MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Dan Dailey, Waste Management and Radiological Protection Division
John McCabe, Waste Management and Radiological Protection Division
Dave Slayton, Waste Management and Radiological Protection Division

FROM: Joe Rogers, Hazardous Waste Section Vapor Intrusion Committee

DATE: May 30, 2017

SUBJECT: Final Vapor Intrusion Screening Form; Petrochem (Stericycle); MID 980 615 298

Attached is a copy of the Final Vapor Intrusion (VI) Screening Form for the Petrochem (Stericycle) facility that was presented at the Hazardous Waste Section (HWS) VI Committee April 4, 2017, meeting. As stated in Section 5 of the form, based on current knowledge, the HWS VI Committee and management recommend that additional data are needed to fully assess the vapor intrusion pathway. Specific recommendations include:

- The buildings of standard design with full-time occupants present need to be investigated for the volatilization to indoor air pathway via the collection of sub-slab soil vapor and possibly indoor air samples;
- Soil gas sample collection points must be installed between the existing known contamination and the residences to the south to investigate the potential for VI to be occurring in the residences;
- Known data gaps regarding source (soil and groundwater) and soil vapor contamination on certain interior portions of the site must be filled via the collection of additional data as part of the corrective action process;
- Further investigation into the location, size, depth, etc. of the utility corridors in the vicinity of the facility must be conducted. Based on the results of this investigation, the utility corridors must then be investigated regarding their potential to act as preferential pathways for the off-site migration of contaminated soil gas and/or groundwater.
- Potential exposure via some of the buildings with non-standard design (i.e. partially open to the atmosphere) and less than full-time occupancy must be reliably controlled through institutional controls implemented via the facility's hazardous waste operating license. This details and timing of implementation regarding this issue must be explored further by the project team.
- The details regarding current facility operations with respect to compliance with MIOSHA (i.e. ambient air and/or personnel monitoring) must be further investigated to determine how these may serve to function as exposure controls in buildings where active waste storage, treatment and handling occurs.
- During the review of site data performed as part of the corrective action process and this evaluation, an off-site source of tetrachloroethylene (PCE) was discovered at the location of a

former large scale dry cleaning operation to the west of the subject facility. The off-site source was referred to MDEQ Remediation and Redevelopment Division staff in the Southeast Michigan District Office.

Project staff should work with the facility, as necessary, to collect and review these data in the context of the corrective action process.

The entire package (form and memo) is already entered into HPRM. I will also enter this into WDS as a CA241CA event in the corrective action module, and file the entire package in the HWS Project Corrective Action File. If you have any questions, please do not hesitate to contact me. Thank you.

Attachment
cc/att: Corrective Action File

Department of Environmental Quality

MDEQ WMRPD Vapor Intrusion Screening Form

1. FACILITY INFORMATION

Initial Screening Date: 3/21/2017

Revision Date(s): 3/23/2017 KK - prelim tox review only
4/13/2017 JM/KK
4/25/2017 KK
5/05/2017 JM

Primary Author: John McCabe
Project Team: Dan Dailey, John McCabe, Dave Slayton
Geologist QA/QC: Dave Slayton ☒ Initials DS
Toxicologist QA/QC: Kristen Kellock ☒ Initials KK
Engineer QA/QC (if necessary): Dan Dailey ☒ Initials DD

Facility/Project Name: Petrochem (Stericycle)
Address: 421 Lycaste St.
City: Detroit
County: Wayne
District SEMI
Latitude: 42 degrees 21'46.76" N **Longitude:** - 82 degrees 57'52.00" W

Facility/Site MID: MID 980 615 298

Facility Operations: ☒ TSD ☐ Plating ☐ Manufacturing ☐ Other: *Click here to enter text.*

Facility Status: ☒ Operating ☐ Closed ☒ Corrective Action ☐ CA Complete ☐ Post-Closure Care

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Regulatory Authority:
☒ Part 111 RCRA ☐ Part 201 ☐ Other: *Click here to enter text.*

Lead Agency/Office:
☒ DEQ ☒ OWMRP ☐ RRD ☐ EPA ☐ DHHS

2. CONCEPTUAL SITE MODEL (CSM) DESCRIPTION:

Develop a concise narrative description of the site as it relates to the potential for vapor intrusion and exposure. See associated instructions for additional details regarding information to include.

Hazardous Substances Released (*e.g. Solvent(s), TCE, PCE, Gasoline, etc*): **Various petroleum hydrocarbons and chlorinated solvents**

Source area(s)
1. **New Container Management Building (CMB) (built over historic contamination)**
2. **Former Container Processing System (fire incident)**
3. **Various tank farms on the western side of the site**
4. **Historic activities as a bulk fuel oil and gasoline refinery/terminal**

CSM Description: The eight acre facility is located in an industrial area with new residential development approximately 280 feet to the south. The facility is currently a licensed and operating hazardous waste treatment, storage and disposal (TSD) facility, handling many of the compounds which it has historically released. The stratigraphy at the facility conists 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 ft. A layer of natural peat underlies the fill material 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. The historic fill material and peat layer form a perched, discontinuous, water bearing unit that does not support pumping. Depth to groundwater varies from four to 8.5 feet across the site, however groundwater is known not to be in contact with site building foundations. The water bearing layer overlies a thick, dry and regionally continuous layer of sitly clay till. Soil borings on site have only penetrated 30 feet into the till but regional borings have documented the thickness of the clay layer to be 90 to 100 ft. There are currently 12 monitoring wells installed at the facility, all of which are set in the perched zone. See attached facility layout map and cross sections for more detail. In general, there are two substantive areas of soil contamination (beneath the berm that runs along the western boundary of the facility and immediately adjacent to and beneath the Container Management Building) and scattered lesser concentrations of volatile organic compounds at various locations across the facility. The western area of soil contamination is dominated by petroleum compounds and PCE. The area beneath and adjacent to the Container Management Building contains elevated concentrations of chlorinated solvents as well as petroleum compounds and some semivolatile organic compounds above proposed Part 201 Media Specific Screening Levels (MSSLs). The semivolatile organic compounds are not addressed in this evaluation as they are not expected to be the primary drivers of vapor intrusion health risk and would be addressed by any remedy that was protective of the compounds evaluated herein. Many of the buildings on site are not occupied, occupied intermittently, or have overhead doors open when occupied. See attached figure detailing use/occupancy of site buildings.

Data Gaps: No data directly beneath some waste management units. No soil vapor data have been collected.

3. CONTAMINANT INFORMATION – RISK EVALUATION

Chemicals of concern in Site Media:

[See Media Specific Screening Levels (MSSL) Table]

Chemical	Media	Concentration Detected	Criteria or Screening Level Comparison	Criteria or Screening Level Value (nonres)	Sample Depth and location	Sample Location Relative to the nearest Receptor	Sample Date
1,2,4-trimethylbenzene	Soil	220,000 µg/kg	> MSSL	1,800 µg/kg	BSB-24 7.5-8.5 ft	< 10 feet (tech center)	8/27/2013
Benzene	Soil	120 µg/kg	> MSSL	50 µg/kg	BSB-25 3-5 ft	Unknown (100 ft south of CMB)	8/27/2013
Methyl tert-butyl either (MTBE)	Soil	8,300 µg/kg	> MSSL	2,100 µg/kg	BSB-36 8-10 ft	60 ft (tech center	8/22/2013
Xylenes	Soil	2,400,000 µg/kg	> MSSL	5,000 µg/kg	15-S 2ft	Directly Under	2/19/2008

						CMB	
Ethylbenzene	Soil	490,000 µg/kg	> MSSL	340 µg/kg	BSB-43 10-12 ft	180 ft (tech center	3/15/2016
Toluene	Soil	930,000 µg/kg	> MSSL	64,000 µg/kg	BSB-43 10-12 ft	180 ft (tech center)	3/15/2016
PCE	Soil	1,000,000 µg/kg	> MSSL	74 µg/kg	14-S	Less than 30 ft. (CMB)	2/20/2008
TCE	Soil	78,000 µg/kg	> MSSL	50 µg/kg	14-S	Less than 30 ft. (CMB)	2/20/2008
Tetrahydrofuran	Soil	85,000 µg/kg	> 2013 NRVIG	11,400 µg/kg	BSB-13 5-7 ft	80 ft (tech center)	8/22/2013
Ethylbenzene	Groundwater	6,900 µg/l	> MSSL	2,200 µg/l	MW-11	60 ft (offsite)	6/17/2016
4-methyl, 2-pentanone	Groundwater	83,000 µg/l	< 2013 NRVIG	4,400,000 µg/l	MW-11	60 ft (offsite)	6/17/2016
MTBE	Groundwater	19,000 µg/l	< MSSL	200,000 µg/l	MW-11	60 ft (offsite)	6/17/2016
PCE	Groundwater	59 µg/l	< MSSL	1,900 µg/l	MW-11	60 ft (offsite)	6/17/2016
Toluene	Groundwater	57,000 µg/l	<MSSL	350,000 µg/l	MW-11	60 ft (offsite)	6/17/2016
1,2,4-Trimethylbenzene	Groundwater	210 µg/l	< MSSL	9,200 µg/l	MW-11	60 ft (offsite)	6/17/2016
Vinyl Chloride	Groundwater	170 µg/l	> 2013 NRVIG	52 µg/l	MW-11	60 ft (offsite)	6/17/2016
Xylenes	Groundwater	32,000 µg/l	< MSSL	37,000 µg/l	MW-11	60 ft (offsite)	6/17/2016

* 2013 NRVIG = Non Residential Soil Screening Level from the 2013 DEQ Vapor Intrusion Guidance Document

Media Specific Screening Levels (MSSL) Evaluation Results: Highest on site detected concentrations for individual parameters were used for screening. Other volatiles and semivolatiles detected but, based on colocation with screened compounds, are not expected to be drivers of vapor intrusion. 1,2,4-trimethylbenzene, benzene, ethylbenzene, xylene, toluene, MTBE, PCE, TCE and tetrahydrofuran were all detected in soils at concentrations above available screening levels. Ethylbenzene, MEK, vinyl chloride and xylene were detected in groundwater at concentrations above available screening levels. 2013 VI Guidance was used for this site as it better represents the GWNIC and nonresidential scenarios as compared to proposed Tier 1 screening levels, which are GWIC and residential values.

Note that groundwater at this site is perched and discontinuous and may not provide an effective medium for contaminant transport across and off the site.

General description of data quality:

Provide any additional information/data qualifiers, etc. Data are of good quality and defensible. Data were

collected under DEQ approved work plans and subject to field and laboratory QA/QC, including field duplicates, field blanks, equipment blanks, laboratory duplicates and method spikes as documented in the February 22, 2010 Summary of Concrete and Soil Sampling for Eight Container Management Units, February 6, 2011 RCRA Facility Investigation Report, February 12, 2015 Corrective Action Investigation Report, and May 13, 2016 Corrective Measures Investigation Report. Groundwater data are also included from the 2016 Annual Groundwater Monitoring Report and are consistent with historical monitoring data. Soil samples collected for VOC analyses were methanol preserved. Groundwater samples were collected by the zero headspace method and preserved with hydrochloric acid. There are limited soil data from the central part of the site and additional delineation of demonstrated areas of contamination will be necessary to fully address the vapor intrusion pathway.

Data Gaps: No sub-slab soil vapor data have been collected.

Vapor Intrusion Modeling Results (As Necessary - Consult Toxicologist):

Chemical	Concentration Detected (units)	Media	Modeled Indoor Air Concentration (units)	TSG Indoor Air RIASL (units)	TSG Screening Level Comparison for Modeled Indoor Air Concentration

Modeling Results Summary:
Provide summary of modeling results as they apply to potential exposure scenarios. Indicate which chemical(s) would drive further action: No indoor air modeling conducted: soil and groundwater data exceed MSSLs and by default exceed the respective RIASL/TS RIALS as indicated.

On-Site VI Exposure Risk Evaluation Results:

☐ Confirmed ☐ High Potential ☒ Medium Potential ☐ Low Potential ☐ **No Potential**

Receptors:

☒ Workers ☒ Sensitive Populations ☐ Other: ☒ Buildings Occupied

Off-Site VI Exposure Risk Evaluation Results:

☐ Confirmed ☐ High Potential ☐ Medium Potential ☒ Low Potential ☐ **No Potential**

Receptors:

☐ NA ☒ Sensitive Populations ☒ Residential ☐ Commercial ☐ Industrial ☒ Buildings Occupied

Additional Information Relating to Zoning/Potential Receptors: Additional information needed to assess potential for unacceptable vapor intrusion in residential development to the south of the site. See staff recommendations.

4. PROJECT TEAM RECOMMENDATIONS:

a. Vapor Intrusion Pathway and/or Data Indicate No Unacceptable Risk:

☐ No further VI evaluation is recommended

b. Further VI Evaluation Recommended as Part of the Corrective Action Process:

☐ Proposed/Planned ☐ In Progress

Recommendations and Rationale for VI Assessment as Part of CA Process Only:

☒ Soil Gas ☒ Sub-Slab Soil Gas ☐ Indoor Air Screening ☐ Indoor Air Sampling ☐ Other

VI Assessment/Response Scope of Work briefly described: ***Sub slab soil vapor collection under those buildings that are occupied on a regular basis (Office building, Laboratory, Locker Room). Indoor air sampling potentially necessary based on results of sub-slab soil vapor sampling. Recommend a formal modification to the facility's TSD Operating License to ensure that overhead doors remain open during shifts in Container Management Building, Operations Building, Maintenance Building and Technical Center unless unacceptable vapor intrusion can be demonstrated not to be occurring in these buildings. Collection of soil vapor data along the southern facility boundary to assess potential for vapor migration to the residential neighborhood south of the facility. Additional data collection to fill soil/groundwater data gaps in the central portion of the facility in order to ensure that all potential vapor source areas are accounted for.***

c. Expedited VI Assessment Recommended Based On:

☐ Modeled Indoor Air ☐ Actual Indoor Air ☐ On-Site ☐ Off-Site

Expedited VI Assessment/Response Timeframe Based on Potential Risk:

Monitoring	Accelerated Response	Time Sensitive Response
☐ *[Compound]* < RIASL	☐ *[Compound]* > RIASL	☐ *[Compound]* > TS RIASL
☐ *[Compound]* < RIASL	☐ *[Compound]* > RIASL	☐ *[Compound]* > TS RIASL
☐ *[Compound]* < RIASL	☐ *[Compound]* > RIASL	☐ *[Compound]* > TS RIASL
☐ *[Compound]* < RIASL	☐ *[Compound]* > RIASL	☐ *[Compound]* > TS RIASL
☐ *[Compound]* < RIASL	☐ *[Compound]* > RIASL	☐ *[Compound]* > TS RIASL

Recommendations and Rationale for Expedited VI Evaluation/Response: *Click here to enter text.*

Recommended VI Evaluation Activities:

☐ Soil Gas ☐ Sub-Slab Soil Gas ☐ Indoor Air Screening ☐ Indoor Air Sampling ☐ Other

VI Assessment/Response Scope of Work briefly described: *Click here to enter text.*

5. MANAGEMENT/HWS VI COMMITTEE RECOMMENDATIONS:

Management/HWS VI Committee Group Comments: The Vapor Intrusion Work Group met and reviewed the information above on April 4, 2017. Present were Jacob Carrick, Nicole Florence, Kristen Kellock, Deb MacKenzie-Taylor, John McCabe, Shane Morrison, Abiy Mussa, Pete Quackenbush, Lisa Quiggle, Dave Slayton, Joe Rogers, Al Taylor, Joe Victory and Ginny Himich. The Work Group had the following recommendations:

1. Recommended vapor intrusion corrective action work to be implemented as part of on-going corrective measures.
2. The buildings of standard design with full-time occupants present need to be investigated for the volatilization to indoor air pathway via the collection of sub-slab soil vapor and possibly indoor air samples.
3. Soil gas sample collection points must be installed between the existing known contamination and the residences to the south to investigate the potential for VI to be occurring in the residences.
4. Known data gaps regarding source (soil and groundwater) and soil vapor contamination on

certain interior portions of the site must be filled via the collection of additional data as part of the corrective action process.

5. Further investigation into the location, size, depth, etc. of the utility corridors in the vicinity of the facility must be conducted, and based on the results of this investigation; the utility corridors must then be investigated regarding their potential to act as preferential pathways for the off-site migration of contaminated soil gas and/or groundwater.

6. Potential exposure via some of the buildings with non-standard design (i.e. partially open to the atmosphere) and less than full-time occupancy must be reliably controlled through institutional controls implemented via the facility's hazardous waste operating license. This details and timing of implementation regarding this issue must be explored further by the project team.

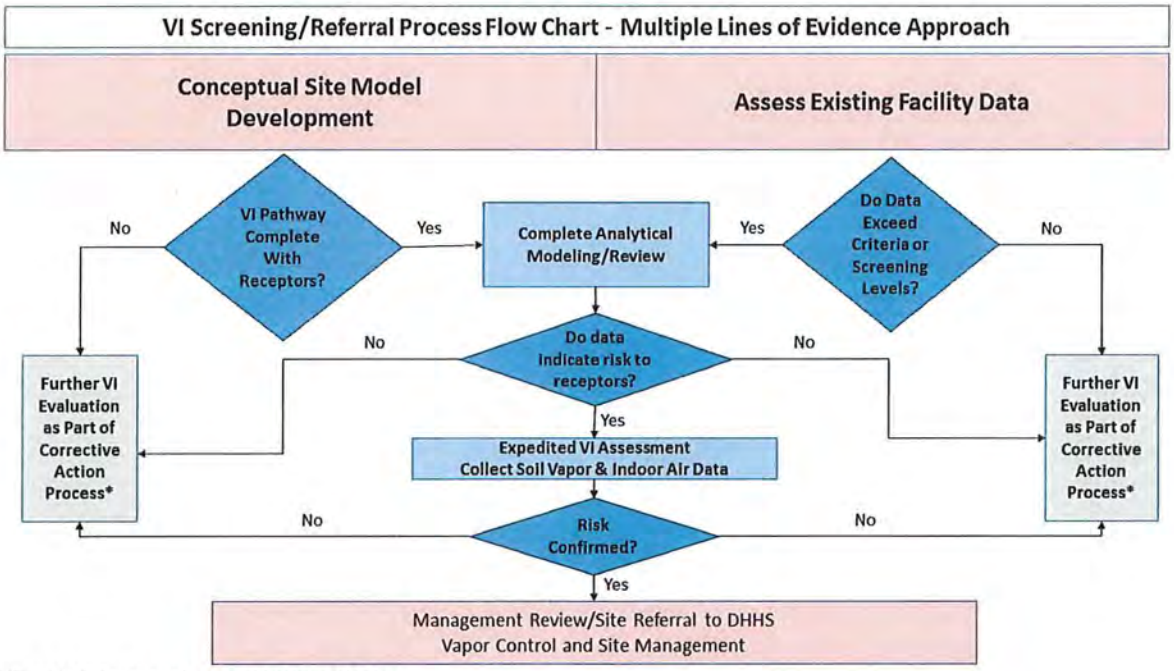
7. The details regarding current facility operations with respect to compliance with MIOSHA (i.e. ambient air and/or personnel monitoring) must be further investigated to determine how these may serve to function as exposure controls in buildings where active waste storage, treatment and handling occurs.

8. During the review of site data performed as part of the corrective action process and this evaluation, an off-site source of PCE was discovered at the location of a former large scale dry cleaning operation to the west of the subject facility. The off-site source was referred to MDEQ Remediation and Redevelopment Division staff in the Southeast Michigan District Office.

Allan B. Taylor — 5/5/17

Allan B. Taylor
Hazardous Waste Section Chief

Date



*VI Will not be further assessed on an expedited basis at this time.