

Regional Construction Firm Keeps Its Fleet Running Using On-site Oil Analysis

Janet Keefe | Global Product Manager

New England Utility Constructors, Inc. (NEUCO), a Centuri Company, specializes in turnkey construction services for pipeline and natural gas and electric distribution for critical energy needs in the New England area. The efficient operation of the company's equipment is crucial to completing construction jobs on time and meeting the energy demands of its customers. Neuco's maintenance team plays a key role in responding to the customers' needs. The firm's operations include a primary service center with four bays and six mechanics located in Neuco's Lawrence, Massachusetts headquarters as well as regional centers in Maine and Cape Cod. In addition, Neuco utilizes two mobile maintenance units that visit job sites on a daily basis to perform routine preventative maintenance actions such as oil changes and equipment inspections, along with in-field repairs.

Neuco's fleet consists of a mix of 175 light, medium and heavy duty vehicles which range from pickups to tractor trailers, along with 28 backhoes, 52 compressors and six Bobcats. It keeps vehicles in the fleet well past their warranty periods so keeping up on maintenance helps to extend the life of the equipment. Neuco uses the same oil analysis and maintenance practices for all their vehicles, regardless of age or warranty status.

Startup of the Oil Analysis Program

Neuco has been analyzing oil since 2001 when its oil supplier offered oil analysis as a service through the use of an outside oil lab. It quickly realized the benefit of oil analysis when it identified several engines with mechanical issues that were repaired

while they were still under warranty. One of those engines was repaired by the OEM with less than 1,000 miles left on the 100,000 mile warranty. If the coolant leak had not been identified then, the engine would most likely have failed after the warranty ended, resulting in a \$20,000 repair bill.





"Testing oil during the warranty period is especially useful to identify any issues while the equipment is still covered by the OEM," said Barry Mirabella, Maintenance Supervisor. "They have never had a problem with an OEM rejecting the results from oil analysis especially because they have a well-established oil analysis program as part of their maintenance practices. "In fact the OEMs usually see it as a head start on investigating a problem," said Mirabella.

Neuco changed from using an outside lab to using an on-site analyzer in 2011 when it purchased a TruckCheck oil analyzer from On-Site Analysis, Inc. Neuco liked getting immediate results to perform the necessary maintenance rather than waiting for the oil lab to send the results days later. The team decided it would test more oil samples

because it would be easier than preparing samples and sending them to the lab. Neuco currently tests about 20-25 samples per month which includes the engine oils in all their vehicles, along with transmission and gear oils.

Optimizing Maintenance Practices with Oil Analysis

As oil and engine technology advanced, OEMs stipulated the use of lower weight oil and moved drain intervals out as high as 30,000 miles. Many mechanics were skeptical of the ability for the oil to hold up that long, but by doing oil analysis at 10,000 mile intervals Mirabella said he was able to consistently monitor the condition of the oil and feel confident that it was not over-extended. At the same time, oil analysis also showed some equipment, such as vacuum trucks or vehicles equipped with on-board air compressors that idle most of the day, needed to have more frequent oil drain intervals than the OEM specified by mileage. The team checks oil samples for this equipment more frequently to monitor the oil condition and eliminate overextending the oil life.



"We have not found it difficult to add oil analysis into our maintenance work flow. We either take a sample at the time we are draining the oil anyway or it is taken as a spot check on certain vehicles; so it is not a lot of extra work and the analyzer is very easy to run," said Mirabella.

Its fleet is located around New England at remote work sites so it does not have the benefit of having the vehicles available on a regular basis in the maintenance facility. Neuco relies on its mobile maintenance units to go to the job sites to service the equipment. At that time, technicians will perform the oil drains on the vehicles which are scheduled and they take an oil sample to bring back to the maintenance facility. They note the truck number and the mileage. Then, that oil sample is run on the analyzer to determine if there are any underlying mechanical issues that need to be addressed. While on the job site, the mobile maintenance unit can collect oil samples from the high idle equipment so those samples can be checked for oil condition even if they are not drained at that time. Although the maintenance unit does not use the analyzer primarily as a tool to extend oil drains, the team feels it has better optimized the drain intervals – extending on some and shortening on others.

For those vehicles based at the headquarters, the maintainers check the oil condition routinely and will extend the oil drains whenever possible as indicated by the oil analysis.



Spectro MicroLab Upgrade

Neuco recently had Spectro Scientific perform an upgrade on their original analyzer to install the current hardware and software packages. The upgrade brings this seven year old instrument up to the equivalent of a current Spectro MicroLab® model. These upgrades are available for all OSA4 model analyzers.

Oil Analysis Benefits on the Job Site

Dave Slater, Manager of Field Support said, "If oil analysis identifies a problem that needs to be repaired, it allows us to plan for it so we can schedule that repair and send a different truck to the job site. If a truck break downs on a job site, there is more than just the repair costs of that truck to deal with for the unexpected failure. We have to get the truck towed in for service, we have to find an available replacement vehicle to send to the job site and then we have to rearrange the maintenance shop schedule to repair the vehicle on short notice. In the meantime, it can cause a work stoppage at the job site which affects job deadlines and adds man-hour costs with the idle work crew waiting for necessary equipment." The primary use of oil analysis is to identify mechanical issues before it causes an in-field failure which would then affect the job site performance.

"Oil analysis can also help us make decisions on our overall asset management," said Slater. "There have been times we planned to sell off a truck in a year or two but if the oil analysis has identified a major issue that is not worth investing in the repair at that stage, then we might choose to liquidate that asset early."

Oil analysis helps Neuco manage its equipment and maintenance workflow more effectively and respond to customers' needs by improving equipment availability and extending the life of its vehicles.

Oil Report Example

Oil analysis has been very beneficial in identifying coolant contamination well before the coolant can be detected visually. Neuco has had oil analysis reports show elemental traces of coolant indicating an EGR cooler failure which can save about \$10,000 in repair costs by repairing the EGR cooler rather than a failed engine.



Account: NEUCO
Address:
Phone:
Email:

Vehicle ID: 1851
Truck Make: BOBCAT
Truck Model: KUBOTA
Vehicle Year : 2012

Component ID: NA100
Component Type : DIESEL ENGINE
Component Make: BOBCAT
Component Model: S185

Oil Brand: SHELL
Oil Type: RIMULA SUPER
Oil Weight: 15W40
Sump Capacity: 11 QUARTS
Viscosity Limit 40 Deg C 92 - 124
Viscosity Limit 100 Deg C 12.5 - 18.3

Diagnosis for current sample
LOW TIME ON OIL LIMITS ACCURACY OF TEST DATA. HOWEVER, ENGINE WEAR RATES NORMAL FOR FIRST OIL CHANGE AND OR BREAK-IN OVERHAUL PERIOD. THE ELEVATED WEAR METAL(S) SHOULD BE CONSIDERED BREAK-IN MATERIAL. HEAVY CONCENTRATION OF WATER PRESENT. COOLANT ADDITIVE(S) PRESENT. SOOT LEVEL HIGHER THAN TYPICAL FOR THE GIVEN TIME ON OIL. POTASSIUM LEVEL HIGHER THAN TYPICAL. CHECK FOR SOURCE OF WATER ENTRY. COOLANT CONTAMINATION IN OIL POSSIBLE. IF EGR EQUIPPED, CHECK EGR VALVE AND/OR EGR COOLER. ADDITIONAL SOURCES ARE BLOWN HEAD GASKET AND/OR CRACKED HEAD OR BLOCK AND AIR COMPRESSOR SYSTEMS (IF SO EQUIPPED). ADVISE USE OF ADDITIONAL DIAGNOSTIC TOOLS TO DETERMINE COURSE OF CORRECTIVE ACTION. OIL DRAIN AND REFILL MAY BE NECESSARY. CONSULT SERVICE PROVIDER FOR FURTHER RECOMMENDATIONS. RESAMPLE IN 2,500 MILES - 4,000 KM - OR 50 HOURS TO CONFIRM OR ESTABLISH A TREND. THIS TEST WAS PERFORMED USING A CALCULATED VISCOSITY READING. DIESEL FUEL CAN BE DIFFICULT TO IDENTIFY IN DIESEL OIL SINCE THEY ARE REFINED FROM SIMILAR OIL STOC

Legend
ABNORMAL
 SEVERE
 X = NOT TESTED / NOT APPLICABLE
 - = NOT DETECTED
 NA = NOT AVAILABLE C = CALCULATED M = MEASURED

Analysis Results:	Units	Current Sample
Sample ID	599	182
Date Analyzed	4/5/2018	11/20/2015
Date Sample Taken	4/5/2018	11/19/2015
Top Up		
Miles on Oil	536	200
Miles on Component	536	1240
Oil Changed	Y/N	No No

Oil Condition:			
Nitration	abs	<2.0	<2.0
Oxidation	abs	5.2	<2.0
Total Base Number	mg KOH/g	7.4	9.0
Viscosity @ 100°C (C)	cSt	15.6	13.4
Viscosity @ 40°C (C)	cSt	110	109
Viscosity Index		151	120

Contamination:			
Glycol	%	-	-
Potassium	ppm	42	<2
Silicon	ppm	<2	6
Sodium	ppm	85	2
Soot	%	2.1	0.3
Water	%	1.7	<0.1

Wear Metals:			
Aluminum	ppm	20	<2
Chromium	ppm	10	3
Copper	ppm	5	9
Iron	ppm	157	10
Manganese	ppm	0	X
Molybdenum	ppm	280	9
Nickel	ppm	0	X
Lead	ppm	7	<2
Tin	ppm	<2	<2
Titanium	ppm	0	X
Vanadium	ppm	6	X

Additives:			
Barium	ppm	0	X
Boron	ppm	1	X
Calcium	ppm	6310	X
Magnesium	ppm	99	X
Phosphorus	ppm	584	X
Zinc	ppm	1619	X

Additional Tests:			
Fuel Dilution	%	15.8	
Total Acid Number	mg KOH/g	0.3	
Total Ferrous	ppm	14.7	
Water	%	13.7	