STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Southwest Region Office
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April 6, 2023

Susan Eugenis, P.E.
Cowlitz County Department of Public Works
1600 13th Avenue South
Kelso, WA 98626

Re: Cowlitz County Landfill Headquarters, State Waste Discharge Permit ST 6074, Leachate Management Engineering Report

Dear Susan Eugenis:

The Department of Ecology (Ecology) received Cowlitz County Landfill HQ's Leachate Management Engineering Report, on February 1, 2023 (electronically). The engineering report (ER) was required to evaluate and propose treatment improvements to meet the effluent limits of state waste discharge permit ST 6074.

The existing leachate treatment system consists of two lagoons, with all leachate entering the North lagoon only. Flow exits the North lagoon by gravity to the leachate transfer pump station, where final effluent is conveyed by pipeline to the Three Rivers Regional Wastewater Authority (TRRWA). Limited surface aeration is provided in the North lagoon and minimal reduction in Biochemical oxygen demand occurs. The South lagoon is not currently utilized to treat leachate.

The following document was received by Ecology	Received Date
Cowlitz County Landfill Headquarters Leachate Management Engineering Report	February 1, 2023 (Electronically)

The ER proposes to increase hydraulic detention time, install new mechanical blowers and diffusers in the South lagoon, and change piping to increase lagoon operational flexibility.

Ecology cannot approve the engineering report until several outstanding issues are resolved. We provide the following comments that need to be addressed in a revised ER submittal. The page numbers of the ER are provided in (parentheses) to aid identification:

1. (Page 20) 5.3 Water Quality Treatment Requirements - Ecology sent a copy of the engineering report (ER) to the Three Rivers Regional Wastewater Authority (TRRWA) asking them to confirm the applicability of the current sewer ordinance local limits, and if the ammonia limit of 44 mg/L (missing in the current permit) will apply to a future permit. TRRWA General Manager, Duane

Leaf, confirmed in an April 4, 2023, email, and comments that the ammonia limit will apply after treatment improvements are completed and the next permit is issued. The ER will need to be revised and resubmitted to include treatment for ammonia to comply with the 44 mg/L limit.

2. (Page 24) 9.1 Recommended Leachate Lagoon Modifications - The ER recommends installation of new aeration blowers and new diffused aeration in the bottom of the South lagoon. Ecology is unable to verify if these improvements will achieve compliance with all TRRWA local limits, including the ammonia limit of 44 mg/L. Aerated lagoons are commonly designed as a heavily loaded oxidation basin, or very lightly loaded activated sludge systems (Wastewater Treatment Plant , WPCF MOP No. 8, ASCE MOEP No. 36, 1982). The ER is missing the detailed design criteria for Ecology to assess the proposed improvements.

   The two vendor proposals for new blowers and diffused aerators provide some data on influent wastewater characterization. Triplepoint Environmental used an internal calculation tool for summer and winter conditions, but the design equation(s) were not provided. For the summer period, Triplepoint estimated effluent BOD concentration to be 218 mg/L. Triplepoint also assumed no reduction in Nitrogenous BOD (the TKN or ammonia component). Ecology agrees that wintertime conditions will be the limiting period to comply with the local limits, due to reduced biological activity at cooler temperatures and higher leachate flows.

   Using the same design parameters and assumptions and applying the aerated lagoon design equation No. 5-64 (in Metcalf & Eddy, second edition) Ecology calculated an effluent BOD of 377 mg/L. Ecology agrees with the use of a conservative reaction rate constant k of 0.317 d^{-1} for the summer period, as this provides a factor of safety to reliably meet the permit effluent limit for BOD.

   $S/S_0 = 1/\{1 + k(V/Q\}$ Equation 5-64 (Wastewater Engineering, Metcalf & Eddy, 2nd Ed. 1979)

   S = Effluent, BOD mg/L
   S_0 = Influent, BOD mg/L
   k = first order BOD removal rate constant, d^{-1}
   V = Volume, Mgal
   Q = Flowrate, Mgal/day

3. (Page 24) 9.2 Proposed Revised Leachate Lagoon Operation - The ER discusses different operational modes for the system improvements, but details are missing. New blowers and diffusers will be installed in the South lagoon. In addition to providing air to enhance BOD and ammonia removal, the diffusers are also expected to achieve complete mix conditions.

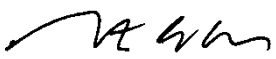
   Mixed liquor suspended solids produced by the conversion of soluble BOD and ammonia are stated to be minimal, but no estimates of biological solids production are provided. Triplepoint assumes 80 percent removal of BOD. At a typical Yield (Y) of 0.5, Ecology estimates 2380 lb/day of biological solids will be produced, requiring either removal as WAS or endogenous decay.

Without removal in a second settling lagoon the corresponding effluent Total Suspended Solids concentration would be 476 mg/L, exceeding the local limit of 350 m/l TSS. No details are provided on how waste sludge will be removed. It does not appear feasible to operate the aerated lagoon in the extended aeration mode of 20-30 days solids retention time (SRT), or low F/M of 0.05-0.15.

Please prepare a revised engineering report to thoroughly evaluate all treatment alternatives that will reliably attain the TRRWA local limits. The revised report should also provide all design criteria, assumptions, and design equations that support the chosen alternative. Please submit the revised report by July 1, 2023, so the landfill can continue to meet the project schedule proposed in Section 9.5 of the ER.

If you have any questions regarding this letter, please contact me at steve.eberl@ecy.wa.gov or by phone at or (564) 999-3584 (cell).

Sincerely,



Steven G. Eberl, P.E.
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cc: Kamren Moen, Ecology
Bolun Wang, Ecology
Bill Harris, Ecology Solid Waste Program
Duane Leaf, TRRWA