



Memorandum

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TO: Brian Helming, Heart of the Valley Metropolitan Sewerage District
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CC: David Kittel, Village of Little Chute
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Greg Parins, Outagamie County Recycling & Solid Waste
Glenn Leo, Foth Infrastructure & Environment, LLC (Foth)
Rob Brillhart, Foth
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FR: Marty Sturzl, Foth Infrastructure & Environment, LLC (Foth)

RE: Outagamie County Landfill – Leachate Pretreatment Pilot Study

Background and Purpose

The Outagamie County Recycling and Solid Waste's (OCRSW) facility is located in the village of Little Chute (Little Chute), Wisconsin and consists of the closed East and West Landfills, the active Northeast Landfill (NELF), and the future location of the Northwest Landfill (NWLF).

Currently, leachate generated from OCRSW landfills is not treated prior to discharge to a treatment plant. Leachate generated from the East and NELF Landfills is transferred to the Heart of the Valley Metropolitan Sewerage District (HOVMSD) via direct discharges to Little Chute's sanitary sewer system per the current wastewater treatment agreement. Leachate generated from the future NWLF will be transferred to and treated by the city of Appleton wastewater treatment plant (AWWTP) via a direct discharge to Appleton's sanitary sewer system that will be constructed with the NWLF. Leachate generated from the West Landfill is currently transferred to the AWWTP via an existing direct discharge to Appleton's sanitary sewer system.

Both HOVMSD and AWWTP have communicated that in the future they may require some form of pretreatment to limit ammonia and BOD concentrations in the leachate discharged to their WWTPs from the NWLF and NELF. At this time, specific concentration limits have not been provided to OCRSW by either AWWTP or HOVMSD. AWWTP will not require pretreatment of leachate generated from the West Landfill, because the leachate contaminant concentrations and volume are not high due to the nature of an older landfill.

In early 2021, Foth began a project to perform a pilot study to evaluate a proprietary chemical pre-treatment system. Xogen Technologies (Xogen) was the provider of the system to be evaluated.

The purpose of this document is to provide HOVMSD an update on the status of this project and to communicate the plans to complete it.

Xogen Technologies

XoGen is a research based-company contacted by Foth in 2020 to obtain preliminary pretreatment capabilities for an advanced electro oxidation process for removal of ammonia from landfill leachate. Xogen's electrolysis reactor is a relatively new technology not supported by years of application on landfill leachate. Therefore, Foth recommended that pilot testing be performed on the NELF leachate to verify the suitability of this technology.

Since starting the leachate pretreatment pilot study project, XoGen has not provided consistent communications or expressed interest in providing pilot testing for the project. Chemical treatments of leachate are often still in the research phase, and have not been widely implemented over the solid waste industry. Multiple chemical-based treatment companies were contacted by Foth, with many of them declining the opportunity to design a preliminary pretreatment system. Application of such a system for leachate pretreatment at OCRSWD would be one of the first of its kind and an experimental process.

Several attempts have been made to contact XoGen, but they have been unresponsive. Since the XoGen process is unproven for treatment of leachate and now they are unresponsive, Foth recommends moving forward with a biological treatment technology, specifically a moving bed bioreactor (MBBR) system, for leachate pretreatment.

Foth is not recommending that OCRSW perform a pilot test for proof of concept on a MBBR system, since the MBBR technology is regularly used for treatment of ammonia and BOD. Additionally, a pilot test for a MBBR system would need to be performed on a much larger scale than the bench top scale, proof of concept, pilot test that was proposed with the XoGen process and would cost substantially more to perform.

Foth recommends focusing the remainder of this project on the timing and logistics of the construction of a MBBR system for leachate generated at the Outagamie County Landfill. The options to be evaluated are described below.

Leachate Pretreatment Options Evaluation

Foth recommends completion of an economic evaluation of options to implement a long-term leachate pretreatment plan for the NWLF and NELF. The options to be evaluated are summarized below:

Option 1 – Managed NELF Discharge

Option 1 consists of continuing to work with HOVMSD to determine acceptable discharge rates from the NELF which will allow the treatment plant to operate without exceeding its discharge limits. Under Option 1, OCRSW would like to meet with HOVMSD personnel to better understand the challenges it has with treating their overall ammonia and BOD load. Leachate

generation in the NELF has been at a peak level for the last 2-3 years. It is our understanding HOTVMSD has remained in general compliance with its discharge limits during this period. OCRSW would like to continue to work with HOTVMSD to maintain its compliance in the future without pretreatment. Actions which can be implemented include the following:

- ◆ Installation of additional devices to adequately control the discharge rate from the NELF within an acceptable value agreed to between OCRSW and HOVMSD.
- ◆ Leachate recirculation.
- ◆ Implementation of methods to reduce overall leachate generation (intermediate & final cover).

Currently, the NELF is projected to be past its peak leachate generation conditions. Approximately 26% of the NELF is now closed with an impervious cover. Additional cover is planned for 2024. Final filling in the NELF could occur as early as 2025. Additional modeling will be performed to more accurately predict the amount and strength of leachate generated by the NELF in the next 5-10 years.

Option 2 – NELF Leachate Haul and Treat

Option 2 consists installation of a storage tank and loadout system to allow for hauling and treating of leachate from the NELF at the NEW Water wastewater treatment plant in Green Bay, WI. This option could include treatment of all or a portion of NELF leachate at NEW Water depending on HOVMSD's ability to continue to treat a smaller percentage without pretreatment.

The haul and treat option would continue indefinitely until the amount and strength of leachate generated by the NELF fell to within a range which HOVMSD could treat without pretreatment.

Option 3 – MBBR Pretreatment – NWLF Phase 2

Option 3 consists of installation of a MBBR pretreatment system to be in operation when Phase 2 of the NWLF begins generating leachate. This is currently estimated to be 2027 but will depend on future filling rates.

The MBBR system would be designed to handle leachate from the NWLF and NELF once local limits are incorporated by AWWTP and HOVMSD. Infrastructure will need to be installed to deliver NELF leachate to the MBBR facility which will be located near Phase 1 of the NWLF. In addition, a discharge pipeline will be needed to direct the pretreated NELF leachate back to the HOVMSD. Pretreated NWLF leachate will be directed to the AWWTP.

Options 1 and or 2 will be used to manage NELF leachate until the MBBR system begins operation.

Schedule

A meeting will be scheduled with HOVMSD personnel to discuss this plan in September of 2021.