

Purification of effluents via membrane separation

An innovative process to purify your wastewater or effluent

THE CHALLENGE

Historically, the treatment and/or purification of an effluent was carried out by classical physico-chemical processes such as adsorption, precipitation, ion exchange, etc. Separation of dissolved species of different sizes (e.g.: Na^+ and UO_2^{2+}) were only feasible through the above processes. To achieve the final goal, the different steps of the process could be complex and costly. Direct separation of two dissolved species was not possible by filtration, which consisted of separating only a liquid and a solid phase.

THE SOLUTION

The membrane process is a relatively recent technology developed since the middle of the 20th century. New developments in the fields of materials science and engineering have led to the development of research on the subject. The principle is relatively simple: a supply solution comes into contact with a semi-permeable membrane, which acts as a filter. Large particles are retained, smaller elements pass through it. This process allows the separation of many elements of very different sizes. Particles of a few hundred μm by microfiltration with ions in the order of 2-3 Å by reverse osmosis. Thus, over the past ten years, many industrial separation processes have emerged in the mining, pharmaceutical, effluent treatment and drinking water treatment sectors... Aware of the prospects in this field, CIME has developed this process in all possible fields of application.

KEY FEATURES

- Reduced consumption of reagents
- Solution purification
- By-product recovery
- Process simplification

Study of the process on a laboratory scale



EXPERTISE & EXPERIENCE

Laboratory tests have been conducted to confirm the possibility of using membrane technology to treat radiologically scarred effluents. The removal rates for uranium and radium were greater than 99.5% for two nanofiltration membranes. This process was transferred to the pilot scale, positioned on site. Lab results have been confirmed: several m³ of mine draining water were treated effectively. Uranium concentrations in the permeate were below the World Health Organisation (WHO) specifications of 30 µg/L.

Application at the Katco mine:

The objective of the membrane project at the Katco site was to assess the technical and economic feasibility of placing membranes on acid uranium eluates to separate sulphuric acid and uranium. The results showed that between 30 and 60% of the free acidity can be recovered in the permeate with, in parallel, uranium recovery rates of between 70 and 98%. This technology will be deployed onsite in 2019.

Mobile pilot



YOUR BENEFITS AT A GLANCE

- Study of the process from laboratory to pilot scale
- Mobile pilot to work on site (20-foot container)
- Several test formats: from 100 mL to 1 m³

Mobile pilot



100 mL to 1m³

CONTACT:

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