Part 213 Closure Report
Retail #9103 (1901 East Seven Mile Road, Detroit, Michigan)

(Prepared by Jeff Crum of Hamp, Mathews & Associates)

ATTACHMENT for the Part 213 Closure Report
Volatilization to Indoor Air Pathway

The volatilization to indoor air pathway (VIAP) was investigated by Hamp, Mathews & Associates, Inc. (HMA) at the retail petroleum service station located at 1901 East Seven Mile Road, Detroit, Michigan ("Site" – MRP #9103). The VIAP sampling investigation was performed during 2017 and 2018. As indicated in previous reports, releases of petroleum volatile organic chemicals (PVOCs) have been confirmed on the Site property southwest of the service station building. Due to the proximity of the releases to the station building, the VIAP was evaluated to determine if subsurface vapor concentrations and site conditions could result in unacceptable indoor air inhalation risk to station employees. Groundwater and soil sample results (i.e., vapor source data) reported by NESA & Associates, Inc. (NESA) are also included in this VIAP risk evaluation per the Michigan Department of Environment, Great Lakes, and Energy (EGLE) "Guidance Document For The Vapor Intrusion Pathway", May 2013.

Four soil vapor probes ("VP" 6-inch stainless steel probes) were installed by Terra Probe Environmental, Inc. under the direction of NESA in July 2015. The soil vapor probe installation procedure was based on the Michigan Department of Environment, Great Lakes, and Energy (MEGLE) Standard operating procedure (SOP) for the "Installation of a Soil Gas/Vapor Monitoring Point to Support Vapor Intrusion Investigations," issued April 30, 2012; last revised February 1, 2013. Soil vapor boring logs are provided in **Attachment A**.

HMA reviewed the historical and recent environmental investigation data, which included soil sample results collected from the July 2015 soil vapor probe borings, to formulate a VIAP conceptual site model (CSM) and a soil vapor sampling plan. A private utility locate was also performed under HMA direction in May 2017 to identify areas of preferential subsurface vapor flow. HMA recommended installation of two additional soil vapor probes based on existing data and the private utility locate. Installation of a vapor probe was attempted along the west side of the building toward the southern end to assess vapor transport conditions along an underground electrical utility entering the building at this location. Pea stone was encountered at this location from 2-feet below grade to the groundwater table, which prevented installation of a soil vapor implant at this location. An additional soil vapor probe was added along the eastern side of the building, VP-5, based on detection of PVOCs in the soil sample from VP-4 on July 2015 (**Figure 1**). Consistent with previously installed VP locations, shallow (3-feet bgs) and deep (5-feet) soil vapor implants were installed.

HMA collected soil vapor samples at all five VP locations for three sample events; August 2017, November 2017 and August 2018. The MEGLE Standard Operating Procedure (SOP) titled, "Sampling Utilizing USEPA Method TO-15 via Bottle-Vac® to Support Vapor Intrusion Investigations" (MEGLE, 2013; Appendix F.3) was applied for collection of the soil vapor samples. This included performance of a helium leak test at each location to evaluate potential

leaks along the sampling train to assure that samples are representative of the subsurface soil vapor conditions within the screened depth interval. The soil vapor samples were collected in 1-Liter Bottle-Vac™ glass containers through a dedicated regulator calibrated to allow 200 ml/min of soil vapor flow into the container. Fibertec Environmental Services supplied the sample containers, regulators, and performed analysis of the soil vapor samples using U.S. Environmental Protection Agency Method TO-15 (USEPA, 1999). Each sample was analyzed for benzene, toluene, ethylbenzene, xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, naphthalene, and 2-methylnaphthalene, referred to as BTEX+4, and methyl-tert-butyl ether (MTBE). These PVOCs were selected for soil vapor analyses to be consistent with the groundwater sample analyses performed at the Site by NESA, and the analytical parameters presented in analytical method guidance by Michigan Department of Environment, Great Lakes and Energy (MEGLE, 2016); "Appendix B Recommended Parameters for Common Petroleum Products". A Landtec GEM™ 2000 was used to collect oxygen, carbon dioxide and methane measurements at each VP location.

Soil Vapor Sample Results

A summary of the PVOC soil vapor concentrations and oxygen levels for three soil vapor sampling events conducted in 2017 and 2018 are provided in **Table 1**. Due to the absence of PVOC detections in the shallow depth interval samples, and relatively elevated oxygen concentrations in the first two sampling events, shallow soil vapor samples were not collected on the final sampling event, August 2018. The sample results are compared to the "restricted" nonresidential Site-Specific Target Levels (SSTLs) for the VIAP shown in the table, which were requested and provided by MEGLE February 26, 2019 (**Attachment B**).

Naphthalene was the only PVOC detected in soil vapor samples collected over three sampling events, and was only detected on the first sampling event, August 2017, in the deep (4-feet below grade) sampled interval at VP-3. The naphthalene soil vapor concentration at VP-3 is less than the restricted nonresidential VIAP SSTLs. As noted above, oxygen measurements were also collected during each event at each sample location and depth interval; the sandy soils are relatively rich in oxygen (**Table 1**). The lack of PVOC detections in soil vapor samples in combination with high oxygen levels is consistent with PVOC biodegradation under aerobic vadose zone soil conditions. Moreover, the absence of PVOC detections in soil vapor is observed even for CSMs where groundwater is in close proximity to the soil vapor sample depth intervals (ITRC 2014, USEPA 2015a).

Groundwater Sample Results

PVOC groundwater concentrations were evaluated in samples collected by NESA in August 2017 (NESA "Figure 4") to assess vapor source conditions near the building. Benzene and ethylbenzene are the only PVOCs detected above MEGLE restricted nonresidential groundwater not in contact (GWNIC) VIAP SSTLs (**Attachment B**). The groundwater benzene concentration at MW-21 (1,100 ug/l) and MW-23 (1,800 ug/l) exceeds the restricted nonresidential GWNIC VIAP SSTL of 380 ug/l. Ethylbenzene in groundwater at MW-21 (2,100 ug/l) also exceeds the restricted nonresidential GWNIC VIAP SSTL of 1,200 ug/l.

Soil Sample Results

Soil samples were collected by NESA in July 2015 during installation of the vapor probes; PVOC sample results are presented on **Figure 1**. While MEGLE provided restricted nonresidential soil SSTLs, USEPA (2015b) vapor intrusion guidance contains the following recommendation and reasons for not using soil sample data to assess the VIAP risk:

> "…bulk soil (as opposed to soil gas) sampling and analysis is not currently recommended for estimating the potential for vapor intrusion to pose unacceptable human health risk in indoor air, because of the potential for vapor loss due to volatilization during soil sampling, preservation, and chemical analysis.

The NESA soil sample PVOC results at VP-1, VP-3 and VP-4 indicate a vapor source is present within the saturated zone, and within the "lateral inclusion zone" for a petroleum vapor source – 30 feet of the building (MEGLE 2013). Alternatively, soil PVOC concentrations from samples collected within the vadose zone (5-feet or less below grade) are non-detect with the exception of benzene and xylenes at VP-3 (3-feet below grade). The soil benzene concentration is 110 ug/kg compared to the MEGLE restricted nonresidential soil VIAP SSTL of 49 ug/kg.

VIAP Closure Strategy Recommendation

To attain Part 213 "unrestricted" nonresidential land use closure for the VIAP, the lateral and vertical locations of PVOCs detected in groundwater and soil (i.e., vapor sources) are considered along with their concentrations. Groundwater is shallow at the Site with depths to groundwater near the building generally ranging from 4.5 to 5-feet below grade. Groundwater elevations were collected by NESA during the soil vapor sampling events at MW-21, MW-23 and MW-27 to inform the VIAP CSM near the building. These monitoring wells are located within the "lateral inclusion zone" for a petroleum vapor source – 30 feet, and within the petroleum "vertical separation distance" of 5 feet pursuant to MEGLE (2013) VIAP guidance.

Based on the collective results and the VIAP CSM, in terms of distance to a vapor source, a land use restriction would be necessary for the Site property to meet Part 213 closure requirements for the VIAP. Land use restrictions can be applied to the property deed to prevent future building modifications and future new building construction to address the potential for unacceptable indoor air exposures to PVOCs.

Based on the soil vapor sample results, a restricted Part 213 closure is acceptable, and no further sampling activities are necessary at the Site.

Prepared by Jeff Crum, Hamp, Mathews & Associates, Inc.

REFERENCES

(ITRC) Interstate Technology & Regulatory Council. 2014. Petroleum Vapor Intrusion Fundamentals of Screening, Investigation, and Management. Prepared by The Interstate Technology & Regulatory Council Petroleum Vapor Intrusion Team.

(MEGLE) Michigan Department of Environment, Great Lakes and Energy. 2016. Application of Target Detection Limits and Designated Analytical Methods. Remediation and Redevelopment Division Resource Materials.

(USEPA) United States Environmental Protection Agency. 1999. Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS). Center for Environmental Research Information, Office of Research and Development, USEPA, Document No. EPA/625/R-96/010b.

(USEPA) United States Environmental Protection Agency. 2015a. Technical Guide For Addressing Petroleum Vapor Intrusion At Leaking Underground Storage Tank Sites. Office of Underground Storage Tanks, Washington, D.C. EPA 510-R-15-001. June 2015.

(USEPA) United States Environmental Protection Agency. 2015b. OSWER Technical Guide for Assessing and Mitigating the apor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air. Office of Solid Waste and Emergency Response. OSWER Publication 9200.2-154. June 2015.

TABLES

TABLE 1

Summary of Soil Vapor Results
Retail #9103 (1901 E. Seven Mile Road, Detroit, MI)

Sample Location	Depth (Feet)	Collection Date	Concentration (ug/m^3)									
			Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	1,2,4-TMB	1,3,5-TMB	2-MN	Naphthalene	Oxygen (%)
VP-1 (D-4')	4	8/7/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	20.1
VP-1 (D-4')	4	11/13/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	5.9
VP-1 (D-6')	6	8/7/2017	<19	<60	<69	<210	<22	<29	<29	<620	<28	20.1
VP-1 (D-6')	6	11/13/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	17.7
VP-1 (D-6')	6	8/21/2018	<110	<50	<52	<170	<22	<65	<160	<1,800	<130	9.5
VP-2 (S-2')	2	8/7/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	20.4
VP-2 (S-2')	2	11/13/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	19.5
VP-2 (D-4')	4	8/7/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	20.3
VP-2 (D-4')	4	11/13/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	20.3
VP-2 (D-4')	4	8/21/2018	<19	<23	<52	<100	<22	<29	<29	<140	<28	17.2
VP-3 (S-2')	2	8/7/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	20.5
VP-3 (S-2')	2	11/13/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	20.0
VP-3 (S-2'-Dup)	2	11/13/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	-
VP-3 (D-4')	4	8/7/2017	<19	<23	<52	<100	<22	<29	<29	<260	**31**	20.5
VP-3 (D-4'-Dup)	4	8/7/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	-
VP-3 (D-4')	4	11/13/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	17.6
VP-3 (D-4')	4	8/21/2018	<19	<23	<52	<100	<22	<29	<29	<140	<28	19.7
VP-4 (S-2')	2	8/7/2017	<19	<23	<52	<110	<22	<29	<29	<160	<30	19.3
VP-4 (S-2')	2	11/13/2017	<19	<23	<52	<100	<22	<29	<29	<140	<28	16.8
VP-4 (D-4')	4	8/7/2017	<19	<23	<52	<110	<22	<29	<29	<140	<30	20.3
VP-4 (D-4')	4	11/13/2017	<19	<23	<52	<110	<22	<29	<29	<160	<28	16.3
VP-4 (D-4')	4	8/21/2018	<19	<23	<52	<100	<22	<29	<29	<140	<28	13.0
VP-5 (S-3')	3	8/7/2017	<19	<23	<52	<100	<22	<29	<29	<140	<30	19.4
VP-5 (S-3')	3	11/13/2017	<19	<23	<52	<100	<22	<29	<29	<160	<28	19.7
VP-5 (D-5')	5	8/7/2017	<19	<23	<52	<100	<22	<29	<29	<140	<30	18.7
VP-5 (D-5')	5	11/13/2017	<19	<23	<52	<110	<30	<29	<29	<140	<30	18.7
VP-5 (D-5')	5	8/21/2018	<19	<23	<52	<100	<22	<29	<29	<140	<28	18.3
MEGLE Restricted Nonresidential VIAP Site-Specific Target Levels (SSTLs)			**260**	**2.50E+05**	**800**	**11,000**	**7,700**	**3,100**	**3,100**	**510**	**59**	**NA**

NOTES:

Yellow highlighted cells are the Michigan Department of Environment, Great Lakes, and Energy Restricted Nonresidential Volatilization to Indoor Air Pathway (VIAP) Site-Specific Target Levels.

Bold larger font values indicate chemicals that were detected above laboratory reporting limits.

VP = Vapor Probe (6-inch stainless steel screen) set beneath the asphalt parking lot. (S) - Shallow, (D) - Deep soil vapor points and depth below grade.

(Dup) = Duplicate sample.

NA - MDEQ RIASL not available.

MTBE = Methyl-tert-butyl ether; MN = 2-Methylnaphthalene; TMB = Trimethylbenzene

FIGURES

SOIL SAMPLE RESULTS			
Chemical	VP-2 (4') (7/16/2015) ug/kg	VP-3 (6') (7/16/2015) ug/kg	VP-3 (12') (7/16/2015) ug/kg
Benzene	<50	<50	<50
Toluene	<50	<50	<50
Ethylbenzene	<50	510	<50
Xylenes	<150	180	<150
MTBE	<250	<250	<250
Naphthalene	<250	<250	<250
2-Methylnaphthalene	<250	<250	<250
1,2,4-Trimethylbenzene	<50	260	<50
1,3,5-Trimethylbenzene	<50	<50	<50

SOIL VAPOR SAMPLE RESULTS
PVOCS NOT DETECTED AUGUST 2017, NOVEMBER 2017 & AUGUST 2018

SOIL SAMPLE RESULTS			
Chemical	VP-1 (5') (7/15/2015) ug/kg	VP-1 (7') (7/15/2015) ug/kg	VP-1 (12') (7/15/2015) ug/kg
Benzene	<50	<200	750
Toluene	<50	<200	<50
Ethylbenzene	<50	600	<50
Xylenes	750	5,800	<150
MTBE	<250	<1,000	1,700
Naphthalene	<250	3,800	<250
2-Methylnaphthalene	<250	3,400	<250
1,2,4-Trimethylbenzene	320	12,000	<50
1,3,5-Trimethylbenzene	360	5,300	<50

SOIL VAPOR SAMPLE RESULTS
PVOCS NOT DETECTED AUGUST 2017, NOVEMBER 2017 & AUGUST 2018

SOIL VAPOR SAMPLE RESULTS
PVOCS NOT DETECTED AUGUST 2017, NOVEMBER 2017 & AUGUST 2018

19126 Dequindre Machine Shop

RESIDENTIAL

TELECOMMUNICATIONS DUCT

ALLEY

HOT LINE CLEANERS FORMER SHELL)
1849 E. 7 Mile Road: (313) 369-9388
'Open' LUST: Facility ID: 50001167

CONCRETE WALK

DEQUINDRE ROAD

SIDEWALK

MW-13 MW-20 MW-37 MW-38

ALLEY

PROPERTY LINE

MW-41 MW-31 MW-19 MW-16 MW-26

DUMPSTER

GRASS

MW-7

MW-12

VP-1

NB-12/ MW-7R

MW-18 MW-36 MW-28

CONCRETE

VP-2

NB-8/ MW-6R

STATION BUILDING

MW-29 MW-35 MW-21

VP-5

VP-3 VP-4

MW-17 MW-30 MW-27 MW-23

VACANT PROPERTY
1923 E 7 MILE ROAD

NB-11 MW-5R

MW-15

MW-40

UST BASIN

MW-34

CANOPY

MW-33

MW-39

MW-32

MW-8

MW-14

MW-11

MW-24 MW-25

CONCRETE

SIDEW

SEVEN MILE ROAD

0 12.5 25

SCALE (Feet)

SOIL SAMPLE RESULTS			
Chemical	VP-3 (3') (7/16/2015) ug/kg	VP-3 (6') (7/16/2015) ug/kg	VP-3 (12') (7/16/2015) ug/kg
Benzene	110	<200	2,300
Toluene	<50	<200	<50
Ethylbenzene	<50	8,100	<50
Xylenes	100	14,470	<150
MTBE	<250	<1,000	2,100
Naphthalene	<250	13,000	<250
2-Methylnaphthalene	<250	6,700	<250
1,2,4-Trimethylbenzene	<50	47,000	<50
1,3,5-Trimethylbenzene	<50	15,000	<50

SOIL VAPOR SAMPLE RESULTS
PVOCS NOT DETECTED AUGUST 2017, NOVEMBER 2017 & AUGUST 2018 *ONLY DETECTION WAS IN VP-3 (4') FOR NAPHTHALENE ON 8/7/2017 AT 31 ug/m^3

SOIL SAMPLE RESULTS			
Chemical	VP-3 (5') (7/16/2015) ug/kg	VP-3 (9') (7/16/2015) ug/kg	VP-3 (12') (7/16/2015) ug/kg
Benzene	<50	1,600	<50
Toluene	<50	59	84
Ethylbenzene	<50	70	110
Xylenes	<150	776	770
MTBE	<250	<250	440
Naphthalene	<250	270	600
2-Methylnaphthalene	<250	<250	<250
1,2,4-Trimethylbenzene	<50	140	760
1,3,5-Trimethylbenzene	<50	150	120

SOIL VAPOR SAMPLE RESULTS
PVOCS NOT DETECTED AUGUST 2017, NOVEMBER 2017 & AUGUST 2018

N W E S

LEGEND

- MONITORING WELL
- REMEDIATION WELL
- DESTROYED MONITORING WELL
- VAPOR MONITORING POINT

EGLE SITE-SPECIFIC NONRESIDENTIAL RESTRICTED VIAC	
Chemical	(ug/m^3)
Benzene	260
Toluene	250,000
Ethylbenzene	800
Xylenes	11,000
MTBE	7,700
Naphthalene	59
2-Methylnaphthalene	510
1,2,4-Trimethylbenzene	3,100
1,3,5-Trimethylbenzene	3,100

NOTES - ORANGE INDICATES EXCEEDANCE OF SCREENING LEVEL
- ONLY DEEP INTERVAL SAMPLED ON 8/21/2018
- *ONLY DETECTION WAS IN VP-3 FOR NAPHTHALENE ON 8/7/2017 AT 31 ug/m^3
- PVOC = PETROLEUM VOLATILE ORGANIC COMPOUND
- VIAC = VOLATILIZATION TO INDOOR AIR CRITERIA

NOTE - BASE MAP PROVIDED BY NESA & ASSOCIATES, INC.

HAMP, MATHEWS & ASSOCIATES, INC.

MRP PROPERTIES COMPANY, LLC
RETAIL #9103
1901 EAST SEVEN MILE ROAD
DETROIT, MICHIGAN

FIGURE 1
SOIL SAMPLE RESULTS (2015) AND SOIL VAPOR RESULTS (2017-2018)

DRAWN BY:	DATE:	PROJECT:	DRAWING ID:
TRF	November 2019	46-6	9103 Soil Vapor Data.dwg

ATTACHMENT A

NESA & ASSOCIATES, INC.

23840 Dequindre Road, Warren, MI 48091

Project No.: MRP 9103
Surface Elevation: NA
Static Water Level: 6 ft.
TOC Elevation: NA
Datum:

Project Name: MRP Properties, LLC
Location: 1901 East Seven Mile Road, Detroit, MI 48234

Well Identification: VP-1
Depth Drilled: 12 ft. **Bore Hole Diameter:** 3.5 in. (0-5'); 2.2 in. (5-12')
Logged By: SMD **Completed MW Depth:** NA
Date(s): 7/15/15 **Drilling Method:** HA/Air Knife/Geoprobe 6620
Contractor: Terra Probe (Jason/Cory) **Certified By:**
Log Prepared By: SMD **On:** 7/28/15 **Checked By:** ASA
Remarks: Behind (North of) station building; 6-inch flushmount with concrete pad

Well Construction Information **Well No.:** VP-1

Screens:
Type: Stainless Steel **Diameter:** 7/16 in.
Size: 6 in. vapor probe **From:** **To:**
Annular Fill:
Type: Concrete **From:** 0 FT **To:** 1 FT
Type: **From:** **To:**
Type: **From:** **To:**
Remarks: Three 6-inch vapor probes at 1) 2 ft, 2) 4 ft, & 3) 6 ft

Water Level	Depth (ft)	Sampling Depth (ft)	Blow Count	Recovery (1-100%)	PID (PPM)	USCS	Graphical Log	Material Description	Well Construction
	0			100%	0.7			TOPSOIL: Grass with topsoil and sand; Sand; fine to med.; trace silt/gravel; Stone/Rock (21AA); light brown	
	-1				0.7			FILL: Fill / sand; Sand; fine to med.; trace silt/gravel; Stone/Rock (21AA); light brown	
	-2				0.9			SAND: Sand; fine to med.; some silt; trace gravel; tan brown	
	-3				0.2			SAND: Sand; fine-med.; some silt; trace gravel; red brown	
	-4				199			SAND: Sand; fine to med.; some silt; moist; brown	
	-5	Soil Sample 5 FT			316			SAND: Sand; fine to med.; some silt; moist; dark brown	
▽	-6			83.33%	747			SAND: Sand; fine to med.; some silt; moist to wet with water at 6 ft; olive gray	
	-7	Soil Sample 7 FT			9.0			SILT: Silt; trace clay; trace sand; wet with water; gray to olive gray	
	-8				0.6			CLAY: Clay; some silt; occassional gravel; stiff, but moist; moldable; gray	
	-9				1.6				
	-10			95.83%	3.1				
	-11				1.0				
	-12	Soil Sample 12 FT						END OF BORING	
	-13								

NESA & ASSOCIATES, INC.

23840 Dequindre Road, Warren, MI 48091

Project No.: MRP 9103
Surface Elevation: NA
Static Water Level: 5 ft.
TOC Elevation: NA
Datum:

Project Name: MRP Properties, LLC
Location: 1901 East Seven Mile Road, Detroit, MI 48234

Well Identification: VP-2
Depth Drilled: 12 ft. **Bore Hole Diameter:** 3.5 in. (0-5'); 2.2 in. (5-12')
Logged By: SMD **Completed MW Depth:** NA
Date(s): 7/16/15 **Drilling Method:** HA/Air Knife/Geoprobe 6620
Contractor: Terra Probe (Jason/Cory) **Certified By:**
Log Prepared By: SMD **On:** 7/28/15 **Checked By:** ASA
Remarks: West of station building; near air pump; 6-inch flushmount with concrete pad

Well Construction Information **Well No.:** VP-2

Screens:
Type: Stainless Steel **Diameter:** 7/16 in.
Size: 6 in. vapor probe **From:** **To:**
Annular Fill:
Type: Concrete **From:** 0 FT **To:** 1 FT
Type: **From:** **To:**
Type: **From:** **To:**
Remarks: Two 6-inch vapor probes at 1) 2 ft & 2) 4 ft

Water Level	Depth (ft)	Sampling Depth (ft)	Blow Count	Recovery (1-100%)	PID (PPM)	USCS	Graphical Log	Material Description	Well Construction
	0							CONCRETE: Concrete	
	-1				0.7			PEA GRAVEL: Pea gravel with some sand; brown	
	-2			100%	0.6				
	-3	Soil Sample 3 FT			1.0			SAND: Sand; fine to med.; some sand; trace clay; brown	
	-4				0.8			CLAY: Clay; some silt; trace sand; moist; stiff; moldable; brown	
▽	-5				3.6			CLAY: Clay with sand; some silt; moist; black	
	-6	Soil Sample 6 FT		83.33%	6.5			SAND: Sand; fine to med.; some silt; saturated with water; black	
	-7				4.1			CLAY: Clay with silt; occassional gravel; stiff; hard; friable; gray-brown to brown	
	-8				2.1			CLAY: Clay; some silt; occassional gravel; stiff, but moist; moldable; gray	
	-9				2.7				
	-10			95.83%	1.3				
	-11				0.7				
	-12	Soil Sample 12 FT			0.7			END OF BORING	
	-13								

NESA & ASSOCIATES, INC.

23840 Dequindre Road, Warren, MI 48091

Project No.: South of station building; west

Surface Elevation: NA
Static Water Level: 5 ft.
TOC Elevation: NA
Datum:

Project Name: MRP Properties, LLC
Location: 1901 East Seven Mile Road, Detroit, MI 48234

Well Identification: VP-3
Depth Drilled: 12 ft. **Bore Hole Diameter:** 3.5 in. (0-5'); 2.2 in. (5-12')
Logged By: SMD **Completed MW Depth:** NA
Date(s): 7/16/15 **Drilling Method:** HA/Air Knife/Geoprobe 6620
Contractor: Terra Probe (Jason/Cory) **Certified By:**
Log Prepared By: SMD **On:** 7/28/15 **Checked By:** ASA
Remarks: South of station building; west of entrance; 6-inch flushmount with concrete pad

Well Construction Information **Well No.:** VP-3

Screens:
Type: Stainless Steel **Diameter:** 7/16 in.
Size: 6 in. vapor probe **From:** **To:**
Annular Fill:
Type: Concrete **From:** 0 FT **To:** 1 FT
Type: **From:** **To:**
Type: **From:** **To:**
Remarks: Two 6-inch vapor probes at 1) 2 ft & 2) 4 ft

Water Level	Depth (ft)	Sampling Depth (ft)	Blow Count	Recovery (1-100%)	PID (PPM)	USCS	Graphical Log	Material Description	Well Construction
▽	0							CONCRETE: Concrete	
	-1				0.3			PEA GRAVEL: Pea gravel with some sand; brown	
	-2				0.5			SAND: Sand; med.-fine; some silt; trace clay; few gravels; brown and orange brown	
	-3	Soil Sample 3 FT		100%	1.5			SAND: Sand; med.-fine; some silt; some gravel; dark brown SAND: Sand; med.-fine; some silt; moist; gray brown	
	-4				0.8			SAND: Sand; fine to med.; some silt; moist to wet with water at 5 ft; brown-gray	
	-5				364			SAND: Sand; fine to med.; some silt; wet with water; gray-brown to gray	
	-6	Soil Sample 6 FT		66.67%	963			CLAY: Clay with silt; trace sand and gravel; moist; soft, but friable; gray	
	-7				6.3				
	-8				7.7			CLAY: Clay with silt; trace gravel intermixed; stiff, but moist; friable; gray	
	-9				2.3				
	-10			83.33%	4.3				
	-11				10.8				
	-12	Soil Sample 12 FT			1.4			END OF BORING	
	-13								

NESA & ASSOCIATES, INC.

23840 Dequindre Road, Warren, MI 48091

Project No.: MRP 9103
Surface Elevation: NA
Static Water Level: 6 ft.
TOC Elevation: NA
Datum:

Project Name: MRP Properties, LLC
Location: 1901 East Seven Mile Road, Detroit, MI 48234

Well Identification: VP-4
Depth Drilled: 12 ft. **Bore Hole Diameter:** 3.5 in. (0-5'); 2.2 in. (5-12')
Logged By: SMD **Completed MW Depth:** NA
Date(s): 7/16/15 **Drilling Method:** HA/Air Knife/Geoprobe 6620
Contractor: Terra Probe (Jason/Cory) **Certified By:**
Log Prepared By: SMD **On:** 7/28/15 **Checked By:** ASA
Remarks: South of station building; east of entrance; 6-inch flushmount with concrete pad

Well Construction Information **Well No.:** VP-4

Screens:
Type: Stainless Steel **Diameter:** 7/16 in.
Size: 6 in. vapor probe **From:** **To:**
Annular Fill:
Type: Concrete **From:** 0 FT **To:** 1 FT
Type: **From:** **To:**
Type: **From:** **To:**
Remarks: Two 6-inch vapor probes at 1) 2 ft & 2) 4 ft

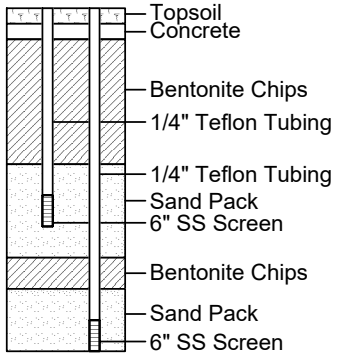
Water Level	Depth (ft)	Sampling Depth (ft)	Blow Count	Recovery (1-100%)	PID (PPM)	USCS	Graphical Log	Material Description	Well Construction
	0							CONCRETE: Concrete	
	-1				0.4			SAND: Sand; fine to med.; some silt; trace clay; trace gravel; brown	
	-2			100%	0.2			SAND: Sand; fine to med.; some silt; trace clay; trace gravel; mainly brown with some gray	
	-3				0.4				
	-4				0.4			SAND: Sand; med. to fine; some silt; trace clay; trace gravel; dark brown	
	-5	Soil Sample 5 FT			0.7			SAND: Sand; med. to fine; some silt; moist; brown	
	-6			36.11%	0.6			CLAY AND SAND: Clay with sand to clayey sand; some silt; wet with water; brown from 6-7 ft; black from 7-8 ft	
	-7				0.2				
	-8				1.4			CLAY: Clay; some silt; few gravels; stiff, but moist; moldable; cohesive; gray	
	-9	Soil Sample 9 FT			1.9				
	-10			41.67%	1.6				
	-11				1.5			CLAY: Clay with silt; trace to some sand; stiff; hard; friable; gray	
	-12	Soil Sample 12 FT			0.6			END OF BORING	
	-13								

HAMP, MATHEWS & ASSOCIATES, INC. 15266 Ann Drive Bath, Michigan 48808 [517] 641-7333	MRP Properties Company, LLC 1901 East Seven Mile Road Detroit, MI Retail # 9103 HMA Project No. 46-6	BORING: VP-5 SHEET 1 OF 1

Date Started:	06/01/17	Well Depth:	3.5' & 5.5'	Drilling Contractor:	Hamp, Mathews and Assoc.
Logged By:	J. Buchin	Well Diameter:	1/4" Teflon Tubing	Drill Method:	Hand Auger
Total Depth:	5.5'	Boring Diameter:	3"	Rig Type:	Hand Auger
Northing:		First GW:	--	Driller:	Jamie Buchin
Easting:		Depth to GW:		Boring Location:	East Side of Building
Coord. System:	St Plane MI S NAD 83	TOC Elevation:	--		

Depth in Feet	PID (ppm)	Water Level	USCS	GRAPHIC	DESCRIPTION
0	--				Topsoil
	--				
	--				SILTY SAND, gray with black staining, dense, dry.
	--		SM		
5	--				
					End of Boring - 5.5'
10					
15					
20					

Well1: VP-5S
Well2: VP-5D
Elev.: --



ATTACHMENT B

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
SOUTHEAST MICHIGAN DISTRICT OFFICE

GRETCHEN WHITMER
GOVERNOR

LIESL EICHLER CLARK
DIRECTOR

February 26, 2019

TO: Mr. Jeff Crum

FROM: Erik Gurshaw

SUBJECT: Site-Specific Criteria Evaluation for:
MRP #9103
1901 East Seven Mile Road, Detroit, Wayne County, Michigan
Facility ID #: 0-0016389

Inserted within the body of this memo are tables that contain site-specific volatilization to indoor air criteria (VIAC) under Part 201 or site-specific screening levels (SSTLs) under Part 213 of the Natural Resources and Environmental Protection Act, 1994 PA 451 as amended, which represent the DEQ's determination of values that reflect best available information regarding the toxicity and exposure risks posed by the hazardous substances present at Former Amoco Service Station No. 5882. These values may be used as site-specific criteria without further documentation, or other values may be developed by a person consistent with the statutory provisions for development of site-specific criteria or SSTLs and provided for DEQ approval.

Additional hazardous substances were included in the site-specific evaluations, which were not explicitly requested. These hazardous substances may be components of recent petroleum releases and primary degradation or breakdown products of tetrachloroethylene. The preemptive site-specific evaluation of these substances was provided in an attempt to limit the potential need for future resubmittal for this facility.

Residential site-specific criteria were included in the evaluation based on information provided and the DEQ's residential conceptual site model. Exceedances of these site-specific residential criteria will require restrictions or institutional controls for closure or aid in the determination of off-site migration.

Nonresidential site-specific criteria do not explicitly include an exposure time. Continuous 24-hour per day exposure may not be representative of worker exposure in commercial or industrial settings. Nonresidential site-specific volatilization to indoor air criteria may be adjusted for some hazardous substances to reflect a reasonable maximum worker exposure of 12-hour per day. Please contact me if adjustment is needed.

The results of this evaluation are as follows:

Table 1. Nonresidential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a nonresidential structure **< 50,000 ft²** with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater Not In Contact (GWNIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m³)
71432	Benzene	380 ca	47 (M) ca	260 ca
75650	t-Butyl alcohol	1,200 (ID) nc	DATA	3,700 nc
104518	n-Butylbenzene	12,000 (S) sol	9,800 nc	10,000 nc
135988	sec-Butylbenzene	18,000 (S) sol	49,000 (C) nc	20 nc
98066	t-Butylbenzene	22 nc	11 (M) nc	20 nc
75343	1,1-Dichloroethane	1,800 ca	74 ca	1,200 ca
107062	1,2-Dichloroethane	560 ca	23 (M) ca	77 ca
64175	Ethanol	6.3E+08 (SE) st	1.6E+07 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	580 (ID) nc	DATA	19,000 nc
100414	Ethylbenzene	1,200 ca	340 ca	800 ca
106934	Ethylene dibromide	77 ca	2.1 (M) ca	3.3 ca
110543	n-Hexane	1,000 (GW) nc	440 nc	36,000 nc
98828	Isopropyl benzene	270 ca	110 (M) ca	190 ca
1634044	Methyl-tert-butyl ether (MTBE)	1.1E+05 ca	2,100 ca	7,700 ca
91576	2-Methylnaphthalene	21,000 nc	30,000 nc	510 nc
91203	Naphthalene	2,000 ca	1,900 ca	59 ca
103651	n-Propylbenzene	46,000 (SE) dev	21,000 (SE) dev	33,000 (SE) dev
108883	Toluene	3.8E+05 (SE) st	64,000 (SE) st	2.5E+05 (SE) st

Table 1. Nonresidential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a nonresidential structure **< 50,000 ft²** with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater Not In Contact (GWNIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m³)
540841	2,2,4-Trimethyl pentane	2,400 (S) (GW) sol	2,200 (M) nc	1.8E+05 nc
526738	1,2,3-Trimethylbenzene	13,000 nc	4,800 nc	3,100 nc
95636	1,2,4-Trimethylbenzene	7,400 nc	2,600 nc	3,100 nc
108678	1,3,5-Trimethylbenzene	5,200 nc	1,800 nc	3,100 nc
1330207	Xylenes	20,000 nc	5,000 nc	11,000 nc

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: (**ca**) = Carcinogenetic; (**nc**) = Non-Carcinogenetic; (**dev**) = Developmental; (**mut**) = Mutagenic cancer; (**st**) = Short-term (i.e., less than chronic exposure): Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote **C**: The site-specific VIAC exceeds the chemical-specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control NAPL to protect against risks associated with NAPL by using methods appropriate for the NAPL present.
- Footnote **DATA**: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
- Footnote **GW**: The calculated value for a hazardous substance based upon GWIC is considered protective when it is greater than the calculated value for GWNIC.
- Footnote **ID**: Requires further evaluation to determine the appropriate media to sample.
- Footnote **M**: Site-specific criterion may be below target detection limits (**TDL**). In accordance with Sec. 20120a(10) when the TDL for a hazardous substance is greater than the developed cleanup criterion, the criterion is the TDL.
- Footnote **NA**: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote **NV**: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote **SE**: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote **S**: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.

Table 2. Nonresidential Volatilization to Indoor Air Criteria (VIAC) adjusted for **12 hour work-day exposure**. The following are **restricted** site-specific criteria that apply to a nonresidential structure **< 50,000 ft²** with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	12 hr Groundwater Not In Contact (GWNIC) (µg/L)	12 hr Soil (µg/kg)	12 hr Soil Gas** (µg/m³)
71432	Benzene	760 ca	94 ca	510 ca
75650	t-Butyl alcohol	2,400 (ID) nc	DATA	7,400 nc
104518	n-Butylbenzene	12,000 (S) sol	20,000 nc	20,000 nc
135988	sec-Butylbenzene	18,000 (S) sol	49,000 (C) nc	41 nc
98066	t-Butylbenzene	44 nc	23 (M) nc	41 nc
75343	1,1-Dichloroethane	3,600 ca	150 ca	2,500 ca
107062	1,2-Dichloroethane	1,100 ca	46 (M) ca	150 ca
64175	Ethanol (#)	6.3E+08 (SE) st	1.6E+07 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	1,200 (ID) nc	DATA	38,000 nc
100414	Ethylbenzene	2,400 ca	680 ca	1,600 ca
106934	Ethylene dibromide	150 ca	4.2 (M) ca	6.6 ca
110543	n-Hexane	2,000 (GW) nc	890 nc	72,000 nc
98828	Isopropyl benzene	540 ca	210 (M) ca	380 ca
1634044	Methyl-tert-butyl ether (MTBE)	2.2E+05 ca	4,200 ca	15,000 ca
91576	2-Methylnaphthalene	25,000 (S) sol	60,000 nc	1,000 nc
91203	Naphthalene	4,000 ca	3,800 ca	120 ca
103651	n-Propylbenzene (#)	46,000 (SE) dev	21,000 (SE) dev	33,000 (SE) dev

Table 2. Nonresidential Volatilization to Indoor Air Criteria (VIAC) adjusted for **12 hour work-day exposure**. The following are **restricted** site-specific criteria that apply to a nonresidential structure **< 50,000 ft²** with a **slab-on-grade**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	12 hr Groundwater Not In Contact (GWNIC) (µg/L)	12 hr Soil (µg/kg)	12 hr Soil Gas** (µg/m³)
108883	Toluene (#)	3.8E+05 (SE) st	64,000 (SE) st	2.5E+05 (SE) st
540841	2,2,4-Trimethyl pentane	2,400 (S) (GW) sol	4,500 nc	3.6E+05 nc
526738	1,2,3-Trimethylbenzene	27,000 nc	9,600 nc	6,100 nc
95636	1,2,4-Trimethylbenzene	15,000 nc	5,200 nc	6,100 nc
108678	1,3,5-Trimethylbenzene	10,000 nc	3,600 nc	6,100 nc
1330207	Xylenes	41,000 nc	9,900 nc	22,000 nc

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: (**ca**) = Carcinogenetic; (**nc**) = Non-Carcinogenetic; (**dev**) = Developmental; (**mut**) = Mutagenic cancer; (**st**) = Short-term (i.e., less than chronic exposure): Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
- Footnote (#): Acceptable air concentrations (AAC) cannot be adjusted to a 12-hour exposure time for hazardous substance.
- Footnote **C**: The site-specific VIAC exceeds the chemical-specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control NAPL to protect against risks associated with NAPL by using methods appropriate for the NAPL present.
- Footnote **DATA**: Insufficient physical chemical parameters to calculate site-specific criteria for specified media. If detections are present in specified media, site-specific soil gas criteria should be used to evaluate risk.
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- Footnote **NV**: The hazardous substance does not meet the department's definition of a volatile; therefore, no criteria were developed.
- Footnote **SE**: Site-specific criteria based on single event exposure; therefore, sampling methods should reflect shorter exposure scenarios.
- Footnote **S**: Calculated health-based value exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is the criterion.

Table 2. Residential Volatilization to Indoor Air Criteria (VIAC). The following are **unrestricted** site-specific criteria that apply to a residential **house** with a **basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m^3)
71432	Benzene	1.0 ca	1.7 (M) ca	110 ca
75650	t-Butyl alcohol	230 (ID) nc	DATA	2,500 nc
104518	n-Butylbenzene	44 nc	550 nc	7,000 nc
135988	sec-Butylbenzene	270 nc	3,800 nc	14 nc
98066	t-Butylbenzene	7.7E-02 (M) nc	0.64 (M) nc	14 nc
75343	1,1-Dichloroethane	4.7 ca	2.6 (M) ca	530 ca
107062	1,2-Dichloroethane	1.4 ca	0.82 (M) ca	33 ca
64175	Ethanol	1.0E+05 (SE) st	1.3E+06 (SE) st	6.3E+05 (SE) st
637923	Ethyl-tert-butyl ether (ETBE)	22 (ID) nc	DATA	13,000 nc
100414	Ethylbenzene	2.8 ca	12 (M) ca	340 ca
106934	Ethylene dibromide	0.13 ca	7.4E-02 (M) ca	1.4 ca
110543	n-Hexane	29 nc	25 nc	24,000 nc
98828	Isopropyl benzene	0.60 (M) ca	3.8 (M) ca	81 ca
1634044	Methyl-tert-butyl ether (MTBE)	250 ca	74 (M) ca	3,300 ca
91576	2-Methylnaphthalene	66 nc	1,700 nc	350 nc
91203	Naphthalene	4.2 (M) ca	67 (M) ca	25 ca
103651	n-Propylbenzene	43 (SE) dev	1,800 (SE) dev	33,000 (SE) dev
108883	Toluene	300 (SE) st	3,700 nc	1.7E+05 nc

Table 2. Residential Volatilization to Indoor Air Criteria (VIAC). The following are **unrestricted** site-specific criteria that apply to a residential **house** with a **basement**, the depth to groundwater submitted for this site (i.e. 5 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m^3)
540841	2,2,4-Trimethyl pentane	160 nc	130 (M) nc	1.2E+05 nc
526738	1,2,3-Trimethylbenzene	43 nc	270 nc	2,100 nc
95636	1,2,4-Trimethylbenzene	25 nc	150 nc	2,100 nc
108678	1,3,5-Trimethylbenzene	18 nc	100 nc	2,100 nc
1330207	Xylenes	75 nc	280 nc	7,600 nc

**Soil gas site-specific criteria are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: (**ca**) = Carcinogenetic; (**nc**) = Non-Carcinogenetic; (**dev**) = Developmental; (**mut**) = Mutagenic cancer; (**st**) = Short-term (i.e., less than chronic exposure): Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate Inhalation exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; or Air Quality Division Acute Initial Threshold Screening Level.
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