

Reverse Osmosis System Saves Canadian Petroleum Wax Manufacturer over US\$150,000

Challenge

For more than 50 years, International Group, Inc. (IGI), has manufactured high-quality petroleum wax based products. IGI has also been known for its commitment to the environment.

IGI recently set out to improve its pre-treatment of incoming city water, which feeds the company's steam boiler system. The existing ion exchange systems used concentrated sulphuric acid and sodium hydroxide, chemicals that posed significant safety concerns when stored onsite. Furthermore, the chemicals caused dramatic swings in the plant's effluent pH as they were sent to drain, making it difficult to maintain a neutral pH in the plant's final effluent.

IGI wanted to discontinue the use of sulphuric acid and sodium hydroxide for the ion exchange systems in the boiler room and improve on the steam boiler system's efficiency, as a cost savings measure. Since IGI's steam plant produces approximately 1.5 million pounds of steam per day, 7 days per week, 360 days per year, it was apparent that the cost savings could potentially be dramatic.

Ultimately, IGI needed a reliable system that would reduce operating costs, make the boiler room a safer place to work, and, most importantly, reduce the amount of chemicals the company was using in the boiler room and sending to the sewer each year.

Solution

GE Water & Process Technologies designed a 150 GPM Reverse Osmosis (RO) system. The system pre-treats the incoming city water, prior to the water

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being fed to the steam boiler system. The RO rejects 98% of the dissolved minerals within the city water, allowing the steam boilers to operate at 100 cycles of concentration versus 10 cycles with the old ion exchange systems. In addition, GE chemically treats the steam boilers, various cooling water systems, the closed systems, and certain process streams within the refinery.

Results

By almost any measure, the GE RO system has been an unmitigated success. Not only has it reduced IGI's boiler system operating costs by over US\$150,000/year by increasing the steam boiler's efficiency by over 3%, but it has also totally eliminated the use of sulphuric acid and caustic in the boiler room. Additionally, it has reduced the amount of boiler blowdown by 10% and reduced the salt discharged to the sanitary sewer by the steam plant water softeners by 70 times the previous amount.

The system has proven to be extremely reliable. The RO System averages 120 GPM, 24 hours per day, 7 days per week, 52 weeks per year. Since February 2004, the RO System has only been offline less than 1% of the time for maintenance, filter changes, and membrane cleanings. In addition, the system has never allowed the boiler feed tank to reach low level.

IGI Wax is proud of the environmental benefits that resulted from this RO System:

- Reduced the salt discharged by the water softeners by 70 times
- Totally eliminated using sulphuric acid and caustic
- Reduced natural gas consumption by 2%, which reduced the emissions from their stack by 2%