



TURBINE TIPS

Turbine Tips provided by Pond and Lucier, LLC. ®

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Subject: Lube Oil Heat Exchangers (Coolers) Need Attention

Applies to: General Electric gas turbines

GE gas turbines use water-to-oil heat exchangers (also known as coolers) to cool the lube oil. Also, the atomizing air pre-cooler uses a water-to-air heat exchanger. These heat exchangers pass an aqueous mixture of water and ethylene glycol as the coolant through the inside of the tubes. Heat is transferred from the oil to the coolant by passing over the outside of cooling tubes. Fig. 1 shows a typical lube oil heat exchanger with the water pipes (orange) connected.

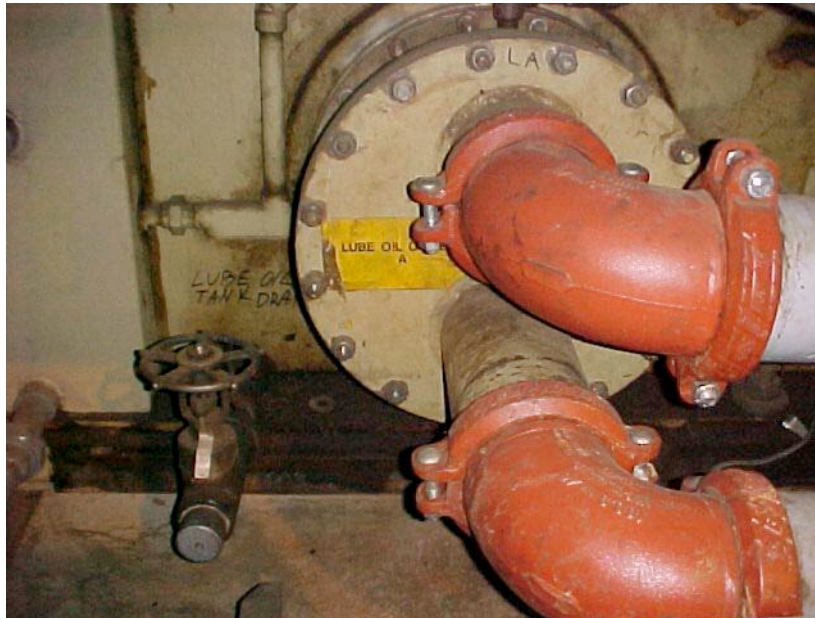


Fig. 1: Lube Oil Heat Exchangers in Turbine Base

Fig. 2 below shows a cooler bundle removed from an oil tank after the oil has been drained. The bundle is carefully rigged so as not to damage the fins on the outside of the tubes. It will later be boxed and shipped for cleaning.

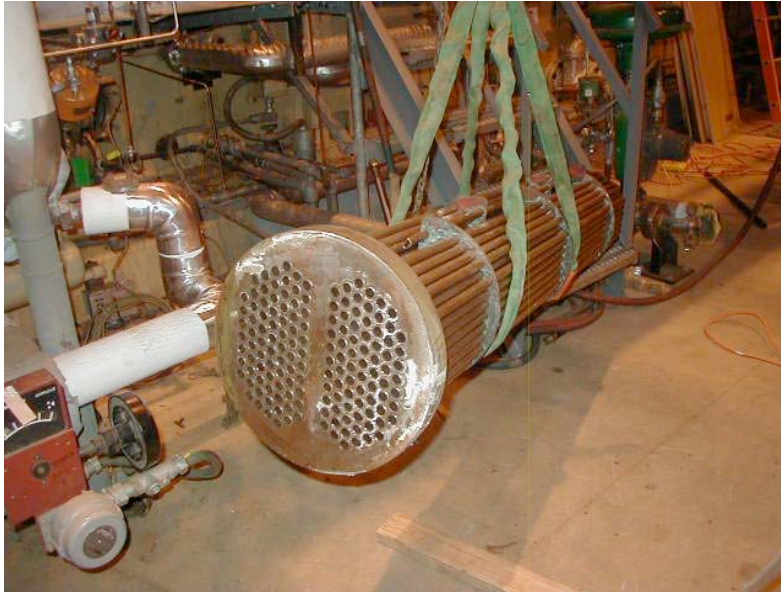


Fig. 2: Lube Oil Heat Exchanger removed from Oil Tank

The heat exchanger above shows the passageways “clusters” for the coolant supply and return lines. The cover shown in Fig. 3 shows the build up of deposits. Below, the left-hand cooler has more rust deposits than the right-hand one, suggesting that it was operated more often than the other.



Fig. 3: Lube Oil Heat Exchanger (Cooler) Covers

The end cover and bundle ends in Fig 3 above show how the coolant flows in one direction in “U” shape and returns in the opposite direction. The cooler bundle shown in Fig. 4 is being boxed to be sent out for cleaning. You can observe the design of the cooler tubes and stand-off supports.



Fig. 4: Heat exchanger tube bundle being prepared for shipment

Sometimes problems with the cooling system (high lube oil temperature, for instance) may be resolved by adjusting the Robertshaw valve, like the one shown in Fig.5 below. However, if the heat exchanger is “clogged” internally, the heat transferred from the oil to the water will be diminished. Adjusting the valve in this case will not likely reduce the turbine lube oil temperature significantly, particularly on high-ambient-temperature days. The cooling passage tube must be flushed with a solution that will dissolve the rust and sludge.



Fig. 5: Robertshaw Temperature Regulator Valve, VPR

For further information about cleaning lube oil heat exchangers, contact Dave Lucier (518-330-4801) or Charles Pond (913-220-5316) of ***Pond and Lucier, LLC***.