

18419 EUCLID AVENUE  
CLEVELAND, OH 44112-1016  
(800) 726-5400, FAX (216) 383-9633

CUSTOMER NO.: 18421  
UNIT NO.: 5026  
DESCRIPTION: DIESEL ENGINE  
END USER: LOCOMOTIVE MANAGER  
MONTREAL MAINE & ATLANTIC RR  
DERBY, ME 04463

MAKE: GE  
MODEL  
OIL BRAND: EXXON  
OIL TYPE: DIOL 17RD 2000  
SERIAL NO.:  
FUEL TYPE: DIESEL

NO. COPIES 1

**SAMPLE DATA**

LAB#	SAMPLE DATE	TIME ON OIL	RECEIPT DATE	TIME ON UNIT
10618	12/21/2006	10000	01/15/2007	500000
219571	09/19/2006	10000	10/14/2006	500000
3945	12/24/2005	10000	01/06/2006	500000
220562	09/07/2005	10000	09/29/2005	500000

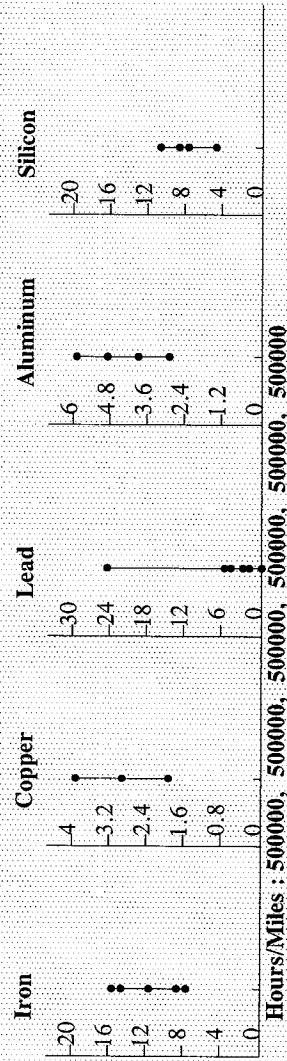
**SPECTROCHEMICAL ANALYSIS (ppm)**

IRON	CHROMIUM	LEAD	COPPER	TIN	ALUMINUM	NICKEL	SILVER	SILICON	BORON	SODIUM	MAGNESIUM	CALCIUM	BARIUM	PHOSPHORUS	ZINC	MOLYBDENUM	TITANIUM	VANADIUM	POTASSIUM	FUEL (%VOL)	VIS @ 40 C	VIS @ 100 C	CSF	WATER (%VOL)	SOOT/SOLIDS (%WT)	COOLANT
8	0	0	3	0	5	0	0	8	2	12	32	5440	0	6	4	123	0	0	0	<1	N/A	15.31	0	0.9	N/A	
9	0	3	3	0	5	0	0	9	2	11	38	4867	0	7	9	171	0	0	0	<1	N/A	16.41	0	1.2	N/A	
15	1	25	3	0	6	0	0	11	8	284	20	4951	0	10	10	81	0	0	0	N/A	N/A	N/A	0.02	1.0	N/A	
12	1	2	2	0	3	0	0	5	1	5	12	4810	0	4	5	113	0	0	0	<1	N/A	15.20	0	1.1	N/A	

**ADDITIONAL TESTS**

LAB#	TBN
10618	10.96
219571	9.51
3945	8.60
220562	10.05

**GRAPHICAL ANALYSIS**



**LAB# ANALYSIS RECOMMENDATIONS**

RESULTS OF TEST PERFORMED INDICATE NO CORRECTIVE ACTION REQUIRED.

10618

RESULTS OF TEST PERFORMED INDICATE NO CORRECTIVE ACTION REQUIRED.

219571

NOTE: TEST RESULTS INDICATE THE PRESENCE OF WATER. NOTE: BORON AND SODIUM LEVELS APPEAR TO BE HIGH. RECOMMEND INSPECT ENGINE FOR INTERNAL WATER LEAKS. \*\*\*RESULTS REPORTED BY FAX\*\*\*

3945

RESULTS OF TEST PERFORMED INDICATE NO CORRECTIVE ACTION REQUIRED.

220562

Key  
A: Abnormal C: Critical

LOCOMOTIVE MANAGER  
MONTREAL MAINE & ATLANTIC RR  
18 B & A AVE  
DERBY, ME 04463

ANALYST-MAL

ANALYST-MAL

ANALYST-JJL

THE FOLLOWING INFORMATION HAS BEEN PROVIDED TO ASSIST IN THE INTERPRETATION OF YOUR OIL ANALYSIS.

WEAR METALS

These metals indicate wear on particular components of an individual unit. The particles of these metals will indicate a wear problem on the microscopic level before the problem can be detected by conventional means. The existence of a wear problem is determined not only by absolute values of metals, but more importantly a relative increase of trend in one or more of these metals.

WEAR METAL SOURCES

- Iron ... Cylinders, Gears, Rings, Crankshafts, Liners, Bearings, Housings, Rust.
Chromium ... Rings, Roller/Taper Bearing, Rods, Platings.
Lead ... Bearing Overlays, additive in gear oil and gasoline.
Copper ... Bushings, Bearings, Thrust-Washers, Friction Plates, Oil Cooler, additive in oil.
Tin ... Bearings, Bushings, Pistons, Platings.
Aluminum ... Pistons, Bearings, Pumps, Blowers, Rotors, Thrust-Washers.
Nickel ... Valves.
Silver ... Bearings, Bushings, Platings.
Manganese ... Trace elements in liners and rings, additive in gasoline.
Titanium ... Trace element.
Vanadium ... Trace element.

CONTAMINANTS

These elements can be an indicator of both internal and external contamination. The source and amount of contamination can be determined by comparison to a previously normal sample or to a new oil reference. Specific tests for some contaminants can supplement the analysis.

CONTAMINANT SOURCES

- Silicon ... Element used to determine the level of airborne dirt and abrasives in the oil (sometimes used as an anti-foam agent).
Boron ... Present in most permanent anti-freeze systems and cooling system inhibitors (sometimes used as an additive).
Sodium ... Present in most permanent anti-freeze systems and cooling system inhibitors (sometimes used as an additive).
Potassium ... Present in most permanent anti-freeze systems and cooling system inhibitors (sometimes used as an additive).

WATER AND SEDIMENT

Reports percent water and percent insolubles (ASTM D-91).

GLYCOL

A specific test for the presence of Glycol (Anti-Freeze) in an oil (ASTM D-2982).

ADDITIVES

These elements are blended into the oil in different forms and quantities by the manufacturer. The additive package in an oil will vary depending on the type of oil.

ADDITIVE FUNCTIONS

- Magnesium ... Dispersant/Detergent additive.
Calcium ... Dispersant/Detergent additive.
Barium ... Dispersant/Detergent additive.
Phosphorus ... Anti-Wear additive.
Zinc ... Anti-Wear additive.
Molybdenum ... Anti-Wear additive.

FUEL DILUTION

Unburned fuel in the oil may signal fuel system leaks or incomplete combustion.

FUEL SOOT

A result of incomplete combustion, blow-by. High levels may indicate combustion problems or overextended drain intervals.

VISCOSITY

The kinematic viscosity (ASTM D-445) determined at 40° C and/or 100° C is a measure of the flow rate of an oil in relation to time. This data is used to assign an SAE grade to an oil.

ENGINE OIL VISCOSITY CLASSIFICATION CHART
MIN-cst-100° C-MAX-cst
SAE GRADE
10W 4.10
20 5.60
30 9.30
40 12.50
50 16.30

Spectrochemical Analysis
Determines component wear, airborne dirt, cooling system contamination, and oil additive concentrations. Information is reported in parts per million (PPM).

Physical Properties

Changes in the physical qualities of the lubricant are determined and evaluated. These changes and the presence of contaminants affecting the properties of lubricants have a direct bearing on its serviceability.

This key section gives the customer an "at a glance" check at their rail's wear trend for the last six sample histories. For industrial applications, this section will contain detailed particle count data.

Our data provides specific information inherent danger to a piece of equipment, the customer is alerted to the emergency by phone or fax.

staveley-services logo and report header information including customer name, address, and contact details.

Customer Unit Information

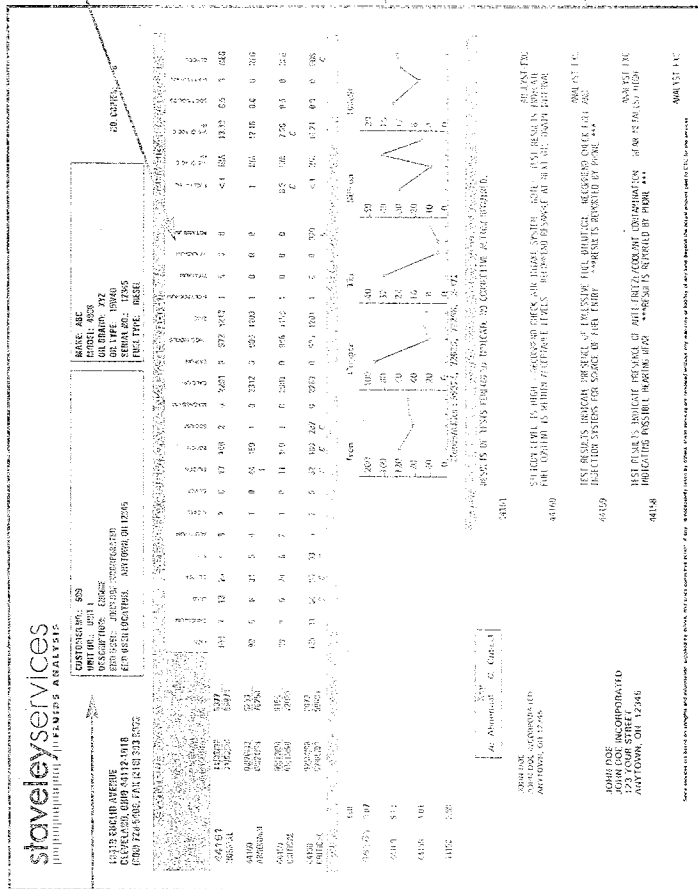
This section of the report lists the identification of the unit sampled, equipment manufacturer, model, oil brand and oil type. This information is supplied by the customer.

Sample Data

Indicates that sample was taken/analyzed on and unit location. Laboratory certification number is in or outside factory is determined the unit manufacturer of such sample is listed.

Additional Test Results

Regarding additional test results (e.g. TAN, TBN, oxidation and nitration) not part of spectrochemical tests reported in these sections.



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