SYSTEM AVAILABILITY

Correction Of Varnish Problems In A Power Plant Turbine

Technical Application Bulletin

PROJECT BACKGROUND

DISCOVER

- Waste incineration plant with 10 MW power.
- Regular problems when the turbine is started up.
- This was determined to be caused by excessive varnish deposits in the control block.
- The turbine oil had a service life of roughly 18 months.
- The goal this customer wanted to achieve was to extend the filter life, have fewer oil changes, and lessen unscheduled downtime.

DIAGNOSE

- A TMU was brought onsite to show the ISO contamination level of their oil.
- 22 machines were then surveyed for oil condition through bottle samples. The oil in many of these machines was found to be either the incorrect oil or oil having high amounts of wear metal.
- From this analysis, Schroeder determined the customer was using an inexpensive return-line filter element.

INDUSTRIES

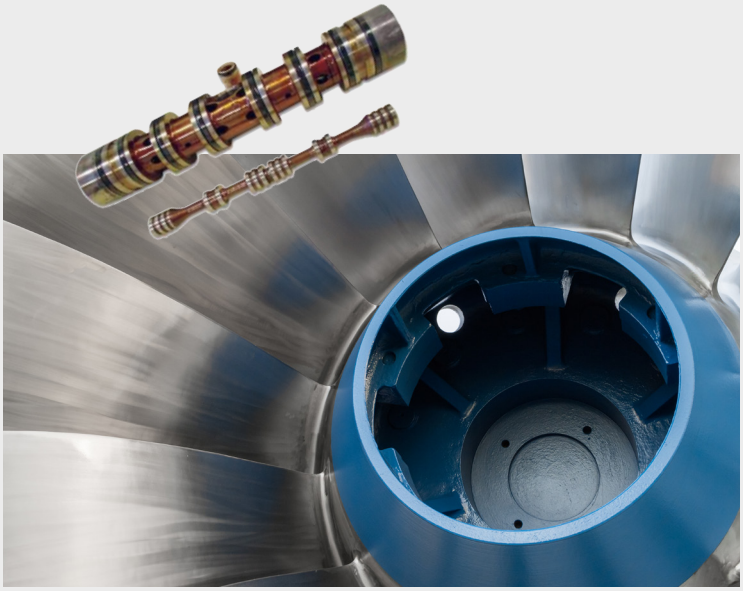
DESIGN

What We Did: On the basis of the analysis, the customer began using a Schroeder VMU | Varnish Mitigation Unit a service-friendly filter power unit to remove oil aging products (varnish) from mineral-oil-based turbine oil:

The VMU is used in the bypass flow and offers the following product features:

- Removal of solid or gel-like oil aging products
- Flow rates between 2.2 and 8.9 L/min
- Available as mobile or stationary system

In this case, a stationary system was selected that constantly removes oil aging products from the turbine oil.



DELIVER

- Reduced oil consumption and improved environmental footprint.
- Following inspections performed by the lab, it was possible to increase the oil service life from roughly 1.5 to roughly 5 years with the VMU.

- The customer's turbine oil consumption was reduced as follows:

Power Plant Turbine	Without VMU	With VMU	Savings
Oil Service Life	1.5 years	5 years	+$3.5 years
Annual Oil Usage	1,408 gal.	422 gal.	-986 gal.
Oil Costs	$17,362 / year	$5,213 / year	-$12,149 / yr.
Disposal of Oil	$3,101 / year	$931 / year	-$2,170 / year
Replacement Valves	$9,310 / year	$2,327 / year	-$6,983 / year

- The customer's environmental footprint was improved thanks to the reduced oil consumption and resulting lower amount of waste oil.

- **Prevention of varnish-based turbine downtime:**
- The VMU filter power unit was able to correct the problems occurring when the turbine was started up.
- The customer no longer has unscheduled turbine downtime caused by varnish.

ROI

Oil Service Life

+3.5 Years

Annual Oil Usage

-986 gal.

Oil Cost Savings

$12.1K

Underlying values:
Oil Service Life = 1.5 years of operation w/o VMU; 5 years w/. 5 - 1.5 = 3.5 years of additional operation

Oil Cost Savings per year = $17,362 per year of new oil w/o VMU; $5,213 w/. $17,362 - $5,213 = $12,149 in yearly savings of oil.

PRODUCT SPECS

VMU | Varnish Mitigation Unit

Flow Rating: 2,200 gpm
Max. Viscosity: 365 SUS
Operating Pressure: 116 psi (8 bar)
Fluid Temperature:
86°F to 140°F
Seals: FKM
Weight: 154 lbs. (70 kg)

CUSTOMER BENEFITS

- Removal of solid or gel-like oil aging products
- Increased operating reliability of the system as a result of fewer deposits in hydraulic valves
- Increased oil service life

FURTHER APPLICATION AREAS