



RO Permitting and Integration Services

Every day, Golder specialists face the challenge of managing contaminants of emerging concern in wastewater, sludge and leachate. In some cases, Publicly Owned Treatment Works (POTWs) are re-evaluating their acceptance of leachate as they are forced to comply with increasingly stringent discharge limitations. While there is no magic wand, reverse osmosis (RO) treatment is proving effective for the management of PFAS and other contaminants of concern. By providing permitting, integration and operational support, Golder's experience can help pave the way for a smoother process.

Permitting

Golder is skilled at working with our clients to navigate through the permitting process, and we routinely support permit negotiations with regulatory agencies and the public participation process. We can prepare permit applications and supporting documents including

customized water quality modeling and evaluations. National Pollutant Discharge Elimination System (NPDES) and other water quality related permits can be subjected to public comment and regulatory negotiations. Golder can help negotiate with regulatory staff to ensure that permit conditions are appropriate for a specific site, while addressing the site's permitting needs.

System Integration

Golder provides a broad range of services to assist the solid waste industry in achieving cost-effective facility management and environmental compliance. These services are provided by teams assembled specifically for the needs of the project. The teams include highly qualified engineers, project managers, scientists, designers, and operations specialists that are dedicated to providing complete leachate management services.

Golder can provide integration of reverse osmosis systems including:

- Facility siting
- Leachate conveyance systems
- Discharge piping and outfalls
- Brine management systems
- Building and ancillary support systems

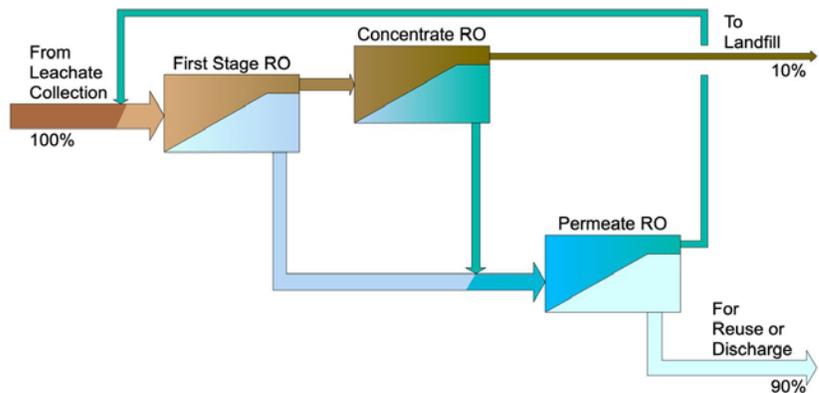
Operations and Maintenance

Golder has a staff of certified operations personnel that actively support facility commissioning and operations. We can also provide complete operations staffs to operate and maintain your facility in full compliance with permit and internal requirements. Golder routinely accepts long-term responsibility for treatment facility operations and maintenance. Appropriately certified personnel operate and/or supervise operations staff. Golder's technical and engineering staff provide support in all aspects of facilities operation, performance, trouble shooting, and optimization.

RO PERMITTING AND INTEGRATION SERVICES



Photo provided by Rochem



Typical Rochem RO Flow Diagram

Confidential Client Municipal Solid Waste (MSW) Landfill

RO NPDES Permitting Project

Golder provided NPDES permitting services to a confidential MSW client installing a Rochem RO system for leachate treatment. Because the state regulators had not previously permitted such a system for leachate treatment, Golder helped to navigate the additional regulatory scrutiny involved with this installation. Permitting included conducting a 6-month receiving waterbody flow study to document flow conditions more favorable to the client than those modeled by the state agencies using existing gaging stations. Golder also successfully completed an antidegradation demonstration for the new discharge and coordinated WET testing and other water quality monitoring for the site. Upon issuance of the NPDES permit, Golder was able to successfully negotiate down many of the initial permit sampling requirements obligated upon the client by the state regulatory agency.

Confidential Client Municipal Solid Waste (MSW) Landfill

NPDES Discharge Permitting

As part of an agency-required NPDES stormwater study at a confidential MSW, Golder completed an approximately 8-month stormwater monitoring program using automated ISCO samplers and associated rain gauges to detect and sample first flush samples of stormwater runoff and additional samples at timed intervals over the subsequent 24-hour period. The study was conducted to detect and assess the level of regulated constituents in stormwater runoff from a roll-off container storage yard. The ISCO sampler was programmed to collect first flush and attenuated flow samples following storms of sufficient size to produce runoff. Golder bottled the samples for laboratory analysis. Using the laboratory analytical results from samples collected under different storm conditions, Golder was able to model impacts to the receiving waterbody at the site NPDES outfall and provide recommendations for addressing the contaminated runoff.

Confidential Client Municipal Solid Waste (MSW) Landfill

Treatment Evaluation and Implementation

Golder evaluated leachate management alternatives including various biological treatment options, deep well injection, continued hauling, and upgrading the flare to boost evaporation capacity. Pilot testing was provided for reverse osmosis as well as a biological fixed film process. The reverse osmosis technology was selected for its ability to consistently meet low limits for mercury and total dissolved solids. A reverse osmosis system was successfully installed with an initial capacity of 40,000 gallons per day and was later increased to 80,000 gallons per day. The system continues to treat leachate with brine recirculation back to the landfill working face. More than ten years of recirculating brine does not appear to have a significant impact on the raw leachate constituents suggesting that brine is retained within the pore spaces of the waste.