

CASE STUDY

VSEP Treatment of Landfill Leachate Presidente Landfill - Buga, Colombia

VSEP is a vibrating RO membrane system developed by New Logic Research of California. This unique design allows for membranes to be used efficiently to treat landfill leachate. Membranes have been tried for more than two decades for this application, but only now can membranes be employed for this use in an efficient way to solve the leachate problem. Landfill leachate can vary a great deal depending on the age of the landfill, the waste received, the amount of rainfall, and many other factors. Other technologies such as digesters, chemical treatment, or engineered wetlands can have selective success, but none represent a complete treatment solution. Only RO membranes are able to remove nearly all contaminants in the leachate and only VSEP with its vibratory shear can achieve high flow rates and volume reduction using RO membranes.

Case Study Background

The City of Buga in Colombia has a small landfill that serves the entire city. There was only a very small space left for putting trash and the projection was that it would run out of space in about 4 months. The Presidente Landfill asked authorities to open a new area on its property for trash disposal. The regulators told them that in order to give them a permit, they must install equipment to treat the landfill leachate. In addition, the existing storage ponds for leachate were nearly at capacity. Production of more Leachate would have required construction of more storage ponds.

A gas to energy project is also planned for this site. The first phase would be gas extraction with flares to burn the gas. The next phase would be installation of electrical gas-fired generators to make electricity. Prior to getting permitting for this project, leachate treatment was also required. While the trash in the landfill needs to be moist so that bacteria can convert organics to methane, there cannot be too much liquid (leachate) in the trash or the rate of gas extraction would be impaired.



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Process Description

A full –scale VSEP system was installed at this site using three of the large 84” VSEP modules. Since the filtrate would be used for land irrigation, only a single pass with RO was required. Other VSEP installations would also include a second stage RO spiral polishing system to make water that would meet surface water discharge requirements. But in this case, Ammonia, COD, and other contaminants were sufficiently removed with just one pass through the VSEP RO system.

There are six leachate holding ponds at the landfill. All of them are located in different levels and able to transfer product using gravity flow. Pond # 1 (8,000 m3) is the one receiving the current leachate production from the landfill and the one at the lowest level. The leachate to be treated with the VSEP system is pumped from this pond to a small equalization tank that feeds the VSEP. This pond is located approximately 600 meters away from where the VSEP system is installed. There is a transfer station consisting in two pumps that transfer the leachate from the storage ponds to the VSEP system.

The permeate produced is used mainly used for sagebrush irrigation in areas near the facility. A future possibility is to use this filtrate for plant bathroom facilities. The main function of the VSEP is to volume reduce the amount of leachate stored onsite. In this way, more trash can be handled with more leachate produced, but with smaller volumes of stored leachate.

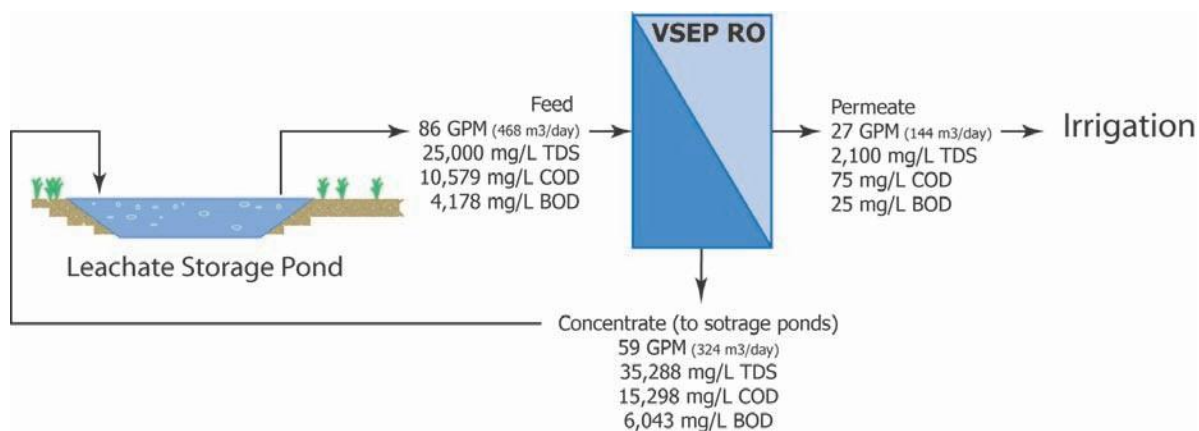
The concentrate obtained from the filtration process is collected in already existing ponds. The plan is to eventually reduce the volume of the stored leachate and the existing ponds to store concentrated product. In the future, this concentrate can be re-injected into the landfill, until evaporation or incineration options can be developed.

The VSEP system is removing 150 m3/day of filtrate from the storage ponds. Possible future expansions can double this amount. VSEP systems are modules, so expansion is easy at any time. 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.



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Separation Quality

The RO VSEP system installed is in general producing filtrate with TDS reduced by more than 90% at about 2,000mg/L TDS and is producing water that meets irrigation standards. The membrane is also removing more than 98% of heavy metals including Cadmium, Zinc, Cobalt, Chrome, Iron, Nickel, Lead, and others. The VSEP is also removing 100% of Fecal and other Coliform bacteria.

Parameter	Leachate Value	VSEP Filtrate	Irrigation Limits
Cobalt	420 µg/L	20 µg/L	50 µg/L
Copper	900 µg/L	7 µg/L	200 µg/L
Chrome	1,750 µg/L	10 µg/L	100 µg/L
Iron	16,340 µg/L	73 µg/L	5,000 µg/L
Manganese	1,030 µg/L	14 µg/L	200 µg/L
Nickel	1,310 µg/L	16 µg/L	200 µg/L
Zinc	1,580 µg/L	18 µg/L	2,000 µg/L



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The VSEP system was sold to a company that operates this landfill as well as many others. This landfill service company now has a competitive advantage when it comes to the services it can provide. Its experience with the VSEP system and the treatment of the leachate can be used at its other landfill operations and may also give it the advantage needed to secure other operation contracts in the region.

The installation of the VSEP system allowed the existing landfill to continue to be used and has extended the useful life of this landfill by at least another 20 years. Extending the life of an Existing landfill is much less expensive than construction of a new landfill. In economic terms, the cost of the VSEP system was just a fraction of the costs without the leachate treatment system. In addition, the installation of the VSEP system has allowed permitting of the gas to energy project that is planned next at the landfill.



For more details,

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or

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or

call 0800 796 344 (NZ)