



Monolec® R & O Compressor / Turbine Oil (6403)

Hydroelectric Dam in SW Pennsylvania – Lake Lynn, Pa.

Westinghouse Generators

- Eliminated foaming
- Stopped pump cavitation
- Lengthened pump life

Customer Profile

This LE customer in Pennsylvania operates a reinforced gravity concrete-type hydroelectric dam. Total plant capacity is 52 megawatts.

Application

Each of the four Westinghouse® 16-MVA generators is powered by a vertical 18,000-hp Francis turbine. Each of the four turbines has 20 wicket gates to regulate water flow through the turbine. The turbines spin the generators to create electricity. Hydraulic pressure of 150 psi has to be maintained in the wicket gates. If you can't control water flow, the plant can't operate.

Challenge

The wicket gate hydraulic system consists of three 2,000-gallon oil tanks. The hydraulic system consists of three 120-gpm Vican® rotary gear pumps on a closed loop system. Pump cavitation was extremely loud, and each 2,000-gallon oil sump had a 5- to 6-inch layer of foam.

The Vican gear pumps would not automatically cycle in warmer weather. They were designed to cycle to the next pump at 150 psi, but they were not exceeding 145 psi because of cavitation. Instead, the pumps would run for three or four days before operators would observe the continual running and manually switch on the next pump. This long operating time resulted in shorter pump life.

LE Solution

In 1999, the plant's operations maintenance manager wondered if adding LE's Monolec® R & O Compressor / Turbine Oil (6403) to the used commercial grade oil would



Westinghouse generators

reduce cavitation and oil foam levels, and thereby improve pump life. LE's Technical Services Department performed a compatibility study and found that draining 20 percent of the oil and replacing the oil in the sump with Monolec 6403 would reduce the oil foaming tendencies.

Results

Initially, only four 55-gallon drums of Monolec 6403 were installed. With only 220 gallons of Monolec 6403 in the



oil, the 5- to 6-inch head of foam disappeared and the cavitation in the pumps was eliminated. The loud whine of the pumps was greatly diminished. The Vican rotary gear pumps started automatically cycling on and off at 150 psi as they were supposed to.

Over the years, pump life at the plant has greatly improved. In 2002, new pumps had to be installed. These pumps are inspected annually and have always been found to have minimal wear. Even when the units are not generating electricity, these pumps run 24/7/365 to keep pressure on the wicket gates. Monolec 6403 is added to the oil sump whenever makeup oil is required.

“LE 6403 has worked very well for us,” said the satisfied operations maintenance manager.



Other LE Products Used

- Wirelife™ Monolec® Penetrating Lubricant (2001) and Wirelife™ Almasol® Coating Lubricant (2002) – hoist cables in the head gates
- Multilec® Industrial Oil (6803) – Ingersoll Rand reciprocating air compressors, and 30-HP & 100 HP screw compressors
- Monolec® Gear Lubricant (703) – all plant gearboxes, head gate and flood gate gearboxes
- Quinplex® Food Machinery Lubricant (4024) – wicket gate bushings where an environmentally friendly grease is desired
- Almaplex® Industrial Lubricant (1274) – general plant lubricant
- Esco Oil Sight Glasses – on gearboxes over the head gates
- Oil Safe® containers – to prevent lube mixing

Thank you to the plant's operations maintenance manager, and to Larry Boyle, LE lubrication consultant (pictured), for providing the information used in this report.



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Based on actual user experience. Individual results may vary. Not intended to supersede manufacturer specifications.

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