
Treatment Systems for Leachate

Engineered Systems: Leachate Treatment

Case History: Seater Waste Management Facility, Caithness

Background

Highland Council on the advice of Aspinwall & Company – replaced the existing inappropriate leachate treatment facility with a specifically designed plant incorporating a circular aeration tank, reed bed dosing tank and enlarged reed bed.

The plant is designed to improve the treatment of the leachate and ground water to the requirement of S.E.P.A. prior to discharge into the local stream

The plant is fully automatic via PLC (Programmable Logic Controller) with SCADA system (Surveillance, Control and Data Acquisition) to record performance and faults.

The standby generator backs up the system in the event of a Scottish Hydro mains failure.

A modem (phone link) enables the PLC and SCADA system to be checked and modified remotely, initially by the supplier (Satec/Tubex) and finally by the Owner/Operator.

Process

There are two sources of leachate feed to the aeration tank – primary feed and secondary feed. Primary feed is the raw leachate from the sumps and upslope risers within the landfilled wastes. This is pumped directly to the aeration tanks by pumps placed within the sumps and upslope risers, in accordance with the operating cycle described in 4 below. 4 N^o leachate feed pumps are incorporated on this contract (2 N^o in the vertical sumps and 2 N^o in the upslope risers) but provision is made in the contract for a further 2 N^o vertical sumps and pumps. Secondary feed is the contaminated groundwater that is stored in the balance tank, from where it is pumped into the aeration tank in accordance with the operating cycle described in 4 below.

After undergoing treatment in accordance with the operating cycle described in 4, the treated effluent is pumped to the reed bed dosing/balance tank, from where it flows by gravity through the reed bed and the final effluent balance pond. The final discharge from the pond either flows by gravity to the watercourse, or is pumped to land irrigation by the irrigation pump. The irrigation pump shall be PLC controlled to operate if the ratio of flow in the watercourse compared to the final discharge falls below a predetermined limit, or if the high alarm switch in the irrigation pump chamber is covered.

Equipment

- Leachate Primary Feed Pumps (MH01, MH02, MH03, MH04, UPR05 & UPR06)
- Secondary Feed Pumps for contaminated ground water and undercell drainage (PSM04, UCD6A, UCD6B, GTP1 & GTP2)
- Balancing tank and Secondary Feed/Transfer Pumps (SFP1 & SFP2)
- Aeration tank with Aerators (A1, A2 & A3), Floating Decant
- Treated Leachate Discharge Pumps (DP1 & DP2)
- Aeration Tank Monitoring for DO & Liquid Temperature
- Caustic Soda Dosing System with pH control system in Aeration Tank
- Reed Bed Dosing Tank
- Reed Bed
- Balance Pond
- Irrigation Pumps (IP1 & IP2)
- Flow Meters for Primary Feed, Secondary Feed, Reed Bed Dosing tank Outlet, Treated Effluent Leaving Site and WaterCourse.
- MCC with PLC and SCADA systems
- Standby Generator with Automatic Change Over
- Container incorporating MCC, PLC, SCADA & Instrumentation in one section and Dosing Pumps and Water Tank & Safety Shower in the other section.
- External flood Lights
- CCTV Camera