

Oil analysis predicts failure, reduces unscheduled downtime



A lab assistant prepares samples for testing.

By BOB CHUMLEY
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As anyone in the gas compression industry knows, downtime is enemy number one. In an environment where equipment is expected to run 24 hours a day, 7 days a week under extreme conditions, downtime due to equipment failure can quickly put a company out of business. Oil analysis can predict equipment failure before it happens and eliminate unscheduled downtime — saving valuable time and a lot of money.

Oil analysis is a snapshot of the condition of both the equipment and the lubricant. Analysis not only

detects equipment failures in the making, but also pinpoints the root cause of a problem, thus preventing catastrophic failures and costly losses in production.

Since natural gas engines are fueled by well head gas — impurities and all — the engine oil should be tested routinely for contamination and wear. Testing always should include total acid number and oxidation/nitration because of the engine's high susceptibility to corrosion due to the unpredictable condition of the gas and extreme environmental operating conditions.

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A lab tech runs a total acid number on a sample.

Oxidation occurs when the oil breaks down from high operating temperatures and from contaminants such as wear metals, dirt or coolant. Nitration is caused when excessive blow-by (combustion by-products) gets into the oil, reacts with moisture and produces nitric acid. As nitration increases, the oil becomes highly corrosive and starts attacking softer metal components such as bearings made of lead, tin, copper and aluminum. If left unchecked, viscosity increases to the point of lubrication starvation, which ultimately leads to premature, and oftentimes catastrophic, failure.

Coolant leaks, which oil analysis will detect long before they can be seen, are one of the biggest reasons for natural gas engine failure. A blown head gasket can allow coolant to contaminate the oil. Depending on the severity of the leak, the oil can become as viscous as tar in a matter of hours. Before long, the bearings and the crankshaft have failed, pushing repair costs into the thousands and replacement costs to over a million.

Monitoring upward trends in oxidation and nitration, acid number and viscosity allows a mechanic to schedule downtime for oil changes and routine maintenance. When maintenance becomes truly predictable, production increases and profits go up. But oftentimes, scheduled downtime is easier said than done.

Engines and compressors at booster stations are at somewhat of an advantage over those in the field. Stations that typically house several units usually have multiple maintenance personnel on hand 24/7 to take routine oil samples every 30 days or so and perform repairs.

A remote well may have only one or two employees, who may or may not be mechanics, and no parts in inventory onsite or scheduling that enables maintenance to be done at off-peak times. Harsh operating conditions, limited manpower and emergency maintenance situations often hinder preventive

maintenance such as routine oil sampling. If a unit goes down in the middle of the night or on a holiday, "hot shot" charges for contracted mechanics brought onsite and overtime mount up quickly. If it's peak season or if the unit has to be moved to be repaired, costs can skyrocket.

The solution to controlling these costs is to put major effort into sampling regularly and finding a reputable, accredited laboratory that's close and assures fast turnaround. A lab that is ISO 17025 A2LA accredited ensures accuracy and reproducibility by reliable methods and processes - that results are traceable to a standard. An ISO 9000 certification guarantees only that production is always done according to the same procedure — it doesn't have to work.

Depth of scope is also extremely important. A laboratory may claim to be ISO 17025, but in reality may have only a handful of tests in its scope. Always check to make sure all the testing your equipment requires falls within the laboratory's ISO 17025 scope.

Bottom line: If equipment is down, it's costing you money. Highly contaminated operating environments, extreme operating conditions and the economics of equipment replacement only increase the value of oil analysis as a necessary part of managing natural gas engine and compressor reliability. 📌

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