



COUNTY OF ST. CLAIR



Smiths Creek Landfill

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scclandfill@stclaircounty.org

December 7, 2023

Ms. Carolyn Parker
Senior Environmental Engineer
Warren District Office
Materials Management Division
Dept. of Environment, Great Lakes, and Energy
27700 Donald Court
Warren, MI 48092-3700

Subject: Compliance Site Inspection; Smiths Creek Landfill, St. Clair County
WDS: 452546

Ms. Parker:

We are in receipt of your letter dated November 14, 2023, identifying observations made during the September 25, 2023 quarterly site inspection and off-site odor survey conducted by the Department of Environment, Great Lakes and Energy (EGLE). The site visit was intended to review conditions at the site in relation to compliance with Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, and its administrative rules (Part 115). The survey of off-site conditions was conducted in the ongoing response to odor issues documented since September 5, 2023.

Based on the site visit, you cited non-compliance with the following administrative rules:

- 1. R 299.4433(c): States “That gases generated by the facility do not create a nuisance and are not otherwise in violation of part 55 of the act at the property boundary.”***

On September 5, 2023, SCL notified you of off-site odors that had become apparent in the vicinity of the landfill. In your response on that same date, SCL was advised that EGLE had received a complaint via PEAS regarding off-site odors in the vicinity of the landfill. Between the time of the PEAS report and your site visit, intermittent odors had been detected off-site by residents and/or SCL staff with varying intensity. During your visit on September 25, 2023, you confirmed the presence of odors in a ravine adjacent to a residential home.





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As you are aware based on our previous submittals, significant ongoing efforts have been, and are being implemented to identify the complex causes of ambient gas beyond the landfill property boundaries and re-establish adequate control of the excess gas.

Your letter refers to speculation during ongoing discussions regarding engineering or design features that may have contributed to the current conditions. Specifically, you have indicated that EGLE staff have questioned the system

capacity, suggesting that the system may not be sized appropriately for expected gas production. Secondly, EGLE staff have indicated that use of predominately horizontal collection lines (versus the more traditional vertical wells) in the approved design is a possible contributing factor to the current challenges. Finally, there is conjecture that some horizontal lines may have settled and filled with liquids, further preventing the extraction of gas.

In response to this speculation, it is important to provide some context with respect to design choices made for cells which are operated as bioreactors. A primary objective of bioreactor operation is to expedite waste stabilization to reduce long-term environmental risk. This is achieved by accelerating the rate of waste degradation so byproducts (i.e. landfill gas and leachate) can be managed more quickly during the active life of the landfill with a rapid decline following cessation of liquids introduction. This limits the amount of gas and leachate likely to be produced during the closure/post-closure period. This conceptual model has been verified based on performance of the bioreactor at SCL. **Attachment 1** shows the comparison between modeled and actual measurements of gas production over time in the original bioreactor cell (Cell 3). The data confirms the steep decline in gas production predicted by theoretical modeling, indicating that the anticipated remaining gas potential for this cell is very low.

To achieve this objective, uniform distribution of septage is required and landfill gas collection must be conducted much earlier than in traditional landfill operation. Lateral gas extraction lines are used for this purpose and these lines are engineered and installed at a minimum 5% slope with dedicated drainage features (i.e., driplegs) that drain to the drainage layer of the cells. The slope and ability to remove liquids distinguishes these collectors from horizontal collectors (referenced in the VN) which do not allow for effective liquids removal.

Use of vertical wells during the portion of the bioreactor lifecycle in which liquids are injected into a cell, is not practical as the wells are likely to become a conduit for liquids to preferentially collect in the well casing preventing even distribution of the liquid, in this case septage, within the waste mass.





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The dense spacing of lateral collectors offers extensive collection area when compared with vertical wells which increases the ability to capture gas more effectively during peak generation. As shown in **Attachment 2**, the gas collection system in Cell 8 contains approximately 12,800 feet of perforated pipe for landfill gas collection. In order to provide equivalent capacity to the horizontal system, hundreds of vertical wells would be required.

We agree that the effectiveness of all of the components of the gas management system must be evaluated, including condition of collector lines, and this process continues. A drop in gas production in older areas in a traditional landfill environment frequently means that the collection system may be compromised as sustained gas production is expected throughout the life of the cell. As bioreactors are designed to shorten the gas production curve, reduced gas production in lower lifts and older cells does not, by default, indicate a compromised collection capacity. Although there is no direct evidence, we agree that the potential for settlement or liquid intrusion is a possibility, and it is currently being evaluated as part of the comprehensive assessment that is currently in progress. We will share our findings with EGLE and should portions of the system be determined to be ineffective, we are committed to corrective measures to restore full functionality.

In 2019, as part of a modification of the RDDP permit to incorporate Cell 8, we provided a gas system analysis using industry standard software (KY Pipe) to document that sufficient capacity exists in the system to manage the volume of gas expected to be generated throughout the life of the landfill. Operationally, we have determined that the vacuum in Cell 8 does not meet the design criteria and indications are that the deficiency is primarily related to settlement in the header network which services the collectors furthest from the blower (i.e., Cell 8). This was confirmed by restoration of vacuum in some portions of the header network that were excavated and regraded.

This work is still ongoing, however, based on the age of the system and inaccessibility of some portions of the header system for repair, it is unlikely that full design vacuum can be restored without system upgrades. In the meantime, the temporary flare and blower installed to augment gas collection in Cell 8 is in place as an interim measure.

The acute focus over the last few months has been to restore available vacuum to areas where deficiencies have been identified and eliminate the nuisance condition being experienced by residents. A complete design and operational review is also underway by a qualified third-party engineering firm (EIL) which was uninvolved with the system design or operation. Your letter identifies that the headers may be vulnerable to settlement due to their placement in the solid waste boundary. The location of headers within the waste mass is not unique to SCL. Settlement can (and does) occur, but oftentimes the placement of headers





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beneath perimeter access roads can introduce other potential failures due to heavy equipment traffic over lines. Considering all these factors, the location of the future header system will be a significant focus of this evaluation.

The initial sizing assumptions and associated factors including expected gas production rate, sizing of the header lines, density (i.e., horizontal and vertical spacing) and sizing of the lateral extraction lines, system and available vacuum, and collection capacity are being re-visited to identify additional system improvements which can be made as soon as possible to rectify the current odor nuisance. These proposed design improvements are being developed to meet recent Part 115 rule requirements.

In summary, we agree that the off-site odors are an indicator that the system is not functioning as designed and is not currently managing all the gas necessary to control nuisance odors. We believe that the factors contributing to the issue involve several concurrent conditions which are being systematically evaluated as a part of the ongoing assessment of the system and its operation.

Your letter refers to the additional notification of non-compliance with Part 55 Air Pollution Control rules in the Notice of Violation letter issued by EGLE on October 25, 2023. A response was provided to that letter in correspondence dated November 22, 2023. Please advise if further discussion is required on the specific citation.

- 2. Section 11511(b)(5)(c)(iv) states that a Research, Development, and Demonstration Project (RDDP) must have “An active gas collection and control system. The system shall be of adequate size for the anticipated methane production rates and to control odors. The system must be operational before the addition of any material to accelerate or enhance biostabilization of the solid waste.”*

As noted in your inspection report, the statute requires that bioreactor cells be equipped with a gas collection system capable of collecting gas which may be generated by the waste mass. While an operation schedule is not mandated in the statute, the collection/destruction infrastructure must be in place to manage gas that is expected to be generated earlier in the waste degradation process than in a traditional landfill. Lateral collectors are an efficient way to have available collection capability as soon as gas production begins rather than waiting to install vertical wells once the waste mass is established.

The leachate collection drainage layer of the landfill liner serves as a gas collection system for the first lifts of waste placed in a bioreactor cell. Lateral gas collection networks as previously described are constructed overlaying subsequent waste lifts. As waste filling progresses, additional lines are installed. Once enough





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waste is in place and those lines can be operated without the risk of significant oxygen intrusion, individual lines are connected to the gas collection system and vacuum is applied. Since the time of the 2022 report 5 lines have been connected and placed into service. Attachment 3 identifies the status of gas system construction and operation in Cell 8.

Based on the 2022 Annual RDDP report, you have noted in your letter that 156,414 gallons of septage sludge was reported to have been placed in Cell 8 during 2022. The referenced sludge is an accumulation of the solids which settle from the liquid septage in the bladder tank prior to injection of the liquid. At the time the referenced sludge was placed in Cell 8, the lateral gas collection system was installed and capable of gas collection.

SCL has made significant efforts to maintain open lines of communication with EGLE regarding progress being made towards resolving the unfortunate odor issue. As a continuation of that collaboration, we will be requesting a technical review with EGLE staff in the immediate future to discuss findings of the comprehensive engineering and operational evaluation that we have referenced in this, and previous correspondence. We have taken each of the concerns raised by EGLE staff into consideration during the assessment and are looking forward to sharing our results as we move into the next phase of corrective measures and system improvements.

The letter further cites:

Section 11511(b)(9) states "If the department determines that the overall goals of an RDDP, including, but not limited to, protection of the environment, natural resources, and the public health, safety, and welfare, are not being achieved, the department may order immediate termination of all or part of the operations of the RDDP or may order other corrective measures.

Voluntary, temporary site-wide suspension of septage injection was implemented on September 22, 2023. Operation of the bioreactor has conducted without significant odor issues since 2008 and the lack of septage injection into Cell 8 (other than limited sludge introduction referenced above) indicates that septage injection is unlikely to be a primary factor in the odor issues. Regardless, we are including the presence of the sludge in the overall evaluation as a possible contributing factor in combination with other conditions.

The letter also indicates that monitoring reports from AQD indicate that elevated concentrations of hydrogen sulfide (H₂S) detected at the surface of the landfill are potentially the result of anaerobic breakdown of septage sludge in the landfill. Based on a review data collected at the site for numerous





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bioreactor cells, there is no immediately apparent correlation between septage sludge placement and the production of H₂S, although we are continuing to assess the data.

The H₂S levels in the areas studied vary significantly, with the highest levels noted in Cells 2, 2B, 6 and 7. We are currently evaluating specific waste streams managed in each cell including certain industrial and C&D materials to identify other possible relationships to H₂S production. As part of our enhanced monitoring effort in response to the odor issues, we are currently taking H₂S concentrations for representative gas well extraction lines (both vertical and lateral) in Cells 4, 6/7, and 8. Results of this monitoring effort will be used to guide future decision-making, including the assessment and protocol for acceptance of special waste streams which may contribute to H₂S issues at landfills.

Beyond the engineering evaluation and H₂S response outlined above, we are also actively looking at system operational practices. Our goal is to increase communication with local residents, municipal officials and operating partners to identify and address potential issues in a timely manner so we can react more quickly to conditions that may be indicative of developing concerns. Below are some examples of the policies we have put in place in recent months:

- Gas wells in affected areas are being monitored daily until odors are sustainably controlled with monitoring conducted at least weekly thereafter. Data is provided to County operations staff and consultants who are tuning for efficiency and recommending continued improvements;
- Gas composition at several key locations (fuel skid, temporary flare, main gas headers at Cell 8, and Cells 3/4) will be monitored each working day;
- Data from Blue Water Renewables (BWR) documenting engine, flare, and system blower performance is provided to the County weekly for use in adjusting the collection system;
- We have increased communication with BWR to ensure tasks planned at the plant and in the field are shared in order to anticipate potential effects on gas collection/destruction;
- Condensate knockout sumps are currently being checked daily to ensure pump on/off levels are being achieved and pumps are functioning properly;
- Direct communication with residents who reach out to landfill staff, continued communication through Kimball Township and the support of FAQ documents to inform residents;
- Continued enhancement of interim cover as needed.

Our common understanding and goal is that the nuisance odors must be resolved and significant action will continue until they are controlled. Several of the issues raised by EGLE in this and previous letters involve detailed discussions of data and operational observations that cannot be adequately summarized





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in a response letter. We look forward to the meeting described in this letter as an opportunity to adequately discuss the data on which our responses are predicated.

Please do not hesitate to contact me should questions arise regarding the above responses or further discussion is required.

Sincerely,
Smiths Creek Landfill

A handwritten signature in blue ink that reads "Matthew Williams".

Matthew Williams
Landfill Manager

Cc: Karry Hepting, St. Clair County
David Richmond, St. Clair County Health Department
Mary Carnagie, EGLE
Joyce Zhu, EGLE
Greg Morrow, EGLE
Iranna Konanahalli, EGLE
Robert Joseph, EGLE
Aaron Darling, EGLE
Terri Zick, CTI
Erin Berish, CTI
Te-Yang Soong, CTI

Attachments

