



DTRO membranes cleaning and leachate treatment chemicals for the landfill plant

Industry Municipal Utilities Sector

Type Membrane treatment chemicals

Task To select or develop a new chemical product that effectively cleans DTRO membranes and treats the leachate in the DTRO process in the landfill.

Water source Landfill leachate

Description

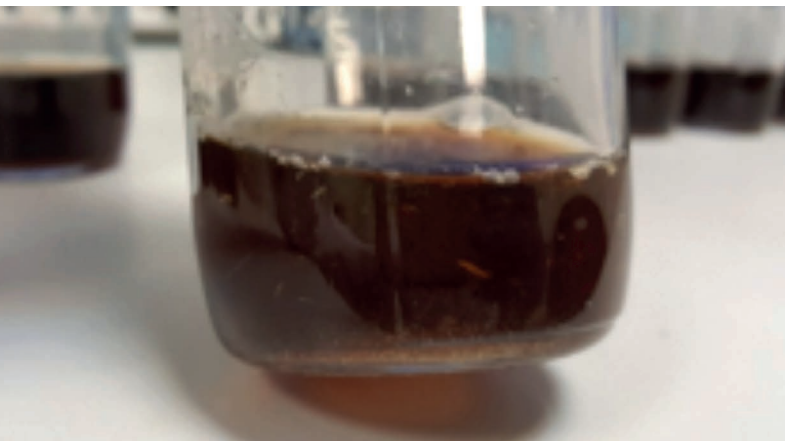
Landfilling is one of the most common methods to dispose waste in many regions worldwide. One of the most important environmental problems is the large amounts of contaminated and hazardous filtrate. For the cleaning of the filtrate, the advanced technology is used – a disc-tube reverse osmosis (DTRO). Effective chemicals for membrane treatment have to be used for optimal and fluent exploitation of reverse osmosis equipment.

Main targets for requirements of product:

- Analysis of landfill plant DTRO procedures
- Determination of raw leachate, concentrate and permeate physical-chemical parameters
- Testing of suitable JurbySoft® and ROptima® products
- Modifying or creating of product with the required parameters
- Data analysis and chemical treatment programme selection

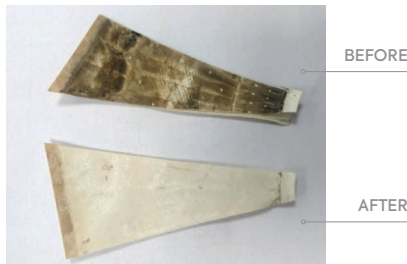
Results

Based on Jurby WaterTech International company experience, on the newest scientific data analysis of the R&D laboratory specialists, and with the successful cooperation of the landfill plant specialists, the right ROptima® chemicals were selected for the proper operation of disk-tube reverse osmosis (DTRO) in the landfill plant for filtrate treatment.



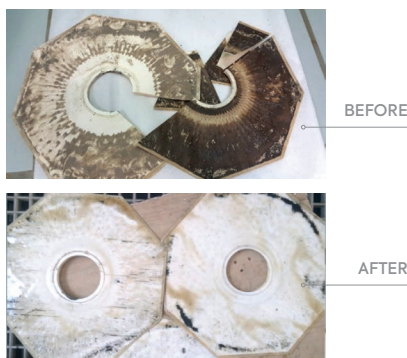


Selection of DTRO membrane acidic and alkaline cleaners



Membrane cleaning in laboratory.

Several products of JurbySoft® and ROptima® products were selected and tested. Prepared cleaning solutions were used for membranes treatment. Pieces of membrane were soaked in these solutions and then washed with RO water. As we can see cleaning solutions prepared from ROptima® 503 and 513 showed best results and were selected for landfill plant DTRO membranes treatment.

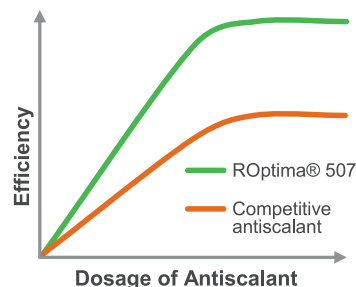


Trial test in landfill plant.

The look of membranes after cleaning with cleaners ROptima 513 and ROptima 503 in the landfill plant. Conductivity of permeate was 4913 $\mu\text{S}/\text{cm}$. Feed water pH was 6.49 (after dosage of sulfuric acid). Alkaline cleaning lasted for 5,5 h and acidic cleaning about 1-2 h (CIP procedure).

ROptima® 503 is a liquid concentrated product based on organic acids and phosphonates. It is acidic concentrate specially designed for membranes cleaning from inorganic impurities induced by carbonates and sulphates of calcium, barium, strontium, and iron.

ROptima® 513 is a concentrated alkaline detergent that contains chelating agents and surfactants to speed up the washing process for efficient flushing of sulphated sediments, biological, colloidal, and organic impurities from membranes.



Selection of antiscalant for leachate treatment

Two samples were got from the landfill plant: feed water/filtrate and concentrate. The detailed analysis of water showed that the water/filtrate has a high level of salts. The water consists of a high level of hardness, carbonates, sulphates, chlorides, silica, etc. The calculated Langelier saturation index is about +2, and the calculated Ryznar saturation index is less than 5.5. These indexes show that filtrate has a high level of scaling tendency and will form a heavy scale on the DTRO membranes.

Several products of JurbySoft® and ROptima® products line were tested. The laboratory experiments were done, Ca^{2+} inhibition efficiency was determined, and the appropriate product and dose was selected.

ROptima® 507 antiscalant is a concentrated product based on high-performance organophosphorus compounds (phosphonates). **ROptima® 507** controls the formation of deposits on membranes, thus extending the service life of the membranes and reducing the maintenance costs. **ROptima® 507** is designed to stabilize and disperse salts. The product is used for landfill filtrate with high levels of carbonate and sulphate salts. The mechanism of action of the new class of phosphonates is based on the blocking and efficient dispersion of salt crystallization centers.