Performance Summary

Controlling Water Contamination with Mobil By-Pass Filters and Mobil LubeGuard Desiccant Breathers Improves Compressor and Pump Productivity with $228,000 Cost Avoidance

June 8, 2010

ExxonMobil SYU Offshore
Goleta, CA

Situation

In March, 2009, in a re-injection reciprocating compressor, extensive engine crankcase corrosion was discovered on oil-wetted surfaces. The investigation focused on oil contamination from water, chemicals and/or sour gas as well as compressor cylinder lube contamination.

Steps were taken to mitigate water contamination from leaking seals; however, environmental conditions make water contamination a persistent problem.

Recommendation

Mobil Field Engineers recommended SYU personnel install a Mobil Bypass Filtration System to remove water, add Mobil LubeGuard Desiccant breathers and monitor oil with Signum Oil Analysis.

Result

Signum Oil Analysis confirms water is being removed successfully from the compressor and shipping pump. Both pieces of equipment are operating reliably and without experiencing the equipment damage which occurred last year.

Prepared By

Matthew Epple
Senior Lubrication Engineer
June 8, 2010

Accepted By

Eugene Ping
Maintenance Supervisor

Engineering Service Report

Controlling Water Contamination with Mobil By-Pass Filters and Mobil LubeGuard Desiccant Breathers Improves Compressor and Pump Productivity with $228,000 Cost Avoidance

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Goleta, CA

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Highlights

ExxonMobil SYU Offshore Maintenance Personnel at the Heritage Platform acted on Mobil Field Engineer's recommendations to monitor, control and remove water contamination in critical equipment to improve reliability and productivity while achieving maintenance savings of $228,000.

Total Cost of Ownership Summary

TCO Category	Notes	Savings
Revenue Enhancement	Reliability as identified in HER CZ 311 Crankcase Corrosion Incident RCA Report, 3/5/09 (* oil equivalent barrels)	80,000oeb*
Expenditure Reduction	Maintenance Costs as identified in HER CZ 311 Crankcase Corrosion Incident RCA Report, 3/5/09	$228,000
	Total Savings	**$228,000**

Situation

During a scheduled overhaul of Heritage 311 Compressor in March, 2009, extensive engine crankcase corrosion was discovered on oil-wetted surfaces. The investigation focused on oil contamination from water, chemicals and/or sour gas as well as compressor cylinder lube contamination.

Mobil Signum Oil Analysis confirmed persistent water contamination in lube oil in this compressor as well as a shipping pump. Subsequently, Mobil Field Engineers made recommendations to monitor water contamination, and control and remove water on an on-going basis from the crankcase lubricant.

Recommendation

Mobil recommended:

- Mobil LubeGuard Desiccant breathers – to reduce environmental water contamination
- Use a Mobil Bypass Filtration System – remove water from contaminated oil
- Signum Oil Analysis – to monitor oil and equipment condition

Result

Signum Oil Analysis confirms water is being removed successfully from the compressor and shipping pump. Both pieces of equipment are operating reliably and without experiencing the equipment damage which occurred last year.

Mobil wishes to thank Mssrs. Eugene Ping, Brian Harvey and Jeff Patterson for their assistance in preparing this report. We applaud your successful efforts to significantly improve equipment reliability and Platform productivity by implementing these recommendation.

Respectfully submitted,
Exxon Mobil Corporation

Matthew Epple
Senior Lubrication Engineer

Matt Legg
Sales Engineer

Bill Fuller
Field Engineering Services Supervisor

Contents

Discussion

ExxonMobil SYU Offshore Maintenance Personnel at the Heritage Platform acted on Mobil Field Engineer's recommendations to monitor, control and remove water contamination in critical equipment to improve reliability and productivity while achieving maintenance savings of $228,000.

Background

During a scheduled overhaul of Heritage 311 Compressor in March, 2009, extensive engine crankcase corrosion was discovered on oil-wetted surfaces. The investigation focused on oil contamination from water, chemicals and/or sour gas as well as compressor cylinder lube contamination.

According to the RCA Form, dated 3/5/09, the direct cause was identified as "Contamination of Circulating Oil". Casual Factors included the "# 2 Pressure Packer Leaking" and "case breathes to outside air – potential for condensation over time."

Impact

In terms of Reliability (Volumes of production) and Property/Equipment Damage (Maintenance Costs) - From the RCA Report Form:

Section 2	**Date Investigation: Start** 3/8/09 **and Completion** 5/09/09		
	Impact	**Safety, Health, Environmental, or Security**	--
		Reliability (Volumes – bbls, mcf, or oeb)	80,000 oeb
		Property/Equipment Damage (Maintenance Costs $)	$228,000
To be completed by Target for Investigation Completion Date by Team Leader	**DIRECT CAUSE (S):**		
	1. Contamination of Crankcase Circulating Oil		
	2.		
	3.		
	4.		

Recommendations

Mobil Field Engineers submitted an Engineering Service Notice (ESN) on November 11, 2009 with these recommendations:

- Mobil LubeGuard Desiccant breathers – to reduce environmental water contamination
- Use a Mobil Bypass Filtration System – remove water from contaminated oil
- Signum Oil Analysis – to monitor oil and equipment condition

From that ESN:

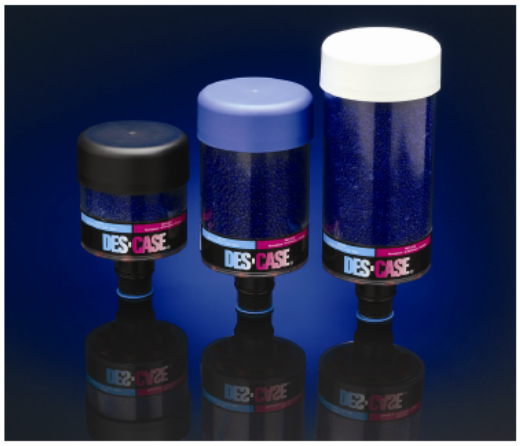
Recommendation/ Findings:	During the on-site evaluation of the shipping pump we noted a competitive desiccant breather on the appropriate location, and in good working condition. The HER-CZZ-311 IGC Compressor had one vent cap breather and a competitive desiccant breather that had exceeded its useful life. ExxonMobil Engineers recommend purchasing Mobil LubeGuard Desiccant Breathers immediately for the HER-CZZ-311 IGC Compressor to reduce risk of water contamination in the Mobil Teresstic 150. A Mobil LubeGuard Desiccant Breather should also be installed on the HER-PAX-332 Shipping Pump once it is time for a breather change out. ExxonMobil recommends dedicating a 200 LP Slip Stream Mobil Filter to the HER-CZZ-311 IGC Compressor, HER-PAX-332 Shipping Pump and any other shipping pump experiencing similar water issues. The Mobil Filter should be tied into the high pressure feed line of the shipping pump, preferably before the current inline filtration units, a zero pressure return line should be used from the Mobil 200 LP to reservoir. The same instillation should be set up for the Mobil Filter attached to the IGC Compressor. Continue to send in oil samples to the Signum Oil Analysis Laboratories and review future results with the ExxonMobil Lubrication Engineering Team.

The 200 LP Slip Stream Mobil Filter filters the oil down to an ISO cleanliness of 16/14/11 with a .1 micron filtering accuracy. At a flow rate of .65 GPM it has water holding capacity of 24 oz and 1.25 lbs of dirt.

200 LP Slip Stream Mobil Filter on HER CZ 311

Mobil Lubeguard Breathers Used at Heritage Platform
Features

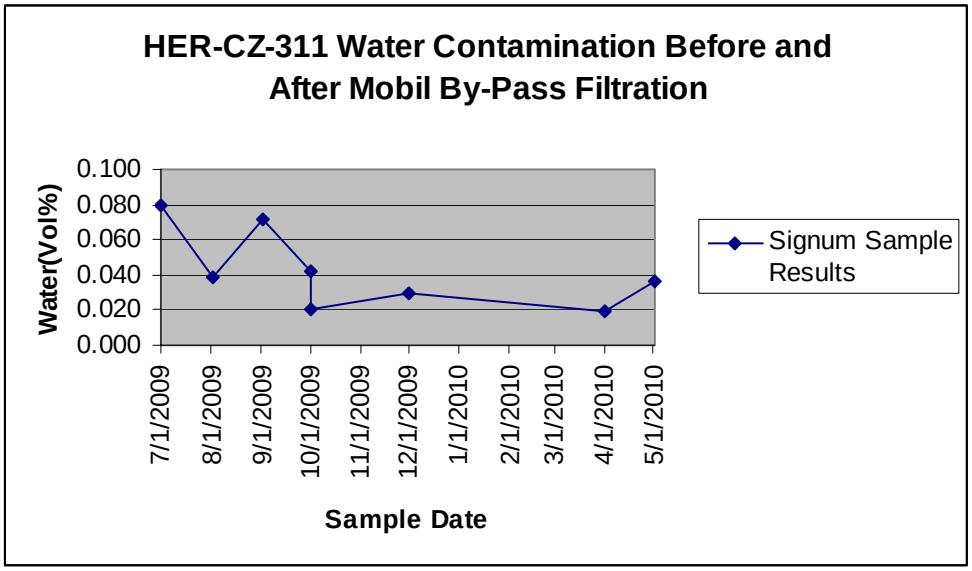
- UV Resistant, Resilient Polycarbonate Plastic Body
- Bi-Directional Air-flow through integrated nylon standpipe design
- Water Vapor Adsorbent
- 3 Micron Absolute Filter
- Color Indicating Silica Gel



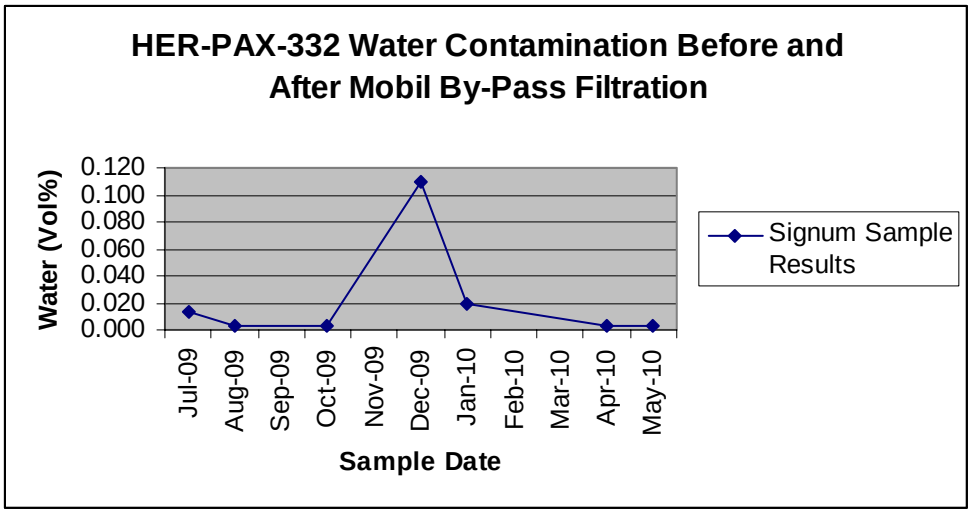
DC-2 DC-3 DC-4

Results

Signum Oil Analysis confirms water is being removed successfully from the compressor and shipping pump. Both pieces of equipment are operating reliably and without experiencing the equipment damage which occurred last year.



Mobil By-Pass Filtration and Mobil Lubeguard Desiccant Breathers Installed October 2009



Mobil By-Pass Filtration and Mobil Lubeguard Desiccant Breathers Installed December 2009

Summary

ExxonMobil SYU Offshore Maintenance Personnel at the Heritage Platform acted on Mobil Field Engineer's recommendations to monitor, control and remove water contamination in critical equipment to improve reliability and productivity while achieving maintenance savings of $228,000.

Appendix 1

Signum Analyses

SIGNUM
OIL ANALYSIS

HAR-CZZ-311

Normal

Account Number :	205627
Account Name :	EXXONMOBIL SANTA YNEZ UNIT
	THE JANKOVICH COMPANY
Date :	10-Jun-2010
Signum Number :	30550153

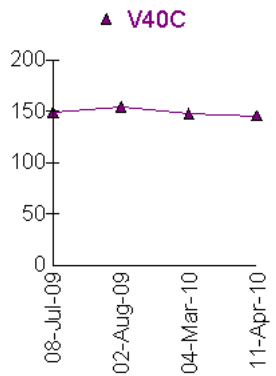
Description :	RECIPROCATING COMPRESSOR
Component :	Compressor
Manufacturer :	SUPERIOR
Model :	W74
Registered Lubricant :	TERESSTIC 150

Comments: No action is required on oil or equipment - Results are within acceptable ranges. - Examine progressive changes and monitor results for changing trends. - Sample at next scheduled interval.

Sample Data

Sample ID	**0102394044**	0063417008	9217438009	9189420057
Date Sampled	**11-Apr-2010**	04-Mar-2010	02-Aug-2009	08-Jul-2009
Date Reported	**15-Apr-2010**	05-Mar-2010	07-Aug-2009	09-Jul-2009
Brand	**MOBIL**	MOBIL	MOBIL	MOBIL
Lubricant Tested	**TERES 150**	TERES 150	TERES 150	TERES 150
Equip.				
Oil				
Resv. Temp				
Make-Up				
Oil Changed				
Filter Changed				

Viscosity



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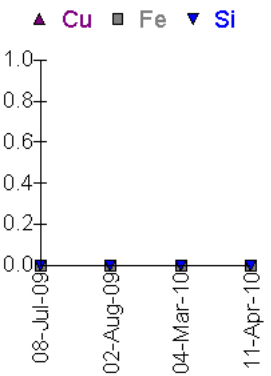


Sample Data

Sample ID	**0102394044**	0063417008	9217438009	9189420057
Date Sampled	**11-Apr-2010**	04-Mar-2010	02-Aug-2009	08-Jul-2009

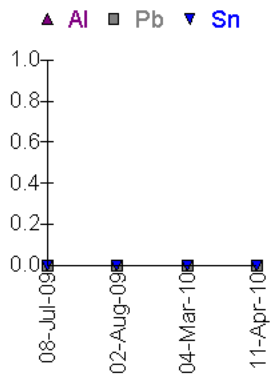
Wear Elements - ppm (mg/kg)

Al (Aluminum)	**0**	0	0	0
Cr (Chromium)	**0**	0	0	0
Cu (Copper)	**0**	0	0	0
Fe (Iron)	**0**	0	0	0
Mo (Molybdenum)	**0**	0	0	0
Ni (Nickel)	**0**	0	0	0
Pb (Lead)	**0**	0	0	0
Sn (Tin)	**0**	0	0	0

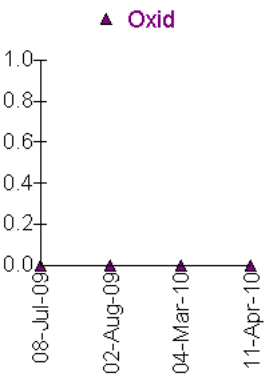
Lubricant Data

Contamination	**Normal**	Normal	*Alert	*Alert
Equipment Rating	**Normal**	Normal	Normal	Normal
Oil Rating	**Normal**	Normal	Normal	Normal
Visc@40C (cst)	**145.7**	147.6	153.8	149.0
Oxidation (Ab/cm)	**0**	0	0	0
Water (Hot Plate)	**NotDetected**	NotDetected	*Detected	*Detected

Elements



Lubricant



Contaminant Elements - ppm (mg/kg)

B (Boron)	**0**	0	0	0
K (Potassium)	**0**	0	0	0
Na (Sodium)	**0**	0	0	0
Si (Silicon)	**0**	0	0	0

Additive Elements - ppm (mg/kg)

Ba (Barium)	**0**	0	0	0
Ca (Calcium)	**3**	0	0	1
Mg (Magnesium)	**0**	1	0	0
P (Phosphorus)	**45**	48	10	12
Zn (Zinc)	**1**	0	0	1

Normal **+ Caution** *** Alert**

EXXON

SIGNUM OIL ANALYSIS

HER-PAX-332

Normal

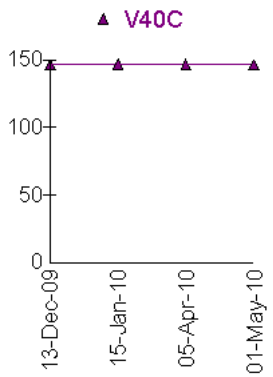
Account Number :	205627	Description :	TWIN SCREW SHIPPING PUMP
Account Name :	EXXONMOBIL SANTA YNEZ UNIT	Component :	Compressor
	THE JANKOVICH COMPANY	Manufacturer :	PLEASE SELECT
		Model :	NOT LISTED-ENTER ALT MODEL
Date :	07-Jun-2010	Registered Lubricant :	TERESSTIC 150
Signum Number :	30550182		

Comments: No action is required on oil or equipment - Results are within acceptable ranges. - Examine progressive changes and monitor results for changing trends. - Sample at next scheduled interval.

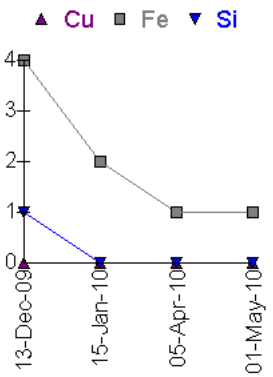
Sample Data

Sample ID	**0126433042**	0099376048	0020490049	9355337075
Date Sampled	**01-May-2010**	05-Apr-2010	15-Jan-2010	13-Dec-2009
Date Reported	**11-May-2010**	14-Apr-2010	22-Jan-2010	22-Dec-2009
Brand	**MOBIL**	MOBIL	MOBIL	MOBIL
Lubricant Tested	**TERES 150**	TERES 150	TERES 150	TERES 150
Equip.				
Oil		13632	13632	
Resv. Temp				120
Make-Up				
Oil Changed				
Filter Changed				

Viscosity



Elements



Sample Data

Sample ID	**0126433042**	0099376048	0020490049	9355337075
Date Sampled	**01-May-2010**	05-Apr-2010	15-Jan-2010	13-Dec-2009

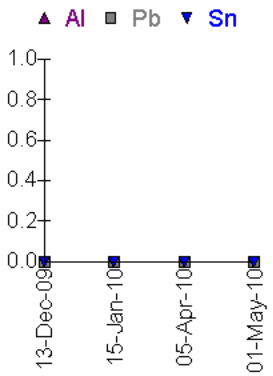
Wear Elements - ppm (mg/kg)

Al (Aluminum)	**0**	0	0	0
Cr (Chromium)	**0**	0	0	0
Cu (Copper)	**0**	0	0	0
Fe (Iron)	**1**	1	2	4
Mo (Molybdenum)	**0**	0	0	0
Ni (Nickel)	**0**	0	0	0
Pb (Lead)	**0**	0	0	0
Sn (Tin)	**0**	0	0	0

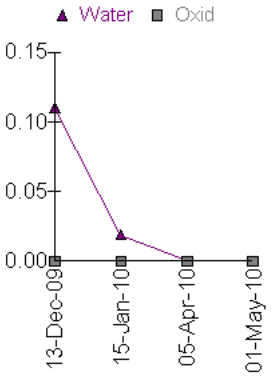
Lubricant Data

Contamination	**Normal**	Normal	Normal	*Alert
Equipment Rating	**Normal**	Normal	Normal	Normal
Oil Rating	**Normal**	Normal	Normal	Normal
Visc@40C (cst)	**146.4**	146.7	146.8	146.4
ISO Code (4/6/14)	**20/16/12**	18/15/10	23/21/16	+
Particle Count > 4µ	**6745**	2227	43558	+
Particle Count > 6µ	**436**	196	18719	
Particle Count >14µ	**36**	10	479	
Oxidation (Ab/cm)	**0**	0	0	0
PQ Index	**0**	0	0	0
Water (Vol%)	**<0.003**	<0.003	0.019	*0.110

Elements



Lubricant



Contaminant Elements - ppm (mg/kg)

B (Boron)	**0**	0	0	0
K (Potassium)	**0**	0	1	1
Na (Sodium)	**1**	0	11	*40
Si (Silicon)	**0**	0	0	1

Additive Elements - ppm (mg/kg)

Ba (Barium)	**0**	0	0	0
Ca (Calcium)	**0**	0	0	4
Mg (Magnesium)	**0**	0	0	1
P (Phosphorus)	**4**	2	3	4
Zn (Zinc)	**2**	2	1	2

Normal **+ Caution** *** Alert**

EXXON