



# Sample Predictive Maintenance Report

## Oil / Fluid Analysis

12857 E. Independence Blvd., Suite F  
Matthews, North Carolina 28105  
800-532-0415  
[www.ISIservesYOU.com](http://www.ISIservesYOU.com)



### System Health Status

Status is a numeric indicator of the overall health of the system or machine presented as a number between 1 – 5, where 1 is a healthy machine and 5 is machine under severe stress.

Status	Comment	Possible Action
1	Healthy system & oil	No action req'd
2	System or oil showing slight deterioration	Continue to monitor
3	System or oil showing clear indication of deterioration	Monitor more frequently use other monitoring techniques to gather more information. Plan corrective action
4	System or oil showing distinct accelerated deterioration. Machine in distress.	Take corrective action to reduce the effects of the detected fault. Make sure of spares availability.
5	System failure may be expected	Plan earliest removal from service

### Wear Elements

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 or trend in one or more of these metals.

### Wear Metal Sources

- Iron ..... Cylinders, Gears, Rings, Crankshafts, Liners, Bearings, Housings, Rust
- Chromium..... Rings, Roller/Taper Bearings, 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

### Wear Index (WI)

A measurement of the amount of ferrous wear within a system.

### Particle Quantifier Index (PQ)

A measurement of the wear debris filtered from used oil.

### Magnetic Separation Index (Mag I)

A measurement of ferrous wear debris magnetically separated from other debris.

### Avg. Size

The average particle size of wear debris.

### Max. Size

The maximum particle size of the wear debris.

### The Density Index (Density)

A measurement of the density of the larger metallic wear particles.

## Particle Type

The wear particle classification according to size and shape used to determine the mechanism of wear.

## Contaminants

These elements can be an indication of contamination from outside the system. The source and amount of contamination can be determined by comparison to a previous, non-contaminated sample of the same unit. 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 (sometimes used as an additive)
- Sodium..... Present in most permanent anti-freeze systems (sometimes used as an additive)
- Potassium..... Present in most permanent anti-freeze systems

## Contamination Index (Contamin)

Measurement of the amount of non-metallic contamination.

## Water and Sediment

Reports percent water and percent insolubles (ASTM D-91). Water ingress not only accelerates corrosion, but can also change the lubricant's properties through reaction with the additives resulting in emulsification.

## 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 Sources

- Magnesium ..... Dispersent/Detergent additive
- Calcium..... Dispersent/Detergent additive
- Barium ..... Dispersent/Detergent additive
- Phosphorus..... Anti-wear additive
- Zinc..... Anti-wear additive
- Molybdenum.... Anti-wear additive

## Elemental Analysis

Spectrographic analysis quantifies the presence of metals in PPM. The metals may be in the form of wear particles, contaminants or oil additives.

## Fuel Dilution

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

## Fuel Soot

A result of 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

SAE Grade	Min - cSt	Max - cSt
10W	4.10	5.59
20W	5.60	9.29
30W	9.30	12.49
40W	12.50	16.29
50W	16.30	21.89

## System Cleanliness Monitoring

Cleanliness of clean oil systems such as hydraulics, turbines or compressors is measured in accordance with ISO 4406 Solid Contamination Code.

## Oil Condition (FTIR)

Infrared analysis determines a lubricant's essential properties and degree of degradation, or the continued fitness for use of the lubricant. A "Fingerprint" of the new oil is used as a comparison for changes in the used oils. Determinants are:

*Oxidation, Nitration, Sulfation, Water, Fuel Dilution, Soot Build-up, Glycol*

## Total Base Number (ASTM D-2896)

The total base number is an expression of the amount of alkaline additives in the lubricant which are capable of neutralizing the acidic products of combustion.

A new oil starts with the highest TBN it will possess. During the time the lubricant is in service, the TBN decreases as the alkaline additives neutralize acids. TBN is an essential element in the establishment of oil drain intervals since it indicates whether the additives are still capable of providing sufficient engine protection.

## Total Acid Number (ASTM D-664)

The total acid number is the quantity of acid or acid-like constituents in the lubricant. An increase in TAN from that of the new lubricant should be monitored. The TAN of a new oil is not necessarily zero since oil additives can be acidic in nature. Increases in TAN usually indicate lube oxidation or contamination with an acidic product. TAN is an indicator of oil serviceability.

**Executive Summary for Oil Analysis**  
October 8, 2007

Equipment Name	Machine Condition		Lubricant Condition		Notes
	Last	New	Last	New	
Brew Stuffing Pump (North)	NORMAL	SLIGHT	NORMAL	NORMAL	1
Brew Stuffing Pump Gearbox (North)	NORMAL	NORMAL	NORMAL	NORMAL	
Brew Stuffing Metering Pump (South)	SLIGHT	NORMAL	NORMAL	NORMAL	
Brew Stuffing Metering Pump Gearbox (South)	NORMAL	NORMAL	NORMAL	SLIGHT	2
Cold Head Discharge Pump	SEVERE	SEVERE	SEVERE	CRITICAL	6
Cold Head Discharge Pump Gea	NORMAL	NORMAL	SLIGHT	SLIGHT	3
Common Premixer	MARGINAL	MARGINAL	SLIGHT	SLIGHT	2,4
Common Premixer East Pump	SLIGHT	NORMAL	NORMAL	SLIGHT	2
Common Premixer East Pump Gearbo	SLIGHT	NORMAL	NORMAL	SLIGHT	2
Common Premixer West Pump	MARGINAL	MARGINAL	NORMAL	SLIGHT	2,4
Common Premixer West Pump Gearbo	SLIGHT	MARGINAL	NORMAL	SLIGHT	2,4
Sullair Compressor (Inside)	NORMAL	NORMAL	NORMAL	MARGINAL	2
Sullair Compressor (Outside)	NORMAL	NORMAL	SLIGHT	SEVERE	2,7
ETMW Mixer North Gearbox	MARGINAL	NORMAL	NORMAL	NORMAL	
ETMW Mixer South Gearbox	MARGINAL	NORMAL	NORMAL	NORMAL	
Fermenter Discharge Pump Gearbo	NORMAL	NORMAL	NORMAL	NORMAL	
Fermenter Pump	MARGINAL	MARGINAL	SLIGHT	SLIGHT	2,5
Mixer Continuous #1 West	MARGINAL	NORMAL	NORMAL	SLIGHT	2
Mixer Continuous #2 East	SLIGHT	NORMAL	NORMAL	SLIGHT	2
Premixer #1 West Pump	SLIGHT	SLIGHT	NORMAL	SLIGHT	1,2
Premixer #1 West	SLIGHT	NORMAL	NORMAL	SLIGHT	2
Premixer #2 East Gearbox	NORMAL	NORMAL	NORMAL	SLIGHT	2
Premixer #2 East	MARGINAL	SLIGHT	NORMAL	SLIGHT	1,2

Notes:

1. Wear metal levels are slightly elevated and may be an indication of early stage wear. Continue monitoring on a regular basis.
2. Water content is slightly elevated and has affected the accuracy of the viscosity reading. Recommend taking action to reduce the water content and check for leaking seals
3. Viscosity in this sample does not match the lubricant identified on the report. Please verify the type of oil being added and provide feedback to ISI
4. Wear metal levels remain elevated but are lower than the last sample. Suspect this may have been due to a recent oil change. Conduct an internal inspection of this unit to determine the source of the wear
5. Wear metal levels have spiked since the last survey and are well above alarm levels. Recommend conducting an internal inspection ASAP to determine the source of the wear
6. Water level has increased to 43% and wear metal levels remain excessive. Recommend conducting an internal inspection ASAP to determine the source of the wear. Change oil to reduce water level
7. Oil cleanliness has degraded with the particle count being well above alarm limits. Recommend changing oil ASAP to improve cleanliness and minimize damage to internal

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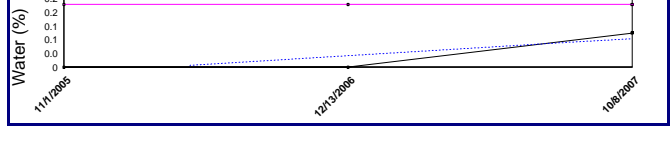
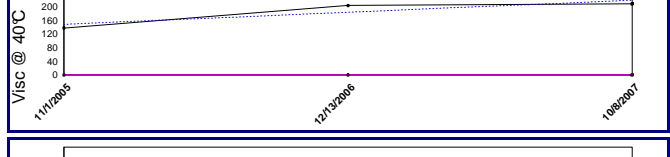
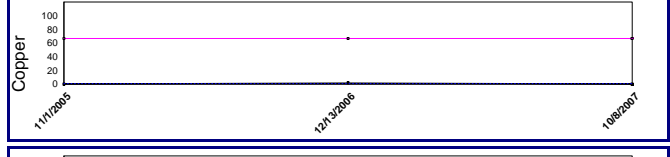
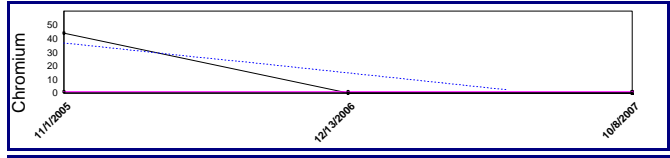
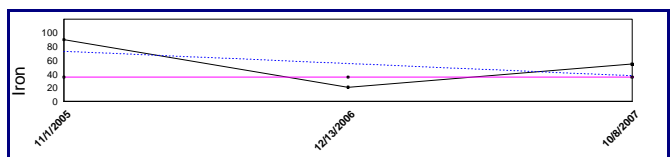


Testing provided by:  
 Lubrication Lab

Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>2</b>
Lube Type	Brew Stuffing North Stuffing Pump	Brew N Pump	Level 4 Make:	Lubricant Condition
Unknown	Test Group(s): B33		Model:	<b>1</b>
			Serial No:	

Lab #:	250041	269157	281868
Work Order:			
Date:	11/1/05	12/13/06	10/8/07
Time on Unit:	0.0	0.0	0.0
Time on Oil:	0.0	0.0	0.0
Mach Cond:	3	1	2
Lube Cond:	1	1	1

AE Spectroscopy - ASTM	11/1/2005	12/13/2006	10/8/2007	STATS
Iron	90	21	54	<b>35</b>
Chromium	44	<1	<1	<b>1</b>
Nickel	<1	3	1	<b>1</b>
Aluminum	31	<1	20	<b>3</b>
Copper	<1	2	<1	<b>67</b>
Tin	<1	<1	<1	<b>17</b>
Silver	<1	<1	<1	<b>1</b>
Lead	<1	<1	<1	<b>12</b>
Silicon	33	<1	20	<b>43</b>
Sodium	3	10	4	<b>178</b>
Boron	2	165	143	
Magnesium	3	3	2	
Calcium	24	175	<1	
Barium	<1	36	<1	
Zinc	414	176	149	
Phosphorous	201	923	1,027	
Molybdenum	<1	<1	<1	
Lithium	<1	<1	5	
Titanium	<1	<1	<1	<b>3</b>
Vanadium	<1	<1	<1	<b>3</b>



Viscosity - ASTM D445 cSt	11/1/2005	12/13/2006	10/8/2007	STATS
Visc @ 40°C	137.50	203.50	208.24	
Visc @ 100°C	10.77	18.73	21.08	
Viscosity Index	40.07	102.50	119.96	

FTIR - Modified ASTM E1421	11/1/2005	12/13/2006	10/8/2007	STATS
Nitration (Abs/cm)	<0.1	6.5	4.6	<b>5.5</b>
Oxidation (Abs/cm)	<0.1	9.0	<0.1	<b>7.5</b>
Water (%)	<0.1	<0.1	0.1	<b>0.2</b>
Ester Brkdw (Abs/cm)				<b>0.4</b>
Glycol (%)	<0.1	<0.1	<0.1	<b>0.1</b>

Iron and aluminum levels are slightly elevated, all other wear metals remain within acceptable limits. Based on sample submitted and tests performed, there are no abnormal indications at this time. Viscosity closer to an ISO 220 lubricant.  
**RECOMMENDED:** Verify the lubricant being used in or added to this unit and inform lab. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data.  
 STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

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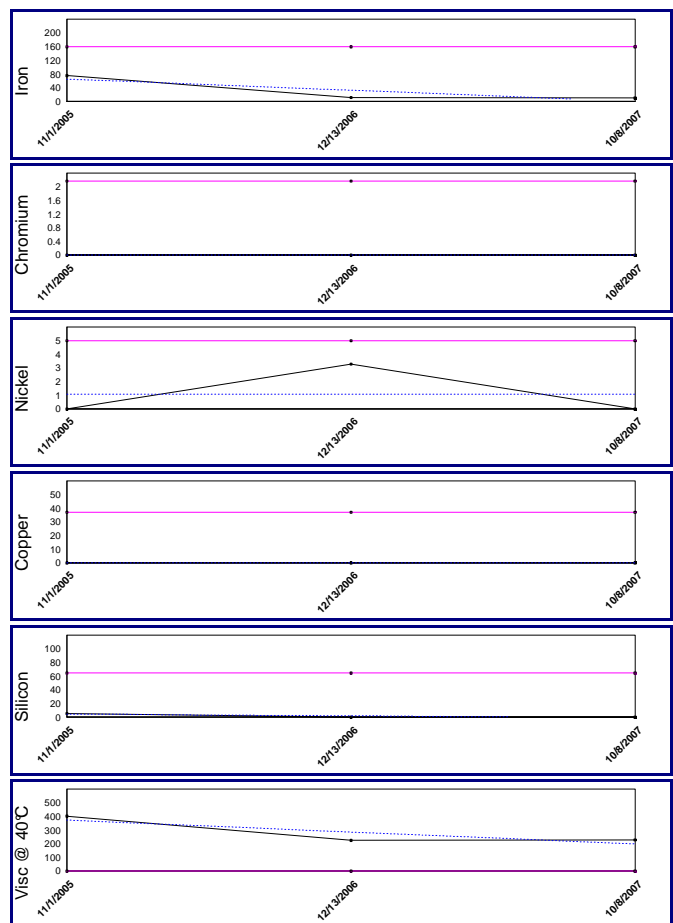
Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	1
Lube Type	Brew Stuffing	Brew	Level 4 Make:	Lubricant Condition
Unknown	North Stuffing Pump Gearbox	North GBX	Model:	1
	Test Group(s): B33		Serial No:	

Lab #:	250043	269160	281870
Work Order:			
Date:	11/1/05	12/13/06	10/8/07
Time on Unit:	0.0	0.0	0.0
Time on Oil:	0.0	0.0	0.0
Mach Cond:	1	1	1
Lube Cond:	1	1	1

AE Spectroscopy - ASTM	11/1/2005	12/13/2006	10/8/2007	STATS
Iron	75	11	10	159
Chromium	<1	<1	<1	2
Nickel	<1	3	<1	5
Aluminum	2	<1	<1	41
Copper	<1	<1	<1	37
Tin	<1	<1	<1	21
Silver	<1	<1	<1	1
Lead	<1	<1	<1	230
Silicon	5	<1	<1	65
Sodium	4	3	5	63
Boron	1	143	108	
Magnesium	16	2	1	
Calcium	34	36	<1	
Barium	9	25	<1	
Zinc	491	32	120	
Phosphorous	256	696	520	
Molybdenum	<1	<1	3	
Lithium	4	<1	4	
Titanium	<1	<1	<1	3
Vanadium	<1	<1	<1	3

Viscosity - ASTM D445 cSt	11/1/2005	12/13/2006	10/8/2007	STATS
Visc @ 40°C	402.60	225.00	227.92	
Visc @ 100°C	41.61	21.63	21.30	
Viscosity Index	155.59	115.24	111.16	

FTIR - Modified ASTM E1421	11/1/2005	12/13/2006	10/8/2007	STATS
Nitration (Abs/cm)	2.1	6.7	2.9	7.7
Oxidation (Abs/cm)	<0.1	5.1	<0.1	28.2
Water (%)	0.3	<0.1	<0.1	0.8
Ester Brkdown (Abs/cm)				2.2
Glycol (%)	<0.1	<0.1	<0.1	0.7



Based on sample submitted and tests performed, there are no abnormal indications at this time. Continue to sample on a regular basis to monitor wear trends and fluid condition.

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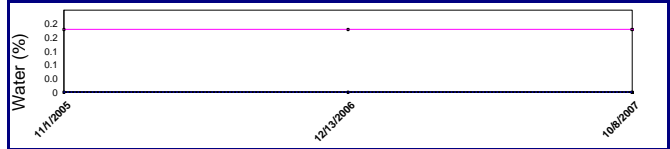
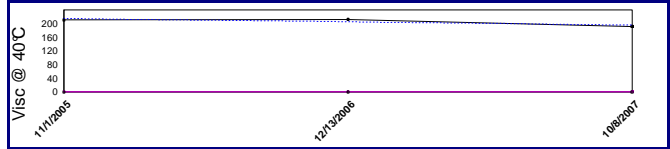
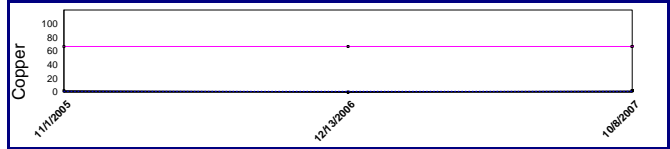
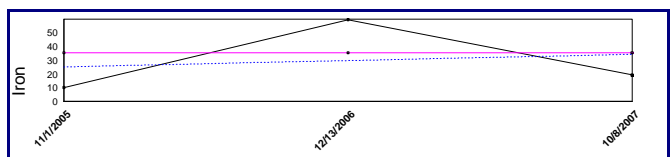


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 Lubrication Lab

Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>1</b>
Lube Type	Brew Stuffing	Brew	Level 4 Make:	Lubricant Condition
Unknown	South Brew Metering Pump	S Meter	Model:	<b>1</b>
	Test Group(s): B33		Serial No:	

Lab #:	250044	269159	281874
Work Order:			
Date:	11/1/05	12/13/06	10/8/07
Time on Unit:	0.0	0.0	0.0
Time on Oil:	0.0	0.0	0.0
Mach Cond:	1	2	1
Lube Cond:	1	1	1

AE Spectroscopy - ASTM	11/1/2005	12/13/2006	10/8/2007	STATS
Iron	10	60	19	<b>35</b>
Chromium	<1	<1	<1	<b>1</b>
Nickel	<1	3	1	<b>1</b>
Aluminum	<1	17	<1	<b>3</b>
Copper	2	<1	2	<b>67</b>
Tin	<1	<1	<1	<b>17</b>
Silver	<1	<1	<1	<b>1</b>
Lead	<1	<1	<1	<b>12</b>
Silicon	<1	4	<1	<b>43</b>
Sodium	4	3	10	<b>178</b>
Boron	166	225	129	
Magnesium	5	1	2	
Calcium	182	45	89	
Barium	16	42	<1	
Zinc	194	95	190	
Phosphorous	785	1,308	781	
Molybdenum	1	<1	<1	
Lithium	<1	<1	1	
Titanium	<1	<1	<1	<b>3</b>
Vanadium	<1	<1	<1	<b>3</b>



Viscosity - ASTM D445 cSt	11/1/2005	12/13/2006	10/8/2007	STATS
Visc @ 40°C	210.90	212.50	191.82	
Visc @ 100°C	20.05	20.55	18.92	
Viscosity Index	109.86	113.17	110.98	

FTIR - Modified ASTM E1421	11/1/2005	12/13/2006	10/8/2007	STATS
Nitration (Abs/cm)	10.4	7.8	2.9	<b>5.5</b>
Oxidation (Abs/cm)	0.1	5.1	2.9	<b>7.5</b>
Water (%)	<0.1	<0.1	<0.1	<b>0.2</b>
Ester Brkdwn (Abs/cm)				<b>0.4</b>
Glycol (%)	<0.1	<0.1	<0.1	<b>0.1</b>

Based on sample submitted and tests performed, there are no abnormal indications at this time. Continue to sample on a regular basis to monitor wear trends and fluid condition. Verify the lubricant being used in this unit and inform lab.

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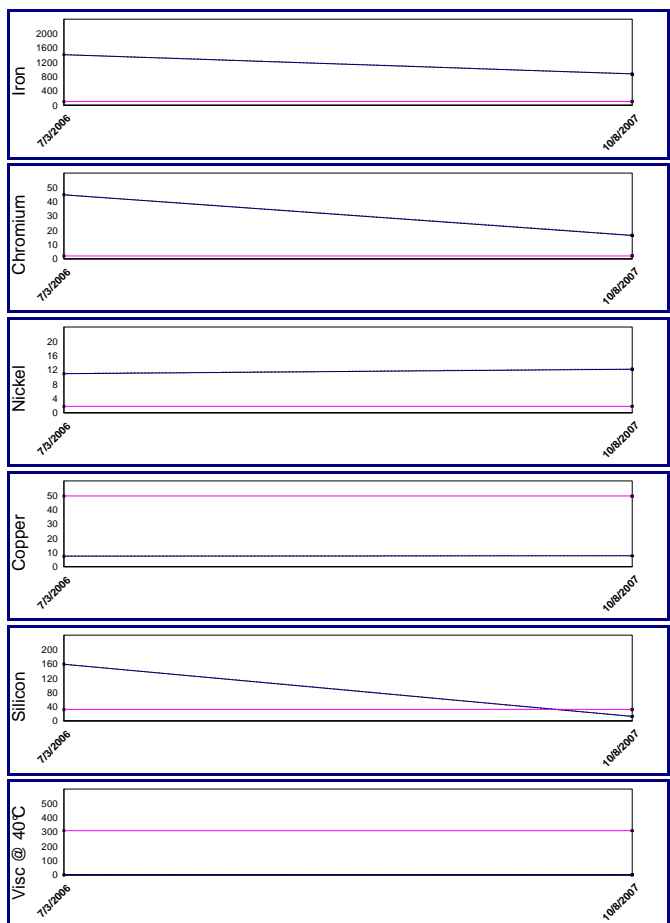
Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>4</b>
Lube Type	Cold Hold	Cold Hold	Level 4 Make:	Lubricant Condition
80W140	Discharge Pump	Discharge Pump	Model:	<b>5</b>
	Test Group(s): B33		Serial No:	

Lab #:	262261	281873
Work Order:		
Date:	7/3/06	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	4	4
Lube Cond:	4	5

AE Spectroscopy - ASTM	7/3/2006	10/8/2007	STATS
Iron	1,412	872	<b>102</b>
Chromium	45	17	<b>2</b>
Nickel	11	12	<b>2</b>
Aluminum	94	9	<b>4</b>
Copper	7	8	<b>49</b>
Tin	<1	8	<b>10</b>
Silver	<1	<1	<b>1</b>
Lead	2	2	<b>87</b>
Silicon	159	13	<b>32</b>
Sodium	263	322	<b>12</b>
Boron	166	45	
Magnesium	66	90	
Calcium	192	242	
Barium	38	<1	
Zinc	1,394	4	
Phosphorous	1,911	1,211	
Molybdenum	4	<1	
Lithium	<1	27	
Titanium	1	<1	<b>3</b>
Vanadium	<1	<1	<b>2</b>

Viscosity - ASTM D445 cSt	7/3/2006	10/8/2007	STATS
Visc @ 40°C	0.00	0.00	<b>310.00</b>
Visc @ 100°C	0.00	0.00	<b>31.00</b>
Viscosity Index		0.00	<b>140.00</b>

FTIR - Modified ASTM E1421	7/3/2006	10/8/2007	STATS
Nitration (Abs/cm)	175.2	<0.1	<b>7.8</b>
Oxidation (Abs/cm)			<b>10.4</b>
Water (%)	16.8	42.3	<b>1.0</b>
Ester Brkdwn (Abs/cm)	127.5		<b>2.8</b>
Glycol (%)			<b>0.2</b>



Water level is very high at 42.3% and prevented any accurate viscosity testing. Iron, chrome, nickel, and aluminum levels are elevated for typical industrial gearboxes and drives. High water levels may threaten the unit by general corrosive attack, accelerated oxidation of the oil, reaction with the additives to cause depletion and emulsify with the oil which may result in inadequate oil film development, resulting in accelerated wear.  
**RECOMMENDED:** Lower water level as soon as possible and check for sources of water ingress. When operations permit, inspect unit for source and extent of water, wear, and other contamination. Continue to sample on a regular basis to monitor wear trends and fluid condition.

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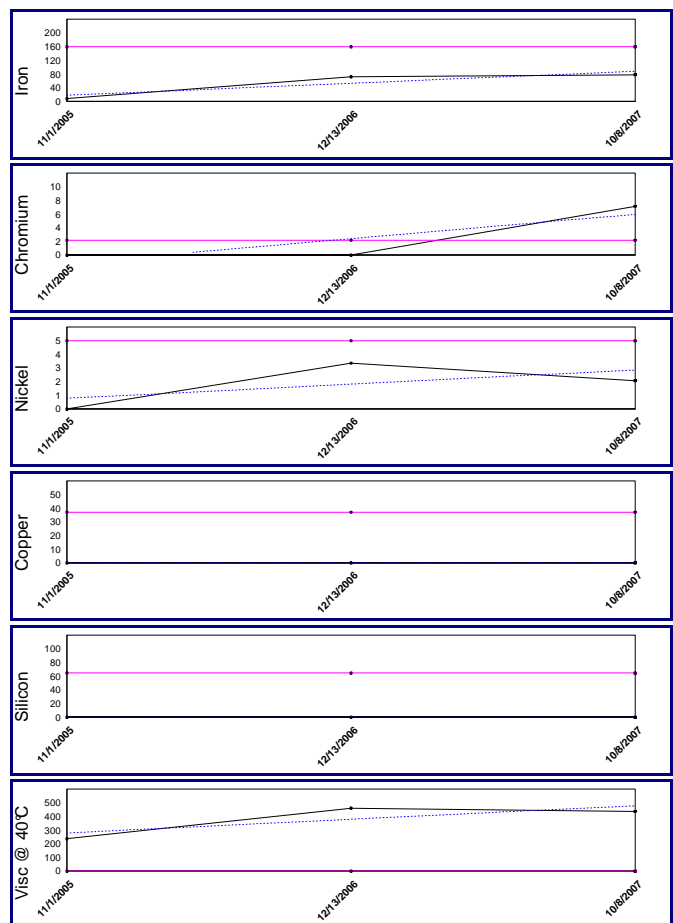
Lube Supplier	Instrumentation Services Inc - Texas 0641 Brew Stuffing South Brew Metering Pump Gearbox Test Group(s): B33	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown		0641	Model:	<b>1</b>
Lube Type		Brew	Level 4 Make:	Lubricant Condition
Unknown		S Meter GBX	Model:	<b>2</b>
			Serial No:	

Lab #:	250045	269158	281869
Work Order:			
Date:	11/1/05	12/13/06	10/8/07
Time on Unit:	0.0	0.0	0.0
Time on Oil:	0.0	0.0	0.0
Mach Cond:	1	1	1
Lube Cond:	1	1	2

AE Spectroscopy - ASTM	11/1/2005	12/13/2006	10/8/2007	STATS
Iron	8	71	78	159
Chromium	<1	<1	7	2
Nickel	<1	3	2	5
Aluminum	<1	<1	2	41
Copper	<1	<1	<1	37
Tin	<1	<1	<1	21
Silver	<1	<1	<1	1
Lead	<1	<1	1	230
Silicon	<1	<1	<1	65
Sodium	2	2	16	63
Boron	99	3	5	
Magnesium	3	14	10	
Calcium	43	31	<1	
Barium	8	17	<1	
Zinc	38	159	235	
Phosphorous	401	589	457	
Molybdenum	3	<1	2	
Lithium	3	<1	32	
Titanium	<1	1	<1	3
Vanadium	<1	<1	<1	3

Viscosity - ASTM D445 cSt	11/1/2005	12/13/2006	10/8/2007	STATS
Visc @ 40°C	236.90	460.80	436.36	
Visc @ 100°C	20.92	48.57		
Viscosity Index	103.90	165.26		

FTIR - Modified ASTM E1421	11/1/2005	12/13/2006	10/8/2007	STATS
Nitration (Abs/cm)	<0.1	17.8	13.6	7.7
Oxidation (Abs/cm)	5.0	5.1	<0.1	28.2
Water (%)	<0.1	0.2	0.2	0.8
Ester Brkdown (Abs/cm)				2.2
Glycol (%)	<0.1	<0.1	<0.1	0.7



Chrome levels is elevated, all other wear metals remain within acceptable limits. Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index.

RECOMMENDED: Lower water level and check for sources of water ingress. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data. STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

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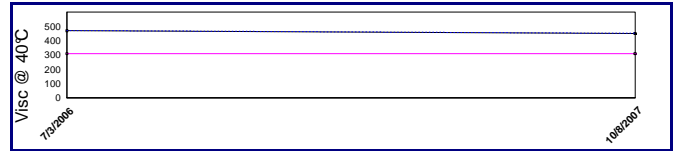
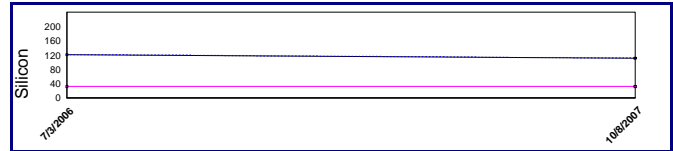
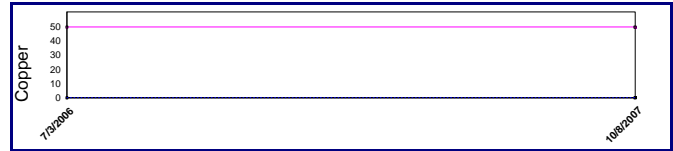
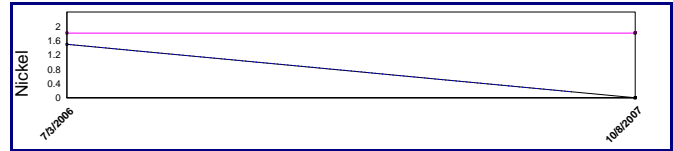
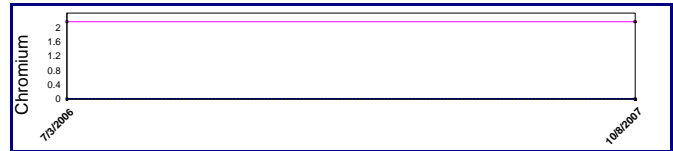
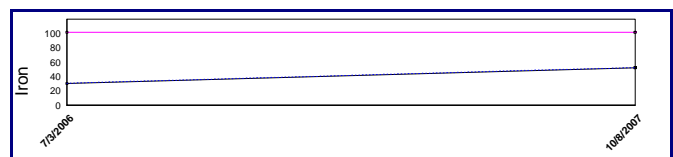


Testing provided by:  
 Lubrication Lab

Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>1</b>
Lube Type	Cold Hold	Cold Hold	Level 4 Make:	Lubricant Condition
80W140	Discharge Pump Gear	Discharge GBX	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	262260	281872
Work Order:		
Date:	7/3/06	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	1	1
Lube Cond:	2	2

AE Spectroscopy - ASTM	7/3/2006	10/8/2007	STATS
Iron	30	52	<b>102</b>
Chromium	<1	<1	<b>2</b>
Nickel	1	<1	<b>2</b>
Aluminum	<1	<1	<b>4</b>
Copper	<1	<1	<b>49</b>
Tin	<1	<1	<b>10</b>
Silver	<1	<1	<b>1</b>
Lead	<1	<1	<b>87</b>
Silicon	121	111	<b>32</b>
Sodium	1	4	<b>12</b>
Boron	<1	<1	
Magnesium	7	7	
Calcium	<1	<1	
Barium	2	<1	
Zinc	132	218	
Phosphorous	797	520	
Molybdenum	<1	<1	
Lithium	<1	10	
Titanium	1	2	<b>3</b>
Vanadium	<1	<1	<b>2</b>



Viscosity - ASTM D445 cSt	7/3/2006	10/8/2007	STATS
Visc @ 40°C	470.38	450.90	<b>310.00</b>
Visc @ 100°C	46.54	47.14	<b>31.00</b>
Viscosity Index	155.71	162.88	<b>140.00</b>

FTIR - Modified ASTM E1421	7/3/2006	10/8/2007	STATS
Nitration (Abs/cm)	8.3	6.9	<b>7.8</b>
Oxidation (Abs/cm)		<0.1	<b>10.4</b>
Water (%)	<0.1	<0.1	<b>1.0</b>
Ester Brkdwn (Abs/cm)	0.0		<b>2.8</b>
Glycol (%)		<0.1	<b>0.2</b>

Viscosity is closer to an EP-7 ISO 460 gear lube. Based on sample submitted and tests performed, there are no abnormal indications at this time. Silicon contamination level is elevated and may indicate dust/dirt entry.

**RECOMMENDED:** Verify the lubricant being used in or added to this unit and inform lab. Assure that all openings are closed, seals tight, and that dust, dirt, and other contaminants do not enter the unit. Continue to sample on a regular basis to monitor wear trends and fluid condition.

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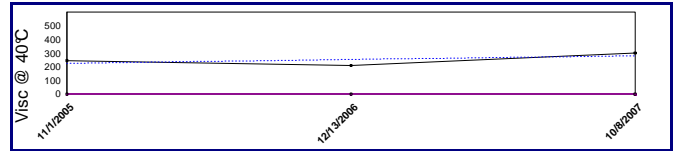
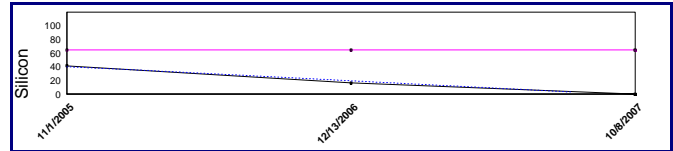
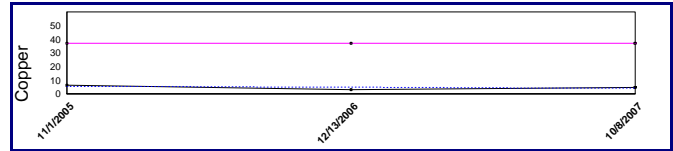
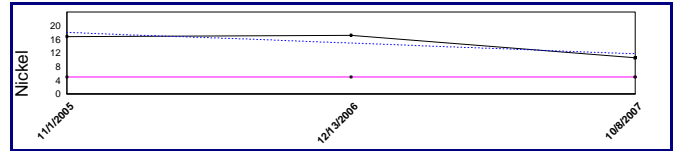
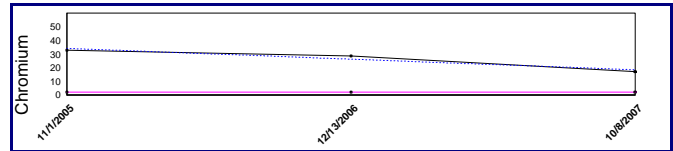
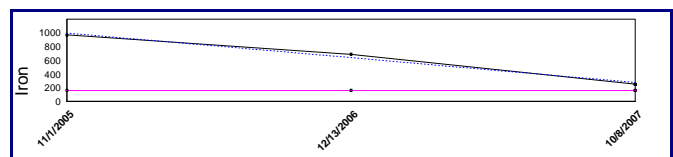


Testing provided by:  
 Lubrication Lab

Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>3</b>
Lube Type	Common Premixers	Common Premi	Level 4 Make:	Lubricant Condition
Unknown	Common Premixer	Common	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	250054	269163	281871
Work Order:			
Date:	11/1/05	12/13/06	10/8/07
Time on Unit:	0.0	0.0	0.0
Time on Oil:	0.0	0.0	0.0
Mach Cond:	3	3	3
Lube Cond:	1	2	2

AE Spectroscopy - ASTM	11/1/2005	12/13/2006	10/8/2007	STATS
Iron	970	688	250	159
Chromium	33	29	17	2
Nickel	17	17	11	5
Aluminum	49	37	13	41
Copper	6	3	5	37
Tin	<1	<1	<1	21
Silver	<1	<1	<1	1
Lead	<1	<1	<1	230
Silicon	42	16	<1	65
Sodium	11	13	8	63
Boron	180	199	125	
Magnesium	2	6	<1	
Calcium	51	46	<1	
Barium	7	26	<1	
Zinc	37	179	1	
Phosphorous	1,123	1,150	911	
Molybdenum	2	<1	2	
Lithium	<1	<1	<1	
Titanium	<1	<1	<1	3
Vanadium	<1	<1	<1	3



Viscosity - ASTM D445 cSt	11/1/2005	12/13/2006	10/8/2007	STATS
Visc @ 40°C	245.80	209.60	301.16	
Visc @ 100°C	23.62	22.34		
Viscosity Index	119.76	129.38		

FTIR - Modified ASTM E1421	11/1/2005	12/13/2006	10/8/2007	STATS
Nitration (Abs/cm)	2.5	18.3	34.6	7.7
Oxidation (Abs/cm)	5.8	6.2	0.3	28.2
Water (%)	0.4	2.1	5.2	0.8
Ester Brkdw (Abs/cm)				2.2
Glycol (%)	<0.1	<0.1	<0.1	0.7

Iron, chrome, and nickel level remain elevated, but are lower than last sample. Other wear metal levels are currently within acceptable limits. Water content has increased from the prior sample.  
**RECOMMENDED:** When operations permit, inspect unit for source and extent of wear and contamination. Lower water level and check for sources of water ingress. Verify the lubricant being used in or added to this unit and inform lab. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data.  
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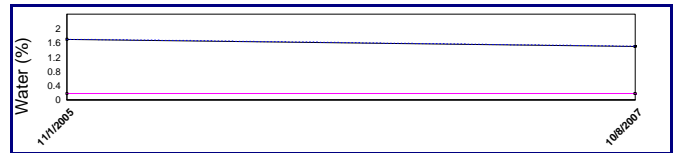
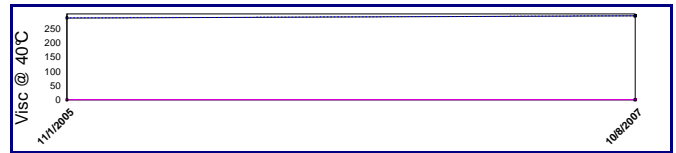
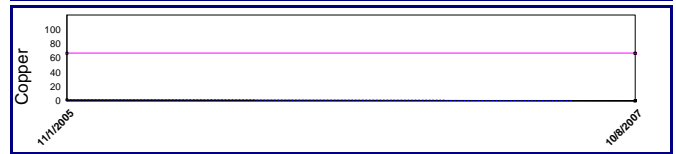
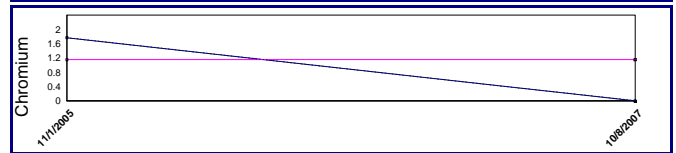
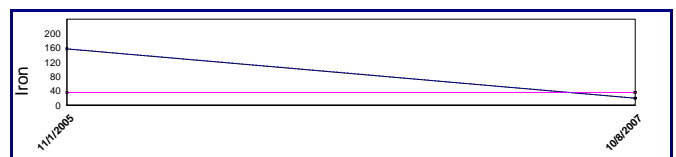


Testing provided by:  
 Lubrication Lab

Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>1</b>
Lube Type	Common Premixers	Common Premi	Level 4 Make:	Lubricant Condition
Unknown	East Pump	E Pump	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	250055	281879
Work Order:		
Date:	11/1/05	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	2	1
Lube Cond:	1	2

AE Spectroscopy - ASTM	11/1/2005	10/8/2007	STATS
Iron	158	19	<b>35</b>
Chromium	2	<1	<b>1</b>
Nickel	22	1	<b>1</b>
Aluminum	3	2	<b>3</b>
Copper	2	<1	<b>67</b>
Tin	<1	<1	<b>17</b>
Silver	<1	<1	<b>1</b>
Lead	<1	1	<b>12</b>
Silicon	<1	<1	<b>43</b>
Sodium	160	3	<b>178</b>
Boron	160	125	
Magnesium	13	<1	
Calcium	110	<1	
Barium	13	<1	
Zinc	114	2	
Phosphorous	1,124	770	
Molybdenum	3	1	
Lithium	<1	<1	
Titanium	<1	<1	<b>3</b>
Vanadium	<1	<1	<b>3</b>



Viscosity - ASTM D445 cSt	11/1/2005	10/8/2007	STATS
Visc @ 40°C	286.20	293.37	
Visc @ 100°C	25.30		
Viscosity Index	113.86		

FTIR - Modified ASTM E1421	11/1/2005	10/8/2007	STATS
Nitration (Abs/cm)	8.9	11.1	<b>5.5</b>
Oxidation (Abs/cm)	5.5	<0.1	<b>7.5</b>
Water (%)	1.7	1.5	<b>0.2</b>
Ester Brkdwn (Abs/cm)			<b>0.4</b>
Glycol (%)	<0.1	<0.1	<b>0.1</b>

Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index. Based on sample submitted and tests performed, there are no abnormal indications at this time.

**RECOMMENDED:** Lower water level and check for sources of water ingress. Verify the lubricant being used in this unit. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data. STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

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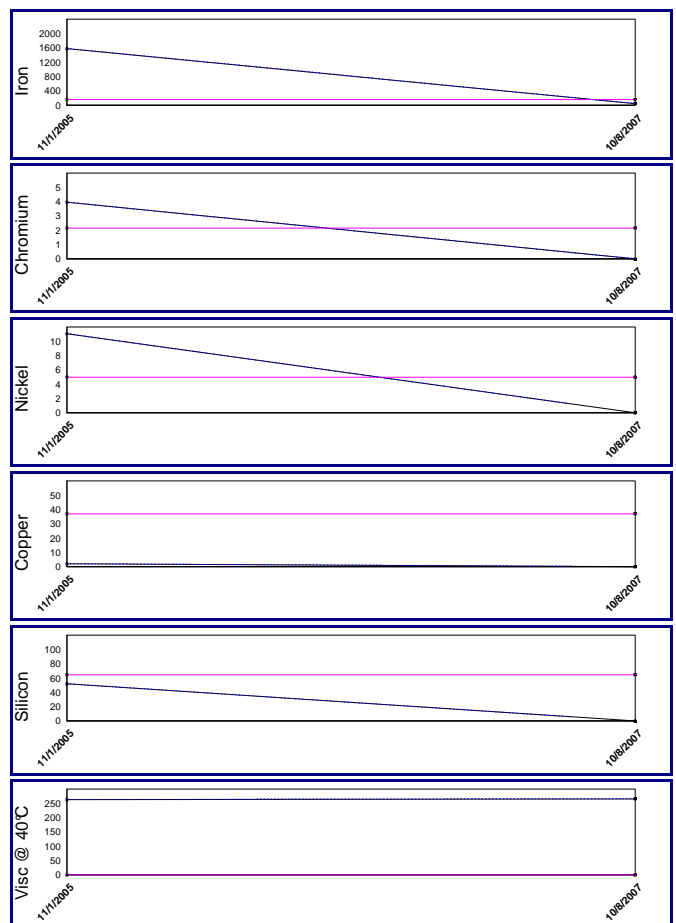
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Unknown	0641	0641	Model:	<b>1</b>
Lube Type	Common Premixers	Common Premi	Level 4 Make:	Lubricant Condition
Unknown	East Pump Gearbox	East GBX	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	250057	281878
Work Order:		
Date:	11/1/05	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	2	1
Lube Cond:	1	2

AE Spectroscopy - ASTM	11/1/2005	10/8/2007	STATS
Iron	1,578	44	159
Chromium	4	<1	2
Nickel	11	<1	5
Aluminum	25	3	41
Copper	2	<1	37
Tin	<1	<1	21
Silver	<1	<1	1
Lead	1	<1	230
Silicon	52	<1	65
Sodium	311	10	63
Boron	251	142	
Magnesium	79	1	
Calcium	148	<1	
Barium	<1	<1	
Zinc	56	115	
Phosphorous	4,159	921	
Molybdenum	6	<1	
Lithium	<1	4	
Titanium	1	<1	3
Vanadium	<1	<1	3

Viscosity - ASTM D445 cSt	11/1/2005	10/8/2007	STATS
Visc @ 40°C	263.20	266.08	
Visc @ 100°C	0.00		
Viscosity Index	0.00		

FTIR - Modified ASTM E1421	11/1/2005	10/8/2007	STATS
Nitration (Abs/cm)	24.8	5.4	7.7
Oxidation (Abs/cm)	10.3	<0.1	28.2
Water (%)	3.2	0.5	0.8
Ester Brkdw (Abs/cm)			2.2
Glycol (%)	0.9	<0.1	0.7



Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index. Based on sample submitted and tests performed, there are no abnormal indications at this time.

**RECOMMENDED:** Lower water level and check for sources of water ingress. Verify the lubricant being used in this unit. Continue to sample on a regular basis to monitor wear trends and fluid condition.

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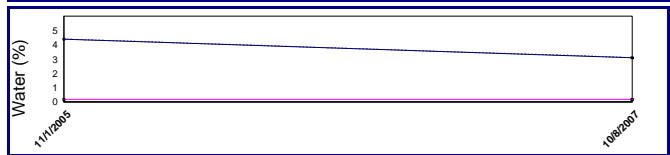
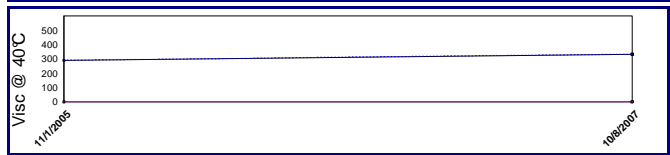
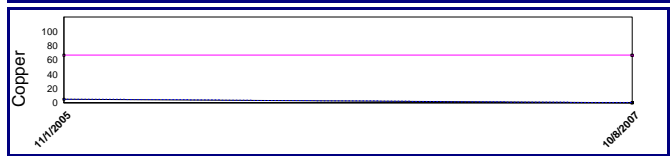
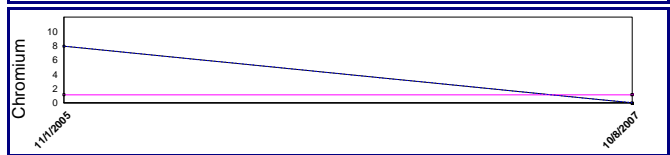
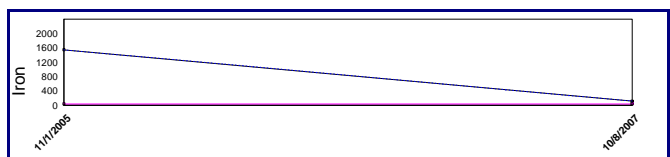


Testing provided by:  
 Lubrication Lab

Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>3</b>
Lube Type	Common Premixers	Common Premi	Level 4 Make:	Lubricant Condition
Unknown	West Pump	W Pump	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	250056	281877
Work Order:		
Date:	11/1/05	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	3	3
Lube Cond:	1	2

AE Spectroscopy - ASTM	11/1/2005	10/8/2007	STATS
Iron	1,547	111	<b>35</b>
Chromium	8	<1	<b>1</b>
Nickel	29	<1	<b>1</b>
Aluminum	40	9	<b>3</b>
Copper	5	<1	<b>67</b>
Tin	<1	<1	<b>17</b>
Silver	<1	<1	<b>1</b>
Lead	<1	<1	<b>12</b>
Silicon	77	<1	<b>43</b>
Sodium	954	29	<b>178</b>
Boron	299	61	
Magnesium	95	2	
Calcium	366	<1	
Barium	5	<1	
Zinc	126	<1	
Phosphorous	4,864	872	
Molybdenum	<1	<1	
Lithium	<1	<1	
Titanium	<1	<1	<b>3</b>
Vanadium	<1	<1	<b>3</b>



Viscosity - ASTM D445 cSt	11/1/2005	10/8/2007	STATS
Visc @ 40°C	289.80	332.98	
Visc @ 100°C	5.09		
Viscosity Index	<1,985.45		

FTIR - Modified ASTM E1421	11/1/2005	10/8/2007	STATS
Nitration (Abs/cm)	22.5	17.5	<b>5.5</b>
Oxidation (Abs/cm)	6.6	<0.1	<b>7.5</b>
Water (%)	4.4	3.1	<b>0.2</b>
Ester Brkdwn (Abs/cm)			<b>0.4</b>
Glycol (%)	<0.1	<0.1	<b>0.1</b>

Iron levels remain elevated, but lower than prior sample. Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index.

**RECOMMENDED:** When operations permit, inspect unit for source and extent of wear and contamination. Lower water level and check for sources of water ingress. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data. STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

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 Lubrication Lab

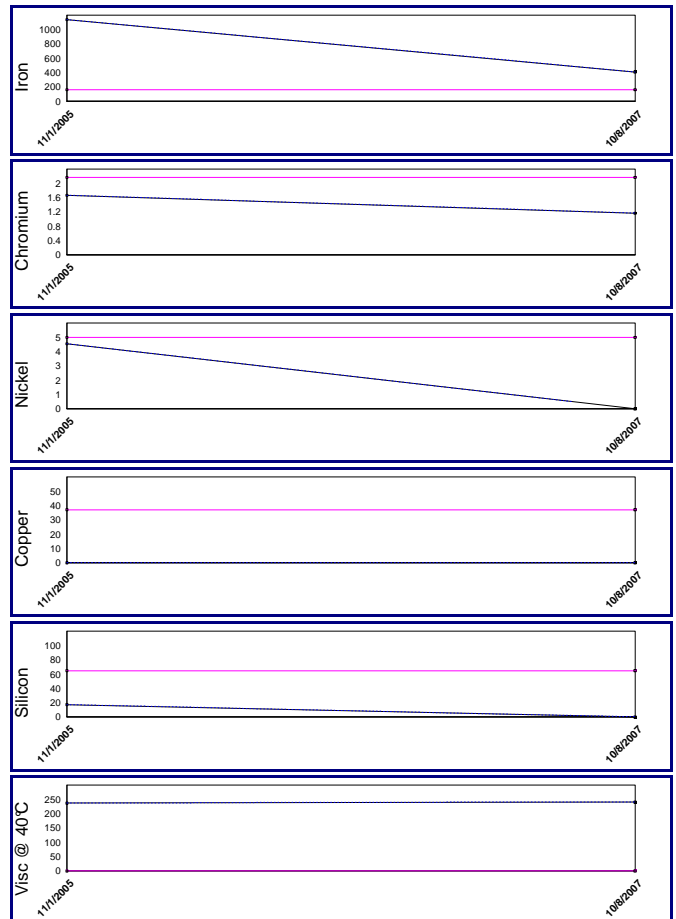
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Unknown	0641	0641	Model:	<b>3</b>
Lube Type	Common Premixers	Common Premi	Level 4 Make:	Lubricant Condition
Unknown	West Pump Gearbox	West GBX	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	250058	281875
Work Order:		
Date:	11/1/05	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	2	3
Lube Cond:	1	2

AE Spectroscopy - ASTM	11/1/2005	10/8/2007	STATS
Iron	1,139	407	159
Chromium	2	1	2
Nickel	5	<1	5
Aluminum	12	3	41
Copper	<1	<1	37
Tin	<1	<1	21
Silver	<1	<1	1
Lead	<1	<1	230
Silicon	17	<1	65
Sodium	92	76	63
Boron	167	139	
Magnesium	37	6	
Calcium	65	<1	
Barium	<1	<1	
Zinc	42	106	
Phosphorous	2,598	1,136	
Molybdenum	3	<1	
Lithium	<1	14	
Titanium	<1	<1	3
Vanadium	<1	<1	3

Viscosity - ASTM D445 cSt	11/1/2005	10/8/2007	STATS
Visc @ 40°C	237.20	240.50	
Visc @ 100°C	23.54		
Viscosity Index	123.38		

FTIR - Modified ASTM E1421	11/1/2005	10/8/2007	STATS
Nitration (Abs/cm)	2.8	13.0	7.7
Oxidation (Abs/cm)	2.3	0.3	28.2
Water (%)	0.3	1.4	0.8
Ester Brkdw (Abs/cm)			2.2
Glycol (%)	<0.1	<0.1	0.7



Iron levels remain elevated, but lower than prior sample. Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index.  
**RECOMMENDED:** When operations permit, inspect unit for source and extent of wear and contamination. Lower water level and check for sources of water ingress. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data.  
 STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

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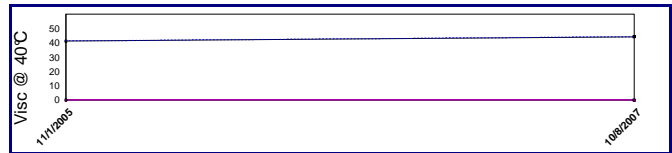
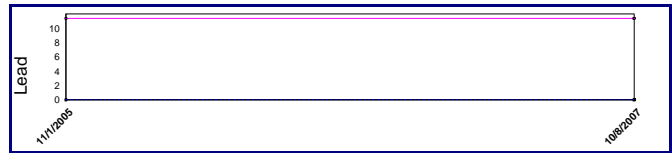
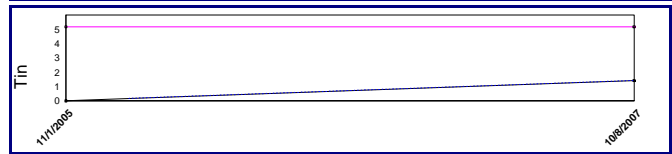
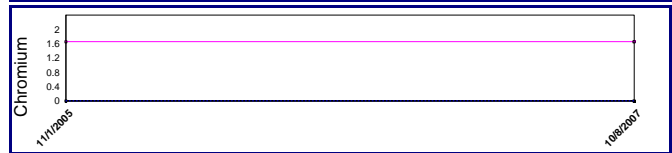
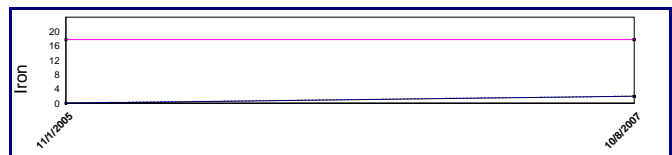


Testing provided by:  
Lubrication Lab

Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>1</b>
Lube Type	Compressor	Comp	Level 4 Make:	Lubricant Condition
Unknown	Sullair Inside Compressor	Inside Comp	Model:	<b>3</b>
	Test Group(s): B44		Serial No:	

Lab #:	250047	281859
Work Order:		
Date:	11/1/05	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	1	1
Lube Cond:	1	3

AE Spectroscopy - ASTM	11/1/2005	10/8/2007	STATS
Iron	<1	2	18
Chromium	<1	<1	2
Nickel	<1	<1	2
Aluminum	<1	<1	3
Copper	2	3	14
Tin	<1	1	5
Silver	<1	<1	1
Lead	<1	<1	11
Silicon	<1	<1	17
Sodium	40	60	30
Boron	<1	<1	
Magnesium	<1	<1	
Calcium	16	<1	
Barium	186	77	
Zinc	171	240	
Phosphorous	35	<1	
Molybdenum	<1	<1	
Lithium	<1	<1	
Titanium	<1	<1	2
Vanadium	<1	<1	2



Particle Counting	10/8/2007	STATS
ISO 2	20	21
ISO 5	19	19
ISO 15	16	15

Viscosity - ASTM D445 cSt	11/1/2005	10/8/2007	STATS
Visc @ 40°C	41.23	44.27	
Visc @ 100°C	7.37		
Viscosity Index	145.04		

FTIR - Modified ASTM E1421	11/1/2005	10/8/2007	STATS
Nitration (Abs/cm)	1.1	27.3	6.1
Oxidation (Abs/cm)	1.0	236.1	58.0
Water (%)	<0.1	3.0	0.6
Ester Brkdwn (Abs/cm)			4.0
Glycol (%)	<0.1	1.2	1.0

Water KF - ASTM D4377	10/8/2007	STATS
Result (%)	1.51 (%)	10,000.00

Total Acid Number - ASTM	10/8/2007	STATS
Result (mg KOH/g)	2.19	

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Wear Index - PQ90				10/8/2007	STATS
Result ()				1.0	25.0

Wear metals remain within acceptable limits. Bubbling caused by water may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index. High water levels may threaten the unit by general corrosive attack, accelerated oxidation of the oil, reaction with the additives to cause depletion and emulsify with the oil which may result in inadequate oil film development, resulting in accelerated wear. Fluid cleanliness has an ISO Solid Contamination Code of 20/19/16

**RECOMMENDED:** Lower water level and check for sources of water ingress. Continue to sample on a regular basis to monitor wear trends and fluid condition.

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Testing provided by:  
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Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>1</b>
Lube Type	Compressor	Comp	Level 4 Make:	Lubricant Condition
Unknown	Sullair Outside Compressor	Outside Comp	Model:	<b>4</b>
	Test Group(s): B44		Serial No:	

Lab #:	262246	281858
Work Order:		
Date:	7/3/06	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	1	1
Lube Cond:	2	4

AE Spectroscopy - ASTM	7/3/2006	10/8/2007	STATS
Iron	9	15	18
Chromium	<1	<1	2
Nickel	1	<1	2
Aluminum	<1	1	3
Copper	5	1	14
Tin	4	<1	5
Silver	<1	<1	1
Lead	<1	<1	11
Silicon	<1	<1	17
Sodium	60	40	30
Boron	<1	<1	
Magnesium	<1	<1	
Calcium	<1	<1	
Barium	36	67	
Zinc	8	3	
Phosphorous	<1	<1	
Molybdenum	<1	<1	
Lithium	<1	<1	
Titanium	<1	<1	2
Vanadium	<1	<1	2

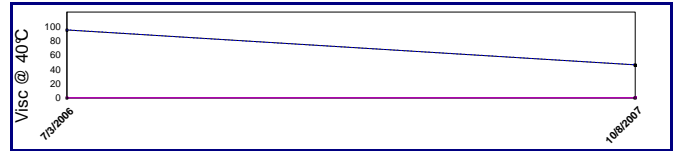
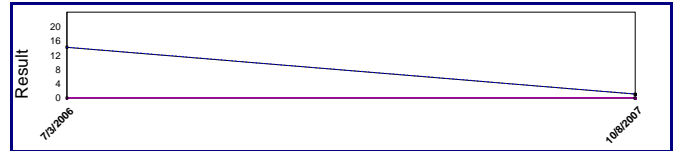
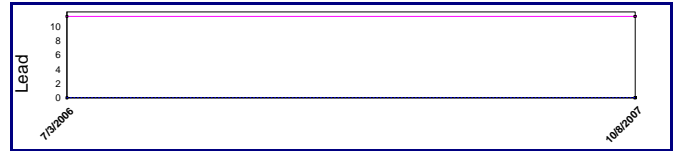
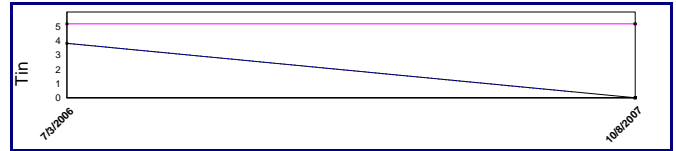
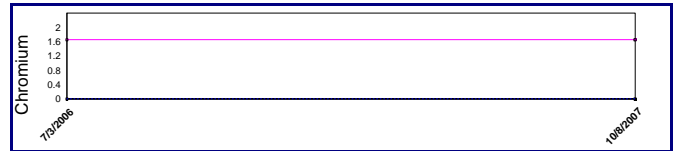
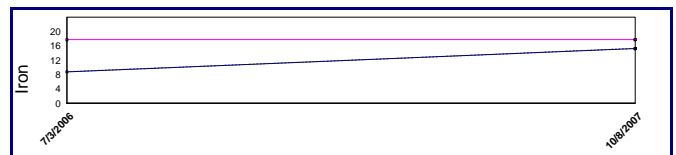
Particle Counting	7/3/2006	10/8/2007	STATS
ISO 2	16	25	21
ISO 5	15	23	19
ISO 15	12	20	15

Viscosity - ASTM D445 cSt	7/3/2006	10/8/2007	STATS
Visc @ 40°C	94.95	46.14	
Visc @ 100°C	11.65		
Viscosity Index	111.71		

FTIR - Modified ASTM E1421	7/3/2006	10/8/2007	STATS
Nitration (Abs/cm)	23.2	23.2	6.1
Oxidation (Abs/cm)	236.7	247.7	58.0
Water (%)	2.1	2.3	0.6
Ester Brkdw (Abs/cm)			4.0
Glycol (%)	<0.1	1.2	1.0

Water KF - ASTM D4377	7/3/2006	10/8/2007	STATS
Result (%)	0.65 (%)	7.82 (%)	10,000.00

Total Acid Number - ASTM	7/3/2006	10/8/2007	STATS
Result (mg KOH/g)	14.21	1.09	



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Wear Index - PQ90		7/3/2006	10/8/2007	STATS
Result ()		1.0	1.0	25.0

Wear metals remain within acceptable limits. Bubbling caused by water may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index. High water levels may threaten the unit by general corrosive attack, accelerated oxidation of the oil, reaction with the additives to cause depletion and emulsify with the oil which may result in inadequate oil film development, resulting in accelerated wear. Fluid cleanliness has an ISO Solid Contamination Code of 25/23/20. This is above an ISO Code of 21/19/15 that is acceptable for general equipment.

**RECOMMENDED:** Check filter to verify if it is operating properly and is clean. Assure that all openings are closed, seals tight, and that dust, dirt, and other contaminants do not enter the unit. Consider filtering fluid using a portable filtration/polishing unit to improve cleanliness. Lower water level and check for sources of water ingress. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data.

STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

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Testing provided by:  
 Lubrication Lab

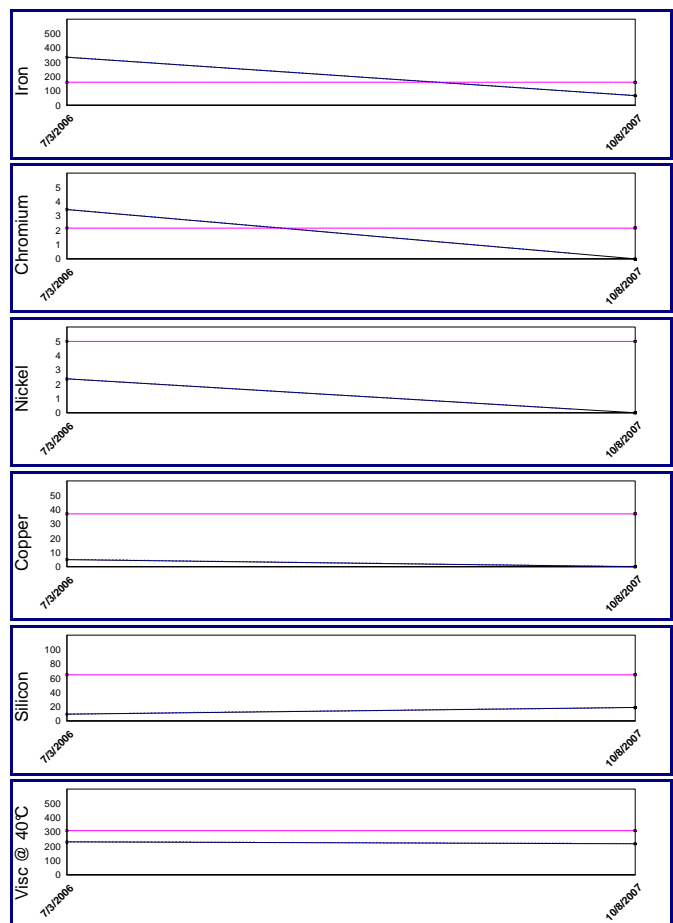
Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>1</b>
Lube Type	ETMW Mixer	ETMW	Level 4 Make:	Lubricant Condition
80W140	North Gearbox	North GBX	Model:	<b>1</b>
	Test Group(s): B33		Serial No:	

Lab #:	262266	281857
Work Order:		
Date:	7/3/06	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	3	1
Lube Cond:	1	1

AE Spectroscopy - ASTM	7/3/2006	10/8/2007	STATS
Iron	335	66	159
Chromium	3	<1	2
Nickel	2	<1	5
Aluminum	<1	<1	41
Copper	5	<1	37
Tin	<1	<1	21
Silver	<1	<1	1
Lead	2	<1	230
Silicon	10	19	65
Sodium	3	3	63
Boron	117	<1	
Magnesium	3	<1	
Calcium	15	<1	
Barium	3	<1	
Zinc	99	1	
Phosphorous	819	213	
Molybdenum	2	<1	
Lithium	3	2	
Titanium	<1	<1	3
Vanadium	<1	<1	3

Viscosity - ASTM D445 cSt	7/3/2006	10/8/2007	STATS
Visc @ 40°C	231.06	218.00	310.00
Visc @ 100°C	19.85	18.39	31.00
Viscosity Index	98.48	93.03	140.00

FTIR - Modified ASTM E1421	7/3/2006	10/8/2007	STATS
Nitration (Abs/cm)	3.7	1.1	7.7
Oxidation (Abs/cm)		<0.1	28.2
Water (%)	<0.1	<0.1	0.8
Ester Brkdwn (Abs/cm)	<0.7		2.2
Glycol (%)		<0.1	0.7



Viscosity is closer to a iso 220. Based on sample submitted and tests performed, there are no abnormal indications at this time. Continue to sample on a regular basis to monitor wear trends and fluid condition.

**RECOMMENDED:** Verify the lubricant being used in or added to this unit and inform lab. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data. STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

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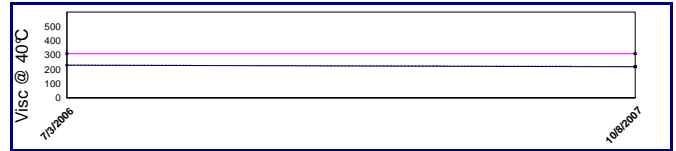
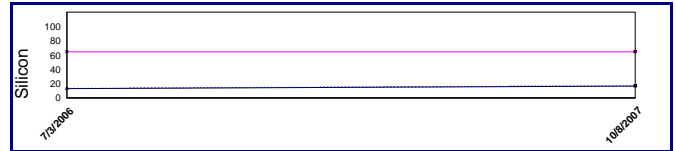
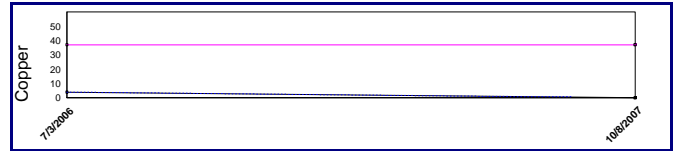
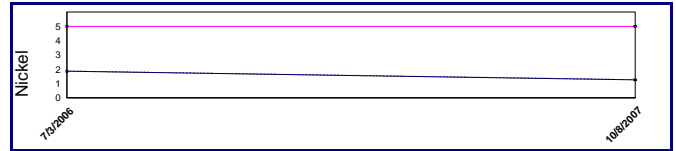
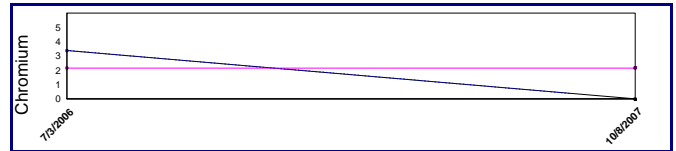
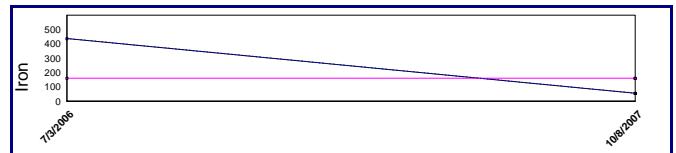


Testing provided by:  
 Lubrication Lab

Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>1</b>
Lube Type	ETMW Mixer	ETMW	Level 4 Make:	Lubricant Condition
80W140	South Gearbox	South GBX	Model:	<b>1</b>
	Test Group(s): B33		Serial No:	

Lab #:	262267	281856
Work Order:		
Date:	7/3/06	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	3	1
Lube Cond:	1	1

AE Spectroscopy - ASTM	7/3/2006	10/8/2007	STATS
Iron	437	54	<b>159</b>
Chromium	3	<1	<b>2</b>
Nickel	2	1	<b>5</b>
Aluminum	1	<1	<b>41</b>
Copper	4	<1	<b>37</b>
Tin	<1	<1	<b>21</b>
Silver	<1	<1	<b>1</b>
Lead	1	<1	<b>230</b>
Silicon	13	17	<b>65</b>
Sodium	3	2	<b>63</b>
Boron	138	<1	
Magnesium	16	<1	
Calcium	23	<1	
Barium	3	<1	
Zinc	101	1	
Phosphorous	938	203	
Molybdenum	<1	2	
Lithium	<1	3	
Titanium	<1	<1	<b>3</b>
Vanadium	<1	<1	<b>3</b>



Viscosity - ASTM D445 cSt	7/3/2006	10/8/2007	STATS
Visc @ 40°C	228.84	218.80	<b>310.00</b>
Visc @ 100°C	20.50	18.42	<b>31.00</b>
Viscosity Index	104.41	92.91	<b>140.00</b>

FTIR - Modified ASTM E1421	7/3/2006	10/8/2007	STATS
Nitration (Abs/cm)	1.7	1.1	<b>7.7</b>
Oxidation (Abs/cm)		<0.1	<b>28.2</b>
Water (%)	<0.1	<0.1	<b>0.8</b>
Ester Brkdwn (Abs/cm)	<0.8		<b>2.2</b>
Glycol (%)		<0.1	<b>0.7</b>

Viscosity is closer to a iso 220. Based on sample submitted and tests performed, there are no abnormal indications at this time. Continue to sample on a regular basis to monitor wear trends and fluid condition.

**RECOMMENDED:** Verify the lubricant being used in or added to this unit and inform lab. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data. STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

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 Lubrication Lab

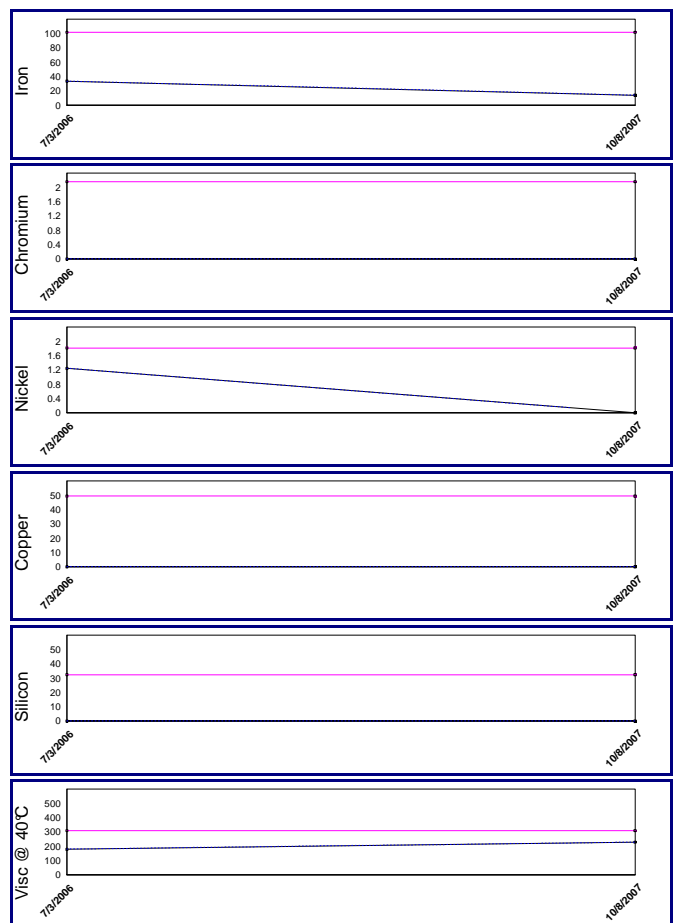
Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>1</b>
Lube Type	Fermenter	Fermenter	Level 4 Make:	Lubricant Condition
80W140	Discharge Pump Gearbox	DischargeGBX	Model:	<b>1</b>
	Test Group(s): B33		Serial No:	

Lab #:	262264	281863
Work Order:		
Date:	7/3/06	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	1	1
Lube Cond:	1	1

AE Spectroscopy - ASTM	7/3/2006	10/8/2007	STATS
Iron	34	14	<b>102</b>
Chromium	<1	<1	<b>2</b>
Nickel	1	<1	<b>2</b>
Aluminum	<1	<1	<b>4</b>
Copper	<1	<1	<b>49</b>
Tin	<1	<1	<b>10</b>
Silver	<1	<1	<b>1</b>
Lead	<1	<1	<b>87</b>
Silicon	<1	<1	<b>32</b>
Sodium	7	49	<b>12</b>
Boron	38	155	
Magnesium	<1	7	
Calcium	<1	<1	
Barium	<1	<1	
Zinc	10	108	
Phosphorous	313	981	
Molybdenum	<1	<1	
Lithium	<1	11	
Titanium	<1	<1	<b>3</b>
Vanadium	<1	<1	<b>2</b>

Viscosity - ASTM D445 cSt	7/3/2006	10/8/2007	STATS
Visc @ 40°C	179.39	229.00	<b>310.00</b>
Visc @ 100°C	16.65	22.46	<b>31.00</b>
Viscosity Index	97.35	119.54	<b>140.00</b>

FTIR - Modified ASTM E1421	7/3/2006	10/8/2007	STATS
Nitration (Abs/cm)	0.4	1.9	<b>7.8</b>
Oxidation (Abs/cm)		<0.1	<b>10.4</b>
Water (%)	<0.1	0.1	<b>1.0</b>
Ester Brkdwn (Abs/cm)	<0.6		<b>2.8</b>
Glycol (%)		<0.1	<b>0.2</b>



Viscosity is closer to a iso 220. Based on sample submitted and tests performed, there are no abnormal indications at this time. Continue to sample on a regular basis to monitor wear trends and fluid condition.

**RECOMMENDED:** Verify the lubricant being used in or added to this unit and inform lab. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data. STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

Instrumentation Services Inc - Texas  
 Frank Vereb  
 12857 E. Independence Blvd Suite F  
 Mathews, NC 28105  
 Ph: 1-800-532-0415  
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Testing provided by:  
 Lubrication Lab

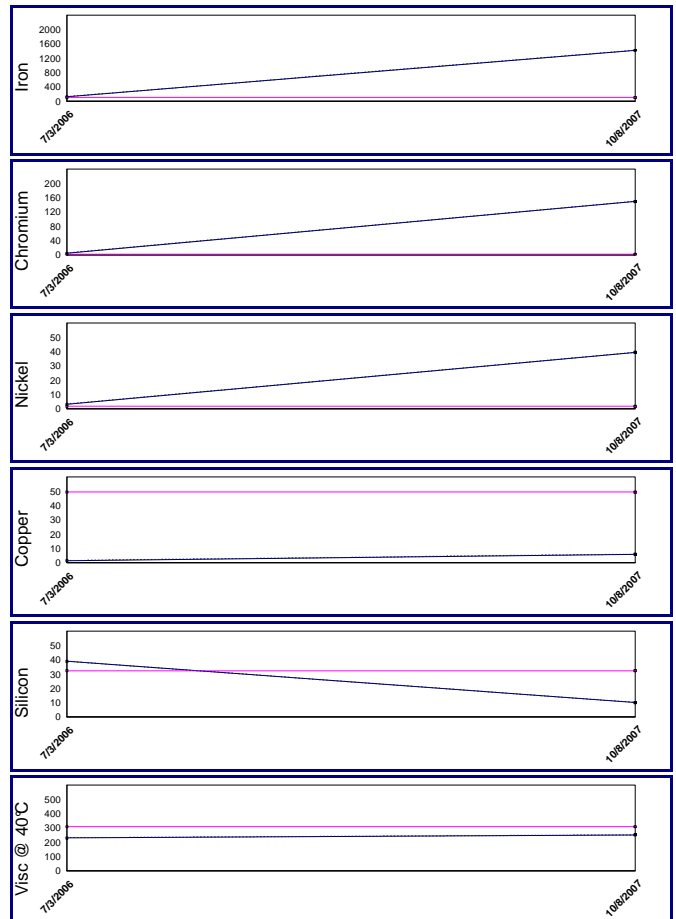
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Unknown	0641	0641	Model:	<b>3</b>
Lube Type	Fermenter	Fermenter	Level 4 Make:	Lubricant Condition
80W140	Fermenter Pump	Fermenter Pump	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	262265	281862
Work Order:		
Date:	7/3/06	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	3	3
Lube Cond:	2	2

AE Spectroscopy - ASTM	7/3/2006	10/8/2007	STATS
Iron	124	1,419	<b>102</b>
Chromium	5	150	<b>2</b>
Nickel	3	40	<b>2</b>
Aluminum	27	14	<b>4</b>
Copper	2	6	<b>49</b>
Tin	<1	<1	<b>10</b>
Silver	<1	<1	<b>1</b>
Lead	<1	<1	<b>87</b>
Silicon	39	10	<b>32</b>
Sodium	45	119	<b>12</b>
Boron	171	87	
Magnesium	14	27	
Calcium	43	60	
Barium	10	<1	
Zinc	107	227	
Phosphorous	1,357	1,571	
Molybdenum	<1	4	
Lithium	<1	2	
Titanium	1	<1	<b>3</b>
Vanadium	<1	<1	<b>2</b>

Viscosity - ASTM D445 cSt	7/3/2006	10/8/2007	STATS
Visc @ 40°C	230.43	252.10	<b>310.00</b>
Visc @ 100°C	21.50	10.47	<b>31.00</b>
Viscosity Index	111.51	<129.62	<b>140.00</b>

FTIR - Modified ASTM E1421	7/3/2006	10/8/2007	STATS
Nitration (Abs/cm)	4.4	37.8	<b>7.8</b>
Oxidation (Abs/cm)		<0.1	<b>10.4</b>
Water (%)	<0.1	5.2	<b>1.0</b>
Ester Brkdwn (Abs/cm)	0.2		<b>2.8</b>
Glycol (%)		<0.1	<b>0.2</b>



Iron, chrome, nickel, and aluminum levels remain elevated for typical industrial gearboxes and drives. Viscosity is closer to an ISO 220 lubricant. Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index.

**RECOMMENDED:** When operations permit, inspect unit for source and extent of wear and contamination. Lower water level and check for sources of water ingress. Verify the lubricant being used in or added to this unit and inform lab. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data. STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

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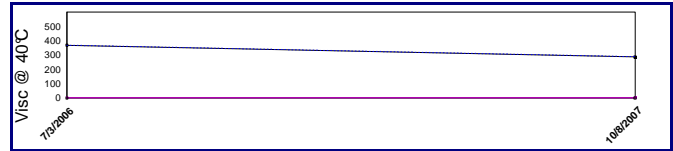
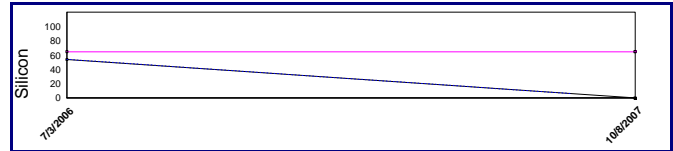
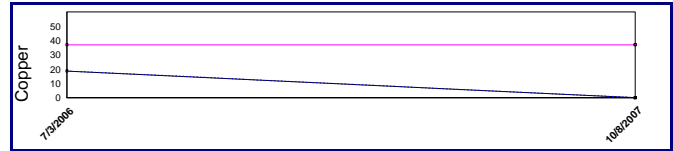
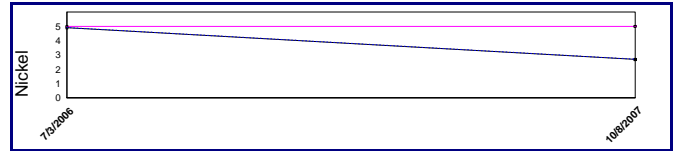
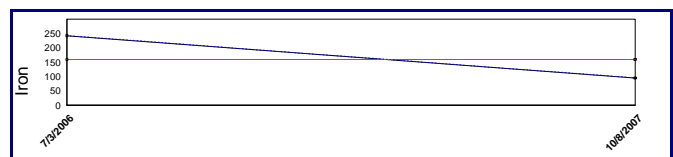


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Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>1</b>
Lube Type	Mixers Continuous	Mixers	Level 4 Make:	Lubricant Condition
Unknown	#1 West	#1 West	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	262247	281861
Work Order:		
Date:	7/3/06	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	3	1
Lube Cond:	1	2

AE Spectroscopy - ASTM	7/3/2006	10/8/2007	STATS
Iron	243	95	159
Chromium	7	4	2
Nickel	5	3	5
Aluminum	4	12	41
Copper	19	<1	37
Tin	<1	<1	21
Silver	<1	<1	1
Lead	<1	<1	230
Silicon	54	<1	65
Sodium	3	5	63
Boron	120	124	
Magnesium	2	<1	
Calcium	12	<1	
Barium	<1	<1	
Zinc	35	1	
Phosphorous	949	754	
Molybdenum	<1	<1	
Lithium	<1	<1	
Titanium	<1	<1	3
Vanadium	<1	<1	3



Viscosity - ASTM D445 cSt	7/3/2006	10/8/2007	STATS
Visc @ 40°C	368.62	286.87	
Visc @ 100°C	25.65		
Viscosity Index	91.97		

FTIR - Modified ASTM E1421	7/3/2006	10/8/2007	STATS
Nitration (Abs/cm)	7.9	8.2	7.7
Oxidation (Abs/cm)	4.1	<0.1	28.2
Water (%)	<0.1	1.0	0.8
Ester Brkdw (Abs/cm)			2.2
Glycol (%)	<0.1	<0.1	0.7

Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index. Water at 1%. Chrome levels are slightly elevated, but all other wear metals remain within acceptable limits.

**RECOMMENDED:** Lower water level and check for sources of water ingress. Continue to sample on a regular basis to monitor wear trends and fluid condition.

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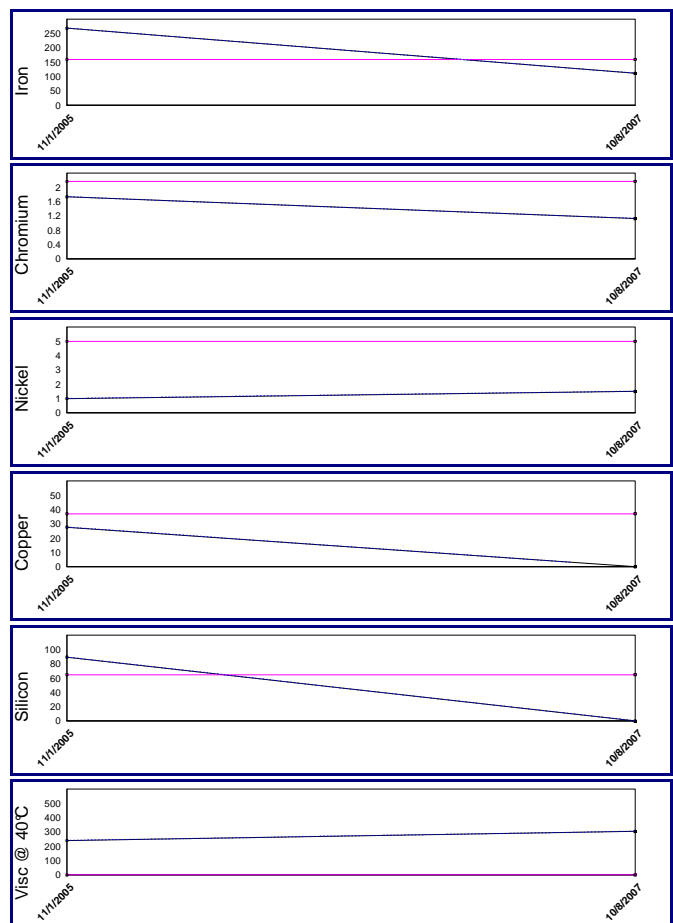
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Unknown	0641	0641	Model:	<b>1</b>
Lube Type	Mixers Continuous	Mixers	Level 4 Make:	Lubricant Condition
Unknown	#2 East	#2 East	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	250046	281860
Work Order:		
Date:	11/1/05	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	2	1
Lube Cond:	1	2

AE Spectroscopy - ASTM	11/1/2005	10/8/2007	STATS
Iron	269	111	159
Chromium	2	1	2
Nickel	1	2	5
Aluminum	5	25	41
Copper	28	<1	37
Tin	<1	<1	21
Silver	<1	<1	1
Lead	<1	<1	230
Silicon	89	<1	65
Sodium	5	4	63
Boron	178	89	
Magnesium	2	<1	
Calcium	44	<1	
Barium	11	<1	
Zinc	144	<1	
Phosphorous	1,036	715	
Molybdenum	4	1	
Lithium	<1	<1	
Titanium	<1	<1	3
Vanadium	<1	<1	3

Viscosity - ASTM D445 cSt	11/1/2005	10/8/2007	STATS
Visc @ 40°C	240.20	304.59	
Visc @ 100°C	22.52		
Viscosity Index	114.45		

FTIR - Modified ASTM E1421	11/1/2005	10/8/2007	STATS
Nitration (Abs/cm)	0.3	8.5	7.7
Oxidation (Abs/cm)	0.5	<0.1	28.2
Water (%)	<0.1	1.2	0.8
Ester Brkdwn (Abs/cm)			2.2
Glycol (%)	<0.1	<0.1	0.7



Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index. Water at 1.2%. Wear metals remain within acceptable limits. High water levels may threaten the unit by general corrosive attack, accelerated oxidation of the oil, reaction with the additives to cause depletion and emulsify with the oil which may result in inadequate oil film development, resulting in accelerated wear.

**RECOMMENDED:** Lower water level and check for sources of water ingress. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data. STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

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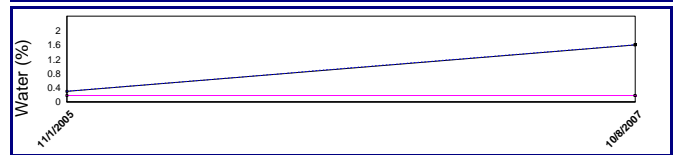
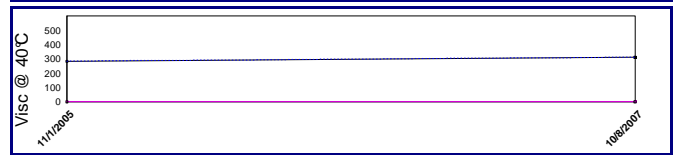
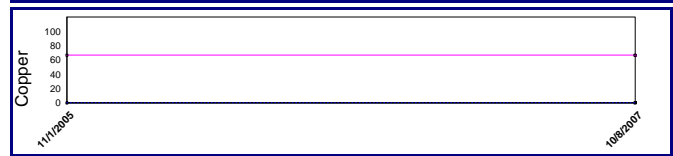
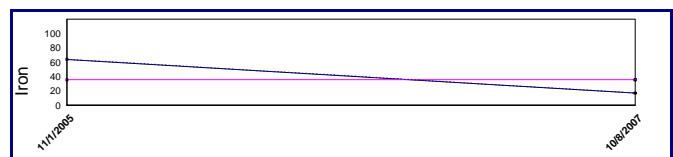


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Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>2</b>
Lube Type	Premixers	Premixers	Level 4 Make:	Lubricant Condition
Unknown	#1 West Premixer Pump	#1 W Pump	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	250050	281867
Work Order:		
Date:	11/1/05	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	2	2
Lube Cond:	1	2

AE Spectroscopy - ASTM	11/1/2005	10/8/2007	STATS
Iron	64	17	<b>35</b>
Chromium	<1	<1	<b>1</b>
Nickel	7	9	<b>1</b>
Aluminum	17	<1	<b>3</b>
Copper	<1	<1	<b>67</b>
Tin	<1	<1	<b>17</b>
Silver	<1	<1	<b>1</b>
Lead	<1	<1	<b>12</b>
Silicon	34	<1	<b>43</b>
Sodium	8	8	<b>178</b>
Boron	154	134	
Magnesium	2	<1	
Calcium	44	<1	
Barium	5	<1	
Zinc	209	1	
Phosphorous	839	754	
Molybdenum	2	<1	
Lithium	<1	<1	
Titanium	<1	<1	<b>3</b>
Vanadium	<1	<1	<b>3</b>



Viscosity - ASTM D445 cSt	11/1/2005	10/8/2007	STATS
Visc @ 40°C	283.20	311.41	
Visc @ 100°C	26.21		
Viscosity Index	120.75		

FTIR - Modified ASTM E1421	11/1/2005	10/8/2007	STATS
Nitration (Abs/cm)	3.1	10.6	<b>5.5</b>
Oxidation (Abs/cm)	6.6	<0.1	<b>7.5</b>
Water (%)	0.3	1.6	<b>0.2</b>
Ester Brkdwn (Abs/cm)			<b>0.4</b>
Glycol (%)	<0.1	<0.1	<b>0.1</b>

Chrome levels are elevated, all other wear metals remain within acceptable limits. Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index. Water is at 1.6%.

**RECOMMENDED:** If wear continues to increase, unit will have to be inspected. Lower water level and check for sources of water ingress. Continue to sample on a regular basis to monitor wear trends and fluid condition.

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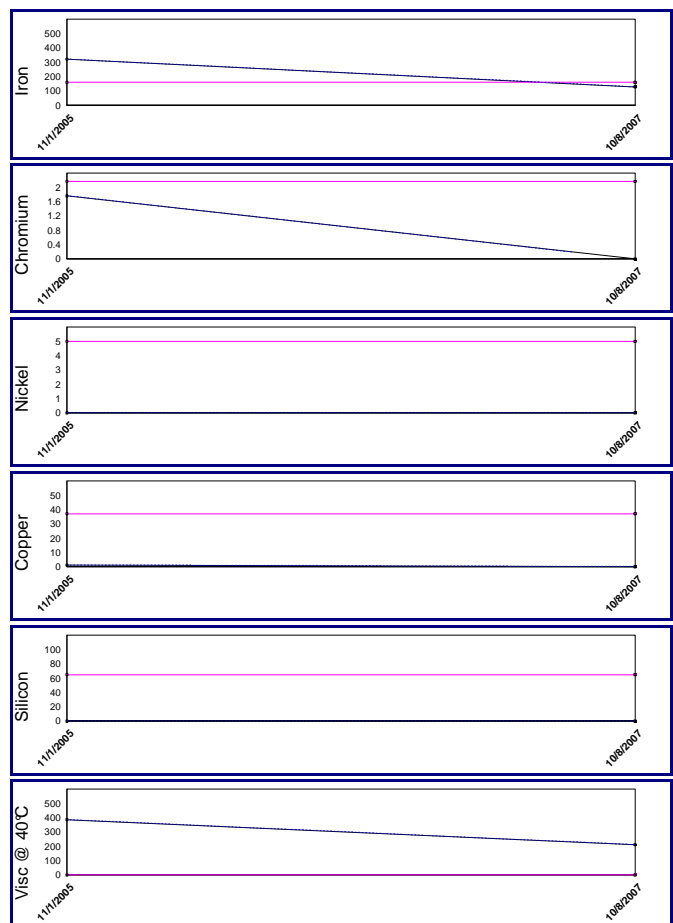
Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>1</b>
Lube Type	Premixers	Premixers	Level 4 Make:	Lubricant Condition
Unknown	#1 West Premixer	#1 West	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	250048	281866
Work Order:		
Date:	11/1/05	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	2	1
Lube Cond:	1	2

AE Spectroscopy - ASTM		11/1/2005	10/8/2007	STATS
Iron		321	128	159
Chromium		2	<1	2
Nickel		<1	<1	5
Aluminum		55	7	41
Copper		1	<1	37
Tin		<1	<1	21
Silver		<1	<1	1
Lead		<1	<1	230
Silicon		<1	<1	65
Sodium		43	10	63
Boron		111	157	
Magnesium		3	3	
Calcium		65	<1	
Barium		31	<1	
Zinc		130	184	
Phosphorous		1,331	1,044	
Molybdenum		1	1	
Lithium		<1	1	
Titanium		<1	<1	3
Vanadium		<1	<1	3

Viscosity - ASTM D445 cSt		11/1/2005	10/8/2007	STATS
Visc @ 40°C		386.90	211.43	
Visc @ 100°C		5.56		
Viscosity Index		<2,076.93		

FTIR - Modified ASTM E1421		11/1/2005	10/8/2007	STATS
Nitration (Abs/cm)		6.0	11.3	7.7
Oxidation (Abs/cm)		223.3	0.8	28.2
Water (%)		1.2	1.3	0.8
Ester Brkdw (Abs/cm)				2.2
Glycol (%)		0.8	<0.1	0.7



Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index. Water is at 1.3%. Based on sample submitted and tests performed, there are no abnormal indications at this time.

**RECOMMENDED:** Lower water level and check for sources of water ingress. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data. STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical

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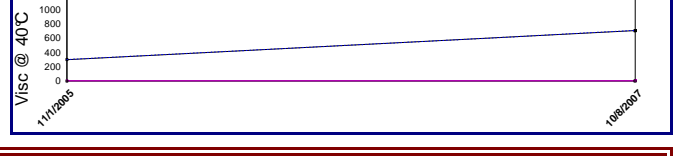
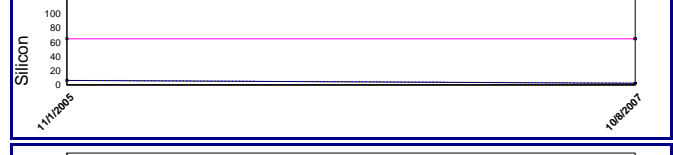
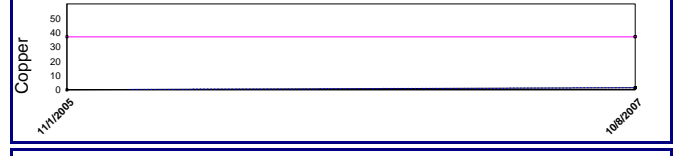
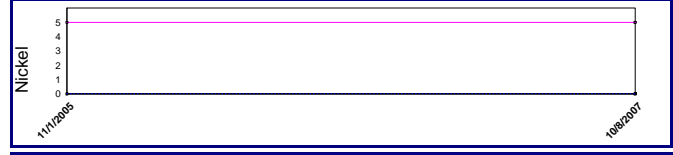
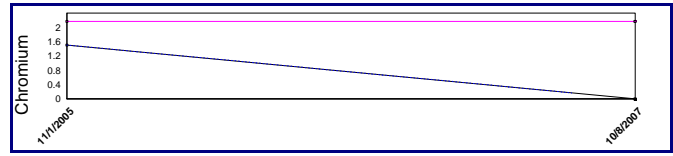
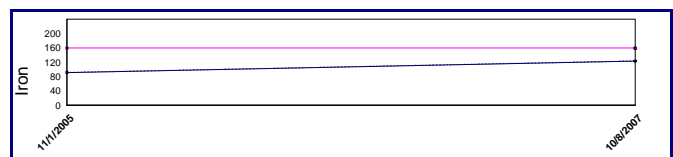


Testing provided by:  
 Lubrication Lab

Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>1</b>
Lube Type	Premixers	Premixers	Level 4 Make:	Lubricant Condition
Unknown	#2 East Premixer Gearbox	#2 E GBX	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	250053	281864
Work Order:		
Date:	11/1/05	10/8/07
Time on Unit:	0.0	0.0
Time on Oil:	0.0	0.0
Mach Cond:	1	1
Lube Cond:	1	2

AE Spectroscopy - ASTM	11/1/2005	10/8/2007	STATS
Iron	91	123	159
Chromium	2	<1	2
Nickel	<1	<1	5
Aluminum	3	3	41
Copper	<1	1	37
Tin	<1	<1	21
Silver	<1	<1	1
Lead	<1	2	230
Silicon	7	3	65
Sodium	8	59	63
Boron	79	58	
Magnesium	6	7	
Calcium	48	27	
Barium	33	7	
Zinc	186	233	
Phosphorous	828	467	
Molybdenum	3	<1	
Lithium	<1	<1	
Titanium	<1	<1	3
Vanadium	2	<1	3



Viscosity - ASTM D445 cSt	11/1/2005	10/8/2007	STATS
Visc @ 40°C	299.00	702.50	
Visc @ 100°C	0.00		
Viscosity Index	0.00		

FTIR - Modified ASTM E1421	11/1/2005	10/8/2007	STATS
Nitration (Abs/cm)	41.8	220.9	7.7
Oxidation (Abs/cm)	36.8	49.6	28.2
Water (%)	2.2	2.1	0.8
Ester Brkdw (Abs/cm)			2.2
Glycol (%)	<0.1	<0.1	0.7

Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index. Water at 2.1%. Wear metals remain within acceptable limits. High water levels may threaten the unit by general corrosive attack, accelerated oxidation of the oil, reaction with the additives to cause depletion and emulsify with the oil which may result in inadequate oil film development, resulting in accelerated wear.

**RECOMMENDED:** Lower water level and check for sources of water ingress. Continue to sample on a regular basis to monitor wear trends and fluid condition.

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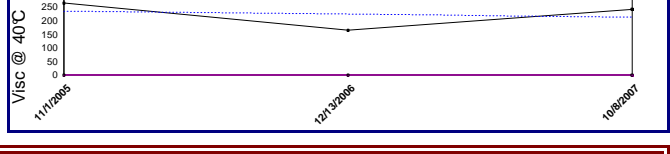
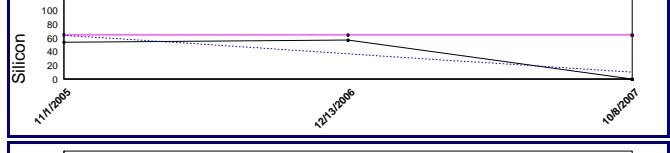
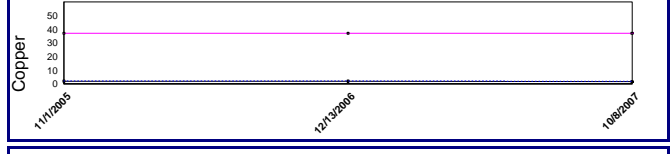
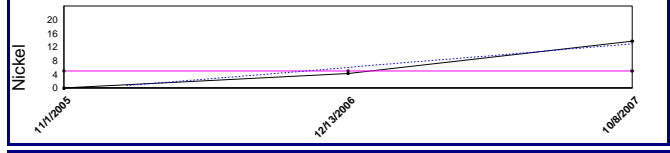
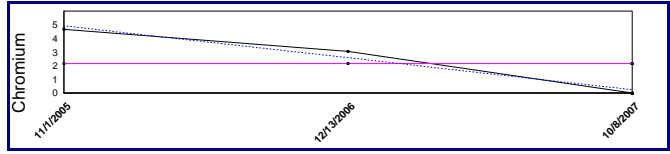
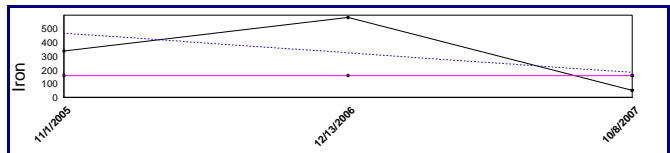
Lube Supplier	Instrumentation Services Inc - Texas	ISI-TX	Level 3 Make: unknown	Machine Condition
Unknown	0641	0641	Model:	<b>2</b>
Lube Type	Premixers	Premixers	Level 4 Make:	Lubricant Condition
Unknown	#2 East Premixer	#2 East	Model:	<b>2</b>
	Test Group(s): B33		Serial No:	

Lab #:	250051	269161	281865
Work Order:			
Date:	11/1/05	12/13/06	10/8/07
Time on Unit:	0.0	0.0	0.0
Time on Oil:	0.0	0.0	0.0
Mach Cond:	2	3	2
Lube Cond:	1	1	2

AE Spectroscopy - ASTM	11/1/2005	12/13/2006	10/8/2007	STATS
Iron	339	583	51	159
Chromium	5	3	<1	2
Nickel	<1	4	14	5
Aluminum	14	12	1	41
Copper	2	2	2	37
Tin	<1	<1	<1	21
Silver	<1	<1	<1	1
Lead	<1	<1	2	230
Silicon	54	57	<1	65
Sodium	9	10	12	63
Boron	205	187	131	
Magnesium	2	5	<1	
Calcium	50	46	<1	
Barium	7	26	<1	
Zinc	133	296	146	
Phosphorous	968	1,096	774	
Molybdenum	3	<1	2	
Lithium	<1	<1	3	
Titanium	<1	<1	<1	3
Vanadium	<1	<1	<1	3

Viscosity - ASTM D445 cSt	11/1/2005	12/13/2006	10/8/2007	STATS
Visc @ 40°C	263.50	164.00	240.98	
Visc @ 100°C	23.70	17.32		
Viscosity Index	112.43	114.43		

FTIR - Modified ASTM E1421	11/1/2005	12/13/2006	10/8/2007	STATS
Nitration (Abs/cm)	5.4	7.3	8.7	7.7
Oxidation (Abs/cm)	9.3	4.7	0.9	28.2
Water (%)	0.4	<0.1	1.1	0.8
Ester Brkdown (Abs/cm)				2.2
Glycol (%)	<0.1	<0.1	<0.1	0.7



Chrome levels are elevated, all other wear metals remain within acceptable limits. Water content may have affected the accuracy of the viscosity testing at 100°C and thus the viscosity index. Water is at 1.1%.

**RECOMMENDED:** If wear continues to increase, unit will have to be inspected. Lower water level and check for sources of water ingress. Continue to sample on a regular basis to monitor wear trends and fluid condition.

NOTE: Green STATS items are averages, red are upper limits. Statistical limits are variant upon dataset size and are used as general guidelines only. Dotted blue lines on graphs are trend lines, solid purple lines on graphs represent upper limit/average as per number in 'STATS' column. Sample was analyzed as received and recommendations based on tests performed. Clark Laboratories LLC is not liable for any consequences resulting from use/abuse of the data and conclusions contained within this report. By receiving this report for services rendered, client accepts full responsibility and liability for all actions occurring from evaluation of this data. STATUS : 1=Normal, 2=Slight, 3=Marginal, 4=Severe, 5=Critical