

El Bordo Poniente Landfill – Mexico City



New Logic Research has developed a process that uses vibrating reverse osmosis membranes to treat landfill leachate as a single step filtration system that can meet any discharge requirement. New Logic's RO VSEP system can be used to volume-reduce the leachate by approximately 80%. In combination with thermal evaporation, a complete zero-liquid discharge solution can be implemented. Evaporation can be accomplished with shallow evaporation ponds or with mechanical evaporation using methane gas from the landfill as the fuel source.

Case Study Background

El Bordo Poniente was Mexico City's only solid waste landfill. The Mexico City government recently closed it and now trash is hauled to new landfills that are farther away. The Bordo Poniente landfill is one of the largest in the world and served a city with a population of nearly 9 million people. Even though closed, the trash heap will produce leachate wastewater and methane gas for years to come. The 975-acre landfill now stores leachate in large ponds that can be seen in satellite images. Treatment must be implemented to process the existing leachate being stored as well as all the leachate that will be generated in the future.



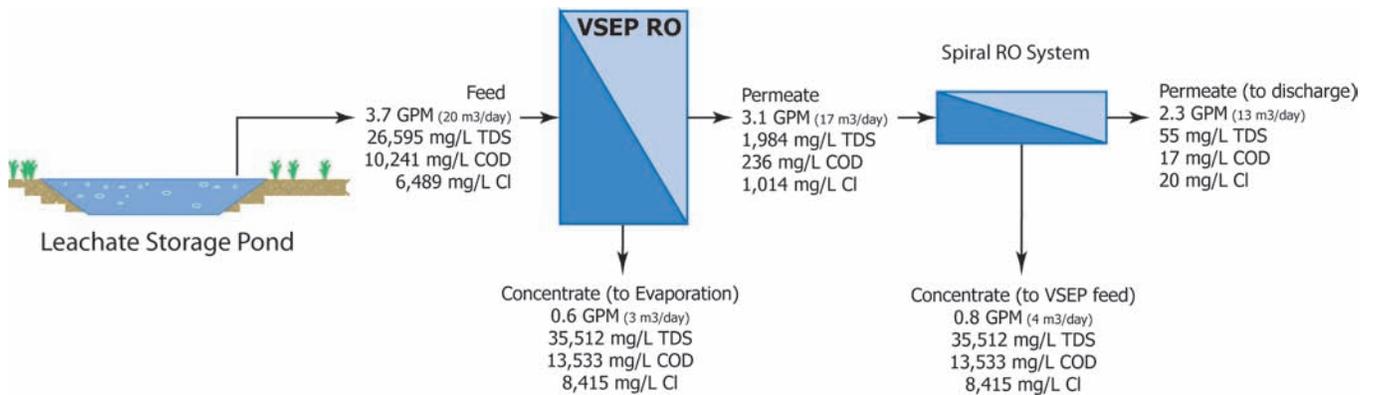
Process Description

A full-scale VSEP system was installed at this landfill to demonstrate New Logic's process. The installation includes an automated 36" VSEP RO vibrating membrane system. The filter pack on this system is equipped with roughly 450 square feet of vibrating RO membrane area. The leachate is first pumped from the large storage pond to a tank feeding the VSEP system. The automated VSEP system processes about 20 m³/day and removes about 80% of the volume as filtrate. The vibration of the membrane limits fouling of the membrane surface allowing for high flux rates even on very concentrated wastewater like leachate. VSEP is also able to operate on raw wastewater with no pretreatment steps and has a very small footprint and operating cost.

The water that filters through the VSEP RO system is collected in a storage tank and then is polished by a conventional spiral RO membrane system to reduce contaminant levels well below surface water discharge requirement. This double pass reverse osmosis process produces water cleaner than any other treatment method available.



The rejected material, or concentrate, is pumped to a collection tank from the VSEP system. This concentrate material is currently being evaluated for disposal options. For now, the VSEP system has shown an ability to reduce leachate pond levels by 80%. This will allow for plenty of storage capacity and will allow for time to select the best disposal method for the concentrated leachate that remains.



Separation Quality

Use of an RO membrane in the VSEP filter pack module allows for a high quality permeate stream. Unlike other treatment options, RO membranes will reduce the concentration of all dissolved solids, organics, and volatile compounds. VSEP RO represents a complete solution rather than a partial one. Conventional wastewater treatment plants would not be able to remove recalcitrant organics such as pesticides and solvents. Nor can it remove heavy metals such as mercury and lead. The VSEP process is able to reject all of the materials and any other dissolve solids.



The two-stage RO process in this case reduced the Chemical Oxygen Demand (COD) in the leachate from 10,000 mg/L to only 17 mg/L in the final treated water. The total dissolved solids (TDS) in the leachate was reduced from 26,000 mg/L to about 55 mg/L.

Summary

This project marks the first VSEP leachate installation in Mexico. There are many VSEP leachate installations around the world. Some landfills may be permitted to discharge leachate to the municipal sewer. However, recalcitrant organics in the leachate may not be properly treated using this method and can be discharged to the environment. Other landfills may reinject the leachate into the landfill. However, this will result in increased hydraulic pressure and raise the risk of landfill failure. Some landfills have used digesters and other treatment techniques, but none are able to produce treated water quality as good as reverse osmosis membrane.

Conventional RO membranes and alternative RO membrane systems have been used for landfill leachate, but these are prone to fouling, low recovery of filtrate, and high operating costs. VSEP is the only efficient and low cost membrane system that can provide a complete efficient treatment solution.

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