



Ox Mountain Landfill is a Sanitary Waste Disposal Facility in Half Moon Bay, California. A Groundwater Treatment System (GWTS) processes landfill-impacted groundwater, using granular activated carbon (GAC) adsorption as the primary treatment mechanism to remove low-level volatile organic compounds (VOCs). The effluent from the GAC vessels is oxidized by air injection to convert dissolved iron to iron-hydroxide precipitate, which was previously removed by clarification process in the Site Sedimentation Basin.

The State-regulated total suspended solids (TSS) limit for the GWTS effluent is 27 mg/l, which is difficult to achieve in the Sedimentation Basin. Invirotreat, the Design Engineer for the GWTS, proposed a low-footprint (72 ft<sup>2</sup>) Ultrafiltration (UF) Membrane System, using Sep™ vacuum-operated, spiral-wound membrane modules to remove the iron-hydroxide solids in place of the 2 acre Sedimentation Basin. The project was approved and implemented in less than 3 months.

Invirotreat contracted with Pure Effect, Inc. to fabricate the UF Membrane Skid. The UF Membrane Skid includes all components of the UF system, including pumps, control valves for backwash, scour blower, and electrical/control panel.

The design parameters of the UF Membrane System for the Ox Mountain Landfill GWTS application are presented below. The iSep™ UF modules are well suited for this application, as they can process TSS feed concentrations of 1,000—2,000 mg/l, and produce essentially “0” TSS in the filtered effluent.

PARAMETERS	UNITS	VALUE	COMMENTS
Design Throughput	gpm	50	40 - 50,000 gpd
Feed TSS Concentration	mg/l	1,000	Up to 2,000 mg/l
Sep™ 500 UF Modules	#	10	0.03 micron
Skid-Mounted UF	ft	6 x 12	Complete System
UF Operation Pressure	psi	-3.0	Filtration Cycle
	psi	8.0	Backwash Cycle
Backwash Rate	gpm	80	at 40 ft
Permeate TSS	mg/l	<1	Essentially None

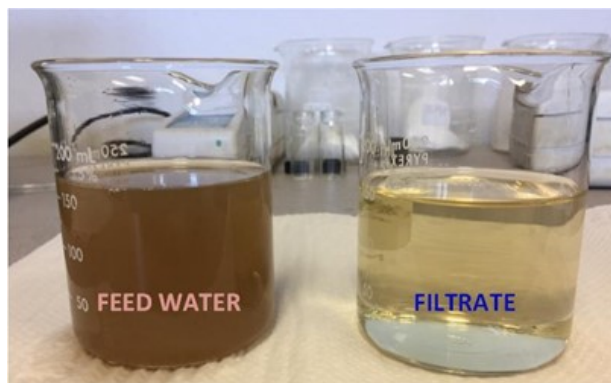
## CASE STUDY— Ox Mountain Groundwater Treatment System, Half Moon Bay, CA

# MICRODYN-NADIR ULTRA-FILTRATION SYSTEM REPLACES SEDIMENTATION BASIN FOR REMOVAL OF IRON-HYDROXIDE PRECIPITATE

Illustration of the feed water and filtrate water quality demonstrates the high performance achieved by the UF Membrane System.

The system is designed to operate safely in a continuous-flow configuration, using a WalChem WIND Controller. The WIND Controller operates the UF Membrane System in full automation mode, using time-sequence to run the filtration and the backwash cycles. The Controller is network capable that will be used in the future for remote monitoring.

The feed tank and the final effluent tank of the UF system are also monitored by the UF Skid Controller, as part of the automated operation sequence. The UF Skid includes electrically actuated valves to control flow configuration during filtration and backwash cycles. Pressure switch and permeate flow meter were installed to monitor the key operating parameters of the UF system. Actual permeate rates exceed 60 gpm, 15% above the design throughput.



Chemical cleaning-in-place (CIP) is used periodically, applying 100 gallons of bleach solution for 2 hours, to remove iron-hydroxide deposits from the membrane surface and restore full performance of the UF System

Invirotreat believes in simple design to ensure effective, continuous operation of its systems. The UF Membrane System proved easy to operate and very effective in removal of the iron-hydroxide solids from the groundwater at Ox Mountain Landfill.

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