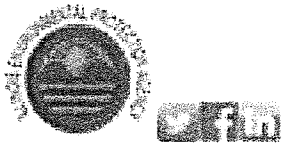
From: Butler, Amy
To: Carrino, James; Pennington, Wendy
Cc: ThalaweArachchilage, Visal
Subject: Class V injection wells
Date: Friday, February 17, 2023 1:16:50 PM
Attachments: image001.png
image002.png
image004.png

Please include a copy of the approval letter for the work along with the Class V Inventory form for the SEE injection wells. Class V wells are injection wells so you don't have to identify the extraction wells on this form. Because you are not within 200 feet of any underground drinking water source and you have our approval to do the work, you can proceed with the work after submitting the form. Please consider this email approval specific to this job and not the standard way in which every site would achieve approval. Since I have spoken with the staff member who handles these permits and we are working closely on this we can handle it this way.

Thanks,
Amy

Amy Butler
Geologist, Groundwater Unit
Illinois EPA/Bureau of Land/Permits
217/558-4716
Amy.Butler@illinois.gov



Illinois Environmental Protection Agency

Bureau of Land • 1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276

Class V Injection Well Inventory Form

1. Date Prepared: 2/17/23
2. County: Madison
3. Prepared By: Brett Howell
   Company/Agency: AECOM
   Phone: 314 429 0100
4. IEPA Site Number: 1191150002
   ☐ Check here if a number has not been previously assigned by the Bureau of Land and provide the Township name: ———
5. Facility Transaction (Check One):
   ☒ First Time Entry ☐ Modify Entry
6. Facility Name: Former Roxana Public Works Yard
   Contact: Brett Howell
   Phone: 314 429 0100
   Address: 143 E. 8th Street
   City: Roxana State: IL Zip Code: 62084
7. Owner: Shell Oil Products US
   Owner's Organization: Equilon Enterprises LLC d/b/a SOPUS
   Phone: 484 632 7955
   Address: 128 East Center Street
   City: Nazareth State: PA Zip Code: 18064
8. Ownership (Check One) ☒ Private ☐ Public ☐ State ☐ Federal
   ☐ Other (specify)
9. Injection Fluid Information
   Description of Fluid: Potable Water
   Is all of the fluid to be injected generated at this facility (Check One)? ☒ Yes ☐ No
   If no, indicate the name and address of the facility(s) where the fluid is generated:

This Agency is authorized to require this information under the Illinois Environmental Protection Act 415 ILCS 5/39. Disclosure of this information is required and failure to do so may prevent this form from being processed and could result in your application being denied. This form has been approved by the Forms Management Center.

10. Distance to closest drinking water well (in feet): >500 feet

If the distance is 200 feet or less, please include the date of completion of the drinking water well:
Date: ——

Ownership of the drinking water well: (Check One) ☐ Private ☒ Public

11. Well Information

A. Well Code	B. Total Wells This Code	C. Well Status	D. Well Location		E. Well Transaction
			Latitude Degree Minute Seconds	Longitude Degree Minute Seconds	
5X26	81		38° 50' 30.5" N	90° 04' 36.6" W	
5X26	36		"	"	
5X	16		"	"	

12. Comments (optional)
16 (5X) wells will be 1½-inch carbon steel wells installed to a depth of ~100-feet bgs. They will be used to monitor temperature.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with 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.

Owner: Not Applicable Date: ——

Signature: Not Applicable

Operator: [redacted] Date: 2/18/2023

Signature: [redacted]

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397
JB PRITZKER, GOVERNOR
JOHN J. KIM, DIRECTOR

217-524-3300

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

7011 1150 0001 0857 6717

AUG 22 2022

Shell Oil Products US
Attn: Leroy Bealer
128 East Center Street
Nazareth, PA 18064

1191150002 – Madison County
Equilon Enterprises LLC dba Shell Oil Products US
ILD080012305
Log No. B-43R-CA-107
RCRA Permits
Permit Approval

Mr. Leroy Bealer,

This is in response to the following submittals made to Illinois EPA regarding corrective action activities on your behalf by AECOM. These documents were submitted to address certain aspects of the Corrective Action requirements of the RCRA Post-Closure Permit for the above-referenced facility (Log No. B-43R):

1. A document (Log No. B-43R-CA-107) entitled "Final Design and Workplan for Proposed Steam Enhanced Extraction System at the Roxana Public Works Yard" dated January 31, 2022, and received on February 01, 2022. This is a workplan for a steam enhanced extraction (SEE) system to target and remediate the highest concentrations of benzene present at the Public Works Yard (PWY), owned by the Village of Roxana.

2. Additional information to submittal No. 1 above entitled, "Additional Information to Log No. B-43R-CA-107 (Roxana PWY SEE Workplan)" dated June 22, 2022, was received on June 24, 2022. The document provides Appendix E to Attachment B of above workplan.

The contamination present within the Village of Roxana, Illinois, is required to be addressed in accordance with the corrective action section of the facility's afore-mentioned RCRA Permit. As part of the remediation efforts conducted within the Village, a Soil Vapor Extraction (SVE) system has been installed and operated to reduce subsurface vapors originating from elevated concentrations of benzene and other volatile organic compounds (VOCs). These VOCs are present in groundwater and soil in the vadose zone at the PWY, and this submittal proposes in-situ thermal remediation (ISTR), specifically SEE, to reduce and remediate benzene as well as other VOCs present in the treatment targeted zone (TTZ) of SEE.

Illinois EPA has reviewed the subject submittals and hereby approves them subject to the following conditions and modifications.

1. In order to implement a successful Corrective Measures Program (CMP) during RCRA Corrective Action, Shell Oil Products US (SOPUS) must follow the process as described in attached document entitled "Illinois EPA Corrective Measures Program Requirements". With the subject workplan and addendum submittal, it has been determined Phase I of the CMP has been approved for the PWY SEE CMP, subject to the conditions of this letter.

2. Within 90 days of the date of this letter, a Final Design Report and Construction Work Plan must be submitted to Illinois EPA for review and approval. This document needs to include the items listed in Section 4.0 of the attached Illinois EPA CMP document and the following specific items included in Conditions below. Any required attachments must also be provided with the new workplan.

3. A scaled site layout map detailing the soil, soil gas and groundwater sampling locations, that would be conducted during SEE operations and post-shutdown of SEE must be provided in the workplan required in Condition 2.

4. With regards to the SEE shutdown criteria (Criteria 1 through 4) as described in Section 4.6 of the subject workplan, the following conditions and modifications must be met. Additional information regarding these shutdown criteria were provided by the facility during a technical meeting Illinois EPA and SOPUS on April 27, 2022, and summarized in an email on May 4, 2022, which has been incorporated below.

   A revised shutdown criteria to reflect below listed requirements and additional clarifications and/or information listed in Conditions 4.b through 4.g must be included in the workplan required in Condition 2 above for Illinois EPA review and approval:

   a. SEE shutdown cannot occur until:

      i. The target soil temperature of 80.2°C is met; and

      ii. Both Shutdown Criteria 1 and Shutdown Criteria 2 are met; or

      iii. The revised Shutdown Criteria 4 required in Condition 4.f below is met.

   b. Shutdown Criteria Item 1: Regarding the "peak" in Criteria 1, the mass recovery curve based on system monitoring/sampling is one method of tracking recovery rates and finding the point of diminishing returns, which is typically on the order of 10% of the peak. This criteria is related to determining when the system has reached diminishing returns, meaning that the SEE technology has done what it can.

c. Shutdown Criteria Item 2: The linear mass recovery rate is looked at via statistical trend data. The list of potential statistical trend analyses is not identified and must be described in detail. This criteria is also related to determining when the system has reached diminishing returns.

d. Shutdown Criteria Item 3: The intent for Criteria Item 3 is to ensure that the entire formation within the target treatment zones gets up to the necessary temperature and operates long enough for the SEE to perform as intended. MC^2 stated that the required 135 days of operation after target temperature is reached was determined from the energy balances and was an estimate of how long the proposed system would require to remove the mass.

   Past completed SEE projects have shown that mass recovered during operations sometimes exceeded the initial estimated mass. Therefore, Illinois EPA cannot approve the proposed shutdown criteria 3.

e. As stated in the May 4, 2022, email, the intent of the "or" for Criteria Item 3 was to prevent the proposed Shell SEE system from operating after removing the benzene mass it was designed for if continued mass recovery is observed related to the Buckeye release. However, there is contamination present beyond the PWY boundaries to the north, northeast, east, and southeast. Contaminant concentrations to the south are not necessarily greater than those in other directions, and this alone cannot govern the shutdown of the system.

f. Shutdown Criteria Item 4: The facility states the TTZs are based on a site-specific value for soil saturation limits (Csat). However, SOPUS cannot use an unapproved site-specific Csat value. While the residential value of 580 mg/kg applies to residential designations for soil, the saturated zone is subject to meet the groundwater objectives for Class I groundwater and any other groundwater-related exposure route values. Revise Criteria 4 to indicate that if the groundwater objectives for Class I groundwater and any other groundwater-related exposure route values are met within the entire dissolved plume, then the SEE may be shutdown based on that sole criteria.

g. Figure(s) must be provided to visually present the diminishing returns in Criteria 1 and 2.

5. The Illinois EPA concurs with the use of SEE at the PWY; however, Illinois EPA disagrees with the treatment range. The current remedial approach intends to limit the scope of the SEE to only a portion of the water column; however, the full extent of the plume within the Village must be addressed. As stated in previous letters, the remedial objectives at the PWY must meet residential standards. Treatment zones must be expanded to encompass the full dissolved plume at the PWY.

The full extent of the treatment zone is considered to be within 3 feet of the water table, and extending vertically and horizontally within 3 feet of the Class I Groundwater Quality Standards (GQSs) being met. The 3-foot variance is acceptable due to this being the variance for the SEE method as defined in Attachment B to the subject submittal; "the heated area is defined as the area that extends 3 feet (ft) beyond the perimeter steam injection well locations." Again, once SOPUS is sampling below the water table within the saturated zone, the groundwater limits apply. The Csat in saturated soil can be a screening tool, but the groundwater remediation objectives to meet the requirements of 35 Ill. Adm. Code Part 742 and Part 620 must be met for the groundwater in the saturated zone.

6. Any additional data required to develop the Final Design Report and Construction Work Plan must be collected within 30 days of the date of this letter.

7. In addition to the proposed sampling locations from specific sample depths based on the 2019 Predesign Investigation, found in Table 1 and Table 2 of Attachment A of the subject submittal, the following must be addressed and incorporated into the Final Design Report:

    i. Include the multi-phase extraction (MPE) wells locations to be sampled for groundwater in Areas A and B.

    ii. Soil borings sampling during the installation of MW-8A, MW-8B, MW-29A, and MW-29B must be continuously logged and sampled. Stainless steel well materials are required as these will be permanent monitoring wells.

a. Provide the results for groundwater profiling (GWP) locations GP-15, GP-16, GP-17, and GP-18, and evaluate results of samples in comparison to what was observed at more recent investigation locations.

b. At this time, the groundwater objective for 1-methylnaphthalene is 0.49 mg/L for a Class I groundwater. With regards to the indoor air pathway evaluation, there is no toxicology data; therefore, the Csat value of 530 mg/kg, and the groundwater solubility of 26 mg/L is applicable.

c. The vertical extent of groundwater contamination at sampling locations PD-03, PD-07 and PD-17 must be delineated. The field sampling was ended prematurely.

    According to Table 6 of Attachment A, the following benzene concentrations were reported: PD-3 was 1,200 mg/L at 71 ft bgs; PD-7 was 1,400 mg/L at 55 ft bgs; and PD-17 was 2,200 mg/L at 50 ft bgs when groundwater sampling stopped at the respective borings. New borings should be installed adjacent to these locations and benzene concentration in groundwater delineated vertically until the appropriate standards are met.

d. Attachment A, Figure 2: The underground water line depicted on Figure 2, has the potential to be a preferential pathway for vapors. The location and elevation of any underground lines along Eighth Street must be provided, and a demonstration provided on how these are not a concern or how they will be addressed.

e. Attachment A, Figure 5.B: There is a typo on cross-section C-C'. Boring PD-08 is listed twice. It appears the point closest to GP-16A, should be labeled PD-09.

f. Attachment A, Appendix F: Regarding the hydraulic conductivity tests performed by laboratory analysis, the result must be increased by 2 orders of magnitude. For example, if the ex-situ K value = 3.0E-05 cm/second, 2 orders of magnitude increase = 3.0E-03 cm/second.

g. Attachment A, Appendix H: No groundwater samples were collected at PD-06, PD-10, PD-15, or PD-16. However, PD-06-, PD-09, and PD-16 had a dyeLIF response. Therefore, new samples must be collected for groundwater delineation at PD-06, PD-09, and PD-16.

h. The separation between Areas A and B appears to have more to do with the location of the wastewater treatment plant footprint at the PWY. The Illinois EPA considers the subsurface region between Areas A and B to have high potential for contamination at similar concentrations. However, the proposed SEE treatment does not appear to be targeted at remediating this portion of the Village property. Modeling presented in Figures 10 and 11 of Attachment A, also estimates that the contamination extends between Areas A and B. Propose the necessary revisions to ensure all subsurface contamination is adequately addressed.

i. Attachment B, Appendix A: Figure WFL-01 provides the well field layout for Areas A and B. It shows the equipment staging area is directly above an area of concern that needs to be included in the remediation project. Therefore, equipment must be staged in a different area if this is preventing SOPUS from treating this area.

j. If the SEE system does not achieve the appropriate standards, SOPUS must include provisions for a transition to continuous groundwater pumping and vapor removal in the new Workplan. The revised report must describe how the potential transition will be completed.

k. O & M Plan: The facility must submit the O & M plan within the report required by Condition 2 above.

l. Health and Safety Plan: The facility must submit the Health and Safety Plan within the report required by Condition 2 above.

m. Sampling locations must be installed adjacent to MW-4 and MW-25 and samples must be collected at multiple intervals as was conducted at the PWY. Sampling must continue vertically until levels no longer exceed the benzene Class I GQS of 0.005 mg/L. The requirements for additional sampling on Eighth Street may serve to meet this requirement if sampling locations align.

8. The sampling procedure for the steam vapor monitoring points (SVP) once operations commence must be revised to address the following comments.

   a. Primary SVP row must be sampled using stainless steel canisters and Modified USEPA Total Organic-15 (TO-15) method at least once a week after the TTZ reaches half the targeted temperature. Illinois EPA acknowledges that there's potential for increase in vapor concentration at the primary SVP due to it being in close proximity to the TTZ, but with residential homes in such close proximity, all effort must be taken to avoid an exposure.

   b. All primary SVP must also be field screened with Tedlar© bags following the provided sampling frequency.

   c. Secondary SVP row must be screened for an increase from baselines established following the program frequency outlined in Section 6.

   d. If the secondary screening tests shows elevated field screening results, SOPUS must then conduct daily testing at both the primary and secondary locations until such times the results falls at or below the baseline obtained following any adjustments to the SEE system. Additionally, modified USEPA TO-15 method must be used to collect samples at each secondary vapor monitoring points to be sent out laboratory testing once the results reach baseline again after an increase for confirmation.

   If an elevation from the baseline results are noted at any of the monitoring points in the primary and/or secondary SVP rows following commencement of SEE, necessary adjustments to the SEE system must be made immediately to bring the results back to baseline values.

9. The proposed sampling for SVPs following shutdown of SEE in Section 6 of the subject submittal cannot be approved and must be revised to indicate samples will be taken at the following frequency:

   a. Three samples a week while also following condition 8 of this letter for the first two weeks following shutdown, then;

   b. Two samples a week until the MPE wells are turned off, then;

   c. Three samples a week for the first two weeks after all extraction has ceased, then;

d. Two samples a week until the TTZ reaches half the target temperature, then;

e. One sample every two weeks until ambient subsurface conditions are reached.

10. SOPUS must provide a detailed cost estimate for the proposed SEE system including costs for installation, operation and shutdown of the system pursuant to 35 IAC 724.244. The estimates must be based upon third party costs and must be supported by a detailed breakdown of the estimated third-party cost for completing each required task. The amount of the various resources needed to complete each task must be provided, as well as the unit cost of these resources and an adjustment for contingencies. Justification for all data used in these calculations must also be provided.

11. The revised Report and Workplan must indicate that SOPUS will operate the SEE system for a longer period of time in the event that the shutdown criteria required in Condition 4 of this letter have not been met during the proposed six-month duration. It would be counterproductive to shutdown the system without achieving the remediation objectives (ROs) and to leave Contaminants of Concern (COCs) behind when the subsurface temperatures have risen significantly.

12. Subsections 4.2.1 and 4.2.2 of the pre-design investigation report indicate that the VOCs concentrations are averaged. When evaluating remediation objectives and shutdown criteria, the individual concentrations at each point must be assessed and not the averaged value.

13. Subsection 3.8.1 indicates the frequency of liquid sampling is once every two-weeks. To ensure compliance with water permits, Illinois EPA has determined that weekly collection and assessment of samples is necessary. This would also identify any issues with the treatment equipment faster while the system is operational. Therefore, subsection 3.8.1 must be revised.

14. The Final Design Report and Construction Work Plan needs to be revised to indicate the site operator will conduct daily monitoring of the treatment area and equipment using a portable PID for any emissions and leaks. The monitoring procedures and a monitoring record log must also be developed and included.

15. The Final Design Report and Construction Work Plan must include provisions for the submittal of monthly CMP progress reports indicating the status and progress of SEE remediation in addition to the post construction and installation report and post SEE shutdown and completion report. The monthly CMP progress reports must include, but not be limited to the following:

- Temperature data
- Mass recovery rates
- Concentrations of organic compounds in the recovered vapor

- Vapor flow rates
- Groundwater flow rates
- Condensate recovery
- Steam injection rates
- Electricity (or fuel) consumption
- Groundwater concentrations
- Contaminant recovery rates
- Energy input data.

The reports must also provide information related to water discharge, air emissions and information from the SVP used to monitor indoor air limits.

16. The subject submittal does not adequately address the controls in place in the event of a rebound of COCs concentrations after the SEE system is shutdown and needs to be revised to address this issue. This is a critical concern, since elevated subsurface temperatures would aid in vaporization of VOCs and the remediation site being in close proximity to a residential neighborhood. Thus, one or both of the following controls must be in place immediately following SEE system shutdown.

    a. The MPE wells must remain in place until the SVE system is operational again in case of a rebound in the COCs; and/or

    b. SOPUS must have the SVE system functional immediately after the MPE wells are shutdown, and before ambient subsurface temperatures are reached as proposed in subject submittal.

17. The Final Design Report and Construction Work Plan needs to be revised to include hot sampling procedures, which would allow SOPUS to sample the system, while SEE is operating. These procedures are needed to determine the effectiveness of the SEE system while it is operational. Hot sampling is required to ensure that the ROs are achieved during SEE system operations, to evaluate system performance and do any optimizations required during operations.

    a. Hot sampling must be conducted at least once a month after the site reaches targeted temperature of 80.2°C. This sampling data must be included in the monthly reports required in Condition 15. above.

18. The proposed primary SVP row is insufficient. Additional SVPs must be installed in order to prevent an exposure in the residential area. Three additional SVPs, each vertically in line with SVP-11, SVP-8 and SVP-7 must be installed during the installation of SVP followed with the same procedure provided in section 6 to establish a baseline of soil vapor conditions.

19. The MPE wells must remain active for at least 30 days post-SEE system shutdown in order to prevent any COCs rebounding and/or migrating to residential neighborhood as discussed in condition 15. above. It is estimated that the temperature would drop 1°C per day per according to a USEPA paper on ISTR, and by this estimate the temperature would be 30°C lower than the targeted temperature following the 30-day period. This is well under benzene and other COCs boiling points at standard atmospheric pressure and would be able to address potential vaporization of the COCs.

20. During the entire SEE operation period, sub-atmospheric pressure must be maintained in the TTZ to minimize the risk of upward migration of contaminants. The pressure must also be constantly monitored to ensure that this condition is met.

21. Following SEE shutdown, SOPUS must:

    1) continue to induce an inward gradient in accordance with the facility's RCRA Permit; and

    2) monitor the vadose zone in the vicinity of any wells exceeding groundwater concentrations published in Appendix B, Table H, of 35 Ill. Adm. Code Part 742, until such time as the groundwater concentrations have been reduced at groundwater monitoring wells within the Village of Roxana.

    If vapor monitoring exceeds applicable standards, then remedial measures will be required, and the Report and Work Plan need to address this potential scenario. In addition, until concentrations in groundwater no longer exceed the values in TACO (Appendix B, Table H, of 35 Ill. Adm. Code Part 742) which indicate a potential for vapor intrusion, the groundwater will continue to be a source of potential recontamination of those zones.

22. SOPUS should notify the Illinois EPA verbally within 24hrs and in writing within 48hrs of occurrence or discovery of any major problems or leaks in the SEE system. The written notice should include how and when the problem was discovered, how long the problem was ongoing for and what actions were taken to remediate the problem.

23. All necessary permits must be obtained from the appropriate local, state, and/or federal agencies, as needed.

This action shall constitute Illinois EPA's final action on the subject submittal. The applicant may appeal this final decision to the Illinois Pollution Control Board pursuant to Section 40 of the Act by filing a petition for a hearing within thirty-five (35) days after the date of issuance of the final decision. However, the 35-day period may be extended for a period of time not to exceed ninety (90) days by written notice from the applicant and the Illinois EPA within the initial 35-day appeal period. If the owner or operator wishes to receive a 90-day extension, a

written request that includes a statement of the date the final decision was received, along with a copy of this decision, must be sent to the Illinois EPA as soon as possible.

For information regarding the request for an extension, please contact:

Illinois Environmental Protection Agency
Division of Legal Counsel
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276
217/782 5544

For information regarding the filing of an appeal, please contact:

Illinois Pollution Control Board, Clerk
State of Illinois Center
100 West Randolph Street, Suite 11 500
Chicago, IL 60601
312/814 3620

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.

If you have any questions regarding this letter, please feel free to contact Amy Butler at (217) 558-4716 for specific questions related to groundwater issues. All other questions regarding this letter should be referred to Visal Poornaka at (217) 558-4717.

Sincerely,

Kenneth E. Smith

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

VP

KES:VP:1191150002-RCRA-B43RCA107-Approval.docx

Attachment: Illinois EPA Corrective Measures Program Requirements

Cc: Wendy Pennington (electronic copy only)