



Application: Steam Turbine

ISOPur Fluid Technologies purifies the oil and the internals of a steam turbine operating with combined hydraulic controls

Introduction

A New England based pharmaceutical company operates its own co-generation power plant. Four steam turbines in the plant were experiencing outages every 18 months for the last 15 years. The turbine overhaul frequency was every 5 years, which resulted in substantial costs and lost production time due to equipment downtime.

The Challenge

The lubricating oil in the turbines was changed out at least once a year and even at that frequency, a bearing failure would occur on one of the four turbines roughly every 18 months. About one-third of these bearing failures involved more serious complications, leading to:

- Costly maintenance
- Part replacement
- Equipment downtime

The company researched purification options and contacted ISOPur to determine whether the patented Balanced Charge Purification (BCP) technology could succeed where centrifuges and fine filters had failed.

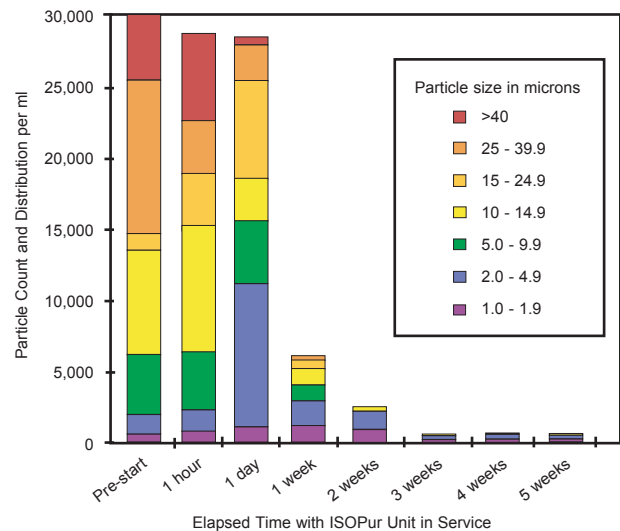
The Solution

The power plant manager tested the ISOPur unit on three turbines in a kidney-loop from the turbine reservoir. The results of the oil analysis after the installation of the ISOPur unit indicated a significant drop in contamination levels over the first five weeks of operation (see Figure 1).

Two and a half years after ISOPur and five years of turbine operation, one of the turbines was opened for inspection and overhaul. Previous overhauls involved removing several inches of sludge and algae from the bottom of the oil sump.

Inspection after the ISOPur installation presented clean internals of the oil sump and pipes. The large oil return lines from the main bearings were also very clean and required no maintenance. In short, the entire system was so spotless that no cleaning was necessary.

Figure 1: Mobil DTE-797 steam turbine particle ct.



	Pre-start	1 hour	1 day	1 week	2 weeks	3 weeks	4 weeks	5 weeks
Total Particles:	29,820	28,340	28,532	6,659	2,305	413	443	337
ISO Code:	24/23/22	24/23/22	23/23/21	21/20/18	18/16/13	16/15/13	16/15/11	16/14/10

ISO code is based on total particle count >2um, >5um, >15um
Particle counts are differential counts per milliliter.

The Return

The financial impact of using the ISOPur system was analyzed and evaluated. The savings considered were reduced oil replacement, elimination of unscheduled outages, extended frequency of overhauls and the savings in overhaul costs directly attributed to improved oil purification by the BCP technology. By installing an ISOPur system on each turbine, the generated projected Net Present Value Savings was \$767,111 per turbine. The impressive internal rate of return on investment was 209%.