. *[NOTE: Model document instructions will be placed in brackets, typed in italicized font, and identified by the term "NOTE." Please delete each Note from the Restrictive Covenant prior to submission of the Restrictive Covenant to MDEQ for review along with the CMIP.]*

2. **[Optional and/or site specific language will be placed in brackets, and typed in regular bold font. Please select the appropriate alternative and/or site specific language, finalize the selection in regular font, and delete unused options prior to submission of the Restrictive Covenant to MDEQ for review along with the CMIP.]**

THE MODEL DOCUMENT STARTS ON THE NEXT PAGE.

[NOTE 1: The top margin of this page must be 2 ½ inches.]

MDEQ Revised 10/13/2015

DECLARATION OF RESTRICTIVE COVENANT

MDEQ Reference No.: RC-OWMRP-111-__-__
Facility MID Number MID ___ ____ ____
MDEQ Approval Date_____

This Declaration of Restrictive Covenant is made to protect public health, safety, or welfare, or the environment pursuant to the provisions of Part 111, Hazardous Waste Management, Michigan Compiled Laws (MCL) 324.11101 *et seq.* (Part 111) and the applicable sections of Part 201, Environmental Remediation, MCL 324.20101 *et seq.* (Part 201) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.101 *et seq*. and the adminstrative rules promulgated pursuant to those Parts, MAC R 299.9101 *et seq.* and MAC R 299.5101 *et seq*. and the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. §§ 6901 *et seq*.

This Declaration of Restrictive Covenant (Restrictive Covenant) is made on _____ (date) by _____, the Grantor(s), whose address is _____, _____, for the benefit of the Grantee, Michigan Department of Environmental Quality (MDEQ), whose address is 525 West Allegan Street, PO Box 30473, Lansing, Michigan 48909-7973.

This Restrictive Covenant has been made to prohibit or restrict activities that could result in unacceptable exposure to environmental contamination present at the property located at _____, in the Township of _____, County of _____ , Michigan, and legally described in Exhibit 1 (Property).

The Property Number (Property's Tax ID Number) is _____.

[*NOTE 2: In cases where releases have contaminated areas beyond the facility boundary defined by the Part A Application [EPA Form 8700-23], please ensure that all off-site affected properties are identified in Exhibit Z].*

The Property is associated with _____(facility name), MID ___ ____ _____ for which a Corrective Measure Implementation Plan (CMIP) *[or equivalent document]* submitted on _____, __, 20__ *[include the following if applicable* **[and subsequently amended on _____]** was approved by the MDEQ on _____, 20__. The corrective measures being implemented to address environmental contamination are fully described in the CMIP entitled _____ submitted by *[insert consultant name, if applicable]*_____on behalf of *[insert facility name]*_____.

The CMIP requires the recording of this Restrictive Covenant to: 1) restrict unacceptable exposures to **[hazardous waste/contaminants/hazardous substances]** located on the Property [*NOTE 3: Insert numeral 2 if there is an enduring physical component of the corrective measure (e.g., exposure barrier)*]; and 2) assure that the use of Property is consistent with the exposure assumptions utilized in the development of **[choose as appropriate: residential; nonresidential; OR site-specific cleanup criteria]** and the exposure control measures relied upon in the CMIP; [and 3) to prevent damage or disturbance of monitoring wells or any other element of the corrective measures constructed on the Property.

The land or resource use restrictions contained in this Restrictive Covenant are based upon information available to the MDEQ at the time the CMIP was approved by the MDEQ. Failure of the corrective measures to achieve and maintain the cleanup criteria, exposure controls, and requirements specified in the CMIP; future changes in the environmental condition of the Property or changes in the cleanup criteria; the discovery of environmental conditions at the Property that were not accounted for in the CMIP; or use of the Property in a manner inconsistent with the restrictions described herein, may result in this Restrictive Covenant not being protective of public health, safety, or welfare, or the environment. Additional restrictions may become necessary. Information pertaining to the environmental conditions at the Property and the corrective actions undertaken at the Property is on file with the MDEQ, Office of Waste Management and Radiological Protection.

Exhibit 2, attached hereto, provides a survey and a map that identifies those portions of the Property that are subject to land use or resource use restrictions as specified herein.

Summary of Corrective Measures

[Hazardous waste/contaminants/hazardous substances] listed in Exhibit 3 have been found in soils or groundwater at the Property in concentrations above the cleanup criteria for unrestricted residential use for relevant exposure pathways. Areas of the Property described in Exhibit 2 may contain **[hazardous waste/contaminants/hazardous substances]** in excess of the concentrations that satisfy the cleanup criteria for unrestricted residential use. *[NOTE 4: In cases of commingled plumes or plumes coming onto subject project that may not be addressed under the CMIP, include the following statement "and may not have been addressed by the corrective measures that have been undertaken to date."]*

The following corrective measures have been or will be undertaken to minimize the migration of **[hazardous waste/contaminants/hazardous substances]**, as described in the CMIP:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Despite the corrective measures named above, **[hazardous waste/contaminants/hazardous substances]** remain present in soils or groundwater at levels that require controls to prevent unacceptable exposures.

Definitions

"Grantee" shall mean the MDEQ and the United State Environmental Protection Agency (USEPA), their respective successor entities, and those persons or entities acting on their behalf.

"Grantor" shall mean _____, the title holder of the Property at the time this Restrictive Covenant was executed, any persons or entities authorized to act on the title holder's behalf, and any future title holder of the Property or some relevant sub-portion of the Property.

"MDEQ" means the Michigan Department of Environmental Quality, its successor entities, and those persons or entities acting on its behalf.

"Owner" means at any given time the then current title holder of the Property or any portion thereof, including any lessees and those persons or entities authorized to act on the title holder's behalf.

"Part 111" means Part 111, Hazardous Waste Management, of the NREPA in effect at the time of the recording of this Restrictive Covenant.

All other terms used in this document which are defined in Part 111 of the NREPA and the Part 111 Administrative Rules, or Part 201 of the NREPA and the Part 201 Administrative Rules solely to the extent not inconsistent with the definitions in Part 111 or the Part 111 Administrative Rules, shall have the same meaning in this document as in those statutes and rules as on the date this Restrictive Covenant is made.

NOW THEREFORE,

Declaration of Land Use or Resource Use Restrictions

The Grantor(s) hereby declare(s) and covenant(s) that **[the Property OR the portion of the Property outlined in Exhibit 2]**, shall be subject to those restrictions on use described below and intends that said restrictions and covenants shall run with the land, and may be enforced in perpetuity against the Owner by the following entities: (1) the Grantor, if it is no longer owner; and (2) MDEQ.

1. Land Use Prohibitions. The Owner shall prohibit all uses of **[the Property OR the portion of the Property outlined in Exhibit 2]** that are not compatible or consistent with the exposure assumptions for the **[residential, nonresidential, OR site-specific]** cleanup criteria. Uses that are compatible with nonresidential cleanup criteria are generally described in the Description of Allowable Uses, attached hereto as [**Exhibit 4**].

   [NOTE 4: If the local zoning ordinance allows for more intensive uses within the Property's current zoning, insert the following:

   The following uses allowed under the *[NOTE 5: Insert name of local zoning authority and zoning code designation.]* _____ **zoning code designations are prohibited:***]*

[NOTE 6: If the local zoning ordinance allows more intensive uses within the Property's current zoning, list the more intensive uses permitted by the local zoning ordinance that are prohibited.]

[a._____
b._____
c._____
d._____**]**

2. Activities Prohibited. The Owner shall prohibit activities on **[the Property OR the portion of the Property outlined in Exhibit 2]** that may result in exposures above levels established in the CMIP. These prohibited activities include:

[NOTE 7: List below all restricted property-specific prohibited activities that are necessary to reliably restrict exposures to hazardous waste or contaminants or hazardous substances here. Examples of such restrictions are restrictions on groundwater use, excavation or other intrusive activity that affect the exposure barrier, construction of wells, construction of buildings, etc.]

a. _____
b. _____
c. _____
d. _____

3. The Owner shall prohibit activities on **[the Property OR the portion of the Property outlined in Exhibit 2]** that may interfere with any element of the CMIP, including prohibiting activities that may interfere with the performance of operation and maintenance activities, monitoring, or other measures necessary to ensure the effectiveness and integrity of the CMIP; including but not limited to:

[NOTE 8: List below all property specific prohibited activities that are necessary to maintain the effectiveness and integrity of the CMIP.]

a. _____
b. _____
c. _____

[NOTE 9: Insert the following paragraph if volatilization to indoor pathway must be addressed.]

[4. Soil Vapor Management. RESERVED. Pending EPA approval of proposed language for this section.]

[NOTE 10: Insert the following paragraph if permanent markers are required, and renumber the paragraphs as appropriate.]

[5. Permanent Markers. The Owner shall not remove, cover, obscure, or otherwise alter or interfere with the permanent markers placed at the locations noted in Exhibit 2. The Owner shall keep vegetation and other materials clear of the permanent markers to assure that the markers are readily visible.]

6. Monitoring Wells. The Owner shall not remove, disturb or damage any monitoring wells on the Property except as provided in the CMIP without MDEQ approval.

7. Contaminated Soil Management. The Owner shall manage contaminated soils, media and/or debris and all other soils located on the Property in accordance with the requirements of Part 111, RCRA Subtitle C, the administrative rules promulgated pursuant to Part 111 and the RCRA, and all other relevant state and federal laws, including, but not limited to, MCL 324.20120c. This includes if the Owner elects to remove any slabs, pavement or other impervious surface on the Property.

8. Access. The Owner shall grant to the MDEQ the right to enter the Property at reasonable times for the purpose of determining and monitoring compliance with the CMIP and this Restrictive Covenant, including the right to take samples, inspect the operation of the corrective measures, inspect any records relating thereto, and to perform any actions necessary to maintain compliance with the Part 111 and the CMIP.

9. Transfer of Interest. The Grantor shall provide notice at the address provided in this document to the MDEQ of the Grantor's intent to transfer any interest in the Property, or any portion thereof, at least fourteen (14) business days prior to consummating the conveyance. A conveyance of title, easement, or other interest in the Property shall not be consummated by the Grantor without adequate and complete provision for compliance with the terms and conditions of this Restrictive Covenant. The Grantor shall include in any instrument conveying any interest in any portion of the Property, including, but not limited to, deeds, leases, and mortgages, a notice which is in substantially the following form:

   NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO A DECLARATION OF RESTRICTIVE COVENANT DATED _____ AND RECORDED WITH THE _____ COUNTY REGISTER OF DEEDS, LIBER_____, PAGE_____.

   A copy of this Restrictive Covenant shall be provided to all future owners, heirs, successors, lessees, easement holders, assigns, and transferees by the person transferring the interest.

10. Notices. Any notice, demand, request, consent, approval, or communication that is required to be made or obtained under this Restrictive Covenant shall be made in writing; include a statement that the notice is being made pursuant to the requirements of this Restrictive Covenant; include the Michigan facility identification number, MID ___-___-___, and the MDEQ Reference No. RC-OWMRP-111-__-__; and shall be served either personally, or sent via first class mail, postage prepaid, as follows:

    Hazardous Waste Section Chief
    Office of Waste Management and Radiological Protection
    Michigan Department of Environmental Quality
    P.O. Box 30241
    Lansing, Michigan 48909-7741

11. Term. This Restrictive Covenant shall run with the Property and shall be binding on the Owner, and all current and future successors, lessees, easement holders, their assigns, and their authorized agents, employees, or persons acting under their direction and

control. This Restrictive Covenant may only be modified or rescinded with the written approval of the MDEQ.

12. Enforcement. The Grantor is entitled to enforce the restrictions and covenants of this Restrictive Covenant by specific performance or other legal action in a court of competent jurisdiction against subsequent Owners of all or part of the Property. The Grantor, on behalf of itself, and its successors in title, intends and agrees that MDEQ is entitled to enforce the restrictions and covenants in this Restrictive Covenant by specific performance or other legal action in a court of competent jurisdiction against the Grantor, as Owner, and thereafter against subsequent Owners of all or part of the Property. All remedies available hereunder shall be in addition to any and all other remedies at law or equity.

13. Modification/Release/Rescission. The Grantor or Owner may request in writing to the MDEQ, at the address provided herein, modifications to, or release or rescission of, this Restrictive Covenant. This Restrictive Covenant may be modified, released or rescinded only with the written approval of the MDEQ. Any approved modification to, or release or rescission of, this Restrictive Covenant shall be filed with the appropriate Registrar of Deeds by the Grantor or Owner and a certified copy shall be returned to the MDEQ at the address provided herein.

14. Severability. If any provision of this Restrictive Covenant is held to be invalid by a court of competent jurisdiction, the invalidity of such provision shall not affect the validity of any other provisions of this Restrictive Covenant and all other provisions shall continue to remain in full force and effect.

15. Authority to Execute Restrictive Covenant. The undersigned person(s) executing this Restrictive Covenant **[is/are]** the Owner(s), or **[has/have]** the express written permission of the Owner(s) and all other holders of a legal interest whose interest is materially affected by this Restrictive Covenant **[as documented and attached hereto as Exhibit W/X/Y]** and represent and certifies that he or she is duly authorized and has been empowered to execute and deliver this Restrictive Covenant.

IN WITNESS WHEREOF, _____ has caused this Restrictive Covenant, RC-OWMRP-111-__-___, to be executed on this_____day of_____, 20__.

By: _____
Signature

Name: _____
Grantor

Its: _____
Title

STATE OF MICHIGAN
COUNTY OF _____

[NOTE 11: Choose only <u>one</u> of the following four acknowledgments:

[<u>OPTION 1</u>: If Grantor is an individual:

The foregoing instrument was acknowledged before me this _____ (date) by _____, an individual.*]*

[<u>OPTION 2</u>: If Grantor is a corporation:

The foregoing instrument was acknowledged before me this _____ (date) by *[NOTE: Insert name of officer or agent, and title of officer or agent signing the document.]* _____ **of** *[NOTE: Insert name of corporation]* _____, **a** *[NOTE: Insert state or place of incorporation]* _____ **Corporation**, **on behalf of the corporation.***]*

[<u>OPTION 3</u>: If Grantor is a partnership:

The foregoing instrument was acknowledged before me this _____ (date) by *[NOTE: Insert name of partner or agent]* _____**, [partner/agent] on behalf of** [*NOTE: Insert name of partnership]* _____**, a partnership.***]*

[<u>OPTION 4</u>: For an individual acting as principal by an attorney in fact (power of attorney):

The foregoing instrument was acknowledged before me this _____ (date) by *[NOTE: Insert name of attorney in fact]* _____ **as attorney in fact on behalf of** *[NOTE: Insert name of principal]* _____**.***]*

_____
Notary Public
State of Michigan, County of _____
Acting in the County of _____
My commission expires: _____

EXHIBIT 1

LEGAL DESCRIPTION OF PROPERTY

[NOTE: This exhibit shall contain the legal description. Exhibit 1 shall also include the parcel identification number(s) of the Property.]

EXHIBIT 2

LEGAL DESCRIPTION AND SURVEY OF RESTRICTED AREAS OF THE PROPERTY

[NOTE: This exhibit shall include a survey of the entire Property identified in the legal description provided in Exhibit 1. The survey shall depict any permanent markers which are part of the CMIP. If the land use and resource use restrictions of this Restrictive Covenant apply to the whole Property, the initial survey is sufficient. If the land use and resource use restrictions of this Restrictive Covenant apply to discrete portions of the Property, then those areas need to be legally described, surveyed individually, and identified on the survey of the Property above. Areas of the Property that are restricted for groundwater use must be identified. All surveys must be conducted by a licensed professional surveyor and shall identify and clearly delineate and graphically depict the spatial extent of all restricted areas in relation to the Property boundaries and the key features of the corrective measures. Surveys must be signed by the surveyor; be sealed with the surveyor's stamped certificate; have a basis of bearings; and certify compliance with all of the requirements of PA 132 of 1970, as amended.]

EXHIBIT 3

LIST OF *[CONTAMINANTS OR HAZARDOUS WASTES OR HAZARDOUS SUBSTANCES]* ABOVE CRITERIA IN SOILS OR GROUNDWATER

[NOTE: This exhibit shall include a list of contaminants or hazardous wastes or hazardous substances which are over the applicable cleanup criteria for soils and/or groundwater.]

[CONTAMINANTS/HAZ WASTE/HAZ SUBSTANCES] CAS NUMBER APPLICABLE CRITERIA (ppb)

EXHIBIT 4

DESCRIPTION OF ALLOWABLE USES

[NOTE: This exhibit is only necessary when the property is restricted to nonresidential or site-specific land uses. It must be consistent with the zoning of the property and with the generic or alternative exposure assumptions used to develop the cleanup criteria.]

[NOTE: This exhibit must be consistent with the generic exposure assumptions, or alternative exposure assumptions used to derive a site-specific criterion, if one was approved in the CMIP and those uses are consistent with the property zoning.]

Option 1: Insert the following if the property is restricted to the nonresidential land use category:

[Nonresidential Land Use: This land use is characterized by any use which is not residential in nature and is primarily characterized by industrial and commercial uses. Industrial uses typically involve manufacturing operations engaged in processing and manufacturing of materials or products. Other examples of industrial uses are utility companies, industrial research and development, and petroleum bulk storage. Commercial uses include any business or income-producing use, such as commercial warehouses, lumber yards, retail gas stations, auto dealerships and service stations, as well as, office buildings, banks, and medical/dental offices (not including hospitals). Commercial uses also include retail businesses whose principal activity is the sale of food or merchandise within an enclosed building and personal service establishments which perform services indoors, such as health clubs, barber/beauty salons, photographic studios, etc.

Any residential use is specifically prohibited from the non-residential land use category. This would include the primary use of the property for human habitation and includes structures such as single family dwellings, multiple family structures, mobile homes, condominiums, and apartment buildings. Any uses which are intended to house, educate, or provide care for children, the elderly, the infirm, or other sensitive populations, and therefore could include day care centers, educational facilities, hospitals, elder care facilities, and nursing homes, may not fit the nonresidential exposure assumptions. Residential or site specific environmental protection standards may need to be considered. The use of any accessory building or portion of an existing building as a dwelling unit permitted for a proprietor or storekeeper and their families, located in the same building as their place of occupation, or for a watchman or caretaker is also prohibited. Any authority that allows for residential use of the Property as a legal non-conforming use is also restricted per the prohibitions contained in this restrictive covenant.]

Option 2: Insert the following if the property is restricted to the site-specific land use category:

[Site-specific land use: If the property is restricted to the site-specific land use category, insert a paragraph that describes those uses that are consistent with

assumptions used to develop site-specific criteria pursuant to MCL 324.20120a(2) and MCL 324.20120b of the NREPA as approved by the MDEQ.]

EXHIBIT W

CONSENT OF OWNER

I, _____, the current and legal Owner of the Property, do hereby consent to the recording of this Restrictive Covenant, RC-OWMRP-111-___-____, and authorize _____(Grantor) to file the Restrictive Covenant with the _____County Register of Deeds for recording.

By: _____
Signature
Name:_____
Print or Type Name
Its:_____
Title

STATE OF MICHIGAN
COUNTY OF _____

_____
Notary Public Signature
State of Michigan
County of _____
My Commission Expires:_____
Acting in the County of_____

EXHIBIT X

CONSENT OF EASEMENT HOLDERS

As evidenced below by my signature, I agree to be subject to the restrictions specified in this Restrictive Covenant.

[NOTE: Insert additional signature blocks if multiple easement holders.]

By: _____
Signature
Name:_____
Print or Type Name
Its:_____
Title

STATE OF MICHIGAN
COUNTY OF _____)

[*NOTE 12: Choose only <u>one</u> of the following four acknowledgments:*

<u>[OPTION 1</u>: If easement holder is an individual:

The foregoing instrument was acknowledged before me this _____(date) by _____, an individual.*]*

<u>[OPTION 2</u>: If easement holder is a corporation:

The foregoing instrument was acknowledged before me this _____ (date) by *[NOTE: Insert name of officer or agent, and title of officer or agent signing the document]* _____ **of** *[NOTE: Insert name of corporation]* _____, **a** *[NOTE: Insert state or place of incorporation]* _____ **Corporation, on behalf of the corporation.***]*

<u>[OPTION 3</u>: If easement holder is a partnership:]

The foregoing instrument was acknowledged before me this _____ (date) by *[NOTE: Insert name of partner or agent]* _____**, [partner/agent] on behalf of** *[NOTE: Insert name of partnership*] _____**, a partnership.***]*

<u>[OPTION 4</u>: For an individual acting as principal by an attorney in fact (power of attorney):

The foregoing instrument was acknowledged before me this _____ (date) by *[NOTE: Insert name of attorney in fact]* _____ **as attorney in fact on behalf of** *[NOTE: Insert name of principal]* _____**.***]*

_____
Notary Public Signature
State of Michigan
County of _____
My Commission Expires:_____
Acting in the County of_____

EXHIBIT Y
CONSENT OF LEASEHOLDER

As evidenced below by my signature, I agree to be subject to the restrictions specified in this Restrictive Covenant.

[NOTE: Insert additional signature blocks if multiple leaseholders]

By: _____
Signature
Name:_____
Print or Type Name
Its:_____
Title

STATE OF MICHIGAN
COUNTY OF _____

[*NOTE 13: Choose only <u>one</u> of the following four acknowledgments:*

<u>[OPTION 1</u>: If lessee is an individual:

The foregoing instrument was acknowledged before me this _____(date) by _____, an individual.*]*

<u>[OPTION 2</u>: If lessee is a corporation:

The foregoing instrument was acknowledged before me this _____ (date) by *[NOTE: Insert name of officer or agent, and title of officer or agent signing the document.]* _____ **of** *[NOTE: Insert name of corporation]*_____, **a** *[NOTE: Insert state or place of incorporation]* _____ **Corporation, on behalf of the corporation.***]*

<u>[OPTION 3</u>: If lessee is a partnership:]

The foregoing instrument was acknowledged before me this _____ (date) by *[NOTE: Insert name of partner or agent]* _____**, [partner/agent] on behalf of** *[NOTE: Insert name of partnership/grantor]* _____**, a partnership.***]*

<u>[OPTION 4</u>: For an individual acting as principal by an attorney in fact (power of attorney):]

*[***The foregoing instrument was acknowledged before me this _____ (date) by** *[NOTE: Insert name of attorney in fact]* _____ **as attorney in fact on behalf of** *[NOTE: Insert name of principal]* _____**.***]*

_____
Notary Public Signature
State of Michigan
County of _____
My Commission Expires:_____
Acting in the County of_____

EXHIBIT Z

ADJACENT AFFECTED PROPERTIES

[NOTE: A map shall include off-site adjacent properties affected by the contamination originating from the Property.]

APPENDIX B

SUMMARY TABLES OF ANALYTICAL RESULTS
2008 CLOSURE OF WMUs

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)												
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
01S-2/19/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Bis(2-ethylhexyl) phthalate	100	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Naphthalene	71	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Naphthalene	52	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
2-Methylnaphthalene	46	J	57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	420	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	46	J	2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
n-Butylbenzene	60		1,600	4,600	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Ethylbenzene	73		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Methyl isobutyl ketone	290	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	85	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
n-Propylbenzene	54	J	1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Toluene	31	J	16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	54	J	100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
1,2,4-Trimethylbenzene	**660**		2,100	2,100	**570**		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	200		1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	330		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
02S (Dup 1S)-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Carbazole	680	J	9,400	39,000	1,100		8.2E+5	NLV	NLV	NLV	NLV	ID	2.4E+6	3.4E+6	2.9E+6	NA
Dibenzofuran	830	J	ID	ID	1,700		ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
Hexachloroethane	90		430	1,200	1,800 (X)	310	1.1E+5	79,000	6.6E+5	1.4E+6	1.4E+6	1.0E+8	7.3E+5	1.0E+6	8.6E+5	NA
Naphthalene	**6,100**		35,000	1.0E+5	**870**		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Naphthalene	**6,100**		35,000	1.0E+5	**870**		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Acenaphthene	1,700	J	3.0E+5	8.8E+5	4,400		9.7E+5	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
Anthracene	490	J	41,000	41,000	ID		41,000	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	1.0E+9	8.6E+8	NA
Benzo(a)anthracene	4,500		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(a)pyrene	3,700		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	1.9E+6	8,000	16,000	11,000	NA
Benzo(b)fluoranthene	5,500		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(g,h,i)perylene	2,300		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	3.5E+8	7.0E+6	1.4E+7	9.5E+6	NA
Benzo(k)fluoranthene	2,400		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8.0E+5	1.6E+6	1.1E+6	NA
Chrysene	4,100		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Dibenz(a,h)anthracene	600	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8,000	16,000	11,000	NA
Fluoranthene	4,500		7.3E+5	7.3E+5	5,500		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Fluorene	940	J	3.9E+5	8.9E+5	5,300		8.9E+5	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	1.2E+8	1.0E+8	NA
Indeno(1,2,3-cd)pyrene	2,100	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
2-Methylnaphthalene	1,700	J	57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
2-Methylnaphthalene	1,200		57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
02S (Dup 1S)-2/20/2008 12:00:00 PM																
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Phenanthrene	2,300		56,000	1.6E+5	5,300		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	6,300		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	590	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Benzene	**150**		**100**	**100**	4,000 (X)	240	2.2E+5	8,400	45,000	99,000	2.3E+5	4.7E+8	4.0E+5 (C)	4.0E+5 (C)	4.0E+5 (C)	4.0E+5
Methyl ethyl ketone	150	J	2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
n-Butylbenzene	130		1,600	4,600	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
sec-Butylbenzene	240		1,600	4,600	ID		88,000	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Ethylbenzene	210		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	760		91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Dichloromethane	**120**	J	**100**	**100**	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Methyl tert-butyl ether	42	J	800	800	15,000 (X)	2,000	5.9E+6 (C)	5.9E+6 (C)	3.0E+7	4.1E+7	8.9E+7	8.8E+10	5.9E+6 (C)	5.9E+6 (C)	5.9E+6 (C)	5.9E+6
n-Propylbenzene	460		1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Toluene	97		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
1,2,4-Trimethylbenzene	**710**		2,100	2,100	**570**		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	62	J	1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	**750**		5,600	5,600	**700**		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
02S-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Carbazole	**1,400**	J	9,400	39,000	**1,100**		8.2E+5	NLV	NLV	NLV	NLV	ID	2.4E+6	3.4E+6	2.9E+6	NA
Dibenzofuran	1,600	J	ID	ID	1,700		ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
Naphthalene	**6,100**		35,000	1.0E+5	**870**		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Naphthalene	**9,300**		35,000	1.0E+5	**870**		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Acenaphthene	3,300		3.0E+5	8.8E+5	4,400		9.7E+5	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
Anthracene	1,200	J	41,000	41,000	ID		41,000	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	1.0E+9	8.6E+8	NA
Benzo(a)anthracene	8,700		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(a)pyrene	7,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	1.9E+6	8,000	16,000	11,000	NA
Benzo(g,h,i)perylene	4,800		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	3.5E+8	7.0E+6	1.4E+7	9.5E+6	NA
Benzo(k)fluoranthene	19,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8.0E+5	1.6E+6	1.1E+6	NA
Chrysene	9,400		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Dibenz(a,h)anthracene	1,300	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8,000	16,000	11,000	NA
Fluoranthene	**8,700**		7.3E+5	7.3E+5	**5,500**		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Fluorene	1,900	J	3.9E+5	8.9E+5	5,300		8.9E+5	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	1.2E+8	1.0E+8	NA
Indeno(1,2,3-cd)pyrene	4,400		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
2-Methylnaphthalene	1,200		57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
2-Methylnaphthalene	2,700		57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
Phenanthrene	4,900		56,000	1.6E+5	5,300		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	14,000		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
02S-2/20/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	380	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Benzene	**140**		**100**	**100**	4,000 (X)	240	2.2E+5	8,400	45,000	99,000	2.3E+5	4.7E+8	4.0E+5 (C)	4.0E+5 (C)	4.0E+5 (C)	4.0E+5
sec-Butylbenzene	230		1,600	4,600	ID		88,000	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
n-Butylbenzene	130		1,600	4,600	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Ethylbenzene	200		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	750		91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Dichloromethane	86	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Methyl tert-butyl ether	50	J	800	800	15,000 (X)	2,000	5.9E+6 (C)	5.9E+6 (C)	3.0E+7	4.1E+7	8.9E+7	8.8E+10	5.9E+6 (C)	5.9E+6 (C)	5.9E+6 (C)	5.9E+6
n-Propylbenzene	460		1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Toluene	75		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	30	J	100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
1,2,4-Trimethylbenzene	**710**		2,100	2,100	**570**		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	59	J	1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	690		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
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Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Bis(2-ethylhexyl) phthalate	1,100		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
2-Methylphenol	45	J														
Methylphenols (J)	45		7,400	20,000	1,400		1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA
3 & 4-Methylphenol	38	J	7,400	20,000	1,400		1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA
Naphthalene	140	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Naphthalene	86	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Phenol	53	J	88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	850	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Bromobenzene	540		550	1,500	NA		3.6E+5	5.8E+5	5.4E+5	5.4E+5	5.4E+5	2.4E+8	7.6E+5 (C)	7.6E+5 (C)	7.6E+5 (C)	7.6E+5
n-Butylbenzene	33	J	1,600	4,600	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
1,2-Dichlorobenzene	**1,900**		14,000	14,000	**360**		2.1E+5 (C)	2.1E+5 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	2.1E+5 (C)	2.1E+5 (C)	2.1E+5 (C)	2.1E+5
1,4-Dichlorobenzene	24	J	1,700	1,700	290		1.4E+5	1.0E+5	2.6E+5	2.6E+5	3.4E+5	5.7E+8	1.9E+6	2.6E+6	2.2E+6	NA
1,1-Dichloroethane	31	J	18,000	50,000	15,000		8.9E+5 (C)	4.3E+5	2.5E+6	6.0E+6	1.4E+7	1.5E+10	8.9E+5 (C)	8.9E+5 (C)	8.9E+5 (C)	8.9E+5
cis-1,2-Dichloroethene	53	J	1,400	1,400	12,000		6.4E+5 (C)	41,000	2.1E+5	4.3E+5	1.0E+6	1.0E+9	6.4E+5 (C)	6.4E+5 (C)	6.4E+5 (C)	6.4E+5
Ethylbenzene	**480**		1,500	1,500	**360**		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	53	J	91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Methyl isobutyl ketone	160	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	100	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
n-Propylbenzene	76		1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Toluene	1,600		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	33	J	100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
1,2,4-Trimethylbenzene	410		2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	270		1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	**3,500**		5,600	5,600	**700**		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)												
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
04S-2/19/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Bis(2-ethylhexyl) phthalate	1,200		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Naphthalene	55	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Phenol	110	J	88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Benzo(a)anthracene	100	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(a)pyrene	64	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	1.9E+6	8,000	16,000	11,000	NA
Benzo(g,h,i)perylene	60	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	3.5E+8	7.0E+6	1.4E+7	9.5E+6	NA
Benzo(k)fluoranthene	190		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8.0E+5	1.6E+6	1.1E+6	NA
Chrysene	66	J	NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Fluoranthene	130	J	7.3E+5	7.3E+5	5,500		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Indeno(1,2,3-cd)pyrene	49	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Pyrene	190		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	490	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	82	J	2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
Ethylbenzene	100		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	26	J	91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Methyl isobutyl ketone	120	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	220	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
n-Propylbenzene	40	J	1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Tetrachloroethene	44	J	100	100	900 (X)	220	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	220		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	150		100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
Trichlorofluoromethane	15	J	52,000	1.5E+5	NA		5.6E+5 (C)	5.6E+5 (C)	1.1E+8	1.4E+11	1.4E+11	1.7E+12	5.6E+5 (C)	5.6E+5 (C)	5.6E+5 (C)	5.6E+5
1,2,4-Trimethylbenzene	150		2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	84		1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	510		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
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Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Butyl benzyl phthalate	660		3.1E+5 (C)	3.1E+5 (C)	26,000 (X)	13,000	3.1E+5 (C)	NLV	NLV	NLV	NLV	2.1E+10	3.1E+5 (C)	3.1E+5 (C)	3.1E+5 (C)	3.1E+5
Dibenzofuran	140	J	ID	ID	1,700		ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
Diethyl phthalate	88	J	1.1E+5	3.2E+5	2,200		7.4E+5 (C)	NLV	NLV	NLV	NLV	1.5E+9	7.4E+5 (C)	7.4E+5 (C)	7.4E+5 (C)	7.4E+5
2,4-Dimethylphenol	410		7,400	20,000	7,600		1.0E+7	NLV	NLV	NLV	NLV	2.1E+9	3.6E+7	5.1E+7	4.3E+7	NA
Di-n-butyl phthalate	220	J	7.6E+5 (C)	7.6E+5 (C)	11,000		7.6E+5 (C)	NLV	NLV	NLV	NLV	1.5E+9	7.6E+5 (C)	7.6E+5 (C)	7.6E+5 (C)	7.6E+5
Di-n-octyl phthalate	220	J	1.0E+8	1.4E+8 (C)	ID		1.4E+8 (C)	NLV	NLV	NLV	NLV	ID	2.0E+7	3.6E+7	2.6E+7	1.4E+8
Bis(2-ethylhexyl) phthalate	1,500		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Isophorone	3,000		15,000	62,000	11,000 (X)	6,200	2.4E+6 (C)	NLV	NLV	NLV	NLV	8.2E+9	2.4E+6 (C)	2.4E+6 (C)	2.4E+6 (C)	2.4E+6
2-Methylphenol	110	J														
3 & 4-Methylphenol	130	J	7,400	20,000	1,400		1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA
Methylphenols (J)	110		7,400	20,000	1,400		1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA
Naphthalene	370	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)												
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
05S-2/19/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Naphthalene	290		35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Phenol	520		88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Acenaphthene	85	J	3.0E+5	8.8E+5	4,400		9.7E+5	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
Anthracene	67	J	41,000	41,000	ID		41,000	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	1.0E+9	8.6E+8	NA
Benzo(a)anthracene	230	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(a)pyrene	170	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	1.9E+6	8,000	16,000	11,000	NA
Benzo(b)fluoranthene	420		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(g,h,i)perylene	220	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	3.5E+8	7.0E+6	1.4E+7	9.5E+6	NA
Chrysene	400		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Fluoranthene	200	J	7.3E+5	7.3E+5	5,500		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Indeno(1,2,3-cd)pyrene	210	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
2-Methylnaphthalene	1,100		57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
2-Methylnaphthalene	510		57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
Phenanthrene	500		56,000	1.6E+5	5,300		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	1,200		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	650	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Benzene	**140**		**100**	**100**	4,000 (X)	240	2.2E+5	8,400	45,000	99,000	2.3E+5	4.7E+8	4.0E+5 (C)	4.0E+5 (C)	4.0E+5 (C)	4.0E+5
Methyl ethyl ketone	740		2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
sec-Butylbenzene	27	J	1,600	4,600	ID		88,000	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
n-Butylbenzene	120		1,600	4,600	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
tert-Butylbenzene	45	J	1,600	4,600	NA		1.8E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
1,2-Dichlorobenzene	41	J	14,000	14,000	360		2.1E+5 (C)	2.1E+5 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	2.1E+5 (C)	2.1E+5 (C)	2.1E+5 (C)	2.1E+5
1,1-Dichloroethane	1,100		18,000	50,000	15,000		8.9E+5 (C)	4.3E+5	2.5E+6	6.0E+6	1.4E+7	1.5E+10	8.9E+5 (C)	8.9E+5 (C)	8.9E+5 (C)	8.9E+5
cis-1,2-Dichloroethene	1,100		1,400	1,400	12,000		6.4E+5 (C)	41,000	2.1E+5	4.3E+5	1.0E+6	1.0E+9	6.4E+5 (C)	6.4E+5 (C)	6.4E+5 (C)	6.4E+5
trans-1,2-Dichloroethene	350		2,000	2,000	30,000		1.4E+6 (C)	43,000	3.3E+5	8.4E+5	2.0E+6	2.1E+9	1.4E+6 (C)	1.4E+6 (C)	1.4E+6 (C)	1.4E+6
1,2-Dichloropropane	20	J	100	100	5,800 (X)	180	3.2E+5	7,400	30,000	51,000	1.2E+5	1.2E+8	5.5E+5 (C)	5.5E+5 (C)	5.5E+5 (C)	5.5E+5
Ethylbenzene	**1,900**		**1,500**	**1,500**	**360**		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	130		91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Methyl isobutyl ketone	1,400		36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	**180**	J	**100**	**100**	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Methyl tert-butyl ether	110	J	800	800	15,000 (X)	2,000	5.9E+6 (C)	5.9E+6 (C)	3.0E+7	4.1E+7	8.9E+7	8.8E+10	5.9E+6 (C)	5.9E+6 (C)	5.9E+6 (C)	5.9E+6
n-Propylbenzene	100		1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Styrene	260		2,700	2,700	2,200		2.7E+5	5.2E+5 (C)	3.3E+6	3.3E+6	4.2E+6	6.9E+9	5.2E+5 (C)	5.2E+5 (C)	5.2E+5 (C)	5.2E+5
Tetrachloroethene	**1,500**		**100**	**100**	**900 (X)**	**220**	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	**7,800**		16,000	16,000	**2,800**		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
1,1,1-Trichloroethane	400		4,000	4,000	4,000		4.6E+5 (C)	4.6E+5	4.5E+6	1.5E+7	3.1E+7	2.9E+10	4.6E+5 (C)	4.6E+5 (C)	4.6E+5 (C)	4.6E+5
Trichloroethene	**430**		**100**	**100**	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
1,2,4-Trimethylbenzene	**1,700**		2,100	2,100	**570**		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	**1,200**		1,800	1,800	**1,100**		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Vinyl chloride	**610**		**40**	**40**	**300**		20,000	2,800	29,000	1.7E+5	4.2E+5	8.9E+8	34,000	47,000	40,000	4.9E+5

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
05S-2/19/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Xylenes, Total	18,000		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
06S-2/19/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Bis(2-ethylhexyl) phthalate	440		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	320	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Ethylbenzene	32	J	1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Dichloromethane	67	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Methyl tert-butyl ether	41	J	800	800	15,000 (X)	2,000	5.9E+6 (C)	5.9E+6 (C)	3.0E+7	4.1E+7	8.9E+7	8.8E+10	5.9E+6 (C)	5.9E+6 (C)	5.9E+6 (C)	5.9E+6
Toluene	58		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
1,3,5-Trimethylbenzene	20	J	1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	210		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
07S-2/19/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Butyl benzyl phthalate	85	J	3.1E+5 (C)	3.1E+5 (C)	26,000 (X)	13,000	3.1E+5 (C)	NLV	NLV	NLV	NLV	2.1E+10	3.1E+5 (C)	3.1E+5 (C)	3.1E+5 (C)	3.1E+5
Bis(2-ethylhexyl) phthalate	510		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
3 & 4-Methylphenol	46	J	7,400	20,000	1,400		1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA
Phenol	59	J	88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	570	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	110	J	2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
Ethylbenzene	84		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Methyl isobutyl ketone	480	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	81	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Toluene	120		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	29	J	100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
Xylenes, Total	290		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
08S (Dup 3S)-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Bis(2-ethylhexyl) phthalate	280		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Naphthalene	70	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	380	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Ethylbenzene	43	J	1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Dichloromethane	70	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)												
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
08S-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Bis(2-ethylhexyl) phthalate	230		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Phenol	30	J	88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	380	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Ethylbenzene	46	J	1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Dichloromethane	85	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Toluene	26	J	16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
09S-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Benzyl alcohol	960	J	2.0E+5	5.8E+5	NA		5.8E+6 (C)	NLV	NLV	NLV	NLV	1.5E+11	5.8E+6 (C)	5.8E+6 (C)	5.8E+6 (C)	5.8E+6
Butyl benzyl phthalate	3,200		3.1E+5 (C)	3.1E+5 (C)	26,000 (X)	13,000	3.1E+5 (C)	NLV	NLV	NLV	NLV	2.1E+10	3.1E+5 (C)	3.1E+5 (C)	3.1E+5 (C)	3.1E+5
2,4-Dimethylphenol	390	J	7,400	20,000	7,600		1.0E+7	NLV	NLV	NLV	NLV	2.1E+9	3.6E+7	5.1E+7	4.3E+7	NA
Di-n-butyl phthalate	1,800	J	7.6E+5 (C)	7.6E+5 (C)	11,000		7.6E+5 (C)	NLV	NLV	NLV	NLV	1.5E+9	7.6E+5 (C)	7.6E+5 (C)	7.6E+5 (C)	7.6E+5
Di-n-octyl phthalate	1,400	J	1.0E+8	1.4E+8 (C)	ID		1.4E+8 (C)	NLV	NLV	NLV	NLV	ID	2.0E+7	3.6E+7	2.6E+7	1.4E+8
Bis(2-ethylhexyl) phthalate	34,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
3 & 4-Methylphenol	740	J	7,400	20,000	1,400		1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA
Naphthalene	770	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Naphthalene	890		35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Phenol	1,400	J	88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Chrysene	440	J	NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Fluoranthene	1000	J	7.3E+5	7.3E+5	5,500		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
2-Methylnaphthalene	440	J	57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
2-Methylnaphthalene	350		57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
Phenanthrene	1,200	J	56,000	1.6E+5	5,300		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	1,200	J	4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	1,500	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Bromobenzene	230		550	1,500	NA		3.6E+5	5.8E+5	5.4E+5	5.4E+5	5.4E+5	2.4E+8	7.6E+5 (C)	7.6E+5 (C)	7.6E+5 (C)	7.6E+5
Methyl ethyl ketone	290	J	2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
sec-Butylbenzene	870		1,600	4,600	ID		88,000	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
n-Butylbenzene	1,800		1,600	4,600	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
tert-Butylbenzene	79		1,600	4,600	NA		1.8E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Chlorobenzene	34	J	2,000	2,000	940		2.6E+5 (C)	2.2E+5	9.2E+5	1.1E+6	2.1E+6	2.1E+9	2.6E+5 (C)	2.6E+5 (C)	2.6E+5 (C)	2.6E+5
1,2-Dichlorobenzene	280		14,000	14,000	360		2.1E+5 (C)	2.1E+5 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	2.1E+5 (C)	2.1E+5 (C)	2.1E+5 (C)	2.1E+5
1,4-Dichlorobenzene	65		1,700	1,700	290		1.4E+5	1.0E+5	2.6E+5	2.6E+5	3.4E+5	5.7E+8	1.9E+6	2.6E+6	2.2E+6	NA
Ethylbenzene	2,500		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	790		91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Methyl isobutyl ketone	190	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	95	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
09S-2/20/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
n-Propylbenzene	1,400		1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Toluene	1,600		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	47	J	100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
1,2,4-Trimethylbenzene	7,400		2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	4,800		1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	11,000		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
10S-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Benzyl alcohol	110	J	2.0E+5	5.8E+5	NA		5.8E+6 (C)	NLV	NLV	NLV	NLV	1.5E+11	5.8E+6 (C)	5.8E+6 (C)	5.8E+6 (C)	5.8E+6
Bis(2-ethylhexyl) phthalate	2,900		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Naphthalene	47	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Phenol	47	J	88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Benzo(b)fluoranthene	39	J	NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	80,000	1.6E+5	1.1E+5	NA
Fluoranthene	53	J	7.3E+5	7.3E+5	5,500		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Phenanthrene	46	J	56,000	1.6E+5	5,300		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	67	J	4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	540	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	180	J	2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
n-Butylbenzene	56		1,600	4,600	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
sec-Butylbenzene	22	J	1,600	4,600	ID		88,000	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
1,1-Dichloroethane	72		18,000	50,000	15,000		8.9E+5 (C)	4.3E+5	2.5E+6	6.0E+6	1.4E+7	1.5E+10	8.9E+5 (C)	8.9E+5 (C)	8.9E+5 (C)	8.9E+5
Ethylbenzene	200		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	25	J	91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Methyl isobutyl ketone	110	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	100	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Methyl tert-butyl ether	39	J	800	800	15,000 (X)	2,000	5.9E+6 (C)	5.9E+6 (C)	3.0E+7	4.1E+7	8.9E+7	8.8E+10	5.9E+6 (C)	5.9E+6 (C)	5.9E+6 (C)	5.9E+6
n-Propylbenzene	37	J	1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Toluene	90		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	41	J	100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
1,2,4-Trimethylbenzene	180		2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	110		1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	380		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
11-2C (subslab of 11C)-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Bis(2-ethylhexyl) phthalate	78	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
2-Methylphenol	45	J														
Methylphenols (J)	45		7,400	20,000	1,400		1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)												
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
11-2C (subslab of 11C)-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Naphthalene	66	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Naphthalene	180	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Phenol	190		88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Phenanthrene	49	J	56,000	1.6E+5	5,300		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	2,100	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	2,800		2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
Chlorobenzene	60		2,000	2,000	940		2.6E+5 (C)	2.2E+5	9.2E+5	1.1E+6	2.1E+6	2.1E+9	2.6E+5 (C)	2.6E+5 (C)	2.6E+5 (C)	2.6E+5
1,2-Dichlorobenzene	23	J	14,000	14,000	360		2.1E+5 (C)	2.1E+5 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	2.1E+5 (C)	2.1E+5 (C)	2.1E+5 (C)	2.1E+5
1,1-Dichloroethene	20	J	18,000	50,000	15,000		8.9E+5 (C)	4.3E+5	2.5E+6	6.0E+6	1.4E+7	1.5E+10	8.9E+5 (C)	8.9E+5 (C)	8.9E+5 (C)	8.9E+5
1,1-Dichloroethane	110		18,000	50,000	15,000		8.9E+5 (C)	4.3E+5	2.5E+6	6.0E+6	1.4E+7	1.5E+10	8.9E+5 (C)	8.9E+5 (C)	8.9E+5 (C)	8.9E+5
Ethylbenzene	**520**		1,500	1,500	**360**		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	36	J	91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Methyl isobutyl ketone	1,400		36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	**590**		**100**	**100**	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
n-Propylbenzene	67		1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Tetrachloroethene	**620**		**100**	**100**	900 (X)	**220**	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	1,600		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
1,1,1-Trichloroethane	200		4,000	4,000	4,000		4.6E+5 (C)	4.6E+5	4.5E+6	1.5E+7	3.1E+7	2.9E+10	4.6E+5 (C)	4.6E+5 (C)	4.6E+5 (C)	4.6E+5
Trichloroethene	**110**		**100**	**100**	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
1,2,4-Trimethylbenzene	250		2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	100		1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	**2,300**		5,600	5,600	**700**		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
12S-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Carbazole	150	J	9,400	39,000	1,100		8.2E+5	NLV	NLV	NLV	NLV	ID	2.4E+6	3.4E+6	2.9E+6	NA
Dibenzofuran	90	J	ID	ID	1,700		ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
Bis(2-ethylhexyl) phthalate	720		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Naphthalene	64	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Acenaphthene	140	J	3.0E+5	8.8E+5	4,400		9.7E+5	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
Anthracene	420		41,000	41,000	ID		41,000	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	1.0E+9	8.6E+8	NA
Benzo(a)anthracene	3,800		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(a)pyrene	3,900		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	1.9E+6	8,000	16,000	11,000	NA
Benzo(b)fluoranthene	3,800		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(g,h,i)perylene	2,300		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	3.5E+8	7.0E+6	1.4E+7	9.5E+6	NA
Benzo(k)fluoranthene	2,400		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8.0E+5	1.6E+6	1.1E+6	NA
Chrysene	4,100		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Dibenz(a,h)anthracene	730		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8,000	16,000	11,000	NA

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)												
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
12S-2/20/2008 12:00:00 PM																
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Fluoranthene	1,600		7.3E+5	7.3E+5	5,500		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Fluorene	130	J	3.9E+5	8.9E+5	5,300		8.9E+5	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	1.2E+8	1.0E+8	NA
Indeno(1,2,3-cd)pyrene	2,100		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
2-Methylnaphthalene	85	J	57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
Phenanthrene	1,500		56,000	1.6E+5	5,300		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	4,800		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	560	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	1,100		2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
Ethylbenzene	48	J	1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Methyl isobutyl ketone	92	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	70	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Tetrachloroethene	51	J	100	100	900 (X)	220	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	110		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	59		100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
1,2,4-Trimethylbenzene	23	J	2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
Xylenes, Total	150	J	5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
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Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Carbazole	**2,300**	J	9,400	39,000	**1,100**		8.2E+5	NLV	NLV	NLV	NLV	ID	2.4E+6	3.4E+6	2.9E+6	NA
Dibenzofuran	1,300	J	ID	ID	1,700		ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Acenaphthene	2,300	J	3.0E+5	8.8E+5	4,400		9.7E+5	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
Acenaphthylene	1,300	J	5,900	17,000	ID		4.4E+5	3.0E+6	2.7E+6	2.7E+6	2.7E+6	1.0E+9	5.2E+6	7.2E+6	6.1E+6	NA
Anthracene	6,400		41,000	41,000	ID		41,000	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	1.0E+9	8.6E+8	NA
Benzo(a)anthracene	15,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(a)pyrene	**14,000**		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	1.9E+6	**8,000**	16,000	**11,000**	NA
Benzo(b)fluoranthene	20,000		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(g,h,i)perylene	7,500		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	3.5E+8	7.0E+6	1.4E+7	9.5E+6	NA
Benzo(k)fluoranthene	8,500		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8.0E+5	1.6E+6	1.1E+6	NA
Chrysene	15,000		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Fluoranthene	**31,000**		7.3E+5	7.3E+5	**5,500**		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Fluorene	2,400	J	3.9E+5	8.9E+5	5,300		8.9E+5	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	1.2E+8	1.0E+8	NA
Indeno(1,2,3-cd)pyrene	7,300		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Phenanthrene	**23,000**		56,000	1.6E+5	**5,300**		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	28,000		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	340	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	330		2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
Dichloromethane	**110**	J	**100**	**100**	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
13S-2/19/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Tetrachloroethene	42	J	100	100	900 (X)	220	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	50	J	16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	54	J	100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
14S (Dup 2S)-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Benzyl alcohol	17,000	J	2.0E+5	5.8E+5	NA		5.8E+6 (C)	NLV	NLV	NLV	NLV	1.5E+11	5.8E+6 (C)	5.8E+6 (C)	5.8E+6 (C)	5.8E+6
Butyl benzyl phthalate	**99,000**		3.1E+5 (C)	3.1E+5 (C)	**26,000 (X)**	**13,000**	3.1E+5 (C)	NLV	NLV	NLV	NLV	2.1E+10	3.1E+5 (C)	3.1E+5 (C)	3.1E+5 (C)	3.1E+5
Carbazole	**15,000**	J	**9,400**	39,000	**1,100**		8.2E+5	NLV	NLV	NLV	NLV	ID	2.4E+6	3.4E+6	2.9E+6	NA
Dibenzofuran	**45,000**		ID	ID	**1,700**		ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
Diethyl phthalate	**250,000**		**1.1E+5**	3.2E+5	**2,200**		7.4E+5 (C)	NLV	NLV	NLV	NLV	1.5E+9	7.4E+5 (C)	7.4E+5 (C)	7.4E+5 (C)	7.4E+5
2,4-Dimethylphenol	**21,000**	J	**7,400**	**20,000**	**7,600**		1.0E+7	NLV	NLV	NLV	NLV	2.1E+9	3.6E+7	5.1E+7	4.3E+7	NA
Di-n-butyl phthalate	**140,000**		7.6E+5 (C)	7.6E+5 (C)	**11,000**		7.6E+5 (C)	NLV	NLV	NLV	NLV	1.5E+9	7.6E+5 (C)	7.6E+5 (C)	7.6E+5 (C)	7.6E+5
Di-n-octyl phthalate	42,000		1.0E+8	1.4E+8 (C)	ID		1.4E+8 (C)	NLV	NLV	NLV	NLV	ID	2.0E+7	3.6E+7	2.6E+7	1.4E+8
Bis(2-ethylhexyl) phthalate	540,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
2-Methylphenol	30,000	J														
3 & 4-Methylphenol	**29,000**	J	**7,400**	**20,000**	**1,400**		1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA
Methylphenols (J)	**30,000**		**7,400**	**20,000**	**1,400**		1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA
Naphthalene	**40,000**		**35,000**	1.0E+5	**870**		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Naphthalene	**190,000**		**35,000**	**1.0E+5**	**870**		2.1E+6	4.7E+5	**3.5E+5**	**3.5E+5**	**3.5E+5**	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Phenol	**120,000**		**88,000**	2.6E+5	**4,200**		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Acenaphthene	**71,000**		3.0E+5	8.8E+5	**4,400**		9.7E+5	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
Anthracene	33,000		41,000	41,000	ID		41,000	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	1.0E+9	8.6E+8	NA
Benzo(a)anthracene	24,000	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(b)fluoranthene	14,000	J	NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(k)fluoranthene	8,600	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8.0E+5	1.6E+6	1.1E+6	NA
Chrysene	20,000	J	NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Fluoranthene	**91,000**		7.3E+5	7.3E+5	**5,500**		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Fluorene	**53,000**		3.9E+5	8.9E+5	**5,300**		8.9E+5	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	1.2E+8	1.0E+8	NA
2-Methylnaphthalene	43,000		57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
Phenanthrene	**130,000**		**56,000**	1.6E+5	**5,300**		1.1E+6	5.1E+6	**1.9E+5**	**1.9E+5**	**1.9E+5**	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	98,000		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	**18,000**	J	**15,000**	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
sec-Butylbenzene	**1,800**	J	**1,600**	4,600	ID		88,000	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
n-Butylbenzene	**4,700**	J	**1,600**	**4,600**	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
1,2-Dichlorobenzene	**7,100**		14,000	14,000	**360**		2.1E+5 (C)	2.1E+5 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	2.1E+5 (C)	2.1E+5 (C)	2.1E+5 (C)	2.1E+5
cis-1,2-Dichloroethene	**13,000**		**1,400**	**1,400**	**12,000**		6.4E+5 (C)	41,000	2.1E+5	4.3E+5	1.0E+6	1.0E+9	6.4E+5 (C)	6.4E+5 (C)	6.4E+5 (C)	6.4E+5
Ethylbenzene	**38,000**		**1,500**	**1,500**	**360**		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	4,500	J	91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Methyl isobutyl ketone	13,000	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
14S (Dup 2S)-2/20/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Dichloromethane	9,800	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
n-Propylbenzene	6,200	J	1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Styrene	5,400	J	2,700	2,700	2,200		2.7E+5	5.2E+5 (C)	3.3E+6	3.3E+6	4.2E+6	6.9E+9	5.2E+5 (C)	5.2E+5 (C)	5.2E+5 (C)	5.2E+5
Tetrachloroethene	1,000,000		100	100	900 (X)	220	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	42,000		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
1,1,1-Trichloroethane	27,000		4,000	4,000	4,000		4.6E+5 (C)	4.6E+5	4.5E+6	1.5E+7	3.1E+7	2.9E+10	4.6E+5 (C)	4.6E+5 (C)	4.6E+5 (C)	4.6E+5
Trichloroethene	66,000		100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
1,2,4-Trimethylbenzene	36,000		2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	18,000		1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	180,000		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
14S-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Benzyl alcohol	18,000	J	2.0E+5	5.8E+5	NA		5.8E+6 (C)	NLV	NLV	NLV	NLV	1.5E+11	5.8E+6 (C)	5.8E+6 (C)	5.8E+6 (C)	5.8E+6
Butyl benzyl phthalate	88,000		3.1E+5 (C)	3.1E+5 (C)	26,000 (X)	13,000	3.1E+5 (C)	NLV	NLV	NLV	NLV	2.1E+10	3.1E+5 (C)	3.1E+5 (C)	3.1E+5 (C)	3.1E+5
Carbazole	11,000	J	9,400	39,000	1,100		8.2E+5	NLV	NLV	NLV	NLV	ID	2.4E+6	3.4E+6	2.9E+6	NA
Dibenzofuran	45,000		ID	ID	1,700		ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
Diethyl phthalate	260,000		1.1E+5	3.2E+5	2,200		7.4E+5 (C)	NLV	NLV	NLV	NLV	1.5E+9	7.4E+5 (C)	7.4E+5 (C)	7.4E+5 (C)	7.4E+5
2,4-Dimethylphenol	22,000	J	7,400	20,000	7,600		1.0E+7	NLV	NLV	NLV	NLV	2.1E+9	3.6E+7	5.1E+7	4.3E+7	NA
Dimethyl phthalate	19,000	J	7.9E+5 (C)	7.9E+5 (C)	NA		7.9E+5 (C)	NLV	NLV	NLV	NLV	1.5E+9	7.9E+5 (C)	7.9E+5 (C)	7.9E+5 (C)	7.9E+5
Di-n-butyl phthalate	140,000		7.6E+5 (C)	7.6E+5 (C)	11,000		7.6E+5 (C)	NLV	NLV	NLV	NLV	1.5E+9	7.6E+5 (C)	7.6E+5 (C)	7.6E+5 (C)	7.6E+5
Di-n-octyl phthalate	36,000		1.0E+8	1.4E+8 (C)	ID		1.4E+8 (C)	NLV	NLV	NLV	NLV	ID	2.0E+7	3.6E+7	2.6E+7	1.4E+8
Bis(2-ethylhexyl) phthalate	490,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
2-Methylphenol	29,000	J														
Methylphenols (J)	29,000		7,400	20,000	1,400		1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA
3 & 4-Methylphenol	29,000	J	7,400	20,000	1,400		1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA
Naphthalene	38,000		35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Naphthalene	190,000		35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Phenol	110,000		88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Acenaphthene	74,000		3.0E+5	8.8E+5	4,400		9.7E+5	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
Anthracene	34,000		41,000	41,000	ID		41,000	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	1.0E+9	8.6E+8	NA
Benzo(a)anthracene	16,000	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(b)fluoranthene	8,400	J	NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	80,000	1.6E+5	1.1E+5	NA
Chrysene	15,000	J	NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Fluoranthene	66,000		7.3E+5	7.3E+5	5,500		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Fluorene	52,000		3.9E+5	8.9E+5	5,300		8.9E+5	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	1.2E+8	1.0E+8	NA
2-Methylnaphthalene	45,000		57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
Phenanthrene	130,000		56,000	1.6E+5	5,300		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	72,000		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	25,000	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
14S-2/20/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
n-Butylbenzene	3,900	J	1,600	4,600	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
1,2-Dichlorobenzene	7,500		14,000	14,000	360		2.1E+5 (C)	2.1E+5 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	2.1E+5 (C)	2.1E+5 (C)	2.1E+5 (C)	2.1E+5
cis-1,2-Dichloroethene	18,000		1,400	1,400	12,000		6.4E+5 (C)	41,000	2.1E+5	4.3E+5	1.0E+6	1.0E+9	6.4E+5 (C)	6.4E+5 (C)	6.4E+5 (C)	6.4E+5
Ethylbenzene	38,000		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	4,200	J	91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Methyl isobutyl ketone	13,000	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	19,000	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
n-Propylbenzene	5,700	J	1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Styrene	4,100	J	2,700	2,700	2,200		2.7E+5	5.2E+5 (C)	3.3E+6	3.3E+6	4.2E+6	6.9E+9	5.2E+5 (C)	5.2E+5 (C)	5.2E+5 (C)	5.2E+5
Tetrachloroethene	960,000		100	100	900 (X)	220	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	44,000		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
1,1,1-Trichloroethane	29,000		4,000	4,000	4,000		4.6E+5 (C)	4.6E+5	4.5E+6	1.5E+7	3.1E+7	2.9E+10	4.6E+5 (C)	4.6E+5 (C)	4.6E+5 (C)	4.6E+5
Trichloroethene	78,000		100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
1,2,4-Trimethylbenzene	32,000		2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	17,000		1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	180,000		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
15S-2/19/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Carbazole	1,700	J	9,400	39,000	1,100		8.2E+5	NLV	NLV	NLV	NLV	ID	2.4E+6	3.4E+6	2.9E+6	NA
Bis(2-ethylhexyl) phthalate	6,400	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Naphthalene	120	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Acenaphthene	3,600	J	3.0E+5	8.8E+5	4,400		9.7E+5	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
Anthracene	9,000		41,000	41,000	ID		41,000	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	1.0E+9	8.6E+8	NA
Benzo(a)anthracene	19,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(a)pyrene	14,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	1.9E+6	8,000	16,000	11,000	NA
Benzo(b)fluoranthene	16,000		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(g,h,i)perylene	8,100		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	3.5E+8	7.0E+6	1.4E+7	9.5E+6	NA
Benzo(k)fluoranthene	8,800		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8.0E+5	1.6E+6	1.1E+6	NA
Chrysene	15,000		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Dibenz(a,h)anthracene	1,900	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8,000	16,000	11,000	NA
Fluoranthene	34,000		7.3E+5	7.3E+5	5,500		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Fluorene	2,900	J	3.9E+5	8.9E+5	5,300		8.9E+5	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	1.2E+8	1.0E+8	NA
Indeno(1,2,3-cd)pyrene	6,600	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Phenanthrene	32,000		56,000	1.6E+5	5,300		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	45,000		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	1000	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	1,800		2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
Ethylbenzene	63	J	1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Methyl isobutyl ketone	130	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
15S-2/19/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Dichloromethane	**190**	J	**100**	**100**	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Tetrachloroethene	84	J	100	100	900 (X)	220	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	330		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	**120**		**100**	**100**	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
Xylenes, Total	250	J	5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
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Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Butyl benzyl phthalate	**310,000**		3.1E+5 (C)	3.1E+5 (C)	**26,000 (X)**	**13,000**	3.1E+5 (C)	NLV	NLV	NLV	NLV	2.1E+10	3.1E+5 (C)	3.1E+5 (C)	3.1E+5 (C)	3.1E+5
Di-n-butyl phthalate	**75,000**	J	7.6E+5 (C)	7.6E+5 (C)	**11,000**		7.6E+5 (C)	NLV	NLV	NLV	NLV	1.5E+9	7.6E+5 (C)	7.6E+5 (C)	7.6E+5 (C)	7.6E+5
Di-n-octyl phthalate	210,000		1.0E+8	1.4E+8 (C)	ID		1.4E+8 (C)	NLV	NLV	NLV	NLV	ID	2.0E+7	3.6E+7	2.6E+7	1.4E+8
Bis(2-ethylhexyl) phthalate	550,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Naphthalene	**200,000**		**35,000**	**1.0E+5**	**870**		2.1E+6	4.7E+5	**3.5E+5**	**3.5E+5**	**3.5E+5**	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Naphthalene	**43,000**	J	**35,000**	1.0E+5	**870**		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
2-Methylnaphthalene	**150,000**	J	**57,000**	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	**35,000**	J	**15,000**	42,000	**34,000**		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
sec-Butylbenzene	**2,900**	J	**1,600**	4,600	ID		88,000	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
n-Butylbenzene	**7,800**	J	**1,600**	**4,600**	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
1,2-Dichlorobenzene	**14,000**		14,000	14,000	**360**		2.1E+5 (C)	2.1E+5 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	2.1E+5 (C)	2.1E+5 (C)	2.1E+5 (C)	2.1E+5
cis-1,2-Dichloroethene	**16,000**		**1,400**	**1,400**	**12,000**		6.4E+5 (C)	41,000	2.1E+5	4.3E+5	1.0E+6	1.0E+9	6.4E+5 (C)	6.4E+5 (C)	6.4E+5 (C)	6.4E+5
Ethylbenzene	**370,000**		**1,500**	**1,500**	**360**		**1.4E+5 (C)**	**1.4E+5 (C)**	2.4E+6	3.1E+6	6.5E+6	1.3E+10	**1.4E+5 (C)**	**1.4E+5 (C)**	**1.4E+5 (C)**	**1.4E+5**
Isopropylbenzene	22,000		91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Methyl isobutyl ketone	16,000	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
n-Propylbenzene	**23,000**		**1,600**	**4,600**	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Tetrachloroethene	**6,600**	J	**100**	**100**	**900 (X)**	**220**	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	**980,000**		**16,000**	**16,000**	**2,800**		**2.5E+5 (C)**	**2.5E+5 (C)**	3.3E+6	3.6E+7	3.6E+7	1.2E+10	**2.5E+5 (C)**	**2.5E+5 (C)**	**2.5E+5 (C)**	**2.5E+5**
1,2,4-Trimethylbenzene	**160,000**		**2,100**	**2,100**	**570**		**1.1E+5 (C)**	**1.1E+5 (C)**	2.5E+7	6.0E+8	6.0E+8	3.6E+10	**1.1E+5 (C)**	**1.1E+5 (C)**	**1.1E+5 (C)**	**1.1E+5**
1,3,5-Trimethylbenzene	**67,000**		**1,800**	**1,800**	**1,100**		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	**2,400,000**		**5,600**	**5,600**	**700**		**1.5E+5 (C)**	**1.5E+5 (C)**	5.4E+7	6.5E+7	1.3E+8	1.3E+11	**1.5E+5 (C)**	**1.5E+5 (C)**	**1.5E+5 (C)**	**1.5E+5**
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Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Benzyl alcohol	630	J	2.0E+5	5.8E+5	NA		5.8E+6 (C)	NLV	NLV	NLV	NLV	1.5E+11	5.8E+6 (C)	5.8E+6 (C)	5.8E+6 (C)	5.8E+6
Bis(2-ethylhexyl) phthalate	130	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Phenol	530		88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	360	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl isobutyl ketone	68	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
17S-2/20/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Dichloromethane	44	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
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Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Benzyl alcohol	2,400		2.0E+5	5.8E+5	NA		5.8E+6 (C)	NLV	NLV	NLV	NLV	1.5E+11	5.8E+6 (C)	5.8E+6 (C)	5.8E+6 (C)	5.8E+6
Bis(2-ethylhexyl) phthalate	2,400		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Phenol	1,100		88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	220	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl isobutyl ketone	65	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	42	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
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Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Benzyl alcohol	1,200	J	2.0E+5	5.8E+5	NA		5.8E+6 (C)	NLV	NLV	NLV	NLV	1.5E+11	5.8E+6 (C)	5.8E+6 (C)	5.8E+6 (C)	5.8E+6
Bis(2-ethylhexyl) phthalate	510		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Phenol	520		88,000	2.6E+5	4,200		1.2E+7 (C)	NLV	NLV	NLV	NLV	1.8E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	310	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Toluene	26	J	16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
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Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Carbazole	410	J	9,400	39,000	1,100		8.2E+5	NLV	NLV	NLV	NLV	ID	2.4E+6	3.4E+6	2.9E+6	NA
Hexachloroethane	420		430	1,200	1,800 (X)	**310**	1.1E+5	79,000	6.6E+5	1.4E+6	1.4E+6	1.0E+8	7.3E+5	1.0E+6	8.6E+5	NA
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Acenaphthene	380	J	3.0E+5	8.8E+5	4,400		9.7E+5	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
Anthracene	1,500		41,000	41,000	ID		41,000	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	1.0E+9	8.6E+8	NA
Benzo(a)anthracene	5,600		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(a)pyrene	5,200		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	1.9E+6	8,000	16,000	11,000	NA
Benzo(b)fluoranthene	7,000		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(g,h,i)perylene	3,600		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	3.5E+8	7.0E+6	1.4E+7	9.5E+6	NA
Benzo(k)fluoranthene	2,800		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8.0E+5	1.6E+6	1.1E+6	NA
Chrysene	4,700		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Dibenz(a,h)anthracene	320	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8,000	16,000	11,000	NA
Fluoranthene	**9,500**		7.3E+5	7.3E+5	**5,500**		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Fluorene	430	J	3.9E+5	8.9E+5	5,300		8.9E+5	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	1.2E+8	1.0E+8	NA
Indeno(1,2,3-cd)pyrene	3,200		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Phenanthrene	**6,000**		56,000	1.6E+5	**5,300**		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	16,000		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

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Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
20S-2/20/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	490	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	66	J	2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
Ethylbenzene	92		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Methyl isobutyl ketone	96	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	320	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
1,1,2,2-Tetrachloroethane	58	J	170	700	1,600 (X)	64	94,000	23,000	34,000	34,000	34,000	6.8E+7	2.4E+5	3.4E+5	2.9E+5	8.7E+5
Tetrachloroethene	1000		100	100	900 (X)	220	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	640		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	68	J	100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
1,2,4-Trimethylbenzene	36	J	2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	42	J	1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	700		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
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Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Carbazole	2,800		9,400	39,000	1,100		8.2E+5	NLV	NLV	NLV	NLV	ID	2.4E+6	3.4E+6	2.9E+6	NA
Dibenzofuran	2,400		ID	ID	1,700		ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
Bis(2-ethylhexyl) phthalate	270	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Naphthalene	560	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Acenaphthene	3,900		3.0E+5	8.8E+5	4,400		9.7E+5	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
Acenaphthylene	430	J	5,900	17,000	ID		4.4E+5	3.0E+6	2.7E+6	2.7E+6	2.7E+6	1.0E+9	5.2E+6	7.2E+6	6.1E+6	NA
Anthracene	9,500		41,000	41,000	ID		41,000	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	1.0E+9	8.6E+8	NA
Benzo(a)anthracene	23,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(a)pyrene	26,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	1.9E+6	8,000	16,000	11,000	NA
Benzo(b)fluoranthene	31,000		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(g,h,i)perylene	14,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	3.5E+8	7.0E+6	1.4E+7	9.5E+6	NA
Benzo(k)fluoranthene	13,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8.0E+5	1.6E+6	1.1E+6	NA
Chrysene	25,000		NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Dibenz(a,h)anthracene	4,500		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8,000	16,000	11,000	NA
Fluoranthene	61,000		7.3E+5	7.3E+5	5,500		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Fluorene	3,600		3.9E+5	8.9E+5	5,300		8.9E+5	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	1.2E+8	1.0E+8	NA
Indeno(1,2,3-cd)pyrene	16,000		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
2-Methylnaphthalene	490	J	57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
Phenanthrene	49,000		56,000	1.6E+5	5,300		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	69,000		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	640	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	73	J	2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
Ethylbenzene	100		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Methyl isobutyl ketone	170	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	160	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
21S-2/20/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Tetrachloroethene	420		100	100	900 (X)	220	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	790		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
Trichloroethene	33	J	100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5
Xylenes, Total	580		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
22S-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Bis(2-ethylhexyl) phthalate	89	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Naphthalene	89	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Naphthalene	140	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	240	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	47	J	2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
n-Butylbenzene	42	J	1,600	4,600	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Chlorobenzene	29	J	2,000	2,000	940		2.6E+5 (C)	2.2E+5	9.2E+5	1.1E+6	2.1E+6	2.1E+9	2.6E+5 (C)	2.6E+5 (C)	2.6E+5 (C)	2.6E+5
1,2-Dichlorobenzene	170		14,000	14,000	360		2.1E+5 (C)	2.1E+5 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	2.1E+5 (C)	2.1E+5 (C)	2.1E+5 (C)	2.1E+5
1,4-Dichlorobenzene	24	J	1,700	1,700	290		1.4E+5	1.0E+5	2.6E+5	2.6E+5	3.4E+5	5.7E+8	1.9E+6	2.6E+6	2.2E+6	NA
Ethylbenzene	930		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	130		91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Methyl isobutyl ketone	98	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	32	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
n-Propylbenzene	76		1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Toluene	150		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
1,2,4-Trimethylbenzene	690		2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	430		1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	7,300		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
23S-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Benzyl alcohol	250	J	2.0E+5	5.8E+5	NA		5.8E+6 (C)	NLV	NLV	NLV	NLV	1.5E+11	5.8E+6 (C)	5.8E+6 (C)	5.8E+6 (C)	5.8E+6
Bis(2-ethylhexyl) phthalate	42	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Naphthalene	65	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	220	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
1,2-Dichlorobenzene	150		14,000	14,000	360		2.1E+5 (C)	2.1E+5 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	2.1E+5 (C)	2.1E+5 (C)	2.1E+5 (C)	2.1E+5
1,4-Dichlorobenzene	23	J	1,700	1,700	290		1.4E+5	1.0E+5	2.6E+5	2.6E+5	3.4E+5	5.7E+8	1.9E+6	2.6E+6	2.2E+6	NA
Ethylbenzene	18	J	1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Methyl isobutyl ketone	64	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	37	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Tetrachloroethene	51	J	100	100	900 (X)	220	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
Toluene	28	J	16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
23S-2/20/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
1,2,4-Trimethylbenzene	200		2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	150		1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	310		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
24S-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Butyl benzyl phthalate	7,600		3.1E+5 (C)	3.1E+5 (C)	26,000 (X)	13,000	3.1E+5 (C)	NLV	NLV	NLV	NLV	2.1E+10	3.1E+5 (C)	3.1E+5 (C)	3.1E+5 (C)	3.1E+5
Di-n-butyl phthalate	1000	J	7.6E+5 (C)	7.6E+5 (C)	11,000		7.6E+5 (C)	NLV	NLV	NLV	NLV	1.5E+9	7.6E+5 (C)	7.6E+5 (C)	7.6E+5 (C)	7.6E+5
Di-n-octyl phthalate	1,100	J	1.0E+8	1.4E+8 (C)	ID		1.4E+8 (C)	NLV	NLV	NLV	NLV	ID	2.0E+7	3.6E+7	2.6E+7	1.4E+8
Bis(2-ethylhexyl) phthalate	7,400		NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Naphthalene	22,000	J	35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Naphthalene	6,600		35,000	1.0E+5	870		2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
Acenaphthene	1,100	J	3.0E+5	8.8E+5	4,400		9.7E+5	3.5E+8	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
Anthracene	1,100	J	41,000	41,000	ID		41,000	1.0E+9 (D)	1.6E+9	1.6E+9	1.6E+9	2.9E+10	7.3E+8	1.0E+9	8.6E+8	NA
Benzo(a)anthracene	1,100	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(a)pyrene	1000	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	1.9E+6	8,000	16,000	11,000	NA
Benzo(b)fluoranthene	1,600	J	NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	80,000	1.6E+5	1.1E+5	NA
Benzo(g,h,i)perylene	790	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	3.5E+8	7.0E+6	1.4E+7	9.5E+6	NA
Benzo(k)fluoranthene	940	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	8.0E+5	1.6E+6	1.1E+6	NA
Chrysene	1000	J	NLL	NLL	NLL		NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
Fluoranthene	2,400		7.3E+5	7.3E+5	5,500		7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
Fluorene	1,100	J	3.9E+5	8.9E+5	5,300		8.9E+5	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	1.2E+8	1.0E+8	NA
Indeno(1,2,3-cd)pyrene	560	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+5	1.1E+5	NA
2-Methylnaphthalene	6,500		57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
Phenanthrene	4,100		56,000	1.6E+5	5,300		1.1E+6	5.1E+6	1.9E+5	1.9E+5	1.9E+5	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
Pyrene	3,000		4.8E+5	4.8E+5	ID		4.8E+5	1.0E+9 (D)	7.8E+8	7.8E+8	7.8E+8	2.9E+9	8.4E+7	1.5E+8	1.1E+8	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	26,000	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Bromobenzene	4,100	J	550	1,500	NA		3.6E+5	5.8E+5	5.4E+5	5.4E+5	5.4E+5	2.4E+8	7.6E+5 (C)	7.6E+5 (C)	7.6E+5 (C)	7.6E+5
n-Butylbenzene	7,700		1,600	4,600	ID		1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
sec-Butylbenzene	2,500	J	1,600	4,600	ID		88,000	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
1,2-Dichlorobenzene	6,500	J	14,000	14,000	360		2.1E+5 (C)	2.1E+5 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	2.1E+5 (C)	2.1E+5 (C)	2.1E+5 (C)	2.1E+5
cis-1,2-Dichloroethene	2,800	J	1,400	1,400	12,000		6.4E+5 (C)	41,000	2.1E+5	4.3E+5	1.0E+6	1.0E+9	6.4E+5 (C)	6.4E+5 (C)	6.4E+5 (C)	6.4E+5
Ethylbenzene	240,000		1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Isopropylbenzene	14,000		91,000	2.6E+5	ID		3.9E+5 (C)	3.9E+5 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
Methyl isobutyl ketone	10,000	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	4,200	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
n-Propylbenzene	20,000		1,600	4,600	NA		3.0E+5	ID	ID	ID	ID	5.9E+8	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Toluene	650,000		16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
1,2,4-Trimethylbenzene	130,000		2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	50,000		1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000

Comparison of Laboratory Results to Part 201 Generic Cleanup Criteria and Screening Levels

Darker or blue shaded cells for the criteria indicate the chemical was found at a concentration that exceeds at least one criterion. Lighter or yellow shaded cells indicate the compound was not detected, but the reporting limit was above the criteria.

Site/Facility/Incident PetroChem

Laboratory Results			Soil: Industrial and Commercial II, III and IV. Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs)													
			Groundwater Protection					Indoor Air	Source size modifier: 1				Direct Contact			
			Residential Drinking Water Protection Criteria And RBSLs	Industrial and Commercial Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Criteria and RBSLs (may not be protective for Drinking Water Sources) (1)	Groundwater Surface Water Interface Criteria and RBSLs (protective for Drinking Water Sources) (1)	Groundwater Contact Protection Criteria and RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria and RBSLs	Infinite Source Volatilization Soil Inhalation Criteria (VSIC) and RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria and RBSLs	Industrial and Commercial II	Commercia III	Commercia IV	Soil Saturation Sceening Levels
24S-2/20/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Xylenes, Total	1,400,000		5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
25S-2/20/2008 12:00:00 PM																
Semivolatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Bis(2-ethylhexyl) phthalate	78	J	NLL	NLL	NLL		NLL	NLV	NLV	NLV	NLV	8.9E+8	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	410	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl ethyl ketone	68	J	2.6E+5	7.6E+5	44,000		2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
Methyl isobutyl ketone	75	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Dichloromethane	39	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Toluene	25	J	16,000	16,000	2,800		2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
26S-2/20/2008 12:00:00 PM																
Semivolatiles, PNAs																
Parameter	**Result (ug/Kg)**	**Qual**														
2-Methylnaphthalene	72	J	57,000	1.7E+5	ID		5.5E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	420	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Ethylbenzene	30	J	1,500	1,500	360		1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
Methyl isobutyl ketone	74	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
1,2,4-Trimethylbenzene	59	J	2,100	2,100	570		1.1E+5 (C)	1.1E+5 (C)	2.5E+7	6.0E+8	6.0E+8	3.6E+10	1.1E+5 (C)	1.1E+5 (C)	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene	28	J	1,800	1,800	1,100		94,000 (C)	94,000 (C)	1.9E+7	4.6E+8	4.6E+8	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
Xylenes, Total	150	J	5,600	5,600	700		1.5E+5 (C)	1.5E+5 (C)	5.4E+7	6.5E+7	1.3E+8	1.3E+11	1.5E+5 (C)	1.5E+5 (C)	1.5E+5 (C)	1.5E+5
27S-2/20/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	380	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Methyl isobutyl ketone	110	J	36,000	1.0E+5	ID		2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
Soil Trip Blank 1-2/20/2008 12:00:00 PM																
Volatiles																
Parameter	**Result (ug/Kg)**	**Qual**														
Acetone	6.3	J	15,000	42,000	34,000		1.1E+8 (C)	1.1E+8 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
Dichloromethane	1.6	J	100	100	19,000 (X)	940	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
Trichloroethene	0.59	J	100	100	4,000 (X)	580	4.4E+5	37,000	2.6E+5	4.4E+5	1.1E+6	2.3E+9	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5 (C,DD)	5.0E+5

Some criteria in the table may show two values with a footnote (M). This occurs when the calculated criterion for the respective land use and pathway is below the target detection limit or TDL (see OM#2, Attachment 1 and foonote M in OM#1, Attachment 1.). In such cases the criterion defaults to the TDL. The first value is the default criterion and the last value the calculated criterion.

More than one result may be reported by the laboratory for the same parameter. (different methods are used for the same parameter)

A ph of 7 and hardness of 100 were used to calculate GSI generic criteria for some parameters

Statewide defaults for metals and cyanide were used to replace some criteria.

APPENDIX C

SUMMARY TABLES OF ANALYTICAL RESULTS
2010 RCRA FACILITY INVESTIGATION

Detectable Laboratory Analytical Results for Volatile Organic Compounds in Soil - RFI 2010

PSC Petro-Chem Processing Group Facility - Detroit, Michigan

Soil Boring Number (sample interval - feet) Sample Collection Date	MDEQ TDL 10/2006	BSB-1 (3-5) 10/20/10	BSB-1 (8-10) 10/20/10	BSB-2 (0-2) 10/20/10	BSB-2 (2-4) 10/20/10	BSB-3 (4-5) 10/20/10	BSB-3 (9-10) 10/20/10	BSB-4 (0-2) 10/20/10	BSB-4 (3-5) 10/20/10	BSB-5 (0-2) 10/20/10	BSB-5 (4-6) 10/20/10	Drinking Water Protection	Groundwater Surface Water Interface Protection	Groundwater Contact Protection	Volatilization to Indoor Air	Volatilization to Ambient Air (Infinite Source)	Direct Contact	Soil Saturation Concentration Screening Levels
VOCs																		
1,2,3-Trimethylbenzene	50	<46	<51	<48	<47	<47	<48	<46	<49	<46	<47	NP	NP	NP	NP	NP	NP	NP
Benzene	50	<56	<100	<56	<59	<47	<70	<54	<49	<55	<58	100	4,000 X	220,000	8,400	45,000	400,000 C	400,000
1,2-Dichlorobenzene	50	<46	<100	<48	<47	<47	<48	<46	<49	<46	<47	14,000	280	210,000 C	210,000 C	46,000,000	210,000 C	210,000
1,1-Dichloroethane	50	<46	<100	<48	<47	<47	<70	<46	<49	<46	<47	50,000	15,000	890,000 C	430,000	2,500,000	890,000 C	890,000
cis -1,2-Dichloroethene	50	<56	<100	<56	<59	<47	<70	<46	<49	<46	<47	1,400	12,000	640,000 C	41,000	210,000	640,000 C	640,000
Ethylbenzene	50	<46	<100	<48	<59	<47	<70	<46	<49	<46	<47	1,500	360	140,000 C	140,000 C	2,400,000	140,000 C	140,000
Isopropylbenzene	50	<56	<100	<56	<59	<53	<70	<54	<54	<55	<58	260,000	3,200	390,000 C	390,000 C	2,000,000	390,000 C	390,000
2-Methylnaphthalene	250	<230	<250	<240	<240	<240	<240	<230	<250	<230	<240	170,000	4,200	5,500,000	1,800,000	1,800,000	26,000,000	NA
Methyl *tert* -butyl ether	50	<46	<100	<48	<47	<47	<70	<46	<49	<46	<47	800	140,000 X	5,900,000 C	5,900,000 C	30,000,000	5,900,000 C	5,900,000
Naphthalene	250	<230	<250	<240	<240	<240	<240	<230	<250	<230	<240	100,000	730	2,100,000	350,000	350,000	52,000,000	NA
n -Propylbenzene	50	<46	<51	<48	<47	<47	<48	<46	<49	<46	<47	4,600	ID	300,000	590,000,000	ID	8,000,000	10,000,000
Tetrachloroethene	50	<56	<100	<56	<59	<53	<70	**200**	<54	**4,200**	**1,400**	100	1,200 X	88,0000 C	21,000	210,000	88,0000 C	88,000
Tetrahydrofuran	250	<230	<250	<240	<240	<240	<240	<230	<250	<230	<240	5,400	220,000 X	32,000,000	2,400,000	15,000,000	9,500,000	120,000,000
Toluene	50	<56	<100	**110**	<59	<53	<70	<54	<54	<55	<58	16,000	5,400	250,000 C	250,000 C	3,300,000	250,000 C	250,000
1,2,4-Trimethylbenzene	50	<56	<100	<56	<59	<53	<70	<54	<54	<55	<58	2,100	570	110,000 C	110,000 C	25,000,000	110,000 C	110,000
1,3,5-Trimethylbenzene	50	<56	<100	<56	<59	<47	<70	<54	<54	<55	<58	1,800	1,100	94,000 C	94,000 C	19,000,000	94,000 C	94,000
o -Xylene	50	<56	<100	<56	<59	<47	<70	<54	<49	<55	<58	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000
m,p -Xylene	100	<92	<200	<95	<94	<95	<96	<92	<98	<92	<95	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000

All soil sample results in micrograms per kilogram (µg/kg) or parts per billion (ppb)

Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012

TDL = Target Detection Limit

VOCs = volatile organic compounds

NS = Not sampled

< = limit of detection for sample

Reporting limits for some analytes may vary depending on the percent moisture content of the sample.

Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ TDL

Gray Shaded/Bold typeface indicates that the MDEQ TDL has been exceeded

Detectable Laboratory Analytical Results for Volatile Organic Compounds in Soil - RFI 2010

PSC Petro-Chem Processing Group Facility - Detroit, Michigan

Soil Boring Number (sample interval - feet) Sample Collection Date	MDEQ TDL 10/2006	BSB-6 (3-5) 10/20/10	BSB-6 (6-8) 10/20/10	BSB-7 (0.5-2) 10/20/10	BSB-7 (8-9) 10/20/10	BSB-8 (3-5) 10/20/10	BSB-8 (5-7) 10/20/10	BSB-9 (7-9) 10/20/10	BSB-9 (9-11) 10/20/10	BSB-10 (5-7) 10/20/10	BSB-10 (8-10) 10/20/10	DUP-1 (4-5) 10/20/10	DUP-2 (7-9) 10/20/10	FB-1 10/20/10	FB-2 10/21/10	Drinking Water Protection	Groundwater Surface Water Interface Protection	Groundwater Contact Protection	Volatilization to Indoor Air	Volatilization to Ambient Air (Infinite Source)	Direct Contact	Soil Saturation Concentration Screening Levels
VOCs																						
1,2,3-Trimethylbenzene	50	<48	<49	<46	**530**	<50	<48	<48	<48	<47	<50	<51	<49	<50	<50	NP	NP	NP	NP	NP	NP	NP
Benzene	50	<59	<63	<46	100	<60	<84	<48	<75	<58	<150	<51	<49	<50	<50	100	4,000 X	220,000	8,400	45,000	400,000 C	400,000
1,2-Dichlorobenzene	50	<48	<49	<46	**1,100**	<50	<84	<48	<48	<47	<150	<51	<49	<50	<50	14,000	280	210,000 C	210,000 C	46,000,000	210,000 C	210,000
1,1-Dichloroethane	50	<100	<48	<47	<47	<70	<46	<49	<46	<47	<150	<51	<49	<50	<50	50,000	15,000	890,000 C	430,000	2,500,000	890,000 C	890,000
cis -1,2-Dichloroethene	50	<48	<63	<46	340	<50	<84	<48	<75	<58	<150	<51	<49	<50	<50	1,400	12,000	640,000 C	41,000	210,000	640,000 C	640,000
Ethylbenzene	50	<48	<63	<46	**17,000**	<50	<84	69	<75	<58	<150	<51	95	<50	<50	1,500	360	140,000 C	140,000 C	2,400,000	140,000 C	140,000
Isopropylbenzene	50	<59	<63	<51	620	<60	<84	<54	<75	<58	<150	<57	<54	<50	<50	260,000	3,200	390,000 C	390,000 C	2,000,000	390,000 C	390,000
2-Methylnaphthalene	250	<240	800	<230	290	<250	<240	<240	<240	<230	<250	<260	<250	<250	<250	170,000	4,200	5,500,000	1,800,000	1,800,000	26,000,000	NA
Methyl *tert* -butyl ether	50	<48	<49	<46	490	<50	<48	<48	<75	<47	<150	<51	<49	<50	<50	800	140,000 X	5,900,000 C	5,900,000 C	30,000,000	5,900,000 C	5,900,000
Naphthalene	250	<240	**720**	<230	**700**	<250	<240	<240	<240	<230	<250	<260	<250	<250	<250	100,000	730	2,100,000	350,000	350,000	52,000,000	NA
n -Propylbenzene	50	<48	<49	<46	960	<50	<48	<48	<48	<47	<150	<51	<49	<50	<50	4,600	ID	300,000	590,000,000	ID	8,000,000	10,000,000
Tetrachloroethene	50	<59	<63	**1,100**	**250**	<60	<84	<54	<75	<58	<150	<57	**110**	<50	<50	100	1,200 X	88,0000 C	21,000	210,000	88,0000 C	88,000
Tetrahydrofuran	250	<240	<250	<230	280	<250	<240	<240	<240	<230	<250	<260	<250	<250	<250	5,400	220,000 X	32,000,000	2,400,000	15,000,000	9,500,000	120,000,000
Toluene	50	<59	<63	<51	2,700	<60	<84	230	<75	<58	<150	<57	610	<50	<50	16,000	5,400	250,000 C	250,000 C	3,300,000	250,000 C	250,000
1,2,4-Trimethylbenzene	50	<59	<63	<51	**3,500**	<60	<84	91	<75	<58	<150	<57	110	<50	<50	2,100	570	110,000 C	110,000 C	25,000,000	110,000 C	110,000
1,3,5-Trimethylbenzene	50	<59	<63	<46	**2,000**	<60	<84	<48	<75	<58	<150	<51	82	<50	<50	1,800	1,100	94,000 C	94,000 C	19,000,000	94,000 C	94,000
o -Xylene	50	<59	<63	<46	**2,800**	<60	<84	260	<75	<58	<150	<51	**910**	<50	<50	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000
m,p -Xylene	100	<97	<98	120	**79,000**	<99	<170	330	<150	<94	<300	<100	**960**	<100	<100	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000

All soil sample results in micrograms per kilogram (µg/kg) or parts per billion (ppb)

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VOCs = volatile organic compounds

NS = Not sampled

< = limit of detection for sample

Reporting limits for some analytes may vary depending on the percent moisture content of the sample.

Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ TDL

Gray Shaded/Bold typeface indicates that the MDEQ TDL has been exceeded

Laboratory Analytical Results for Volatile Organic Compounds in Groundwater

PSC Petro-Chem Processing Group Facility - Detroit, Michigan

Soil Boring Number Sample Collection Date	MDEQ TDL 10/2006	BSB-2 10/20/10	BSB-3 10/21/10	BSB-4 10/20/10	BSB-5 10/20/10	BSB-6 10/21/10	BSB-7 10/20/10	BSB-8 10/20/10	BSB-9 10/20/10	BSB-10 10/20/10	DUP-1 10/20/10	DUP-2 10/21/10	EB-1 TUBING 10/20/10	EB-2 LINER 10/20/10	Trip Blank 10/20/10	Drinking Water	Groundwater Surface Water Interface	Volatilization to Indoor Air	Groundwater Contact	Flamability and Explosivity Screening Level
VOCs																				
1,2,3-Trimethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	**1.1**	**120**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
Diisopropyl ether	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**92**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	86	ID	8,000 S	8,000 S	8,000 S
tert -Amylmethyl ether	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**25**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	190	NA	570,000	2,600,000 S	NA
tert -Butyl alcohol	50	<50	<50	<50	<50	<50	**4,000**	<50	<50	<50	<50	<50	<50	<50	<50	11,000	NA	1,000,000,000 D,S	79,000,000	61,000,000
Diethyl ether	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**20**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	10	ID	61,000,000 S	35,000,000	650,000
Acetone	20	<20	**22**	<20	<20	**27**	**3,200**	<20	<20	**35**	<20	**27**	<20	<20	<20	2,100	1,700	1,000,000,000 D,S	31,000,000	15,000,000
Benzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**75**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0 A	200 X	35,000	11,000	68,000
2-Butanone	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**1,900**	<5.0	<5.0	<5.0	<5.0	**5.7**	<5.0	<5.0	<5.0	38,000	2,200	240,000,000 S	240,000,000 S	ID
sec -Butylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**7.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	230	ID	ID	4,400	ID
Chlorobenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**6.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	100 A	25	470,000 S	86,000	160,000
1,2-Dichlorobenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**280**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	600 A	13	160,000 S	160,000 S	NA
1,4-Dichlorobenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	75 A	17	74,000 S		NA
1,1-Dichloroethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**32**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2,500	740	2,300,000	2,400,000	380,000
1,2-Dichloroethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0 A	360 X	59,000	19,000	2,500,000
cis -1,2-Dichloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**150**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	70 A	620	210,000	200,000	530,000
trans -1,2-Dichloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	100 A	1,500 X	200,000	220,000	230,000
Ethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**11,000**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	74 E	18	170,000 S	170,000 S	43,000
Isopropylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**160**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2,300	28	56,000 S	56,000 S	29,000
4-Isopropyltoluene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**7.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
2-Methylnaphthalene	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**11**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	750	19	25,000 S	25,000 S	ID
4-Methyl-2-Pentanone	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**16,000**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5,200	ID	20,000,000 S	13,000,000	ID
Methyl *tert* -butyl ether (MtBE)	1.0	<1.0	**66**	**9.3**	<1.0	<1.0	**7,500**	**2.1**	**2.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	40 E	7,100 X	47,000,000 S	610,000	ID
Naphthalene	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**20**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1,500	11	31,000 S	31,000 S	NA
n -Propylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**150**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	230	ID	ID	15,000	ID
Tetrachloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**10**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0 A	60 X	170,000	12,000	ID
Tetrahydrofuran	5.0	<5.0	**17**	<5.0	<5.0	<5.0	**35,000**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	270	11,000 X	16,000,000	1,600,000	60,000
Toluene	1.0	**2.4**	**3.0**	**3.1**	<1.0	<1.0	**22,000**	**1.3**	**1.8**	**2.3**	**3.0**	<1.0	<1.0	<1.0	<1.0	790 E	270	530,000 S	530,000 S	61,000
Trichloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0 A	200 X	4,900	22,000	ID
1,2,4-Trimethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**560**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	63 E	17	56,000 S	56,000 S	56,000 S
1,3,5-Trimethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**250**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	72 E	45	61,000 S	61,000 S	ID
o -Xylene	1.0	<1.0	**1.1**	**1.3**	<1.0	<1.0	**9,600**	<1.0	<1.0	**1.0**	**1.4**	<1.0	<1.0	<1.0	<1.0	280 E	41	190,000 S	190,000 S	70,000
m,p -Xylene	2.0	<2.0	<2.0	**2.1**	<2.0	<2.0	**40,000**	<2.0	<2.0	<2.0	**2.2**	<2.0	<2.0	<2.0	<2.0	280 E	41	190,000 S	190,000 S	70,000

All groundwater sample results in micrograms per Liter (µg/L) or parts per billion (ppb)

MDNRE = Michigan Department of Natural Resources and Environment

TDL = Target Detection Limit

VOCs = volatile organic compounds

NS = Not sampled

< = limit of detection for sample

Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ TDL

Gray Shaded/Bold typeface indicates that the MDEQ non-industrial criterion has been exceeded

APPENDIX D

SUMMARY TABLES OF ANALYTICAL RESULTS
2013 CORRECTIVE ACTION INVESTIGATION

Table 1
Corrective Action Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Soil

Petro-Chem Processing Group Facility - Detroit, Michigan

Sample Identification		**BSB-11**		**BSB-12**			**BSB-13**		**BSB-14**		**DUP-01**	**BSB-15**		MDEQ Nonresidential Cleanup Criteria**						
(sample interval - feet)		(3-5)	(5-7)	(8-10)	(10-12)	(18-20)	(3-5)	(5-7)	(3-5)	(5-7)		(3-5)	(5-7)							
Collection Date	MDEQ TDL 10/2006	8/22/2013	8/22/2013	8/22/2013	8/22/2013	8/22/2013	8/22/2013	8/22/2013	8/22/2013	8/22/2013	8/22/2013	8/23/2013	8/23/2013	Drinking Water Protection	Groundwater Surface Water Interface Protection	Groundwater Contact Protection	Volatilization to Indoor Air	Volatilization to AmbientAir	Direct Contact	Soil Saturation Concentration Screening Levels
Analysis Date		8/28/2013	8/28/2013	8/28/2013 8/30/2013	8/27/2013 8/28/2013	8/27/2013 8/28/2013	8/27/2013	8/27/2013 8/28/2013	8/27/2013	8/27/2013	8/27/2013	8/27/2013	8/27/2013							
Collection Method		Grab																		
VOCs																				
Acetone	1,000	<1,000 J,V-	<1,000 J,V-	<1,000 J,V-	1,516	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	42,000	34,000	110,000,000	110,000,000	160,000,000 C	73,000,000	110,000,000
Benzene	50	<50	<50	**270 J,J-**	**750**	<50	<50	**110**	<50	<50	<50	<50	<50	100	4,000 X	220,000	8,400	45,000	840,000 C	400,000
2-Butanone	250	<631	<608	<808 J,J-	2,900 J,E1	<583	<588	<613	<609	<592	<644	<685	<693	760,000	44,000	27,000,000	27,000,000	35,000,000	27,000,000 C, DD	27,000,000
n -Butylbenzene	50	<50	<50	<50 J,J-	160	<50	<50	<50	<50	<50	<50	<50	<50	4,600	ID	120,000	ID	880,000,000	8,000,000	10,000,000
sec -Butylbenzene	50	<63	<60	<80 J,J-	170	<58	<58	<61	<60	<59	<64	<68	<69	4,600	ID	88,000	ID	180,000,000	8,000,000	10,000,000
tert -Butylbenzene	50	<50	<50	<50 J,J-	<50	<50	<50	<50	<50	<50	<50	<50	<50	4,600	ID	180,000	ID	290,000,000	8,000,000	10,000,000
Carbon tetrachloride	50	<63	<60	**390 J,J-**	<71	<58	<58	<61	<60	<59	<64	<68	<69	100	900 X	92,000	990	12,000	39,000 C	390,000
Chloroethane	250	<315	<304	1,000 J,J-	<359	<291	385	<306	<304	<296	<322	<342	<346	34,000	22,000 X	950,000 C	950,000 C	36,000,000 C	950,000 C	950,000
Cyclohexane	250	330	<304	<404 J,J-	1,300	<291	<294	<306	<304	<296	<322	<342	<346	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	50	<50	<50	<50 J,J-	**3,800**	<50	<50	**610**	<50	<50	<50	<50	<50	14,000	280	210,000 C	210,000 C	46,000,000 C	63,000,000 C	210,000
1,1-Dichloroethane	50	<63	<60	6,700 J,J-	580	<58	510	530	<60	<59	<64	<68	<69	50,000	15,000	890,000 C	430,000	2,500,000	890,000 C	890,000
1,2-Dichloroethane	50	<63	<60	82 J,J-	<71	<58	<58	<61	<60	<59	<64	<68	<69	100	7,200 X	380,000	11,000	21,000	420,000	1,200,000
1,1-Dichloroethene	50	<63	<60	**200 J,J-**	<71	<58	<58	<61	<60	<59	<64	<68	<69	140	2,600	220,000	330	37,000	660,000 C	570,000
cis -1,2-Dichloroethene	50	<50	<50	1,100 J,J-	1,400	<50	210	290	<50	<50	<50	<50	<50	1,400	12,000	640,000	41,000	41,000	640,000 C	640,000
trans -1,2-Dichloroethene	50	<50	<50	140 J,J-	<63	<50	<50	<50	<50	<50	<50	<50	<50	2,000	30,000 X	1,400,000 C	43,000	330,000	1,400,000 C	1,400,000
Ethylbenzene	50	69	<60	**11,000 J,J-**	**180,000**	210	**2,500**	**15,000**	<60	<59	<64	<68	<69	1,500	360	140,000 C	140,000 C	2,400,000 C	140,000 C	140,000
Isopropylbenzene	50	<320	<300	<400 J,J-	2,800	<290	<290	330	<300	<300	<320	<340	<350	260,000	3,200	390,000 C	390,000 C	2,000,000	390,000 C	390,000
4-Isopropyltoluene	50	<130	<120	<160 J,J-	410	<120	<120	<120	<120	<120	<130	<140	<140	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	<100	<100	**15,000 J,J-**	**2,000**	<100	**468**	**1,100**	<100	<100	<100	<100	<100	100	30,000 X	2,300,000 C	240,000	700,000	2,300,000 C	2,300,000
2-Methylnaphthalene	250	678	<304	1,300 J,J-	2,700	<291	<294	591	<304	<296	<322	<342	<346	170,000	4,200	5,500,000	4,900,000	1,800,000	26,000,000	NA
4-Methyl-2-Pentanone	250	<315	<304	5,400 J,J-	8,200	<291	<294	1,300	<304	<296	<322	<342	<346	100,000	ID	2,700,000 C	53,000,000 C	53,000,000	2,700,000 C	2,700,000
Methyl *tert* -butyl ether (MtBE)	50	<320	<300	**1,800 J,J-**	**4,700**	<290	<290	320	<300	<300	<320	<340	<350	800	140,000 X	5,900,000 C	5,900,000 C	30,000,000	5,900,000 C	5,900,000
Naphthalene	250	459	<304	**1,900 J,J-**	**4,700**	<291	<294	569	<304	<296	<322	<342	<346	100,000	730	2,100,000	470,000	350,000	52,000,000	NA
n -Propylbenzene	50	<63	<60	330 J,J-	**5,100**	<58	<58	570	<60	<59	<64	<68	<69	4,600	ID	300,000	ID	590,000,000	8,000,000	10,000,000
Tetrachloroethene	50	<63	<60	**2,900 J,J-**	**250**	<58	**210**	**130**	**760**	91	<64	<68	<69	100	1,200 X	88,000 C	21,000	210,000	88,000 C	88,000
Tetrahydrofuran	250	<315	<304	1,200 J,J-	4,900	<291	364	1,200	<304	<296	<322	<342	<346	5,400	220,000 X	32,000,000	2,400,000	15,000,000	9,500,000	120,000,000
Toluene	50	310	<50	**14,000 J,J-**	**350,000**	280	1,900	**8,500**	<50	<50	<50	<50	70	16,000	5,400	250,000 C	250,000 C	3,300,000 C	250,000 C	250,000
1,2,4-Trichlorobenzene	250	<315	<304	<404 J,J-	<359	<291	<294	<306	<304	<296	<322	<342	<346	4,200	5,900 X	1,100,000 C	1,100,00 C	34,000,000	1,100,000 C,DD	1,100,000
1,1,1-Trichloroethane	50	<63	<60	**2,300 J,J-**	<86	<58	250	160	<60	<59	<64	<68	<69	4,000	1,800	460,000 C	460,000	4,500,000	460,000 C	460,000
Trichloroethene	50	<63	<60	**2,200 J,J-**	**140**	<58	<58	63	<60	<59	<64	<68	<69	100	4,000 X	440,000	1,900	14,000	500,000 C,DD	500,000
1,2,3-Trimethylbenzene	50	<130	<120	<160 J,J-	2,100	<120	<120	190	<120	<120	<130	<140	<140	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	50	200	<120	**710 J,J-**	**14,000**	<120	<120	**1,300**	<120	<120	<130	<140	<140	2,100	570	110,000 C	110,000 C	25,000,000	110,000 C	110,000
1,3,5-Trimethylbenzene	50	<130	<120	490 J,J-	**6,200**	<120	<120	590	<120	<120	<130	<140	<140	1,800	1,100	94,000 C	94,000 C	19,000,000 C	94,000 C	94,000
Vinyl Chloride	50	<50	<50	<50 J,J-	**320**	<50	<50	<50	<50	<50	<50	<50	<50	40	260 X	20,000	2,800	29,000	34,000	490,000
Xylenes	100	723	<182	**39,000**	**750,000**	**913**	**7,800**	**62,000**	<182	<177	<193	<205	<207	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000
Other VOCs	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary	Vary	Vary

All soil sample results in micrograms per kilogram (µg/kg) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated December 30, 2013
TDL = Target Detection Limit
VOCs = volatile organic compounds
< = limit of detection for sample
E1 = the reported value is estimated due to the presence of interference
J = the concentration is an estimated value
J- = the result is an estimated quantity, but the result may be biased low
V- = recovery in the assocated continuing calibration verification sample (CCV) exceeds the lower control limit. Results may be biased low.
Reporting limits for some analytes may \ Reporting limits for some analytes may vary depending on the percent moisture content of the sample.
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup Criteria
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
NA = criterion is not available
ND = non-detect
ID = insufficient data to develop criterion
C = the criterion developed exceeds the chemical-specific soil saturation screening level (Csat)
D = calculated criterion exceeds 100 percent, hence it is reducted to 100 percent or 1.0E+9 parts per billion (ppb)
DD = hazardous substance causes developmental effects
X = the GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source

Table 1 (continued)
Corrective Action Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Soil

Petro-Chem Processing Group Facility - Detroit, Michigan

Sample Identification		**BSB-16**		**BSB-17**		**BSB-18**		**DUP-03**	**BSB-19**		**BSB-20**		**BSB-21**		MDEQ Nonresidential Cleanup Criteria**						
(sample interval - feet)		(3-5)	(5-7)	(3-5)	(5-7)	(3-5)	(5-7)		(3-5)	(5-7)	(3-5)	(5-7)	(3-5)	(5-7)							
Collection Date	MDEQ TDL 10/2006	8/23/2013	8/23/2013	8/23/2013	8/23/2013	8/23/2013	8/23/2013	8/23/2013	8/26/2013	8/26/2013	8/26/2013	8/26/2013	8/26/2013	8/26/2013	Drinking Water Protection	Groundwater Surface Water Interface Protection	Groundwater Contact Protection	Volatilization to Indoor Air	Volatilization to AmbientAir	Direct Contact	Soil Saturation Concentration Screening Levels
Analysis Date		8/27/2013	8/27/2013	8/27/2013	8/27/2013	8/27/2013 8/28/2013	8/28/2013	8/27/2013	8/30/2013	8/30/2013	8/30/2013	8/30/2013	8/30/2013	8/30/2013							
Collection Method		Grab																			
VOCs																					
Acetone	1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<3,602	<1,000	<1,000	<1,000	<1,000	<1,000	42,000	34,000	110,000,000	110,000,000	160,000,000 C	73,000,000	110,000,000
Benzene	50	<50	<50	<50	<50	**450**	**350**	<50	<290	<50	<50	84	<50	<50	100	4,000 X	220,000	8,400	45,000	840,000 C	400,000
2-Butanone	250	<573	<562	<655	<636	<630	<603	<653	<2,900	<306	<414	<323	<334	<335	760,000	44,000	27,000,000	27,000,000	35,000,000	27,000,000 C, DD	27,000,000
n-Butylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<290	<50	<50	<50	<50	<50	4,600	ID	120,000	ID	880,000,000	8,000,000	10,000,000
sec-Butylbenzene	50	<57	<56	<65	<63	<63	<60	<65	<290	<50	<50	<50	<50	<50	4,600	ID	88,000	ID	180,000,000	8,000,000	10,000,000
tert-Butylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<290	<50	<50	<50	<50	<50	4,600	ID	180,000	ID	290,000,000	8,000,000	10,000,000
Carbon tetrachloride	50	<57	<56	<65	<63	<63	<60	<65	<570	<61	<82	<64	<66	<67	100	900 X	92,000	990	12,000	39,000 C	390,000
Chloroethane	250	<286	<281	<327	<318	449	514	<326	<2,900	<306	<414	<323	<334	<335	34,000	22,000 X	950,000 C	950,000 C	36,000,000 C	950,000 C	950,000
Cyclohexane	250	<286	<281	<327	<318	535	<301	<326	<571	<250	<250	<250	<250	<250	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	50	<50	<50	<50	<50	<50	<50	<50	<290	<50	<50	<50	<50	<50	14,000	280	210,000 C	210,000 C	46,000,000 C	63,000,000 C	210,000
1,1-Dichloroethane	50	<57	<56	<65	<63	<63	<60	<65	<570	<61	<82	<64	<66	<67	50,000	15,000	890,000 C	430,000	2,500,000	890,000 C	890,000
1,2-Dichloroethane	50	<57	<56	<65	<63	<63	<60	<65	<570	<61	<82	<64	<66	<67	100	7,200 X	380,000	11,000	21,000	420,000	1,200,000
1,1-Dichloroethene	50	<57	<56	<65	<63	<63	<60	<65	<290	<50	<50	<50	<50	<50	140	2,600	220,000	330	37,000	660,000 C	570,000
cis-1,2-Dichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<290	<50	<50	<50	<50	<50	1,400	12,000	640,000	41,000	41,000	640,000 C	640,000
trans-1,2-Dichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<290	<50	<50	<50	<50	<50	2,000	30,000 X	1,400,000 C	43,000	330,000	1,400,000 C	1,400,000
Ethylbenzene	50	<57	<56	<65	<63	**22,000**	**16,000**	<65	**790**	74	<50	200	<50	<50	1,500	360	140,000 C	140,000 C	2,400,000 C	140,000 C	140,000
Isopropylbenzene	50	<290	<280	<330	<320	330	<300	<330	<290	<50	<50	<50	<50	<62	260,000	3,200	390,000 C	390,000 C	2,000,000	390,000 C	390,000
4-Isopropyltoluene	50	<110	<110	<130	<130	<130	<120	<130	<290	<50	<50	<58	<50	<50	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	<100	<100	<100	<100	<100	<100	<100	<285	<100	<100	<100	<100	<100	100	30,000 X	2,300,000 C	240,000	700,000	2,300,000 C	2,300,000
2-Methylnaphthalene	250	<286	<281	<327	<318	<315	<301	<326	<285	<250	<250	<250	<250	<250	170,000	4,200	5,500,000	4,900,000	1,800,000	26,000,000	NA
4-Methyl-2-Pentanone	250	<286	<281	<327	<318	<315	<301	<326	<5,700	<613	<828	<647	<668	<670	100,000	ID	2,700,000 C	53,000,000 C	53,000,000	2,700,000 C	2,700,000
Methyl *tert*-butyl ether (MtBE)	50	<290	<280	<330	<320	800	780	<330	<570	<61	<82	<64	<66	<67	800	140,000 X	5,900,000 C	5,900,000 C	30,000,000	5,900,000 C	5,900,000
Naphthalene	250	<286	<281	<327	<318	<315	<301	<326	<285	<250	<250	<250	<250	<250	100,000	730	2,100,000	470,000	350,000	52,000,000	NA
n-Propylbenzene	50	<57	<56	<65	<63	240	230	<65	<290	<50	<50	<50	<50	<50	4,600	ID	300,000	ID	590,000,000	8,000,000	10,000,000
Tetrachloroethene	50	<57	<56	<65	<63	<63	<60	<65	**520**	<50	**940**	<50	<50	<50	100	1,200 X	88,000 C	21,000	210,000	88,000 C	88,000
Tetrahydrofuran	250	<286	<281	<327	<318	<315	<301	<326	<2,900	615	<414	<323	<334	<335	5,400	220,000 X	32,000,000	2,400,000	15,000,000	9,500,000	120,000,000
Toluene	50	<50	<50	<50	<50	170	300	<50	820	110	340	360	<50	240	16,000	5,400	250,000 C	250,000 C	3,300,000 C	250,000 C	250,000
1,2,4-Trichlorobenzene	250	<286	<281	<327	<318	<315	<301	<326	863	<250	<250	<250	<250	<250	4,200	5,900 X	1,100,000 C	1,100,00 C	34,000,000	1,100,000 C,DD	1,100,000
1,1,1-Trichloroethane	50	<57	<56	<65	<63	<63	<60	<65	<570	<61	<82	<64	<66	<67	4,000	1,800	460,000 C	460,000	4,500,000	460,000 C	460,000
Trichloroethene	50	<57	<56	<65	<63	<63	<60	<65	<570	<61	**130**	<64	<66	<67	100	4,000 X	440,000	1,900	14,000	500,000 C,DD	500,000
1,2,3-Trimethylbenzene	50	<110	<110	<130	<130	<130	<120	<130	350	<50	<50	<50	<50	<50	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	50	<110	<110	<130	<130	220	270	<130	**1,000**	<89	<50	<50	<50	<50	2,100	570	110,000 C	110,000 C	25,000,000	110,000 C	110,000
1,3,5-Trimethylbenzene	50	<110	<110	<130	<130	270	260	<130	450	<50	<50	<50	<50	<50	1,800	1,100	94,000 C	94,000 C	19,000,000 C	94,000 C	94,000
Vinyl Chloride	50	<50	<50	<50	<50	<50	<50	<50	<290	<50	<50	<50	<50	<50	40	260 X	20,000	2,800	29,000	34,000	490,000
Xylenes	100	<172	<168	<196	<191	**44,000**	**37,000**	<195	**4,400**	625	<150	545	<150	<150	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000
Other VOCs	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary	Vary	Vary

All soil sample results in micrograms per kilogram (µg/kg) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012
TDL = Target Detection Limit
VOCs = volatile organic compounds
< = limit of detection for sample
NA = criterion is not available
Reporting limits for some analytes may vary depending on the percent moisture content of the sample.
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup Criteria
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
NA = criterion is not available
ND = non-detect
ID = insufficient data to develop criterion
C = the criterion developed exceeds the chemical-specific soil saturation screening level (Csat)
D = calculated criterion exceeds 100 percent, hence it is reducted to 100 percent or 1.0E+9 parts per billion (ppb)
DD = hazardous substance causes developmental effects
X = the GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source

Table 1 (continued)
Corrective Action Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Soil

Petro-Chem Processing Group Facility - Detroit, Michigan

Sample Identification	MDEQ TDL 10/2006	**BSB-22**		**BSB-23**		**BSB-24**		**BSB-25**		**BSB-26**		**BSB-27**		**DUP-06**	MDEQ Nonresidential Cleanup Criteria**						
(sample interval - feet)		(3-5)	(9-10)	(3-5)	(9-10)	(3-5)	(7.5-8.5)	(3-5)	(5-7)	(3-5)	(5-7)	(3-5)	(5-7)								
Collection Date		8/26/2013	8/26/2013	8/26/2013	8/26/2013	8/27/2013	8/27/2013	8/27/2013	8/27/2013	8/27/2013	8/27/2013	8/27/2013	8/27/2013	8/27/2013							
Analysis Date		8/30/2013	8/30/2013	8/30/2013	8/30/2013	8/30/2013	8/30/2013	8/30/2013	8/29/2013	8/29/2013	8/29/2013	8/29/2013	8/29/2013 8/30/2013	8/30/2013	Drinking Water Protection	Groundwater Surface Water Interface Protection	Groundwater Contact Protection	Volatilization to Indoor Air	Volatilization to AmbientAir	Direct Contact	Soil Saturation Concentration Screening Levels
Collection Method		Grab																			
VOCs																					
Acetone	1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<21,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<21,000	42,000	34,000	110,000,000	110,000,000	160,000,000 C	73,000,000	110,000,000
Benzene	50	<50	<50	<50	<50	<50	<1,100	**120**	<50	<50	<50	<50	<64	<1,100	100	4,000 X	220,000	8,400	45,000	840,000 C	400,000
2-Butanone	250	<394	<281	<287	<295	<582	<21,000	<559	<607	<552	<258	<552	<687	<21,000	760,000	44,000	27,000,000	27,000,000	35,000,000	27,000,000 C, DD	27,000,000
n-Butylbenzene	50	<50	<50	<50	<50	<50	**69,000**	<50	<50	<50	<50	<50	<50	**57,000**	4,600	ID	120,000	ID	880,000,000	8,000,000	10,000,000
sec-Butylbenzene	50	<50	<50	<50	<50	<58	**28,000**	<55	<60	<55	<50	<55	<68	**24,000**	4,600	ID	88,000	ID	180,000,000	8,000,000	10,000,000
tert-Butylbenzene	50	<50	<50	<50	<50	<50	3,500	<50	<50	<50	<50	<50	<50	3,000	4,600	ID	180,000	ID	290,000,000	8,000,000	10,000,000
Carbon tetrachloride	50	<78	<56	<57	<59	<58	<2,100	<55	<60	<55	<51	<55	<68	<2,100	100	900 X	92,000	990	12,000	39,000 C	390,000
Chloroethane	250	<394	<281	<287	<295	<291	<11,000	<279	<303	<276	<258	<276	<343	<11,000	34,000	22,000 X	950,000 C	950,000 C	36,000,000 C	950,000 C	950,000
Cyclohexane	250	<250	<250	<250	<250	<291	<11,000	<279	<303	<276	<250	<276	<343	<11,000	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	50	<50	<50	<50	<50	<50	<1,100	<50	<50	<50	<50	<50	<50	<1,100	14,000	280	210,000 C	210,000 C	46,000,000 C	63,000,000 C	210,000
1,1-Dichloroethane	50	<78	<56	<57	<59	<58	<2,100	<55	<60	<55	<51	<55	<68	<2,100	50,000	15,000	890,000 C	430,000	2,500,000	890,000 C	890,000
1,2-Dichloroethane	50	<78	<56	<57	<59	<58	<2,100	<55	<60	<55	<51	<55	<68	<2,100	100	7,200 X	380,000	11,000	21,000	420,000	1,200,000
1,1-Dichloroethene	50	<50	<50	<50	<50	<58	<2,100	<55	<60	<55	<50	<55	<68	<2,100	140	2,600	220,000	330	37,000	660,000 C	570,000
cis-1,2-Dichloroethene	50	<50	<50	<50	110	<50	<1,100	<50	<50	<50	<50	<50	<50	<1,100	1,400	12,000	640,000	41,000	41,000	640,000 C	640,000
trans-1,2-Dichloroethene	50	<50	<50	<50	<50	<50	<1,100	<50	<50	<50	<50	<50	<50	<1,100	2,000	30,000 X	1,400,000 C	43,000	330,000	1,400,000 C	1,400,000
Ethylbenzene	50	<50	<50	<50	<50	<58	<2,100	<55	<60	<55	70	<55	250	<2,100	1,500	360	140,000 C	140,000 C	2,400,000 C	140,000 C	140,000
Isopropylbenzene	50	<50	<50	<50	<50	<290	<11,000	<280	<300	<280	<66	<280	<340	<11,000	260,000	3,200	390,000 C	390,000 C	2,000,000	390,000 C	390,000
4-Isopropyltoluene	50	<50	<50	<50	<50	<120	36,000	<110	<120	<110	<50	<110	<140	32,000	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	<100	<100	<100	<100	<100	<2,100	<100	<100	<100	<100	<100	<100	<2,100	100	30,000 X	2,300,000 C	240,000	700,000	2,300,000 C	2,300,000
2-Methylnaphthalene	250	<250	<250	<250	<250	<291	**88,000**	<279	<303	<276	<580	<276	1,400	**85,000**	170,000	4,200	5,500,000	4,900,000	1,800,000	26,000,000	NA
4-Methyl-2-Pentanone	250	<789	<562	<574	<591	<291	<11,000	<279	<303	<276	<517	<276	<343	<11,000	100,000	ID	2,700,000 C	53,000,000 C	53,000,000	2,700,000 C	2,700,000
Methyl *tert*-butyl ether (MtBE)	50	<78	<56	<57	<59	<290	<11,000	<280	<300	<280	<51	<280	<340	<11,000	800	140,000 X	5,900,000 C	5,900,000 C	30,000,000	5,900,000 C	5,900,000
Naphthalene	250	<250	<250	<250	<250	<291	**70,000**	<279	<303	<276	<259	<276	**8,600**	**60,000**	100,000	730	2,100,000	470,000	350,000	52,000,000	NA
n-Propylbenzene	50	<50	<50	<50	<50	<58	**17,000**	<55	<60	<55	71	<55	<68	**15,000**	4,600	ID	300,000	ID	590,000,000	8,000,000	10,000,000
Tetrachloroethene	50	<50	<50	<50	<50	**390**	**8,000**	<55	<60	<55	<50	<55	<68	**7,400**	100	1,200 X	88,000 C	21,000	210,000	88,000 C	88,000
Tetrahydrofuran	250	<394	<281	<287	<295	<291	<11,000	<279	<303	<276	<258	<276	<343	<11,000	5,400	220,000 X	32,000,000	2,400,000	15,000,000	9,500,000	120,000,000
Toluene	50	170	<50	64	<50	<50	<1,100	160	<50	<50	190	<50	240	<1,100	16,000	5,400	250,000 C	250,000 C	3,300,000 C	250,000 C	250,000
1,2,4-Trichlorobenzene	250	<250	<250	<250	<250	<291	<11,000	<279	<303	<276	<250	<276	<343	<11,000	4,200	5,900 X	1,100,000 C	1,100,00 C	34,000,000	1,100,000 C,DD	1,100,000
1,1,1-Trichloroethane	50	<78	<56	<57	<59	<58	<2,100	<55	<60	<55	<51	<55	<68	<2,100	4,000	1,800	460,000 C	460,000	4,500,000	460,000 C	460,000
Trichloroethene	50	<78	<56	93	<59	<58	<2,100	<55	<60	<55	<51	<55	<68	<2,100	100	4,000 X	440,000	1,900	14,000	500,000 C,DD	500,000
1,2,3-Trimethylbenzene	50	<50	<50	<50	<50	<120	140,000	<110	<120	<110	<58	<110	<140	120,000	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	50	<50	<50	<50	<50	<120	**220,000**	<110	<120	<110	120	<110	230	**190,000**	2,100	570	110,000 C	110,000 C	25,000,000	110,000 C	110,000
1,3,5-Trimethylbenzene	50	<50	<50	<50	<50	<120	**74,000**	<110	<120	<110	<50	<110	<140	**67,000**	1,800	1,100	94,000 C	94,000 C	19,000,000 C	94,000 C	94,000
Vinyl Chloride	50	<50	<50	<50	<50	<50	<1,100	<50	<50	<50	<50	<50	<50	<1,100	40	260 X	20,000	2,800	29,000	34,000	490,000
Xylenes	100	261	<150	<150	<150	<174	**25,000**	<167	<182	<165	387	<165	761	**23,000**	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000
Other VOCs	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary	Vary	Vary

All soil sample results in micrograms per kilogram (µg/kg) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012
TDL = Target Detection Limit
VOCs = volatile organic compounds
< = limit of detection for sample
NA = criterion is not available
Reporting limits for some analytes may vary depending on the percent moisture content of the sample.
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup Criteria
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
NA = criterion is not available
ND = non-detect
ID = insufficient data to develop criterion
C = the criterion developed exceeds the chemical-specific soil saturation screening level (Csat)
D = calculated criterion exceeds 100 percent, hence it is reducted to 100 percent or 1.0E+9 parts per billion (ppb)
DD = hazardous substance causes developmental effects
X = the GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source

Table 1 (continued)
Corrective Action Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Soil

Petro-Chem Processing Group Facility - Detroit, Michigan

Soil Boring Number	MDEQ TDL 10/2006	**BSB-28**		**BSB-29**		**BSB-30**		**BSB-31**		**DUP-02**	MDEQ Nonresidential Cleanup Criteria**						
(sample interval - feet)		(4-5)	(5-6)	(3-4)	(8-9)	(4-5)	(9-10)	(7-8)	(11-12)		Drinking Water Protection	Groundwater Surface Water Interface Protection	Groundwater Contact Protection	Volatilization to Indoor Air	Volatilization to AmbientAir	Direct Contact	Soil Saturation Concentration Screening Levels
Collection Date		4/17/2014	4/17/2014	4/17/2014	4/17/2014	4/17/2014	4/17/2014	4/17/2014	4/17/2014	4/17/2014							
Analysis Date		4/24/2014	4/24/2014	4/24/2014	4/24/2014	4/24/2014	4/24/2014	4/24/2014	4/24/2014	4/24/2014							
Collection Method		Grab															
VOCs																	
Acetone	1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	42,000	34,000	110,000,000	110,000,000	160,000,000 C	73,000,000	110,000,000
Benzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	100	4,000 X	220,000	8,400	45,000	840,000 C	400,000
2-Butanone	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	760,000	44,000	27,000,000	27,000,000	35,000,000	27,000,000 C, DD	27,000,000
n-Butylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	4,600	ID	120,000	ID	880,000,000	8,000,000	10,000,000
sec-Butylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	4,600	ID	88,000	ID	180,000,000	8,000,000	10,000,000
tert-Butylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	4,600	ID	180,000	ID	290,000,000	8,000,000	10,000,000
Carbon tetrachloride	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	100	900 X	92,000	990	12,000	39,000 C	390,000
Chloroethane	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	34,000	22,000 X	950,000 C	950,000 C	36,000,000 C	950,000 C	950,000
Cyclohexane	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	14,000	280	210,000 C	210,000 C	46,000,000 C	63,000,000 C	210,000
1,1-Dichloroethane	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	50,000	15,000	890,000 C	430,000	2,500,000	890,000 C	890,000
1,2-Dichloroethane	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	100	7,200 X	380,000	11,000	21,000	420,000	1,200,000
1,1-Dichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	140	2,600	220,000	330	37,000	660,000 C	570,000
cis-1,2-Dichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	1,400	12,000	640,000	41,000	41,000	640,000 C	640,000
trans-1,2-Dichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	2,000	30,000 X	1,400,000 C	43,000	330,000	1,400,000 C	1,400,000
Ethylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	1,500	360	140,000 C	140,000 C	2,400,000 C	140,000 C	140,000
Isopropylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	260,000	3,200	390,000 C	390,000 C	2,000,000	390,000 C	390,000
4-Isopropyltoluene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	30,000 X	2,300,000 C	240,000	700,000	2,300,000 C	2,300,000
2-Methylnaphthalene	250	<250	<250	<250	<250	<250	<250	<251	<250	<250	170,000	4,200	5,500,000	4,900,000	1,800,000	26,000,000	NA
4-Methyl-2-Pentanone	250	<328	<308	<299	<312	<283	<313	<339	<301	<250	100,000	ID	2,700,000 C	53,000,000 C	53,000,000	2,700,000 C	2,700,000
Methyl *tert*-butyl ether (MtBE)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	800	140,000 X	5,900,000 C	5,900,000 C	30,000,000	5,900,000 C	5,900,000
Naphthalene	250	<250	<250	<250	<250	<250	<250	630	<250	<250	100,000	730	2,100,000	470,000	350,000	52,000,000	NA
n-Propylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	4,600	ID	300,000	ID	590,000,000	8,000,000	10,000,000
Tetrachloroethene	50	**2,500**	<50	62	<50	**120**	<50	<50	<50	<50	100	1,200 X	88,000 C	21,000	210,000	88,000 C	88,000
Tetrahydrofuran	250	<328	<308	<299	<312	<283	<313	<339	<301	<250	5,400	220,000 X	32,000,000	2,400,000	15,000,000	9,500,000	120,000,000
Toluene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	16,000	5,400	250,000 C	250,000 C	3,300,000 C	250,000 C	250,000
1,2,4-Trichlorobenzene	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	4,200	5,900 X	1,100,000 C	1,100,00 C	34,000,000	1,100,000 C,DD	1,100,000
1,1,1-Trichloroethane	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	4,000	1,800	460,000 C	460,000	4,500,000	460,000 C	460,000
Trichloroethene	50	100	<50	<50	<50	<50	<50	<50	<50	<50	100	4,000 X	440,000	1,900	14,000	500,000 C,DD	500,000
1,2,3-Trimethylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	2,100	570	110,000 C	110,000 C	25,000,000	110,000 C	110,000
1,3,5-Trimethylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	1,800	1,100	94,000 C	94,000 C	19,000,000 C	94,000 C	94,000
Vinyl Chloride	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	40	260 X	20,000	2,800	29,000	34,000	490,000
Xylenes	100	<150	<150	<150	<150	<150	<150	<150	<150	<150	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000
Other VOCs	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary	Vary	Vary

All soil sample results in micrograms per kilogram (µg/kg) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012
TDL = Target Detection Limit
VOCs = volatile organic compounds
< = limit of detection for sample
NA = criterion is not available
Reporting limits for some analytes may vary depending on the percent moisture content of the sample.
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup Criteria
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
NA = criterion is not available
ND = non-detect
ID = insufficient data to develop criterion
C = the criterion developed exceeds the chemical-specific soil saturation screening level (Csat)
D = calculated criterion exceeds 100 percent, hence it is reducted to 100 percent or 1.0E+9 parts per billion (ppb)
DD = hazardous substance causes developmental effects
X = the GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source

Table 1 (continued)
Corrective Action Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Soil

Petro-Chem Processing Group Facility - Detroit, Michigan

Soil Boring Number		**BSB-32**		**BSB-33**		**BSB-34**		**BSB-35**		**Dup-03**	MDEQ Nonresidential Cleanup Criteria**						
(sample interval - feet)		(2-4)	(10-12)	(2-4)	(8-10)	(3-5)	(8-10)	(2-4)	(6-8)								
Collection Date	MDEQ TDL 10/2006	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	Drinking Water Protection	Groundwater Surface Water Interface Protection	Groundwater Contact Protection	Volatilization to Indoor Air	Volatilization to AmbientAir	Direct Contact	Soil Saturation Concentration Screening Levels
Analysis Date		9/23/2014 9/24/2014	9/23/2014 9/24/2014	9/23/2014 9/24/2014	9/23/2014 9/24/2014	9/23/2014 9/24/2014	9/23/2014 9/24/2014	9/23/2014 9/24/2014	9/23/2014 9/24/2014	9/24/2014							
Collection Method		Grab															
VOCs																	
Acetone	1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	42,000	34,000	110,000,000	110,000,000	160,000,000 C	73,000,000	110,000,000
Benzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	100	4,000 X	220,000	8,400	45,000	840,000 C	400,000
2-Butanone	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	760,000	44,000	27,000,000	27,000,000	35,000,000	000,000 C, DD	27,000,000
n -Butylbenzene	50	<50	<50	<50	<50	130	<50	<50	<50	170	4,600	ID	120,000	ID	880,000,000	8,000,000	10,000,000
sec -Butylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	4,600	ID	88,000	ID	180,000,000	8,000,000	10,000,000
tert -Butylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	4,600	ID	180,000	ID	290,000,000	8,000,000	10,000,000
Carbon tetrachloride	50	<56	<65	<55	<74	<60	<98	<60	<82	<61	100	900 X	92,000	990	12,000	39,000 C	390,000
Chloroethane	250	<280	<320	<270	<370	<300	<490	<300	<410	<300	34,000	22,000 X	950,000 C	950,000 C	36,000,000 C	950,000 C	950,000
Cyclohexane	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	14,000	280	210,000 C	210,000 C	46,000,000 C	63,000,000 C	210,000
1,1-Dichloroethane	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	50,000	15,000	890,000 C	430,000	2,500,000	890,000 C	890,000
1,2-Dichloroethane	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	100	7,200 X	380,000	11,000	21,000	420,000	1,200,000
1,1-Dichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	140	2,600	220,000	330	37,000	660,000 C	570,000
cis -1,2-Dichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	1,400	12,000	640,000	41,000	41,000	640,000 C	640,000
trans -1,2-Dichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	2,000	30,000 X	1,400,000 C	43,000	330,000	1,400,000 C	1,400,000
Ethylbenzene	50	<50	<50	<50	<50	60	<50	<50	<50	120	1,500	360	140,000 C	140,000 C	2,400,000 C	140,000 C	140,000
Isopropylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	260,000	3,200	390,000 C	390,000 C	2,000,000	390,000 C	390,000
4-Isopropyltoluene	50	<50	<50	<50	<50	<50	<50	<50	<50	56	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	30,000 X	2,300,000 C	240,000	700,000	2,300,000 C	2,300,000
2-Methylnaphthalene	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	170,000	4,200	5,500,000	4,900,000	1,800,000	26,000,000	NA
4-Methyl-2-Pentanone	250	<280	<320	<270	<370	<300	<490	<300	<410	<300	100,000	ID	2,700,000 C	53,000,000 C	53,000,000	2,700,000 C	2,700,000
Methyl *tert* -butyl ether (MtBE)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	800	140,000 X	5,900,000 C	5,900,000 C	30,000,000	5,900,000 C	5,900,000
Naphthalene	250	<250	<250	<250	<250	410	<250	<250	<250	370	100,000	730	2,100,000	470,000	350,000	52,000,000	NA
n -Propylbenzene	50	<50	<50	<50	<50	92	<50	<50	<50	140	4,600	ID	300,000	ID	590,000,000	8,000,000	10,000,000
Tetrachloroethene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	100	1,200 X	88,000 C	21,000	210,000	88,000 C	88,000
Tetrahydrofuran	250	<280	<320	<270	<370	<300	<490	<300	<410	<300	5,400	220,000 X	32,000,000	2,400,000	15,000,000	9,500,000	120,000,000
Toluene	50	<50	<50	<50	<50	59	<50	<50	<50	160	16,000	5,400	250,000 C	250,000 C	3,300,000 C	250,000 C	250,000
1,2,4-Trichlorobenzene	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	4,200	5,900 X	1,100,000 C	1,100,00 C	34,000,000	,100,000 C,DD	1,100,000
1,1,1-Trichloroethane	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	4,000	1,800	460,000 C	460,000	4,500,000	460,000 C	460,000
Trichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	100	4,000 X	440,000	1,900	14,000	500,000 C,DD	500,000
1,2,3-Trimethylbenzene	50	<50	<50	<50	<50	140	<50	<50	<50	220	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	50	<50	<50	<50	<50	470	<50	<50	<50	**680**	2,100	570	110,000 C	110,000 C	25,000,000	110,000 C	110,000
1,3,5-Trimethylbenzene	50	<50	<50	<50	<50	86	<50	<50	<50	130	1,800	1,100	94,000 C	94,000 C	19,000,000 C	94,000 C	94,000
Vinyl Chloride	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	40	260 X	20,000	2,800	29,000	34,000	490,000
Xylenes	100	<150	<150	<150	<150	420	<150	<150	<150	790	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000
Other VOCs	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary	Vary	Vary

All soil sample results in micrograms per kilogram (µg/kg) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012
TDL = Target Detection Limit
VOCs = volatile organic compounds
< = limit of detection for sample
Reporting limits for some analytes may vary depending on the percent moisture content of the sample.
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup Criteria
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
NA = criterion is not available
ND = non-detect
ID = insufficient data to develop criterion
C = the criterion developed exceeds the chemical-specific soil saturation screening level (Csat)
D = calculated criterion exceeds 100 percent, hence it is reducted to 100 percent or 1.0E+9 parts per billion (ppb)
DD = hazardous substance causes developmental effects
X = the GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source

Table 1 (continued)
Corrective Action Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Soil

Petro-Chem Processing Group Facility - Detroit, Michigan

Soil Boring Number	MDEQ TDL 10/2006	**BSB-36**			**BSB-38**		MDEQ Nonresidential Cleanup Criteria**						
(sample interval - feet)		(0-2)	(8-10)	(12.5-13)	(1.5-2)	(4.5-5)	Drinking Water Protection	Groundwater Surface Water Interface Protection	Groundwater Contact Protection	Volatilization to Indoor Air	Volatilization to AmbientAir	Direct Contact	Soil Saturation Concentration Screening Levels
Collection Date		12/22/2014	12/22/2014	12/22/2014	12/22/2014	12/22/2014							
Analysis Date		12/27/2014	12/27/2014	12/25/2014	12/25/2014	12/25/2014							
Collection Method		Grab											
VOCs													
Acetone	1,000	<1,000 J,L+	<1,100 J,L+	<1,000	<1,000	<5,300	42,000	34,000	110,000,000	110,000,000	160,000,000 C	73,000,000	110,000,000
Benzene	50	<50	<50	<50	88	<270	100	4,000 X	220,000	8,400	45,000	840,000 C	400,000
2-Butanone	250	<250 J,L+	<250 J,L+	<250	<250	<1,100	760,000	44,000	27,000,000	27,000,000	35,000,000	27,000,000 C, DD	27,000,000
n -Butylbenzene	50	<50	<50	<50	<50	<270	4,600	ID	120,000	ID	880,000,000	8,000,000	10,000,000
sec -Butylbenzene	50	<50	<50	<50	<50	<270	4,600	ID	88,000	ID	180,000,000	8,000,000	10,000,000
tert -Butylbenzene	50	<50	<50	<50	<50	<270	4,600	ID	180,000	ID	290,000,000	8,000,000	10,000,000
Carbon tetrachloride	50	<50	<56	<58	<62	<530	100	900 X	92,000	990	12,000	39,000 C	390,000
Chloroethane	250	<260	<560	<250	360	<1,100	34,000	22,000 X	950,000 C	950,000 C	36,000,000 C	950,000 C	950,000
Cyclohexane	250	<250	<250	<250	<250	<270	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	50	<50	<50	<50	180	<270	14,000	280	210,000 C	210,000 C	46,000,000 C	63,000,000 C	210,000
1,1-Dichloroethane	50	<50	<50	<50	83	<270	50,000	15,000	890,000 C	430,000	2,500,000	890,000 C	890,000
1,2-Dichloroethane	50	<50	<50	<50	<50	<270	100	7,200 X	380,000	11,000	21,000	420,000	1,200,000
1,1-Dichloroethene	50	<50	<50	<50	<50	<270	140	2,600	220,000	330	37,000	660,000 C	570,000
cis -1,2-Dichloroethene	50	<50	<50	<50	<50	<270	1,400	12,000	640,000	41,000	41,000	640,000 C	640,000
Diisopropyl ether	250	<250	2,000	<250	<250	<270	1,300 C	ID	1,300 C	1,300 C	3,200,000	1,300 C	1,300
Ethylbenzene	50	<50	<50	<50	**4,000**	<270	1,500	360	140,000 C	140,000 C	2,400,000 C	140,000 C	140,000
Isopropylbenzene	50	<100 J,L+	<230 J,L+	<50	370	<270	260,000	3,200	390,000 C	390,000 C	2,000,000	390,000 C	390,000
4-Isopropyltoluene	50	<50	<50	<50	<50	<270	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	<100	<100	<100	<100	<530	100	30,000 X	2,300,000 C	240,000	700,000	2,300,000 C	2,300,000
2-Methylnaphthalene	250	<250	<250	<250	<250	<530	170,000	4,200	5,500,000	4,900,000	1,800,000	26,000,000	NA
4-Methyl-2-Pentanone	250	<510	3,500	<250	<340	<1,100	100,000	ID	2,700,000 C	53,000,000 C	53,000,000	2,700,000 C	2,700,000
Methyl *tert* -butyl ether (MtBE)	50	<50	**8,300**	<50	**1,000**	**5,200**	800	140,000 X	5,900,000 C	5,900,000 C	30,000,000	5,900,000 C	5,900,000
Naphthalene	250	<250	<250	<250	<250	<270	100,000	730	2,100,000	470,000	350,000	52,000,000	NA
n -Propylbenzene	50	<50	<50	<50	440	<270	4,600	ID	300,000	ID	590,000,000	8,000,000	10,000,000
Styrene	50	<50	<50	<50	280	<270	2,700	2,100 X	270,000	520,000 C	3,300,000	520,000 C	520,000
Tetrachloroethene	50	**160**	<50	<50	<50	<270	100	1,200 X	88,000 C	21,000	210,000	88,000 C	88,000
Tetrahydrofuran	250	<260	4,500	<290	1,600	<2,700	5,400	220,000 X	32,000,000	2,400,000	15,000,000	9,500,000	120,000,000
Toluene	50	<50	130	<50	1,100	<270	16,000	5,400	250,000 C	250,000 C	3,300,000 C	250,000 C	250,000
1,2,4-Trichlorobenzene	250	<250	<250	<250	<250	<270	4,200	5,900 X	1,100,000 C	1,100,00 C	34,000,000	1,100,000 C,DD	1,100,000
1,1,1-Trichloroethane	50	<50	<50	<50	<50	<270	4,000	1,800	460,000 C	460,000	4,500,000	460,000 C	460,000
Trichloroethene	50	<50	<50	<50	<50	<270	100	4,000 X	440,000	1,900	14,000	500,000 C,DD	500,000
1,2,3-Trimethylbenzene	50	<50	<50	<50	430	<270	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	50	<50	<50	<50	**3,000**	<270	2,100	570	110,000 C	110,000 C	25,000,000	110,000 C	110,000
1,3,5-Trimethylbenzene	50	<50	<50	<50	1,000	<270	1,800	1,100	94,000 C	94,000 C	19,000,000 C	94,000 C	94,000
Vinyl Chloride	50	<50	<50	<50	<50	<270	40	260 X	20,000	2,800	29,000	34,000	490,000
Xylenes	100	190	<150	<150	**24,000**	<800	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000
Other VOCs	NA	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary	Vary	Vary

All soil sample results in micrograms per kilogram (µg/kg) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012
TDL = Target Detection Limit
VOCs = volatile organic compounds
< = limit of detection for sample
Reporting limits for some analytes may vary depending on the percent moisture content of the sample.
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
NA = criterion is not available
ND = non-detect
ID = insufficient data to develop criterion
C = the criterion developed exceeds the chemical-specific soil saturation screening level (Csat)
D = calculated criterion exceeds 100 percent, hence it is reducted to 100 percent or 1.0E+9 parts per billion (ppb)
DD = hazardous substance causes developmental effects
X = the GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source

Table 2
Corrective Action Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Groundwater

Petro-Chem Processing Group Facility - Detroit, Michigan

Sample Identification	MDEQ TDL 10/2006	**BSB-11**	**BSB-12**	**BSB-13**	**BSB-14**	**DUP-02**	**BSB-15**	**BSB-16**	**BSB-17**	**BSB-18**	**DUP-04**	**BSB-19**	**BSB-20**	**BSB-21**	MDEQ Nonresidential Cleanup Criteria**				
(screen depth - feet)		(7-11)	(12-16)	(7-11)	(7-11)		(7-11)	(7-11)	(7-11)	(7-11)		(7-11)	(7-11)	(7-11)					
Collection Date		8/22/2013	8/22/2013	8/22/2013	8/22/2013	8/22/2013	8/23/2013	8/23/2013	8/23/2013	8/23/2013	8/23/2013	8/26/2013	8/26/2013	8/26/2013					
Analysis Date		8/30/2013	8/28/2013 8/31/2013	8/30/2013 8/31/2013	8/30/2013	8/30/2013	8/30/2013	8/30/2013	8/28/2013 8/30/2013	8/29/2013 8/30/2013	8/30/2013	8/30/2013 8/31/2013	8/30/2013 8/31/2013	8/30/2013 8/31/2013	Drinking Water	Groundwater Surface Water Interface	Volatilization to Indoor Air	Groundwater Contact	Flamability and Explosivity Screening Level
Collection Method		Screen Point 16																	
VOCs																			
Acetone	20	<20	**48,000 J,V+**	**160,000**	<20	<20	<50	<20	<200	<1,000	<50	<20	<26	<20	2,100	1,700	1,000,000,000 D,S	31,000,000	15,000,000
Benzene	1.0	<1.0	**130**	<1,000	<1.0	<1.0	**19**	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	5.0 A	200 X	35,000	11,000	68,000
Bromochloromethane	1.0	<1.0	19	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
tert -Butyl alcohol	50	<50	<10,000	<5,000	<50	<50	750	580	<100	3,600	690	<50	180 J,*	87 J,*	11,000	NA	1,000,000,000 D,S	79,000,000	61,000,000
2-Butanone	5.0	<5.0	**18,000**	**32,000**	<5.0	<5.0	<25	<5.0	<100	<500	<25	<5.0	9.5	<5.0	38,000	2,200	240,000,000 S	240,000,000 S	ID
n -Butylbenzene	1.0	<1.0	1.1	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	230	ID	ID	5,900	ID
sec -Butylbenzene	1.0	<1.0	<1.0	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	230	ID	ID	4,400	ID
Chlorobenzene	1.0	<1.0	2.0	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	100 A	25	470,000 S	86,000	160,000
Chloroethane	5.0	<5.0	6.5	<2,000	<5.0	<5.0	<25	<5.0	<40	<500	<25	<5.0	<5.0	<5.0	1,700	1,100 X	5,700,000 S	440,000	110,000
Chloroform	1.0	<1.0	2.1	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	1.5	<1.0	80 A,W	350	180,000	150,000	ID
1,2-Dichlorobenzene	1.0	<1.0	**55**	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	600 A	13	160,000 S	160,000 S	NA
1,4-Dichlorobenzene	1.0	<1.0	<1.0	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	75 A	17	74,000 S	6,400	NA
1,1-Dichloroethane	1.0	<1.0	<2,000	**1,300**	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	2,500	740	2,300,000	2,400,000	380,000
1,2-Dichloroethane	1.0	<1.0	**42**	<820	<1.0	<1.0	<5.0	<1.0	<16	<100	<5.0	<1.0	<1.0	<1.0	5.0 A	360 X	59,000	19,000	2,500,000
1,1-Dichloroethene	1.0	<1.0	4.0	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	7.0 A	130	1,300	11,000	97,000
cis -1,2-Dichloroethene	1.0	<1.0	<2,000	**1,800**	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	70 A	620	210,000	200,000	530,000
trans -1,2-Dichloroethene	1.0	<1.0	43	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	100 A	1,500 X	200,000	220,000	230,000
Diethyl ether	5.0	<5.0	**61**	<1,000	<5.0	<5.0	<10	**47**	<20	<200	<10	<5.0	<5.0	<5.0	10 E	ID	61,000,000 S	35,000,000	650,000
Diisopropyl ether	5.0	<5.0	45	<1,000	<5.0	<5.0	5.9	**160**	<20	**180**	11	<5.0	<5.0	<5.0	86	ID	8,000 S	8,000 S	8,000 S
Ethylbenzene	1.0	<1.0	<2,000	**20,000**	3.1	3.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	74 E	18	170,000 S	170,000 S	43,000
2-Hexanone	5.0	<5.0	14	<2,000	<5.0	<5.0	<25	<5.0	<40	<500	<25	<5.0	<5.0	<5.0	2,900	ID	8,700,000	5,200,000	NA
Isopropylbenzene	1.0	<1.0	24	<850	<1.0	<1.0	<5.0	<1.0	<17	<100	<5.0	<1.0	<1.0	<1.0	2,300	28	56,000 S	56,000 S	29,000
4-Isopropyltoluene	1.0	<1.0	<1.0	<630	<1.0	<1.0	<5.0	<1.0	<13	<100	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
2-Methylnaphthalene	5.0	<5.0	<5.0	<3,900	<5.0	<5.0	<20	<5.0	<80	<390	<20	<5.0	<5.0	<5.0	750	19	25,000 S	25,000 S	ID
4-Methyl-2-Pentanone	5.0	<5.0	**84,000 J,V+**	**180,000**	6.2	<5.0	<25	<5.0	<21	<500	<25	<5.0	<5.0	<5.0	5,200	ID	20,000,000 S	13,000,000	ID
Methyl *tert* -butyl ether (MtBE)	1.0	3.1	**14,000**	**27,000 J, V-**	**220 E**	**210**	**740**	28	<40 J,V-	**9,900**	**710**	3.8	13	16	40 E	7,100 X	47,000,000 S	610,000	ID
Naphthalene	5.0	<5.0	6.3	<1,000	<5.0	<5.0	<25	<5.0	<20	<500	<25	<5.0	<5.0	<5.0	1,500	11	31,000 S	31,000 S	NA
n -Propylbenzene	1.0	<1.0	29	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	230	ID	ID	15,000	ID
Styrene	1.0	<1.0	1.1	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	100 A	80 X	310,000 S	9,700	140,000
tert -Amylmethyl ether	5.0	<5.0	120	<1,000 J, V-	<5.0	<5.0	<5.0	<5.0	<5.0	<100	<5.0	<5.0	<5.0	<5.0	190 E	NA	570,000	2,600,000 S	NA
Tetrachloroethene	1.0	<1.0	**36**	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	5.0 A	60 X	170,000	12,000	ID
Tetrahydrofuran	5.0	<5.0	**43,000**	**85,000**	7.1	11	170	110	<100	**1,700**	<25	150	<5.0	<5.0	270	11,000 X	16,000,000	1,600,000	60,000
Toluene	1.0	<1.0	**24,000**	**99,000**	8.8	9.5	<5.0	2.2	<20	<100	<5.0	1.3	<1.0	<1.0	790 E	270	530,000 S	530,000 S	61,000
1,1,1-Trichloroethane	1.0	<1.0	9.6	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	200 A	89	1,300,000 S	1,300,000 S	ID
Trichloroethene	1.0	<1.0	**29**	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	5.0 A	200 X	4,900	22,000	ID
1,2,3-Trimethylbenzene	1.0	<1.0	37	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	1.0	<1.0	**200**	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	63 E	17	56,000 S	56,000 S	56,000 S
1,3,5-Trimethylbenzene	1.0	<1.0	**62**	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	72 E	45	61,000 S	61,000 S	ID
Vinyl Chloride	1.0	<1.0	**14**	<1,000	<1.0	<1.0	<5.0	<1.0	<20	<100	<5.0	<1.0	<1.0	<1.0	2.0 A	13 X	13,000	1,000	33,000
Xylenes	3.0	<3.0	**15,000**	**91,000**	14	14	**140**	<3.0	<40	<200	<10	<3.0	<3.0	<3.0	280 E	41	190,000 S	190,000 S	70,000
Other VOCs	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary

All groundwater sample results in micrograms per Liter (µg/L) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012
TDL = Target Detection Limit
VOCs = volatile organic compounds
ND = not detected
E = The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
J = the concentration is an estimated value
V- = recovery in the assocated continuing calibration verification sample (CCV) exceeds the lower control limit. Results may be biased low.
V+ = recovery in the assocated continuing calibration verification sample (CCV) exceeds the upper control limit. Results may be biased high.
* = value reported is outside QA limits
< = limit of detection for sample
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup Criteria
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
ID = insufficient data to develop criterion
A = Criterion is the state of Michigan drinking water standard established pursuant to Sceoin 5 of 1976 PA 399, MCL 325.1005
D = Calculated criterion exceeds 100 percent, hence it is reduced to 100 percent of 1.0E+9 parts per billion (ppb)
E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of NREPA, 1994 PA 451, as amended
S = Criterion defaults to the hazardous substance-specific water solubility limit
W = Concentrations of trihalomethanes in groundwaer shall be added together to determine compliance with the Michigan drinking water standard of 80 µg/L.
X = The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source
NA = not available

Table 2 (continued)
Corrective Action Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Groundwater

Petro-Chem Processing Group Facility - Detroit, Michigan

Sample Identification	MDEQ TDL 10/2006	BSB-22	BSB-23	DUP-05	BSB-24	BSB-25	BSB-26	BSB-29	BSB-30	BSB-31	Dup-01	BSB-32	BSB-33	BSB-34	BSB-35	Dup-04	BSB-36	BSB-38	MDEQ Nonresidential Cleanup Criteria**				
(screen depth - feet)		(10-14)	(7-11)		(7-11)	(7-11)	(8-12)	(4-9)	(5-10)	(8-13)		(11-16)	(11-16)	(11-16)	(7-12)								
Collection Date		8/26/2013	8/26/2013	8/26/2013	8/27/2013	8/27/2013	8/27/2013	4/17/2014	4/17/2014	4/17/2014	4/17/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	12/22/2014	12/22/2014					
Analysis Date		8/30/2013	8/30/2013 8/31/2013	8/30/2013	8/30/2013 8/31/2013	8/30/2013 8/31/2013	8/30/2013 8/31/2013	4/24/2014	4/24/2014	4/24/2014	4/24/2014	9/23/2014	9/23/2014	9/23/2014	9/23/2014	9/23/2014	12/24/2014	12/24/2014	Drinking Water	Groundwater Surface Water Interface	Volatilization to Indoor Air	Groundwater Contact	Flamability and Explosivity Screening Level
Collection Method		Screen Point 16										Temporary Monitoring Well											
VOCs																							
Acetone	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	21	<20	<20	<20	<20	<20	<20	<20 J,*	2,100	1,700	1,000,000,000 D,S	31,000,000	15,000,000
Benzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**6.5**	5.0 A	200 X	35,000	11,000	68,000
Bromochloromethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
tert -Butyl alcohol	50	<50	100 J,*	91 J,*	<50	<50	<50	<50	<50	1,100	<50	<50	<50	<50	<50	<50	1,500	1,400	11,000	NA	1,000,000,000 D,S	79,000,000	61,000,000
2-Butanone	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0 J,L+	<5.0 J,L+	<5.0 J,L+	<5.0 J,L+	<5.0 J,L+	<5.0 J,L+	<5.0 J,*	38,000	2,200	240,000,000 S	240,000,000 S	ID
n -Butylbenzene	1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	230	ID	ID	5,900	ID
Chlorobenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	100 A	25	470,000 S	86,000	160,000
Chloroethane	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	14	35	1,700	1,100 X	5,700,000 S	440,000	110,000
Chloroform	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	80 A,W	350	180,000	150,000	ID
1,2-Dichlorobenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	600 A	13	160,000 S	160,000 S	NA
1,1-Dichloroethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2,500	740	2,300,000	2,400,000	380,000
1,2-Dichloroethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0 A	360 X	59,000	19,000	2,500,000
1,1-Dichloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	7.0 A	130	1,300	11,000	97,000
cis -1,2-Dichloroethene	1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	70 A	620	210,000	200,000	530,000
trans -1,2-Dichloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	100 A	1,500 X	200,000	220,000	230,000
Diethyl ether	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.9	**11**	10 E	ID	61,000,000 S	35,000,000	650,000
Diisopropyl ether	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**140**	**160**	86	ID	8,000 S	8,000 S	8,000 S
Ethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	<1.0	<1.0	10	74 E	18	170,000 S	170,000 S	43,000
2-Hexanone	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0 J,L+	<5.0 J,L+	<5.0 J,L+	<5.0 J,L+	<5.0 J,L+	<5.0 J,L+	<5.0 J,*	2,900	ID	8,700,000	5,200,000	NA
Isopropylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2,300	28	56,000 S	56,000 S	29,000
4-Isopropyltoluene	1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
2-Methylnaphthalene	5.0	<5.0	<5.0	<5.0	7.4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	750	19	25,000 S	25,000 S	ID
4-Methyl-2-Pentanone	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5,200	ID	20,000,000 S	13,000,000	ID
Methyl *tert* -butyl ether (MtBE)	1.0	5.0	**41**	16	<2.0	7.5	<2.0	<1.0	<1.0	**150**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**7,700**	**8,200**	40 E	7,100 X	47,000,000 S	610,000	ID
Naphthalene	5.0	<5.0	<5.0	<5.0	6.9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1,500	11	31,000 S	31,000 S	NA
n -Propylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	230	ID	ID	15,000	ID
Styrene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	100 A	80 X	310,000 S	9,700	140,000
tert -Amylmethyl ether	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0 J,V-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	7.3	8.6	190 E	NA	570,000	2,600,000 S	NA
Tetrachloroethene	1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	2.5	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0 A	60 X	170,000	12,000	ID
Tetrahydrofuran	5.0	<5.0	<5.0	<5.0	<5.0	36	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	24	59	270	11,000 X	16,000,000	1,600,000	60,000
Toluene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	1.4	3.6	6.4	4.6	5.3	2.6	3.6	<1.0	5.2	790 E	270	530,000 S	530,000 S	61,000
1,1,1-Trichloroethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	200 A	89	1,300,000 S	1,300,000 S	ID
Trichloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0 A	200 X	4,900	22,000	ID
1,2,3-Trimethylbenzene	1.0	<1.0	<1.0	<1.0	14	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	1.0	<1.0	<1.0	<1.0	17	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.4	1.2	<1.0	<1.0	<1.0	<1.0	3.3	63 E	17	56,000 S	56,000 S	56,000 S
1,3,5-Trimethylbenzene	1.0	<1.0	<1.0	<1.0	4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	72 E	45	61,000 S	61,000 S	ID
Vinyl Chloride	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0 A	13 X	13,000	1,000	33,000
Xylenes	3.0	<3.0	<3.0	<3.0	4.6	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	8.3	4.7	4.9	<3.0	3.5	<3.0	**57**	280 E	41	190,000 S	190,000 S	70,000
Other VOCs	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary

All groundwater sample results in micrograms per Liter (µg/L) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012
TDL = Target Detection Limit
VOCs = volatile organic compounds
ND = not detected
L+ = Recovery in the assocated laboratory sample (LCS) exceeds the upper control limit. Results may be biased high.
J = the concentration is an estimated value
V- = recovery in the assocated continuing calibration verification sample (CCV) exceeds the lower control limit. Results may be biased low.
* = value reported is outside QA limits
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup Criteria
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
ID = insufficient data to develop criterion
A = Criterion is the state of Michigan drinking water standard established pursuant to Sceoin 5 of 1976 PA 399, MCL 325.1005
D = Calculated criterion exceeds 100 percent, hence it is reduced to 100 percent of 1.0E+9 parts per billion (ppb)
E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of NREPA, 1994 PA 451, as amended
S = Criterion defaults to the hazardous substance-specific water solubility limit
W = Concentrations of trihalomethanes in groundwaer shall be added together to determine compliance with the Michigan drinking water standard of 80 µg/L.
X = The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source
NA = not available

Table 2 (continued)
Corrective Action Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Groundwater

Petro-Chem Processing Group Facility - Detroit, Michigan

Sample Identification	MDEQ TDL 10/2006	**TB-1**	**TB-02**	**TB-03**	**TB-04**	**Trip Blank**	**TB-9/18/14**	**FB-01**	**FB-02**	**FB-01**	**FB-9/18/14**	**RB-01**	**RB-02**	**RB-01**	**RB-9/18/14**	**Trip Blank**	**Rinsate**	MDEQ Nonresidential Cleanup Criteria**				
Collection Date		8/22/2013	8/23/2013	8/26/2013	8/27/2013	4/18/2014	9/18/2014	8/22/2013	8/26/2013	4/17/2014	9/18/2014	8/23/2013	8/27/2013	4/17/2014	9/18/2014	12/22/2014	12/22/2014					
Analysis Date		8/29/2013	8/29/2013	8/30/2013	8/30/2013	4/24/2014	9/29/2014	8/30/2013	8/30/2013	4/24/2014	9/29/2014	8/30/2013 8/31/2013	8/30/2013	4/24/2014	9/29/2014	12/26/2014	12/26/2014	Drinking Water	Groundwater Surface Water Interface	Volatilization to Indoor Air	Groundwater Contact	Flamability and Explosivity Screening Level
Collection Method		Grab																				
VOCs																						
Acetone	20	<28	<20	<20	<20	<20	<20	<20	<24	<20	<21	<20	<21	<20	<21	<20 J,L+	<21	2,100	1,700	1,000,000,000 D,S	31,000,000	15,000,000
Benzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0 A	200 X	35,000	11,000	68,000
Bromochloromethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
Bromodichloromethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	7.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	80 A,W	ID	37,000	14,000	ID
tert-Butyl alcohol	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	250 J,E	11,000	NA	1,000,000,000 D,S	79,000,000	61,000,000
2-Butanone	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0 J,L+	<5.0 J,L+	38,000	2,200	240,000,000 S	240,000,000 S	ID
n-Butylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	230	ID	ID	5,900	ID
sec-Butylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	230	ID	ID	4,400	ID
Chlorobenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	100 A	25	470,000 S	86,000	160,000
Chloroethane	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1,700	1,100 X	5,700,000 S	440,000	110,000
Chloroform	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.7	80 A,W	350	180,000	150,000	ID
Dibromochloromethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	80 A,W	ID	110,000	18,000	ID
1,2-Dichlorobenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	600 A	13	160,000 S	160,000 S	NA
1,4-Dichlorobenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	75 A	17	74,000 S	6,400	NA
1,1-Dichloroethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2,500	740	2,300,000	2,400,000	380,000
1,2-Dichloroethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0 A	360 X	59,000	19,000	2,500,000
1,1-Dichloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	7.0 A	130	1,300	11,000	97,000
cis-1,2-Dichloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	70 A	620	210,000	200,000	530,000
trans-1,2-Dichloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	100 A	1,500 X	200,000	220,000	230,000
Diethyl ether	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**14**	10 E	ID	61,000,000 S	35,000,000	650,000
Diisopropyl ether	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	86	ID	8,000 S	8,000 S	8,000 S
Ethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	74 E	18	170,000 S	170,000 S	43,000
2-Hexanone	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0 J,L+	<5.0 J,L+	2,900	ID	8,700,000	5,200,000	NA
Isopropylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2,300	28	56,000 S	56,000 S	29,000
4-Isopropyltoluene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
Methylene Chloride	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**210 J,E**	5.0 A	1,500 X	1,400,000	220,000	ID
2-Methylnaphthalene	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	750	19	25,000 S	25,000 S	ID
4-Methyl-2-Pentanone	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5,200	ID	20,000,000 S	13,000,000	ID
Methyl *tert*-butyl ether (MtBE)	1.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	40 E	7,100 X	47,000,000 S	610,000	ID
Naphthalene	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1,500	11	31,000 S	31,000 S	NA
n-Propylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	230	ID	ID	15,000	ID
Styrene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	100 A	80 X	310,000 S	9,700	140,000
tert-Amylmethyl ether	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	190 E	NA	570,000	2,600,000 S	NA
Tetrachloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0 A	60 X	170,000	12,000	ID
Tetrahydrofuran	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	270	11,000 X	16,000,000	1,600,000	60,000
Toluene	1.0	<1.5	<1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	790 E	270	530,000 S	530,000 S	61,000
1,1,1-Trichloroethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	200 A	89	1,300,000 S	1,300,000 S	ID
Trichloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0 A	200 X	4,900	22,000	ID
1,2,3-Trimethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	63 E	17	56,000 S	56,000 S	56,000 S
1,3,5-Trimethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	72 E	45	61,000 S	61,000 S	ID
Vinyl Chloride	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0 A	13 X	13,000	1,000	33,000
Xylenes	3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	280 E	41	190,000 S	190,000 S	70,000
Other VOCs	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary

All groundwater sample results in micrograms per Liter (µg/L) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012
TDL = Target Detection Limit
VOCs = volatile organic compounds
ND = not detected
< = limit of detection for sample
E = The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated
J = The concentration is an estimated value
L+ = Recover in the associated laboratory sample (LCS) exceeds the upper control limit. Results may be biased high
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup Criteria
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
ID = insufficient data to develop criterion
A = Criterion is the state of Michigan drinking water standard established pursuant to Sceoin 5 of 1976 PA 399, MCL 325.1005
D = Calculated criterion exceeds 100 percent, hence it is reduced to 100 percent of 1.0E+9 parts per billion (ppb)
E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of NREPA, 1994 PA 451, as amended
S = Criterion defaults to the hazardous substance-specific water solubility limit
W = Concentrations of trihalomethanes in groundwaer shall be added together to determine compliance with the Michigan drinking water standard of 80 µg/L.
X = The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source
NA = not available

APPENDIX E

SUMMARY TABLES OF ANALYTICAL RESULTS
2015 CORRECTIVE MEASURE STUDY INVESTIGATION

Table 1
Corrective Measures Study Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Soil

PSC Petro-Chem Processing Group Facility - Detroit, Michigan

Sample Identification	MDEQ TDL 10/2006	**BSB-39**		**BSB-40**		**BSB-41**		**BSB-42**		**BSB-43**		MDEQ Nonresidential Cleanup Criteria**						
(sample interval - feet)		(1-3)	(3-5)	(3-5)	(8-10)	(1.5-3.5)	(3.5-5.5)	(5-7)	(8-10)	(10-12)	(16-18)	Drinking Water Protection	Groundwater Surface Water Interface Protection	Groundwater Contact Protection	Volatilization to Indoor Air	Volatilization to Ambient Air (Infinite Source)	Direct Contact	Soil Saturation Concentration Screening Levels
Collection Date		3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016							
Analysis Date		3/22/2016	3/18/2016	3/18/2016	3/18/2016	3/18/2016	3/21/2016	3/18/2016	3/18/2016 3/21/2016	3/18/2016 3/21/2016	3/18/2016							
Collection Method		Grab																
VOCs																		
Acetone	1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<6,700	<1,000	42,000	34,000	110,000,000 C	110,000,000 C	160,000,000	73,000,000	110,000,000
Benzene	50	<50	<50	<50	<50	<50	<50	<50	**110**	**820**	<50	100	4,000 X	220,000	8,400	45,000	400,000 C	400,000
2-Butanone	250	<250	<250	<250	<250	<250	<250	<250	1,200	<1,300	<250	760,000	44,000	27,000,000 C	27,000,000 C	35,000,000	27,000,000 C, DD	27,000,000
n -Butylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	440	<50	4,600	ID	120,000	880,000,000	ID	8,000,000	10,000,000
sec -Butylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	410	<50	4,600	ID	88,000	180,000,000	ID	8,000,000	10,000,000
tert -Butylbenzene	50	<50	<50	<50	<50	<50	<50	<50	<50	<330	<50	4,600	ID	180,000	290,000,000	ID	8,000,000	10,000,000
Carbon tetrachloride	50	<50	<50	<50	<50	<50	<50	**120**	**420**	<330	<50	100	900 X	92,000	990	12,000	390,000 C	390,000
Chloroethane	250	<300	<250	<250	<250	<250	<310	<250	<250	<1,300	<250	34,000	22,000 X	950,000 C	950,000 C	36,000,000	950,000 C	950,000
Cyclohexane	250	<250	<250	<250	<250	<250	<250	<250	330	<330	<250	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	50	<50	<50	<50	<50	<50	<50	<50	**1,100**	**6,800**	<50	14,000	280	210,000 C	210,000 C	46,000,000	210,000 C	210,000
1,1-Dichloroethane	50	<50	<50	<50	<50	<50	<50	1,000	2,500	900	<50	50,000	15,000	890,000 C	430,000	2,500,000	890,000 C	890,000
1,2-Dichloroethane	50	<50	<50	<50	<50	<50	<50	<50	<50	<330	<50	100	7,200 X	380,000	11,000	21,000	420,000	1,200,000
1,1-Dichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<50	<330	<50	140	2,600	220,000	330	3,700	570,000 C	570,000
cis -1,2-Dichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<78	**5,000**	<110	1,400	12,000	640,000 C	41,000	210,000	640,000 C	640,000
trans -1,2-Dichloroethene	50	<50	<50	<50	<50	<50	<50	<50	<50	<330	<50	2,000	30,000 X	1,400,000 C	43,000	330,000	1,400,000 C	1,400,000
Ethylbenzene	50	<50	<50	<50	<50	<50	<50	<50	**36,000**	**490,000**	**2,800**	1,500	360	140,000 C	140,000 C	2,400,000	140,000 C	140,000
Isopropylbenzene	50	<50	<50	<50	<50	<50	<50	<50	480	**5,500**	<50	260,000	3,200	390,000 C	390,000 C	2,000,000	390,000 C	390,000
4-Isopropyltoluene	50	<50	<50	<50	<50	<50	<50	<50	<60	<330	<50	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	<100	<100	<100	<100	<100	<100	<100	**980**	**530**	<100	100	30,000 X	2,300,000 C	240,000	700,000	2,300,000 C	2,300,000
2-Methylnaphthalene	250	<300	<300	<310	<290	<310	<250	<310	<400	<3,300	<290	170,000	4,200	5,500,000 C	1,800,000	1,800,000	26,000,000	NA
4-Methyl-2-Pentanone	250	<250	<300	<310	<290	<310	<310	<310	2,300	9,400	<290	100,000	ID	2,700,000 C	2,700,000 C	53,000,000	2,700,000 C	2,700,000
Methyl *tert* -butyl ether (MtBE)	50	<50	<50	<50	<50	<50	<50	<50	690	**1,400**	**850**	800	140,000 X	5,900,000 C	5,900,000 C	30,000,000	5,900,000 C	5,900,000
Naphthalene	250	<250	<250	<250	<250	<250	<250	<310	<400	<3,300	<290	100,000	730	2,100,000	350,000	350,000	52,000,000	NA
n -Propylbenzene	50	<50	<50	<50	<50	<50	<50	<50	790	**9,700**	80	4,600	ID	300,000	590,000,000	ID	8,000,000	10,000,000
Tetrachloroethene	50	<50	**120**	<50	<50	<50	<50	**830**	**2,600**	**5,000**	<50	100	1,200 X	88,0000 C	21,000	210,000	88,0000 C	88,000
Tetrahydrofuran	250	<250	<250	<250	<250	<250	<250	<250	1,600	<670	**7,800**	5,400	220,000 X	32,000,000	2,400,000	15,000,000	9,500,000	120,000,000
Toluene	50	<50	<50	<50	<50	<50	<50	<50	**25,000**	**930,000**	**7,000**	16,000	5,400	250,000 C	250,000 C	3,300,000	250,000 C	250,000
1,2,4-Trichlorobenzene	250	<250	<250	<250	<250	<250	<250	<250	<250	<330	<250	4,200	5,900 X	1,100,000 C	1,100,000 C	34,000,000	1,100,000 C,DD	1,100,000
1,1,1-Trichloroethane	50	<50	<50	<50	<50	<50	<50	720	**2,500**	<330	<50	4,000	1,800	460,000 C	460,000	4,500,000	460,000 C	460,000
Trichloroethene	50	<50	<50	<50	<50	<50	<50	**290**	**750**	**740**	<50	100	4,000 X	440,000	1,900	14,000	500,000 C,DD	500,000
1,2,3-Trimethylbenzene	50	<50	<50	<50	<50	<50	<50	<50	340	3,800	<50	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	50	<50	<50	<50	<50	<50	<50	<120	**2,700**	**34,000**	280	2,100	570	110,000 C	110,000 C	25,000,000	110,000 C	110,000
1,3,5-Trimethylbenzene	50	<50	<50	<50	<50	<50	<50	<50	**1,200**	**13,000**	130	1,800	1,100	94,000 C	94,000 C	19,000,000	94,000 C	94,000
Vinyl Chloride	50	<50	<50	<50	<50	<50	<50	<50	<50	<330	<50	40	260 X	20,000	2,800	29,000	34,000	490,000
Xylenes	100	<150	<150	<150	<150	<150	<150	<150	**130,000**	**2,300,000**	**13,000**	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000
Other VOCs	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary	Vary	Vary
Moisture Content (%)		16	16	20	13	20	19	18	37	25	15							

All soil sample results in micrograms per kilogram (µg/kg) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012
TDL = Target Detection Limit
VOCs = volatile organic compounds
< = limit of detection for sample
Reporting limits for some analytes may vary depending on the percent moisture content of the sample.
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup Criteria
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
NA = criterion is not available
ND = non-detect
ID = insufficient data to develop criterion
C = the criterion developed exceeds the chemical-specific soil saturation screening level (Csat)
D = calculated criterion exceeds 100 percent, hence it is reducted to 100 percent or 1.0E+9 parts per billion (ppb)
DD = hazardous substance causes developmental effects
X = the GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source

Table 1 (continued)
Corrective Measures Study Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Soil

PSC Petro-Chem Processing Group Facility - Detroit, Michigan

Sample Identification	MDEQ TDL 10/2006	**BSB-44**		**BSB-45**		**BSB-46**		**BSB-47**		**BSB-48**		**Dup-01**	MDEQ Nonresidential Cleanup Criteria**						
(sample interval - feet)		(2-4)	(4-6)	(9-11)	(13-15)	(6-8)	(9-11)	(3-5)	(5-7)	(3-5)	(5-7)								
Collection Date		3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016							
Analysis Date		3/18/2016	3/18/2016 3/22/2016	3/18/2016 3/22/2016	3/21/2016 3/22/2016	3/18/2016	3/18/2016	3/18/2016	3/18/2016	3/18/2016	3/18/2016	3/18/2016							
Collection Method		Grab																	
													Drinking Water Protection	Groundwater Surface Water Interface Protection	Groundwater Contact Protection	Volatilization to Indoor Air	Volatilization to Ambient Air (Infinite Source)	Direct Contact	Soil Saturation Concentration Screening Levels
VOCs																			
Acetone	1,000	<1,000	<1,000	<1,000	3,700	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	42,000	34,000	110,000,000 C	110,000,000 C	160,000,000	73,000,000	110,000,000
Benzene	50	**170**	**230**	<50	**1,100**	<50	<50	<50	<50	<50	<50	<50	100	4,000 X	220,000	8,400	45,000	400,000 C	400,000
2-Butanone	250	<250	<250	<250	<640	<250	<250	<250	<250	<250	<250	<250	760,000	44,000	27,000,000 C	27,000,000 C	35,000,000	27,000,000 C, DD	27,000,000
n -Butylbenzene	50	<50	<50	<50	<160	<50	<50	<50	<50	<50	<50	<50	4,600	ID	120,000	880,000,000	ID	8,000,000	10,000,000
sec -Butylbenzene	50	<50	<50	<50	<160	<50	<50	<50	<50	<50	<50	<50	4,600	ID	88,000	ID	ID	8,000,000	10,000,000
tert -Butylbenzene	50	<50	<50	<50	<160	<50	<50	<50	<50	<50	<50	<50	4,600	ID	180,000	ID	ID	8,000,000	10,000,000
Carbon tetrachloride	50	<50	<50	<50	<160	<50	<50	<50	<50	<50	<50	<50	100	900 X	92,000	990	12,000	390,000 C	390,000
Chloroethane	250	<250	<250	<250	<1,600	<250	<250	<250	<250	<250	<250	<250	34,000	22,000 X	950,000 C	950,000 C	36,000,000	950,000 C	950,000
Cyclohexane	250	<250	330	<250	330	<250	<250	<250	<250	<250	<250	<250	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	50	<50	<93	<50	**6,600**	<50	<50	<50	<50	<50	<50	<50	14,000	280	210,000 C	210,000 C	46,000,000	210,000 C	210,000
1,1-Dichloroethane	50	180	93	110	<160	<50	<50	<50	<50	<50	<50	<50	50,000	15,000	890,000 C	430,000	2,500,000	890,000 C	890,000
1,2-Dichloroethane	50	<50	<50	<50	<160	<50	<50	<50	<50	<50	<50	<50	100	7,200 X	380,000	11,000	21,000	420,000	1,200,000
1,1-Dichloroethene	50	<50	<50	<50	<160	<50	<50	<50	<50	<50	<50	<50	140	2,600	220,000	330	3,700	570,000 C	570,000
cis -1,2-Dichloroethene	50	90	<50	<50	340	<50	<50	<50	<50	**9,400**	**8,700**	<50	1,400	12,000	640,000 C	41,000	210,000	640,000 C	640,000
trans -1,2-Dichloroethene	50	<50	<50	<50	<160	<50	<50	<50	<50	<82	66	<50	2,000	30,000 X	1,400,000 C	43,000	330,000	1,400,000 C	1,400,000
Ethylbenzene	50	**4,700**	**35,000**	81	**260,000**	<50	<50	<50	<50	<50	<50	<50	1,500	360	140,000 C	140,000 C	2,400,000	140,000 C	140,000
Isopropylbenzene	50	130	530	<50	**3,700**	<50	<50	<50	<50	<50	<50	<50	260,000	3,200	390,000 C	390,000 C	2,000,000	390,000 C	390,000
4-Isopropyltoluene	50	<50	<50	<50	440	<50	<50	<50	<50	<50	<50	<50	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	**200**	<100	<100	<320	<100	<100	<100	<100	<100	<100	<100	100	30,000 X	2,300,000 C	240,000	700,000	2,300,000 C	2,300,000
2-Methylnaphthalene	250	<290	1,300	<330	<320	<320	<310	<300	<320	<290	<300	<290	170,000	4,200	5,500,000	4,900,000	1,800,000	26,000,000	NA
4-Methyl-2-Pentanone	250	<290	<360	<330	2,700	<320	<310	<300	<320	<290	<300	<290	100,000	ID	2,700,000 C	2,700,000 C	53,000,000	2,700,000 C	2,700,000
Methyl *tert* -butyl ether (MtBE)	50	<50	<50	<50	**5,600**	<50	<50	<50	<50	<50	<50	<50	800	140,000 X	5,900,000 C	5,900,000 C	30,000,000	5,900,000 C	5,900,000
Naphthalene	250	<250	**4,800**	<250	<560	<320	<310	<300	<320	<290	<300	<290	100,000	730	2,100,000	350,000	350,000	52,000,000	NA
n -Propylbenzene	50	140	870	<50	4,200	<50	<50	<50	<50	<50	<50	<50	4,600	ID	300,000	ID	ID	8,000,000	10,000,000
Tetrachloroethene	50	<50	<50	**300**	<160	73	<50	**990**	100	**28,000**	**10,000**	**280**	100	1,200 X	88,0000 C	21,000	210,000	88,0000 C	88,000
Tetrahydrofuran	250	<250	<250	<250	**38,000**	<250	<250	<250	<250	<250	<250	<250	5,400	220,000 X	32,000,000	2,400,000	15,000,000	9,500,000	120,000,000
Toluene	50	2,000	2,600	91	**98,000**	<50	<50	<50	<50	<50	<50	<50	16,000	5,400	250,000 C	250,000 C	3,300,000	250,000 C	250,000
1,2,4-Trichlorobenzene	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	4,200	5,900 X	1,100,000 C	1,100,000 C	34,000,000	1,100,000 C,DD	1,100,000
1,1,1-Trichloroethane	50	110	140	200	<160	<50	<50	<50	<50	<50	<50	<50	4,000	1,800	460,000 C	460,000	4,500,000	460,000 C	460,000
Trichloroethene	50	<50	<50	**120**	<160	<50	<50	<50	<50	**8,500**	**4,600**	<50	100	4,000 X	440,000	1,900	14,000	500,000 C,DD	500,000
1,2,3-Trimethylbenzene	50	<50	<120	<50	2,400	<50	<50	<50	<50	<50	<50	<50	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	50	150	**1,600**	<130	**17,000**	<130	<120	<120	<130	<120	<120	<120	2,100	570	110,000 C	110,000 C	25,000,000	110,000 C	110,000
1,3,5-Trimethylbenzene	50	130	1,100	<50	**6,700**	<50	<50	<50	<50	<50	<50	<50	1,800	1,100	94,000 C	94,000 C	19,000,000	94,000 C	94,000
Vinyl Chloride	50	<50	<50	<50	<160	<50	<50	<50	<50	**210**	**680**	<50	40	260 X	20,000	2,800	29,000	34,000	490,000
Xylenes	100	**4,500**	**78,000**	480	**1,200,000**	<150	<150	<150	<150	<150	<150	<150	5,600	820	150,000 C	150,000 C	54,000,000	150,000 C	150,000
Other VOCs	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary	Vary	Vary
Moisture Content (%)		13	30	24	69	22	18	16	21	15	17	15							

All soil sample results in micrograms per kilogram (µg/kg) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012
TDL = Target Detection Limit
VOCs = volatile organic compounds
< = limit of detection for sample
Reporting limits for some analytes may vary depending on the percent moisture content of the sample.
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup Criteria
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
NA = criterion is not available
ND = non-detect
ID = insufficient data to develop criterion
C = the criterion developed exceeds the chemical-specific soil saturation screening level (Csat)
D = calculated criterion exceeds 100 percent, hence it is reducted to 100 percent or 1.0E+9 parts per billion (ppb)
DD = hazardous substance causes developmental effects
X = the GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source

Table 2
Corrective Measures Study Investigation
Laboratory Analytical Results for Volatile Organic Compounds in Groundwater

PSC Petro-Chem Processing Group Facility - Detroit, Michigan

Sample Identification	MDEQ TDL 10/2006	**BSB-40**	**BSB-41**	**BSB-42**	**BSB-44**	**BSB-45**	**BSB-46**	**BSB-47**	**BSB-48**	**Dup-01**	**MW-11**	**MW-12**	**Trip Blank**	**Rinsate Blank**	MDEQ Nonresidential Cleanup Criteria**				
(screen depth - feet)		(8-10)	(8-10)	(10-15)	(8-10)	(10-15)	(10-15)	(8-10)	(8-10)	(8-10)	(10.68-15.68)	(6.35-11.35)							
Collection Date		3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/15/2016	3/18/2016	3/18/2016	3/15/2016	3/18/2016					
Analysis Date		3/18/2016	3/18/2016	3/18/2016	3/18/2016	3/18/2016	3/18/2016 3/21/2016	3/18/2016	3/17/2016	3/17/2016	3/25/2016	3/25/2016	3/22/2016	3/25/2016	Drinking Water	Groundwater Surface Water Interface	Volatilization to Indoor Air	Groundwater Contact	Flammability and Explosivity Screening Level
Collection Method		Temporary Monitoring Well									Low-Flow								
VOCs																			
Acetone	20	<20	<20	**24,000**	**20,000**	**17,000**	<20	36	57	22	**34,000**	<20	<20	<20	2,100	1,700	1,000,000,000 D,S	31,000,000	15,000,000
Benzene	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	**640**	<1.0	<1.0	<1.0	5.0 A	200 X	35,000	11,000	68,000
Bromochloromethane	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
tert-Butyl alcohol	50	<50	<50	<10,000	<10,000	<10,000	<50	<50	<50	<50	<10,000	<50	<50	<50	11,000	NA	1,000,000,000 D,S	79,000,000	61,000,000
2-Butanone	5.0	<5.0	<5.0	**8,100**	**9,100**	**2,600**	<5.0	<5.0	<5.0	<5.0	**17,000**	<5.0	<5.0	<5.0	38,000	2,200	240,000,000 S	240,000,000 S	ID
n-Butylbenzene	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	<1,000	<1.0	<1.0	<1.0	230	ID	ID	5,900	ID
sec-Butylbenzene	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	230	ID	ID	4,400	ID
Chlorobenzene	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	100 A	25	470,000 S	86,000	160,000
Chloroethane	5.0	<5.0	<5.0	<2,000	<2,000	<2,000	<5.0	<5.0	<5.0	<5.0	<1,000	<5.0	<5.0	<5.0	1,700	1,100 X	5,700,000 S	440,000	110,000
Chloroform	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	80 A,W	350	180,000	150,000	ID
1,2-Dichlorobenzene	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	600 A	13	160,000 S	160,000 S	NA
1,4-Dichlorobenzene	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	75 A	17	74,000 S	6,400	NA
1,1-Dichloroethane	1.0	<1.0	<1.0	**1,100**	**1,100**	<1,000	<1.0	<1.0	<1.0	<1.0	**1,300**	<1.0	<1.0	<1.0	2,500	740	2,300,000	2,400,000	380,000
1,2-Dichloroethane	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	5.0 A	360 X	59,000	19,000	2,500,000
1,1-Dichloroethene	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	3.5	<1.0	<500	<1.0	<1.0	<1.0	7.0 A	130	1,300	11,000	97,000
cis-1,2-Dichloroethene	1.0	<1.0	<1.0	**2,600**	**11,000**	<1,000	<1.0	<1.0	**2,400**	<1.0	**8,700**	<1.0	<1.0	<1.0	70 A	620	210,000	200,000	530,000
trans-1,2-Dichloroethene	1.0	<1.0	<1.0	<500	<500	<500	<1.0	<1.0	13	<1.0	<500	<1.0	<1.0	<1.0	100 A	1,500 X	200,000	220,000	230,000
Diethyl ether	5.0	<5.0	<5.0	<1,000	<1,000	<1,000	<5.0	<5.0	<5.0	<5.0	<500	<5.0	<5.0	<5.0	10 E	ID	61,000,000 S	35,000,000	650,000
Diisopropyl ether	5.0	<5.0	<5.0	<1,000	<1,000	<1,000	<5.0	<5.0	<5.0	<5.0	<500	<5.0	<5.0	<5.0	86	ID	8,000 S	8,000 S	8,000 S
Ethylbenzene	1.0	<1.0	<1.0	**18,000**	**19,000**	**13,000**	<1.0	<1.0	6.8	<1.0	**15,000**	<1.0	<1.0	<1.0	74 E	18	170,000 S	170,000 S	43,000
2-Hexanone	5.0	<5.0	<5.0	<1,000	<1,000	<1,000	<5.0	<5.0	<5.0	<5.0	<1,000	<5.0	<5.0	<5.0	2,900	ID	8,700,000	5,200,000	NA
Isopropylbenzene	1.0	<1.0 L+	<1.0 L+	<500	<500	<500	<1.0 L+	<1.0 L+	<1.0	<1.0	<500	<1.0	<1.0	<1.0	2,300	28	56,000 S	56,000 S	29,000
4-Isopropyltoluene	1.0	<1.0	<1.0	<500	<500	<500	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
2-Methylnaphthalene	5.0	<5.0	<5.0	<1,000	<1,000	<1,000	<5.0	<5.0	<5.0	<5.0	<2,000	<5.0	<5.0	<5.0	750	19	25,000 S	25,000 S	ID
4-Methyl-2-Pentanone	5.0	<5.0	<5.0	**95,000**	**54,000**	**13,000**	<5.0	<5.0	<5.0	<5.0	**89,000**	<5.0	<5.0	<5.0	5,200	ID	20,000,000 S	13,000,000	ID
Methyl *tert*-butyl ether (MtBE)	1.0	<1.0	7.7	**20,000**	**10,000**	**2,900**	13	<1.0	<1.0	<1.0	**20,000**	<1.0	<1.0	<1.0	40 E	7,100 X	47,000,000 S	610,000	ID
Naphthalene	5.0	<5.0	<5.0	<1,000	<1,000	<1,000	<5.0	<5.0	<5.0	<5.0	<1,000	<5.0	<5.0	<5.0	1,500	11	31,000 S	31,000 S	NA
n-Propylbenzene	1.0	<1.0	<1.0	<500	<500	<500	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	230	ID	ID	15,000	ID
Styrene	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	<1,000	<1.0	<1.0	<1.0	100 A	80 X	310,000 S	9,700	140,000
tert-Amylmethyl ether	5.0	<5.0	<5.0	<1,000	<1,000	<1,000	<5.0	<5.0	<5.0	<5.0	<1,000	<5.0	<5.0	<5.0	190 E	NA	570,000	2,000,000 S	NA
Tetrachloroethene	1.0	<1.0	<1.0	<500	<500	<500	<1.0	<1.0	**18**	<1.0	<500	<1.0	<1.0	<1.0	5.0 A	60 X	170,000	12,000	ID
Tetrahydrofuran	5.0	<5.0	<5.0	**35,000**	**22,000**	**12,000**	<5.0	<5.0	<5.0	<5.0	**38,000**	<5.0	<5.0	<5.0	270	11,000 X	16,000,000	1,600,000	60,000
Toluene	1.0	<1.0	<1.0	**94,000**	**130,000**	**84,000**	<1.0	1.0	13	<1.0	**110,000**	<1.0	<1.0	<1.0	790 E	270	530,000 S	530,000 S	61,000
1,1,1-Trichloroethane	1.0	<1.0	<1.0	<500	<500	<500	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	200 A	89	1,300,000 S	1,300,000 S	ID
Trichloroethene	1.0	<1.0	<1.0	<500	<500	<500	<1.0	<1.0	**8.3**	<1.0	<500	<1.0	<1.0	<1.0	5.0 A	200 X	4,900	22,000	ID
1,2,3-Trimethylbenzene	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	1.0	<1.0	<1.0	**880**	**990**	<500	<1.0	<1.0	<1.0	<1.0	<1,000	<1.0	<1.0	<1.0	63 E	17	56,000 S	56,000 S	56,000 S
1,3,5-Trimethylbenzene	1.0	<1.0	<1.0	<1,000	<1,000	<1,000	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<1.0	<1.0	72 E	45	61,000 S	61,000 S	ID
Vinyl Chloride	1.0	<1.0	<1.0	<500	<500	<500	<1.0	<1.0	**490**	<1.0	<500	<1.0	<1.0	<1.0	2.0 A	13 X	13,000	1,000	33,000
Xylenes	3.0	<3.0	<3.0	**82,000**	**85,000**	**55,000**	<3.0	3.2	32	<3.0	**68,000**	<3.0	<3.0	<3.0	280 E	41	190,000 S	190,000 S	70,000
Other VOCs	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Vary	Vary	Vary	Vary	Vary

All groundwater sample results in micrograms per Liter (µg/L) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
** = Part 201 Generic Cleanup Criteria and Screening Levels, dated September 28, 2012
TDL = Target Detection Limit
VOCs = volatile organic compounds
ND = not detected
L+ = Recovery in the associated laboratory sample (LCS) exceeds the upper control limit. Results may be biased high.
< = limit of detection for sample
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ Generic Nonresidential Cleanup Criteria
Gray Shaded indicates that concentrations exceed this MDEQ Generic Nonresidential Cleanup Criteria

Criteria Footnotes
ID = insufficient data to develop criterion
A = Criterion is the state of Michigan drinking water standard established pursuant to Sceoin 5 of 1976 PA 399, MCL 325.1005
D = Calculated criterion exceeds 100 percent, hence it is reduced to 100 percent of 1.0E+9 parts per billion (ppb)
E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of NREPA, 1994 PA 451, as amended
S = Criterion defaults to the hazardous substance-specific water solubility limit
W = Concentrations of trihalomethanes in groundwaer shall be added together to determine compliance with the Michigan drinking water standard of 80 µg/L.
X = The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source
NA = not available

APPENDIX F

SUMMARY TABLES OF ANALYTICAL RESULTS
2016 SEMI-ANNUAL GROUNDWATER MONITORING

Table - Summary of Laboratory Analytical Results for Volatile Organic Compounds

2016 1st Semi-Annual Monitoring Event
PSC Petro-Chem Processing Group Facility - Detroit, Michigan

Monitoring Well Number	MDEQ TDL	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-9 Dup	Rinsate Blank	Trip Blank
Sample Collection Date	**6/2016**	**6/17/2016**	**6/16/2016**	**6/16/2016**	**6/17/2016**	**6/17/2016**	**6/17/2016**	**6/17/2016**	**6/17/2016**	**6/16/2016**	**6/17/2016**	**6/17/2016**	**6/17/2016**	**6/16/2016**	**6/17/2016**	**6/16/2016**
Volatile Organic Compounds																
Diisopropyl ether	5.0	<5.0	<5.0	<5.0	**5.7**	**5.9**	<5.0	<5.0	<5.0	**5.4**	<5.0	**95**	<5.0	**5.7**	<5.0	<5.0
tert-Amylmethyl ether	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**200**	<5.0	<5.0	<5.0	<5.0
tert-Butyl alcohol	50	<50	**87**	<50	**940**	<50	**310**	<50	<50	**170**	<50	**3,000**	<50	**190**	<50	<50
Diethyl ether	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**61**	<5.0	<5.0	<5.0	<5.0
Acetone	20	**24**	<20	<20	**27**	<20	<20	<20	<20	<20	<20	**32,000**	<20	<20	<20	<20
Benzene	1.0	<1.0	**14**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	**420**	<1.0	<1.0	<1.0	<1.0
2-Butanone	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**17,000**	<5.0	<5.0	<5.0	<5.0
Chloroform	1.0	<1.0	<1.0	**2.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**920**	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.4**	<1.0	<1.0	<1.0	<1.0	**7,500**	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**3.2**	<1.0	<1.0	<1.0	<1.0	**6,900**	<1.0	<1.0	<1.0	<1.0
Isopropylbenzene	1.0	<1.0	**2.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0
4-Methyl-2-Pentanone	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**83,000**	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether (MtBE)	1.0	**25**	**1.8**	**5.7**	**87**	**7.0**	**810**	<1.0	**5.1**	**690**	**5.3**	**19,000**	<1.0	**720**	<1.0	<1.0
Methylene Chloride	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**350**	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**59**	<1.0	<1.0	<1.0	<1.0
Tetrahydrofuran	5.0	<5.0	**200**	<5.0	**7.4**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**40,000**	<5.0	<5.0	<5.0	<5.0
Toluene	1.0	<1.0	**1.5**	<1.0	<1.0	<1.0	**28**	<1.0	<1.0	<1.0	<1.0	**57,000**	<1.0	<1.0	<1.0	<1.0
1,2,3-Trimethylbenzene	1.0	<1.0	**1.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**210**	<1.0	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**76**	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**170**	<1.0	<1.0	<1.0	<1.0
o-Xylene	1.0	<1.0	**1.9**	<1.0	<1.0	<1.0	**2.6**	<1.0	<1.0	<1.0	<1.0	**7,100**	<1.0	<1.0	<1.0	<1.0
m,p-Xylene	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**11**	<2.0	<2.0	<2.0	<2.0	**25,000**	<2.0	<2.0	<2.0	<2.0
Xylene (total)	3.0	<3.0	<3.0	<3.0	<3.0	<3.0	**13**	<3.0	<3.0	<3.0	<3.0	**32,000**	<3.0	<3.0	<3.0	<3.0
Semi-Volatile Organic Compounds																
Benzyl Alcohol	5	<5.4	<5.3	<5.2	<5.2	<5.5	<5.4	<5.3	<5.7	<5.1	<6.2	**10**	<5.2	<5.0	<5.5	--
Bis(2-ethylhexyl)phthalate	5.0	**190**	**44**	**390**	**47**	**140**	**230**	**140**	**42**	**32**	**200**	**200**	**150**	**29**	**37**	--
Fluoranthene	1	<1.1	**1.2**	<1.0	<1.0	<1.1	<1.1	<1.1	<1.1	<1.0	<1.2	<1.0	<1.0	<1.0	<1.1	--
2-Methylnapthalene	5.0	<5.0	**8.2**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--
3&4-Methylphenol	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	**77**	<10	<10	<10	--
Petroleum Distillates																
Diesel Range Organics (DRO)	200	<200	**910**	<200	**2,500**	<200	<200	<200	<200	<200	--	**5,700**	<200	<200	<200	--
Oil Range Organics (ORO)	200	**450**	**1,000**	**630**	**1,300**	**210**	**230**	**430**	**450**	<200	--	**660**	<200	<200	<200	--
Gasoline Range Organics (GRO)	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	--	**140,000**	<200	<200	<200	--

All groundwater sample results in micrograms per Liter (µg/L) or parts per billion (ppb)
MDEQ = Michigan Department of Environmental Quality
TDL = Target Detection Limit
NS = Not sampled
-- = analyte not analyzed
< = limit of detection for sample
NA = TDL not available
E1 = The reported value is estimated due to the presence of interference
G- = Recovery of the associated Surrogate Compound exceeds the lower control limit. Results may be biased low.
Yellow Shaded/Bold typeface indicates that concentration exceeds MDEQ TDL