Case Study in Power Generation Industry

Trinity Refining & Safety Systems

Oil & Fuel Solutions

TRINITY
OIL, FUEL, AND WATER SOLUTIONS

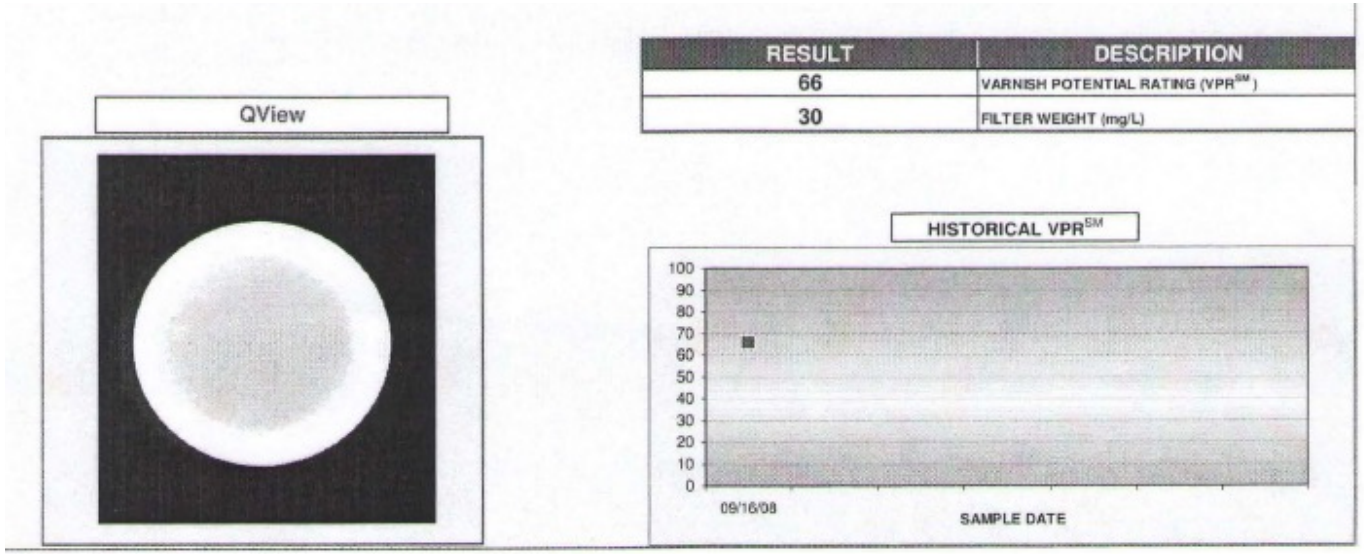
MAKING GREEN GREENER TRINITY™

The Situation

- This case study comes from a “peaking station” at a large power plant
- The turbine at issue is a GE frame size 6 gas powered turbine
  - The turbine maintains temperatures, 140*F
  - The capacity of the turbine is 3700 gallons
- Moisture and varnish accumulate to cause the following problems:
  - reduced heat transfer
  - sticking valves
  - equipment failure

Initial Oil Sample

- The varnish potential rating was measured at 66 per the Quantitative Spetrophotometric Analysis, used by Analysts, Inc.
- The level of varnish is found to be high
- The .45 micron filter patch visually showed some darkening

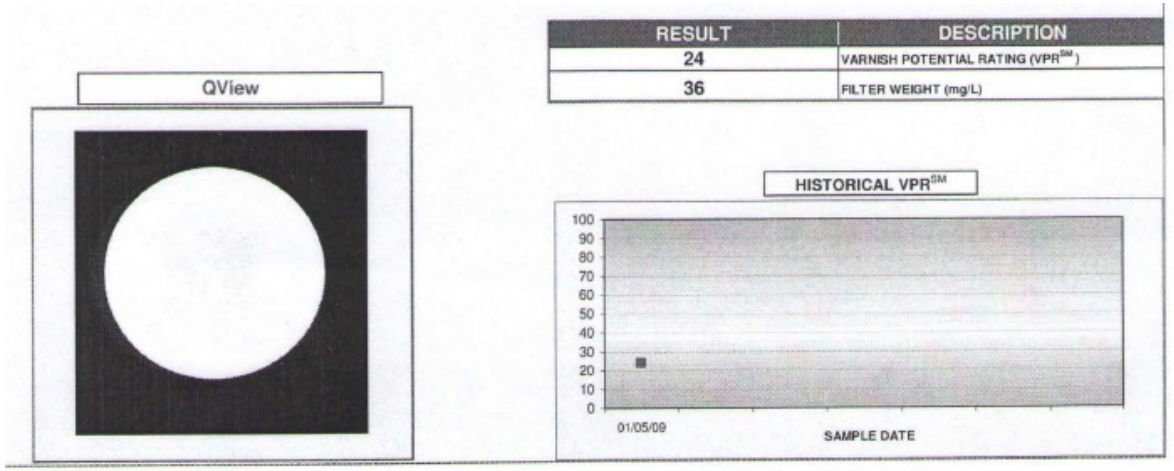


Test

- A Filter System was added to the turbine oil sump
- The filter was run continuously for 4 weeks without interrupting operation of the turbine.
- After 4 weeks a new sample of oil was taken to evaluate the effectiveness of the filter…

The Results

- The sample was measured at the same lab with the same process as the “before” sample
- This sample measured 24 on the varnish potential rating, in the normal range
- The .45 micron filter patch showed very little visually



Test Results Summary

- The filter was able to be used without any down time to the turbine operation
- Varnish was removed quickly and efficiently using two filter sets
- Removal of the varnish will extend the service life of the oil and keep the equipment operating at high levels of cleanliness
- The cost to clean and maintain the oil was less than 20% of the cost of changing the oil in the system

Cost Savings Results

- Without filters
  - Oil change every 8 years
  - 3700 gallons x $6 per gallon = $22,200
  - Clean-up of varnish build-up requires 2 days of downtime, cleaning chemicals and flushing. The cost of this clean-up is $60,000 to $80,000
- With filters
  - Oil change every 12 to 18 years
  - Initial cost of filtration system = $12,890
  - Annual cost of replacement filters and electricity = $2,000 / year
  - Cleaning and flushing not required
  - **Total Savings over 8 years = ($22,200 + $60,000) – ($12,890 + $2,000 x 8 years) = $49,310**
  - **Total Savings over 16 years = ($44,400 + $120,000) – ($12,890 + $2,000 x 16 years) = $119,510**
  - **Downtime cost was not even factored in!**

Overall Take Away

- Maintaining oil is far more efficient than changing oil
  - Keeping the oil clean keeps the machinery operating at peak performance
  - Downtime is eliminated
  - Costly cleaning is not required
- **The cost to clean and maintain the oil was less than 20% of the cost of changing the oil in the system**