ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
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JB PRITZKER, GOVERNOR JOHN J. KIM, DIRECTOR

217/524-3301

CERTIFIED MAIL
RETURN RECEIPTREQUESTED
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OCT 0 1 2020

Shell Oil Products US
Attn: Mr. Dan Kirk
150 N. Dairy Ashford
Building A Fifth Floor
Houston, TX 77079

WRB Refining LP Wood River Refinery
Attn: Mr. Thomas Morgan
900 South Central Avenue
P.O. Box 76
Roxana, Illinois 62084

Re: 1191150002 -- Madison County
Equilon Enterprises (d/b/a Shell Oil Products US)
ILD080012305
Log No. B-43R-CA-95, CA-98
Received: April 7, 2017, April 28, 2017, July 17, 2017, November 27, 2017
RCRA Permit
Permit CA

Dear Mr. Kirk and Mr. Morgan:

This is in response the following submittals made to Illinois EPA regarding RCRA corrective action activities at the above-referenced RCRA permitted facility submitted on your behalf by AECOM. These documents were submitted to Illinois EPA to address certain aspects of the Corrective Action requirements of the RCRA Post-Closure Permit for the above-referenced facility:

1. A document (Log No. B-43-CA-95) entitled "TACO Tier 3 Demonstration Report", dated April 6, 2017, and received April 7, 2017, which provide a site characterization summary and Tier 3 demonstration requesting to shut down the Soil Vapor Extraction (SVE) system. Additional information submitted to this document included:

   A document (Log No. B-43-CA-95) entitled "TACO Tier 3 Demonstration Report—Corrections to Part 1, Table 3-4 and Appendix 3-E", dated April 27, 2017, and received April 28, 2017, present revised information to the demonstration;

   A document (Log No. B-43-CA-95) entitled "Supplement to TACO Tier 3 Demonstration Report", dated July 14, 2017, and received July 17, 2017; and

2. A document (Log No. B-43-CA-98) entitled "TACO Tier 3 Demonstration—Response to Agency comments provided between June 30 and October 6, 2017", dated November 22, 2017, received November 27, 2017, was provided to address Illinois EPA comments.

The contamination present within the Village of Roxana, Illinois, is required to be address in accordance with the corrective action section of the facility's afore-mentioned RCRA Permit. As of part of the efforts conducted within the Village, an SVE system has been installed and operated to reduce the subsurface vapors present above the groundwater table. The subject submittals provide information to support the facility's interpretation that the SVE has been effective and conditions support shut down of the SVE followed by one year of rebound monitoring, and dismantle of the system if rebound monitoring supports that conclusion.

Based on a review of the subject submittals, the Illinois EPA can neither approve or deny the subjects submittal at this time as it is premature to shut down the SVE system. The following conditions and modifications apply:

1. Groundwater concentrations from Roxana Interim Groundwater Monitoring Reports for Second Quarter 2018 to present were compared to values published in Appendix B, Table H, of 35 Ill. Adm. Code Part 742, and there continues to be a potential for vapor migration after shutdown of the SVE system. Therefore, any future proposal must maintain the SVE system in areas of concern until the groundwater concentrations have been reduced to levels consistent with applicable standards at groundwater monitoring wells within the Village of Roxana.

Any future requests must consider the following procedural comments:

2. The indoor air calculations evaluate methyl-tert-butyl ether (MTBE) and 1,1,2-trichloroethane as carcinogens.

   35 Ill. Adm. Code 742.200 defines a carcinogen as *a contaminant that is classified as a category A1 or A2 carcinogen by the American Conference of Governmental Industrial Hygienists; a category 1 or 2A/2B carcinogen by the World Health Organization's International Agency for Research on Cancer; a "human carcinogen" or "anticipated human carcinogen" by the United States Department of Health and Human Service National Toxicological Program; or a category A or B1/B2 carcinogen or as "carcinogenic to humans" or "likely to be carcinogenic to humans" by the United States Environmental Protection Agency in the integrated risk information system or a final rule issued in a Federal Register notice by the USEPA.* [415 ILCS 5/58.2]

   MTBE is classified as an "A3" carcinogen by the American Conference of Governmental Industrial Hygienists, and a "3" carcinogen by the World Health Organization's International Agency for Research on Cancer.

1,1,2-trichloroethane is classified as an "A3" carcinogen by the American Conference of Governmental Industrial Hygienists, a "3" carcinogen by the World Health Organization's International Agency for Research on Cancer and a "C" carcinogen by the United States Environmental Protection Agency in the integrated risk information system.

Neither of these chemicals meet the definition of a carcinogen provided in both 35 Ill. Adm. Code 742 and 415 ILCS. When evaluating MTBE and 1,1,2- trichloroethane as non-carcinogens, the appropriate indoor air remediation objectives are 3.1 mg/m^3 and 0.00021 mg/m^3, respectively.

3. The indoor air carcinogen calculation for 1,2-dichloropropane uses an incorrect value of 3.7E-05 $(ug/m^3)^{-1}$ for the inhalation unit risk factor (URF). The proper value is 3.7E-06 $(ug/m^3)^{-1}$. Using the correct URF value in the calculation, the indoor air remediation objective for 1,2-dichloropropane is 0.00066 mg/m^3.

4. The chloroform calculation uses a dimensionless henry's constant (H') value of 1.5E-01. This value is associated with a system temperature of 25^0 C. Per 35 Ill. Adm. Code 742.717(h), the default henry's constant system temperature for the indoor inhalation exposure route is 13^0 C. The appropriate chloroform H' value at 13^0 C is 9.18E-02. The value is provided at 35 Ill. Adm. Code 742, Appendix C, Table E.

5. The vinyl chloride calculation uses a diffusivity in air (D_i) value of 1.1E-01 cm^2/s, a diffusivity in water (D_w) value of 1.20E-05 cm^2/s, and a henry's constant (H') value of 1.14E+00. These values are not consistent with the values provided in 35 Ill. Adm. Code 742, Appendix C, Table E. The Appendix C, Table E values are:

Parameter	Value	Unit
D_i	1.06E-01	cm^2/s
D_w	1.23E-06	cm^2/s
H'	8.14E-01	Unitless

The Illinois EPA notes the values utilized are values presented for the USEPA's regional screening level (RSL) chemical and physical parameters.

6. The following table lists non-TACO chemicals utilizing a henry's constant value set at a system temperature of 25^0 C. The henry's constant system temperature for the indoor inhalation exposure route is 13^0 C. The corrected henry's constant values using a system temperature of 13^0 C are as follows:

Chemical	Proposed H' at 25^0 C	Corrected H' at 13^0 C
Benzyl chloride	1.7E-02	8.21E-03
1,3-Butadiene	3.01E+00	2.18E+00
Chloromethane	3.61E-01	2.69E-01

Chemical	Proposed H' at 25^0 C	Corrected H' at 13^0 C
Cyclohexane	6.13E+00	3.64E+00
Ethyl Chloride	4.54E-01	3.12E-01
Hexachlorobutadiene	4.21E-01	1.77E-01
Hexane	7.36E+01	4.45E+01
2-Hexanone	3.81E-03	1.93E-03
4-Methyl-2-pentanone	1.38E-04	2.93E-03
Isopropanol	3.31E-04	1.41E-04
n-Propylbenzene	4.29E-01	2.00E-01
1,1,2,2-Tetrachloroethylene	1.5E-02	7.43E-03
Tetrahydrofuran	2.88E-03	1.74E-03
1,1,2-Trichloro-1,2,2-trifluoroethane	2.15E+02	1.37E+01
1,2,4-Trimethylbenzene	2.52E-01	1.15E-01
1,3,5-Trimethylbenzene	3.59E-01	1.64E-01

The Illinois EPA wishes to clarify data for the enthalpy of vaporization at the normal boiling point ($H_{v,b}$) for *n*-Heptane is not available; therefore, a henry's constant value of 8.18E+01 at 25^0 C must be used.

7. The Tier 3 evaluation proposes a dirt floor residential building scenario, with a basement foundation extending to 7 feet (2.13 meters) below ground surface (bgs). The Illinois EPA provides the following comments regarding the proposed building parameters:

   a. When using a building parameter value other than a default value listed in 35 Ill. Adm. Code 742, Appendix C, Table L, an institutional control stating buildings may not be present above the contamination plume that are smaller than the proposed building parameters used to calculate the remediation objectives is necessary. To avoid any institutional controls for the area of concern, the Illinois EPA recommends using the default value of 2.0 meters for the distance from the ground surface to the bottom of the basement slab (L_F) value.

   b. The calculations use a building height of 2.44 meters. The 2.44-meter building height value is associated with a slab-on-grade building. Per 35 Ill. Adm. Code 742, Appendix C, Table M, the appropriate building height for a basement foundation building is 4.27 meters.

   c. The calculations use a slab footprint value of 100 m^2. The Illinois EPA wishes to clarify the parameter represents the surface area of the enclosed space at or below grade, and is represented by the symbol "A_B" at Section 742, Appendix C, Tables L and M. To calculate an appropriate basement "A_B" value for use in the proposed equations, Appendix C, Table L provides equation J&E12b for calculating the value for a basement building scenario. The equation is:

$$A_B = (L_B \times W_B) + (2 \times L_F \times L_B) + (2 \times L_F \times W_B)$$

Using the proposed building length (L_B) and width (W_B), and the recommended 2.0-meter default distance between the ground surface to the bottom of the slab (L_F), the appropriate "A_B" value for use in the calculation is 180 m^2.

d. The calculations propose a building ventilation rate (Q_{bldg}) of 129 m^3/hr, or 3.59E+04 cm^3/s. The Illinois EPA wishes to clarify the proposed value is appropriate for slab-on-grade buildings, not basement buildings. The appropriate Q_{bldg} value for a basement scenario when using the Illinois EPA default 2.0 meter L_F value is 226 m^3/hr or 6.28E+04 cm^2/s. This value is available at 35 Ill. Adm. Code 742, Appendix C, Table M.

8. The following chemicals may be excluded from further consideration, as the chemical concentrations do not exceed the applicable residential indoor inhalation exposure route remediation objectives for all depths sampled:

- Acetone
- 2-Butanone
- Carbon Disulfide
- Chlorodibromomethane
- Chloroethane
- Cyclohexane
- 1,2-Dichlorobenzene
- 1,1-Dichloroethane
- 1,1-Dichloroethylene
- *cis*-1,2-Dichloroethylene
- *trans*-1,2-Dichloroethylene
- Isopropylbenzene (Cumene)
- 4-Methyl-2-Petanone (MIBK)
- Methyl-tert-Butyl-Ether (MTBE)
- *n*-Propylbenzene
- Styrene
- Tetrahydrofuran
- Toluene
- 1,1,1-Trichloroethane
- Trichlorofluoromethane
- 1,2,2-Trichloro-1,1,2-Trifluoroethane (Freon 113)

9. The facility collected and analyzed several soil gas samples from 5 feet bgs. Samples collected from the 5-foot depth demonstrate contaminated soil gas has migrated above the proposed basement floor. In other words, no vertical separation or transport distance between the basement floor and contaminated soil gas exists.

When no vertical separation exists between the soil gas sample depth and the bottom of the proposed basement floor, the D_{source} value should set at 1 cm below the foundation floor depth. This will result in a distance between the source and foundation (L_T) of 1 cm. When using a L_T value of 1 cm, soil gas sample concentrations from the most recent sample event that demonstrate exceedances of residential remediation objectives at 5 feet bgs are as follows:

- Bromodichloromethane exceeds the residential remediation objective of 0.00051 mg/m^3 at the following sample point:

Location	Concentration (mg/m^3)
VMP-47	0.0018

- Chloroform exceeds the residential remediation objective of 0.00044 mg/m^3 at the following sample points:

Location	Concentration (mg/m^3)
VMP-1	0.0068
VMP-6	0.0069
VMP-7	0.0021
VMP-8	0.00097
VMP-9	0.0014
VMP-23	0.003
VMP-24	0.0013
VMP-32	0.0031
VMP-47	0.0046
VMP-64	0.0009

- Ethylbenzene exceeds the residential remediation objective of 0.0056 mg/m^3 at the following sample points:

Location	Concentration (mg/m^3)
VMP-1	0.068
VMP-4	0.061
VMP-63	0.025

- Naphthalene exceeds the residential remediation objective of 0.00053 mg/m^3 at the following sample point:

Location	Concentration (mg/m^3)
VMP-24	0.00058

In addition, several chemicals' method detection limits exceed the residential remediation objectives at the 5-foot sample depth. As a result, the Illinois EPA cannot determine if the remediation objectives are met. The following table is a list of chemicals with method detection limits exceeding remediation objectives at 5 feet bgs.
Due to the number of locations where the method detection limits exceed the remediation objectives, the below table provides the chemical and the remediation objective that the method detection limit must meet for the chemical when analyzed for soil gas from 5 feet bgs:

Chemical	R.O. for 1 cm L_T (mg/m^3)
Benzene	0.0015
Bromodichloromethane	0.00051
Bromoform	0.064
Bromomethane	0.031
1,3-Butadiene	0.00035
Carbon Tetrachloride	0.0023
Chloroform	0.00044
1,2-Dibromoethane	0.000040
1,4-Dichlorobenzene	0.0014
1,2-Dichloroethane	0.0039
1,2-Dichloropropane	0.0037
1,3-Dichloropropylene (*cis+trans*)	0.0042
1,4-Dioxane	0.00088
Ethylbenzene	0.0056
Naphthalene	0.00053
Hexachlorobutadiene	0.0018
2-Hexanone	0.19
1,1,2,2-Tetrachloroethane	0.00037
Tetrachloroethylene	0.057
1,2,4-Trichlorobenzene	0.03
1,1,2-Trichloroethane	0.0012
Trichloroethylene	0.0033
Vinyl Chloride	0.0011

10. Using the correct values noted in Items 2-7 above, the following chemicals exceed the residential indoor inhalation exposure route for soil gas samples collected from depths between 8.5 and 20 feet bgs:

- Chloroform exceeds the residential indoor inhalation remediation objective of 0.048 mg/m^3 at 10 feet bgs for the following sample point:

Location	Concentration (mg/m^3)
VMP-50	0.066

11. Using the correct values noted in Items 2-7 above, the following chemicals either exceed or present method detection limits that exceed the residential indoor inhalation exposure route for the most recent soil gas analyses at sample location VMP-56 at 38.5 feet bgs:

Chemical	Concentration (mg/m^3)	Remediation Objective (mg/m^3)
Benzene	470	1.5
Bromodichloromethane	<57 (MDL)	0.51
Bromoform	<87 (MDL)	64
Bromomethane	<33 (MDL)	23
1,3-Butadiene	<19 (MDL)	0.35
Carbon Tetrachloride	<53 (MDL)	2.3
Chloroform	<41 (MDL)	0.44
alpha-Chlorotoluene	<41 (MDL)	0.34
1,2-Dibromoethane	<65 (MDL)	0.04
1,4-Dichlorobenzene	<51 (MDL)	1.4
1,2-Dichloroethane	<34 (MDL)	3.9
1,2-Dichloropropane	<39 (MDL)	3.7
1,2-Dichloropropylene (*cis*+*trans*)	<38 (MDL)	4.2
1,4-Dioxane	<120 (MDL)	0.88
Ethylbenzene	250	5.7
Hexachlorobutadiene	<300 (MDL)	1.8
Hexane	8,400	4,400
1,1,2,2-Tetrachloroethane	<58 (MDL)	3
1,2,4-Trichlorobenzene	<250 (MDL)	30
1,1,2-Trichloroethane	<46 (MDL)	1.2
Trichloroethylene	<45 (MDL)	3.3
Vinyl Chloride	<22 (MDL)	1.1

12. Using the correct values noted in Items 1-6 above, the following chemicals either exceed or present method detection limits that exceed the residential indoor inhalation exposure route for the most recent soil gas analyses at sample location VMP-2 at 42 feet bgs:

Chemical	Concentration (mg/m^3)	Remediation Objective (mg/m^3)
Benzene	51 (estimated)	1.7
Bromodichloromethane	<540 (MDL)	0.57
Bromoform	<840 (MDL)	71
Bromomethane	<3,100 (MDL)	25
1,3-Butadiene	<180 (MDL)	0.39

Chemical	Concentration (mg/m^3)	Remediation Objective (mg/m^3)
Carbon Tetrachloride	<510 (MDL)	2.5
Chlorobenzene	<370 (MDL)	350
Chloroform	<400 (MDL)	0.49
Chloromethane	<1,700 (MDL)	380
alpha-Chlorotoluene	<420 (MDL)	0.38
1,2-Dibromoethane	<620 (MDL)	0.045
1,4-Dichlorobenzene	<490 (MDL)	1.6
1,2-Dichloroethane	<330 (MDL)	4.3
1,2-Dichloropropane	<370 (MDL)	4.1
1,2-Dichloropropylene (*cis*+*trans*)	<370 (MDL)	4.7
1,4-Dioxane	<1,200 (MDL)	0.98
Ethylbenzene	<350 (MDL)	6.3
Hexachlorobutadiene	<3,400 (MDL)	2.0
2-Hexanone	<1,300 (MDL)	210
1,1,2,2-Tetrachloroethane	<560 (MDL)	0.41
Tetrachloroethylene	<550 (MDL)	63
1,2,4-Trichlorobenzene	<2,400 (MDL)	34
1,1,2-Trichloroethane	<440 (MDL)	1.3
Trichloroethylene	<440 (MDL)	3.6
Vinyl Chloride	<210 (MDL)	1.3

13. In addition to the above noted method detection limit exceedances for 1,2-Dibromoethane, analyses results for the chemical demonstrates method detection limit exceedances of the applicable residential soil gas indoor inhalation remediation objectives. Due to the number of locations where the method detection limits exceed the applicable remediation objectives, the below table provides the indoor inhalation remediation objective that the method detection limit must meet at the specified soil gas sample depths:

Soil Gas Sample Depth (feet bgs)	1,2-Dibromoethane Soil Gas R.O. (mg/m^3)
8.5	0.0025
9.5	0.0037
10	0.0043
11.5	0.0062
12	0.0069
12.5	0.0075
13.5	0.0088
23.5	0.021

14. The facility proposes to exclude the construction worker population indoor inhalation exposure route using a "trench" scenario, in place of a building. The Illinois

EPA wishes to clarify construction worker populations are not subject to the exclusion of the indoor inhalation route. In addition, 35 Ill. Adm. Code 742.200 defines a "building" as a man-made structure with an enclosing roof and enclosing walls (except for windows and doors) that is fit for any human occupancy for at least six consecutive months. The proposed trench in the scenario does not meet the definition of a building pursuant to Section 742.200.

15. RCRA corrective action activities carried out at the Equilon facility including off-site activities as necessary must meet the requirements of: (1) 35 Ill. Admin. Code 724.201; (2) the facility's RCRA permit; and (3) Illinois EPA letters regarding such activities.

Work required by this letter, your submittal or the regulations may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, the Professional Engineering Practice Act of 1989, the Professional Geologist Licensing Act, and the Structural Engineering Licensing Act of 1989. This letter does not relieve anyone from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

Should you have any questions regarding groundwater-related issues associated with this project, please contact Amy Butler 217/558-4716; questions regarding other aspects of this project should be directed to William T. Sinnott, II at 217/524-3310.

Sincerely,

Kenneth E. Smith

Kenneth E. Smith, P.E., Manager
Permit Section
Division of Land Pollution Control
Bureau of Land

KES:WTS1191150002-RCRA-B43RCA95-B43RCA98
WPW AMB

Bcc: Bureau File
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