

**Analysis Report**

Component Information		Sample Information		Customer Information	
Machine Type:	Low Speed Diesel	Sump Size:	5,320	Received:	01/15/2016
Lubricant:	MOBIL/Mobilgard 300	Report:	01/15/2016	R-5 - Ship A-201	
Machine MFG:	SULZER	Sample No.:	2695 - 2 - 1 - 17	Port Example	
Machine MOD:	6RND90	Data Analyst:	DR	Baltimore, MD	
				Contact:	Jack Boilerman

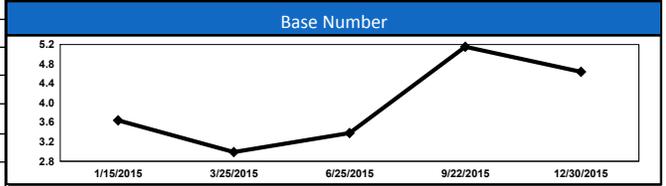
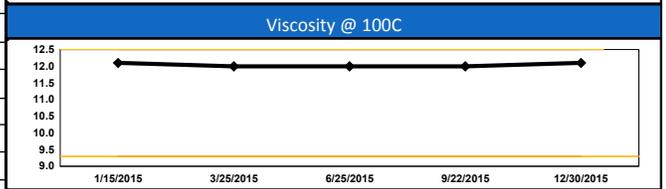
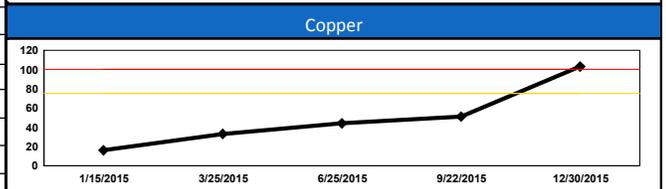
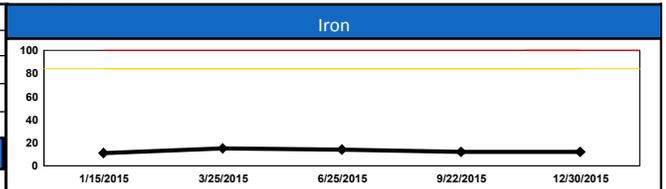
**PROBLEMS**  
 HIGH COPPER.  
 Low VISCOSITY 100C  
 EXCESSIVE FUEL DILUTION

**COMMENTS** Elevated wear metals may indicate accelerated machine wear. Inspect unit for abnormal noise, vibration and high temperature.  
 The viscosity is out of range due to excessive fuel contamination in the fluid. Fuel dilution level is above acceptable limits. Locate source of fuel leakage or possible cause of contamination prior to changing oil.

**CUSTOMER NOTES** Mach Hours: 86617 \* Last oil change on 3/1/2012

Date Sampled	NEW OIL	12/30/2015	9/22/2015	6/25/2015	3/25/2015	1/15/2015
Lab No		1616750	1551194	1494456	1441548	1405210
Machine / Lube Cond.		M / N	N / N	N / N	N / N	N / N
Lube Hours		2755	2755	2999	4	2753
Machine Hours		86617	86617	86615	86373	86369

ELEMENTAL SPECTROSCOPY (ppm) ASTM D5185 Mod (-) indicates below detection limit						
Wear Metals	Iron	12	12	14	15	11
	Copper	103	51	44	33	16
	Lead	-	-	-	5	-
	Aluminum	2	-	-	-	-
	Tin	-	-	-	-	-
	Nickel	-	-	-	-	-
	Chromium	-	-	-	-	-
	Titanium	-	-	-	-	-
	Vanadium	7	8	7	8	6
	Silver	-	-	-	-	-
Additives	Calcium	1733	1790	1697	1996	1631
	Magnesium	10	11	12	13	12
	Phosphorus	173	167	170	217	157
	Zinc	226	234	232	287	203
	Barium	-	-	-	-	-
Contaminants	Molybdenum	-	-	-	-	-
	Silicon	4	5	4	6	5
	Boron	8	41	10	11	8
	Lithium	-	-	-	-	-
	Sodium	50	38	43	60	41
Potassium	-	-	-	-	-	



FTIR SPECTROSCOPY (Indexing Numbers) ASTM E2412						
Oxidation		3	2	2	2	2
Glycol		0	0	0	0	0
Soot		3	3	4	3	3
Nitration		5	5	5	5	5

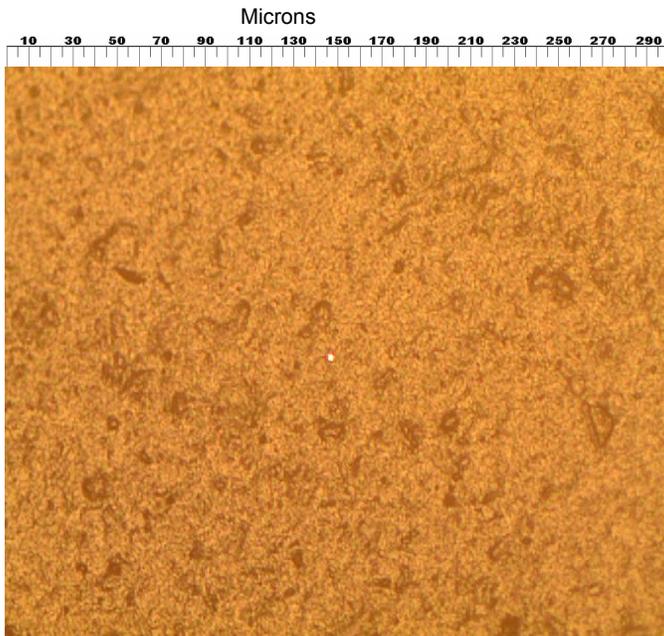
VISCOSITY (centistokes) ASTM D445						
Viscosity@100°C		11.1	12.0	12.0	12.0	12.1

Date	Customer Corrective Actions
1/13/15	re-sample; Possibility of switched sample warrants resampling.

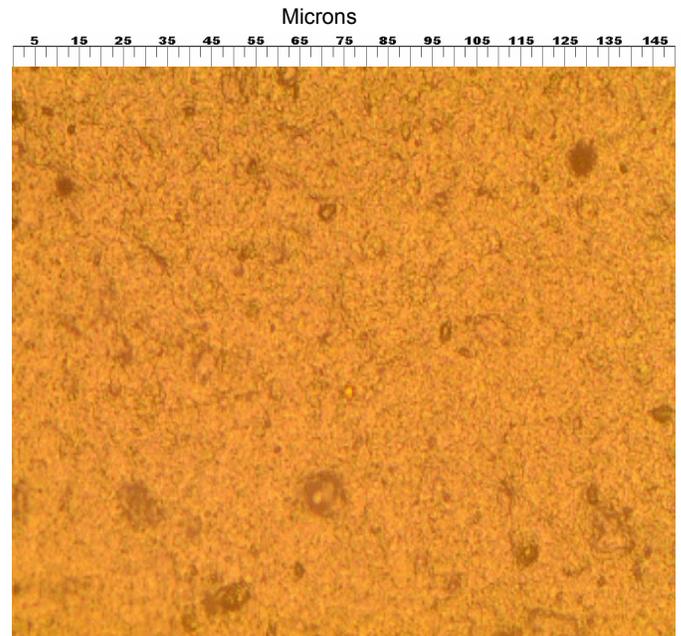
**Wear Particle Analysis Report**

	Trace	Light	Moderate	Heavy	Max. Size	Particle Composition
Rubbing Wear					5-15	Copper Alloy, White Non-Ferrous
Rolling Contact						
Sliding Wear						
Rolling/Sliding Wear						
Cutting Wear						
Chunks						
Spheres						
Corrosion						
Dark Metallic Oxides						
Red Oxides						
Dust/Dirt						
Other Contaminants						
Oxidation By-Products						

Observations: Analytical microscopy has discovered the following abnormalities. High levels of dust and dirt. Excessive dust and dirt particles are the result of external contamination. These are usually airborne and the result of open hatches, failed seals, poor filtration and inadequate breathers.



100x Rubbing wear debris & dust/dirt.



200x Rubbing wear debris & dust/dirt.