

PRESSURE VESSEL & COLUMN INSPECTION REPORT

LSD: 01-02-038-03 W5M

Date: September 25, 2014

SAP Equipment ID:

VESSEL STATIC DATA

Plant		Sylvan Lake Gas Plant		Op Unit		Sylvan Lake		System		Flare				
Prov Insp. #				CRN				Equip Tag # (Barcode)				43357		
Equipment Description								Flare Knockout Drum				Serial #		
Manufacturer				Unknown				Vessel Class		Non-code Vessel				
Internal Access				YES		Description:		Manway		Year Built				
MAWP		14.9		psi		@		0		MDMT		0		
Code			None		RT:		4		PWHT		NO			
Diameter		84"		Length		(T/T) 132"		OAL		Horizontal				
Shell		Mat'l				Thickness		Corr. Allowance						
Head		Mat'l				Thickness		Corr. Allowance						
Nozzle		Mat'l				Thickness		Corr. Allowance						
Internal Coating			NO			Internal Clad:		NO		Capacity			m³	
Manway:			YES			Inspection Port		NO		Saddle				
Nozzle Rating			150		lb ANSI		Painted:		YES		Insulated		NO	

PROCESS DATA

Product Description	Flare gas	Sweet	
Operating Pressure	14.9 psi	Operating Temperature	59 °F

INSPECTION SUMMARY

Vessel is non-code and has numerous defects from manufacturing including, gouges and broken tack welds. General corrosion was noted throughout the vessel. Backing plates are used for internal vessel welds. Drain nozzles were obstructed with debris and residue. There was no ground cable attached to vessel at the time of inspection (Vessel is on concrete foundation). There were missing anchor bolts.

RECOMMENDATIONS

Ensure that the missing anchor bolts are installed and that the vessel is properly grounded. Monitor the depth and length of gouges at next scheduled internal inspection.

NONCONFORMANCES / INSPECTION DEFICIENCIES

The vessel was not anchored.
The vessel was not grounded.

INSPECTION PLANNING

Inspection Strategy		Availability		Inspection Interval	
Inspection Date		Date of Last Inspect		Date of Next Inspect	

REPORT CERTIFICATION

The signatures below certify that inspections/tests have been completed in accordance with the identified inspection strategy and that the specified equipment is considered fit for service until the date of next inspection.

Inspected by	Nyssa Moore	Date	September 25, 2014
Reviewed and Approved by		Date	
Criticality Assessment Rerun		Inspection Planning Rerun	
Assessed Next Inspection Date			

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External Inspection Comments

ID	General	Condition
V1	Other (please explain)	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
This is a non-code vessel.		
V2	General Corrosion	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V3	General Leaks	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V4	Vibration	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V5	Dissimilar Flange Rating	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V6	Ladder/Stairway	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V7	Heads	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V8	Guy Wires	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V9	Electrical Ground	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input checked="" type="checkbox"/> Poor <input type="checkbox"/> N/A
Vessel is on a concrete foundation with no electrical ground cable found at the time of inspection.		
V10	Painted Inactive Corrosion	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V11	Coating/Painting	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V12	Expansion Joint or Bellows	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V13	Gauge/Site Glass	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V14	Shell	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V15	Jacket	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
	Supports	Condition
V21	Other (please explain)	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V22	Foundation	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V23	Anchor Bolts	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input checked="" type="checkbox"/> Poor <input type="checkbox"/> N/A
Missing anchor bolts.		
V24	Saddle Skirt	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V25	Davit	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V26	Fireproofing	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
	Connections	Condition
V31	Other (please explain)	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V32	Small Branches	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A

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V33	Nozzles	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V34	Manways	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V35	Reinforcing Pads	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V36	Inadequate Thread Engagement	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input checked="" type="checkbox"/> Poor <input type="checkbox"/> N/A
There were short-bolted studs on the inlet flange.		
V37	Bolting	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V38	Flanges	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
V39	Leak Clamps	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
	Insulation	Condition
V41	Other (please explain)	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V42	Damage	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V43	Penetrations	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V44	Jacket	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V45	Banding	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V46	Seals/Joints	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
	Relief Device	Condition
V51	Other (please explain)	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V52	Corrosion	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V53	Leaks	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V54	Restricted Inlet/Outlet	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V55	Manual Operation Lever	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A

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Internal Inspection Comments

ID	General	Condition
V1	Other (Please Explain)	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
There were numerous areas where broken tack welds were left in place, as well as mechanical gouges and plate defects found throughout the vessel. Please see the table below for further details.		
V2	Corrosion (Depth, Length, Width)	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
General corrosion was noted throughout the vessel, estimated to be approximately 0.010"-0.020" deep, with isolated areas of minor pitting.		
V3	Erosion	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
V4	Distortion	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
V5	Blisters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
V6	Deposits	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
There was minor residue and debris present in the vessel.		
V7	Heads	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
Areas of mechanical gouges		
V8	Welds	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
There were backing plates used on the welds. The backing plates appeared to be in good condition.		
V9	Nozzles	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
Debris was present in several of the nozzles		
V10	Shell	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
Areas of mechanical gouges		
V11	Gasket Surfaces	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
	Internals	Condition
V21	Other (please explain)	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A
The internal inlet piping and deflector plate appeared to be secure and in good condition.		
V22	Demister	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V23	Baffle / Weir	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V24	Sparger	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V25	Thermowells	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V26	Metallic Linings	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V27	Non-Metallic Linings	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V28	Trays	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V29	Tray Rings	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A
V30	Other Welded Attachments	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input checked="" type="checkbox"/> N/A

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Issues Found During Inspection

Type of Issue	Depth	Location
Pit	0.060"	Bottom of East Shell
Plate Defect	0.155"	North Side of West End of Shell
Plate Defect	0.065"	Bottom of West End of Shell
Plate Defect	0.125"	Bottom of West End of Shell
Plate Defect	0.135"	Bottom of West End of Shell
Broken Tack Weld	1" Long	Top of West End of Shell
Broken Tack Weld	-	Bottom of West End of Shell
Broken Tack Weld	2" Long - 0.095"	Bottom of West End of Shell
Broken Tack Weld	-	Top of West Head
Gouge	0.110"	East Head (Bottom)
Gouge	3" Long (Shallow)	East Head (Bottom)
Gouge	3" Long - 0.050"	East End of Shell (North)
Gouge	7" Long (Shallow)	Bottom of East End of Shell
Gouge	6" Long (Shallow)	Bottom of East End of Shell
Gouge	2" Long - 0.095"	Bottom of East End of Shell
Gouge	4" Long - 0.090"	Bottom of East End of Shell
Gouge	0.040"	Bottom of West End of Shell

Magnetic Particle Inspection Comments:

Wet Visible Magnetic Particle Inspection (WVMPI) and Wet Fluorescent Magnetic Particle Inspection (WFMPI) were performed on two, 2" cut outs prior to a new liquid level bridle being installed. No cracks or other indications were found at the time of inspection.

Wet Visible Magnetic Particle Inspection (WVMPI) was also performed on all of the new liquid level bridle attachment welds. No indications were found.

Post Welding:

Wet Visible Magnetic Particle Inspection (WVMPI) and Wet Fluorescent Magnetic Particle Inspection (WFMPI) were performed on the completed welds, 24 hours after the completion of the welding, to ensure no cracks or other welding defects were present in the weld and heat affected zones. No rejectable indications were found at the time of inspection.

Chief Inspector Certification # _____**Chief Inspector Signature** _____**Assigned Interval** _____**Date** _____

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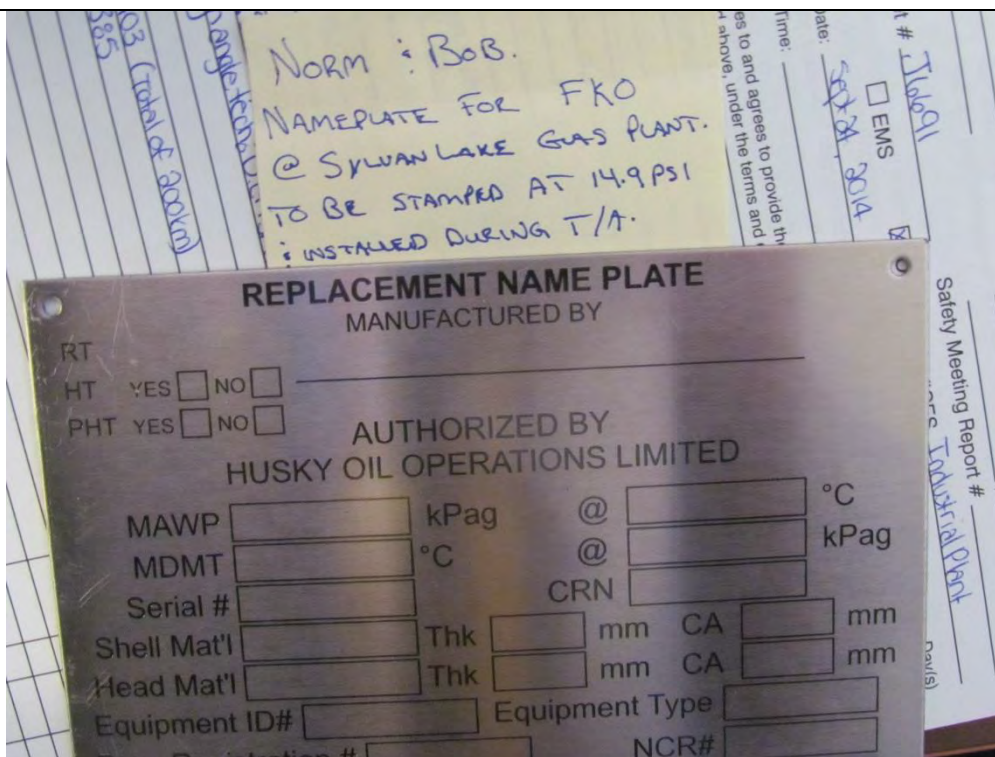
Date: September 25, 2014

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Pictures



General view of LSD sign



Vessel nameplate to be installed

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General view of vessel



Vessel head (east)

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Missing anchor bolts and concrete foundation



Vessel manway (west head)

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General view of vessel manway



Short bolting on inlet flange

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Vessel inlet piping and deflector plate assembly



Backing plates for weld seams

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Bottom nozzles were obstructed with debris



Nozzle has been removed in east head

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Discharge pipe in manway cover



Non full penetration weld for new nozzle

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New nozzle weld (1)



New nozzle weld (2)

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0.065"/0.125"/0.135" plate defects in bottom of west end of shell



Broken tack weld in top of west head

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0.110" Depth gouge in east head (bottom)



Internal vessel pipe and backing plate at west head

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General view of 2" cut out



Liquid level bridle attachment welds

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General view of completed weld (1)



General view of completed weld (2)

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Cover Page – Static Equipment Inspection Report			
Client:	Husky Energy	Inspection Date:	September 25, 2014
Facility:	Sylvan Lake Gas Plant	LSD:	01-21-038-03 W5M
Requested By:	Bob Marchak	Equipment#:	
Equipment:	Flare Knockout Drum		

Equipment Status			
<input checked="" type="checkbox"/> In Service	<input type="checkbox"/> Standby	<input checked="" type="checkbox"/> Sweet Service	<input type="checkbox"/> Insulated
<input type="checkbox"/> Not In Service	<input type="checkbox"/> Unknown	<input type="checkbox"/> Sour Service	<input checked="" type="checkbox"/> Not Insulated

Procedure			
<input checked="" type="checkbox"/> SISL-1 MT Inspection	<input type="checkbox"/> SISL-5 UT Lamination	<input type="checkbox"/> SISL-16 Automated UT	<input checked="" type="checkbox"/> SISL-24 VE/VI Inspection
<input type="checkbox"/> SISL-2 PT Inspection	<input type="checkbox"/> SISL-10 Hardness Testing	<input type="checkbox"/> SISL-20 Corrosion Survey	<input type="checkbox"/> SISL-28 Piping Inspection
<input type="checkbox"/> SISL-3 UT Inspection of Welds	<input type="checkbox"/> SISL-13 Holiday Testing	<input type="checkbox"/> SISL-21 Comp. Cracking Survey	<input type="checkbox"/> Other
<input type="checkbox"/> SISL-4 UT Thickness	<input type="checkbox"/> SISL-14 Coating Repair	<input type="checkbox"/> SISL-23 Installation Inspection	

Technicians/Inspectors		Certifications	
Nyssa Moore		ISI# 000759	API-510# 48773
Scott Anderson		CGSB# I-UT# 17077	CGSB II-MT# 17077

Technique			
<input type="checkbox"/> UT Thickness	<input type="checkbox"/> MPI (Dry Powder)	<input checked="" type="checkbox"/> Visual (External)	<input type="checkbox"/> LPI (Visible Aqueous)
<input type="checkbox"/> UT Shearwave	<input checked="" type="checkbox"/> MPI (Wet Fluorescent)	<input checked="" type="checkbox"/> Visual (Internal)	<input type="checkbox"/> LPI (Visible Solvent Removable)
<input type="checkbox"/> UT (C-scan)	<input checked="" type="checkbox"/> MPI (Wet Visible)	<input type="checkbox"/> Hardness (Microdur)	<input type="checkbox"/> LPI (Fluorescent Water Washable)
<input type="checkbox"/> Phased Array	<input type="checkbox"/> RVT	<input type="checkbox"/> Hardness (Telebrinel)	<input type="checkbox"/> LPI (Fluorescent Solvent Removable)
<input type="checkbox"/> Automated UT	<input type="checkbox"/> Holiday Detection	<input type="checkbox"/> Chemical Etching	

Equipment		Consumables	
Ultrasonic	Magnetic Particle	Magnetic Particle	Liquid Penetrant
<input type="checkbox"/> DMS-2 S/N:	<input checked="" type="checkbox"/> AC Yoke	<input checked="" type="checkbox"/> Magnaflux 7HF (black)	<input type="checkbox"/> SKL-WP Penetrant
<input type="checkbox"/> USN-52L	<input type="checkbox"/> DC Yoke	<input checked="" type="checkbox"/> Magnaflux WCP-2 Contrast Paint	<input type="checkbox"/> SKD-S2 Developer
<input type="checkbox"/> USN-58L	<input type="checkbox"/> Permanent Yoke	<input checked="" type="checkbox"/> Magnaflux 14AM Fluorescent Bath	<input checked="" type="checkbox"/> SKC-S Cleaner
<input type="checkbox"/> USN-Phaser	<input checked="" type="checkbox"/> Blacklight	<input type="checkbox"/> Red Oxide Powder	<input type="checkbox"/> DP-51 Penetrant
<input type="checkbox"/> Westdyne Intraspac 4	Other	<input type="checkbox"/> Grey Oxide Powder	<input type="checkbox"/> DR-62 Developer
Other	<input type="checkbox"/> RVT XLG-3	<input type="checkbox"/> Echogel II	
<input type="checkbox"/> Tinker Razor Holiday Detector	<input type="checkbox"/> RVT Non-articulating	<input type="checkbox"/> Sono 1100	

Magnetic Particle	
Yoke:	AC Yoke - Contour B-300 S/N: 21408
Technique:	AC Continuous
Lighting:	Flashlight and Blacklight (1000 Lux Min.)


Inspection Surface	
Surface:	Outside
Condition:	Painted
Material:	Carbon Steel

Ultrasonic Transducers				
Description	Serial #	Frequency	Diameter	Angle

Code	
Code:	ASME V
Acc. Criteria:	Customer Spec.
Calibration:	Lift 10 lb plate
Sensitivity:	

Comments:
An external and internal visual inspection, and magnetic particle inspection were performed on the vessel. Please see attached report for further detail.

Signature:



Nyssa Moore

Date:

October 3, 2014