



MATRIX INSPECTION

VESSEL INSPECTION SUMMARY

Report #: **137922-WF-1**
 Inspect Date: 08/22/2009
 Page: 1 of 10
 IRISNDT #: 137922

Client: CNRL District: Slave Lake Field: Britnell
 Facility: 12-09-081-22W4 Unit / Skid #: N/A LSD: 12-09-081-22W4
 Jurisdiction #: A0403456 Equip Tag #: PV-610 Serial #: 97015-1-30
 CRN #: L0015.2 Nat'l Bd #: N/A Year Built: 1998
 Manufacturer: RCI Equipment Description: Treater
 Status: In Service - Shutdown Date Removed From Service: _____ Service: Sweet
 MAWP Shell: 75 Psi @ 300 °F Height/Length: 394 in. Code Stamp: Y N
 MAWP Tube: _____ @ _____ Size/Diameter.: 120 in. O.D. Insulated: Y N
 MDMT: -20 °F RT: RT-1 Volume: _____ PWHT: Y N
 Support Type: Saddle Manway: Y N
 C.A.: _____ in. Coated: Y N Clad: Y N J.E.: _____ Remote Access: - _____

Component	Material	Nominal Thk	Diameter	OD/ID	Tube Side	Shell Side
-					<input type="checkbox"/>	<input type="checkbox"/>
-					<input type="checkbox"/>	<input type="checkbox"/>
-					<input type="checkbox"/>	<input type="checkbox"/>
-					<input type="checkbox"/>	<input type="checkbox"/>
-					<input type="checkbox"/>	<input type="checkbox"/>

Comments:

PSV Static Data

PSV -1 Tag #: _____ Serial #: _____ CRN: _____
 Model #: _____ Capacity: SCFM Set Pressure: psi
 Manufacturer: _____ Service Company: _____
 Inlet Size & Type: _____ in. - Last Service Date: _____
 Outlet Size & Type: _____ in. - Block Valve: _____ - _____
 Carseal Intact: Yes Code Stamp: Yes
 Shell Side / Tube Side: Shell Side Location of PSV: _____

PSV -2 Tag #: _____ Serial #: _____ CRN: _____
 Model #: _____ Capacity: _____ Set Pressure: _____
 Manufacturer: _____ Service Company: _____
 Inlet Size & Type: _____ - Last Service Date: _____
 Outlet Size & Type: _____ - Block Valve: _____ - _____
 Carseal Intact: _____ Code Stamp: _____
 Shell Side / Tube Side: _____ Location of PSV: _____

PSV Comments

There is no access to the PSV. A boom lift or scaffold is required.

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Client: CNRL LSD: 12-09-081-22W4 Jurisdiction #: A0403456

External Inspection Results - VE

Item	Y	N	N/A	Condition	Comment	NCR	Action Item	Priority
Nameplate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Foundation and Supports	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Anchor Bolts	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Grounding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Insulation Condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reject	Seal top shell insulation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1
PSV	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Shell & Heads	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Metal Surfaces (Paint)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reject	Repaint nozz. & btm. shell	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1
Aux Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Cathodic Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reject	Anode rollers deteriorated	<input type="checkbox"/>	<input type="checkbox"/>	1
Alignment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Flange Connections	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Pressure Gauge	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Piping from Vessel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept	New piping installed	<input type="checkbox"/>	<input type="checkbox"/>	
Temperature Gauge	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Sight Glass	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Leaks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Evidence of previous leak/spill	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0
Current UT Survey	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			UT Company: Matrix		
Previous UT Survey	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			UT Company:		

LEGEND:

- Priority 0 - General Recommendations
- Priority 1 - Goal date is 30 days from the activity date
- Priority 2 - Goal date is 90 days from the activity date.
- Priority 3 - Goal date is 1 Year from the activity date.
- Priority 4 - Goal date is 5 Years from the activity date.

External Visual Observations**Manual Review Required By Customer Representative -**

An external visual inspection was performed on Treater and the inspection findings are as follows:

- The first spool of piping down-stream of the drain and bottom shell outlet nozzles were in the process of being replaced at the time of inspection.
- The insulation is wet and the cladding corroded along the bottom shell around the nozzles. Upon request CNRL removed 6 inches of shell insulation around all of the bottom nozzles. No corrosion was observed on the shell. Mild to heavy external corrosion was noted on 5 nozzles. The two nozzles with the most significant wall losses were selected for weld repair.
- For the purpose of this inspection and consequent repairs the nozzles on the bottom shell were identified N1 through N7. Refer to the attached drawing for nozzle orientation and depth of corrosion to each nozzle.
- Nozzles N3 & N4 were selected for weld build up to the wasted areas. The area to be welded on N3 was approximately 200 degrees around the circumference and up to 1.5" longitudinally. The area to be welded on N4 was approximately 300 degrees around the circumference and up to 2.5" longitudinally. Refer to page 4 of this report for further repair details.
- The top shell insulation is stained with oil below a nozzle with a blind flange connection and below the gas dome flanges. The staining appears old from a previous leak or spill.
- The saddle supports are secure and level.
- The sight glasses, temperature and pressure gauges are clear and visible.
- The ladder and platform are secure and level.
- External UT was carried out on the bottom shell nozzles with no significant internal wall losses noted.
- There is no access to the PSV. A boom lift or scaffold is required.
- Refer to the attached photos and drawing for details.

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Client: CNRL LSD: 12-09-081-22W4 Jurisdiction #: A0403456

Internal Inspection Results – VI Internal Inspection Performed

Item	Y	N	N/A	Condition	Comment	NCR	Action Item	Priority
Shell	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept	Approx. 5% of shell not visible	<input type="checkbox"/>	<input type="checkbox"/>	
Heads	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept	Approx. 5% of heads not visible	<input type="checkbox"/>	<input type="checkbox"/>	
Manway	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Gasket Surfaces	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Welds	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept	Approx. 5% of shell not visible	<input type="checkbox"/>	<input type="checkbox"/>	
Refractory	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Heating Coils	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Demister Pad	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Vane Pack	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Baffles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Trays	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept		<input type="checkbox"/>	<input type="checkbox"/>	
Filter	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Internal Coating	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Tubesheet	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	
Tube Bundle	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	

LEGEND:

Priority 0 - General Recommendations.

Priority 1 - Goal date is 30 days from the activity date.

Priority 2 - Goal date is 90 days from the activity date.

Priority 3 - Goal date is 1 Year from the activity date.

Priority 4 - Goal date is 5 Years from the activity date.

Internal Visual Observations

Manual Review Required By Customer Representative -

An internal visual inspection was performed on Treater and the inspection findings are as follows:

- The fire tubes were removed for access to steam clean and inspect. The fire tubes were sent to Slave Lake for sandblasting and inspection. The de-sand trays on the bottom shell and internal piping were not removed for inspection access.
- Several areas inside the treater were not clean or visible. 2-3 inches of fluid is present on the bottom shell. Heavy product build up is present on isolated areas of the shell (5%) and throughout the structural steel & de-sand piping.
- The fire tube supports are bent slightly.
- The anode and bottom shell nozzles are dirty and not 100% visible. The anode rollers have deteriorated.
- The demister pad and associated supporting hardware is in good condition.
- One of the anchor bolts for the vortex breaker is broken. CNRL elected to remove the vortex breaker.
- No significant erosion, corrosion or pitting was observed on any visible areas. Internal UT thickness was carried out on the middle and upper shell to investigate for external corrosion under the insulation. All thicknesses recorded were within nominal thickness.
- The fire tubes are straight and free of any significant external corrosion. UT was carried out at random throughout the tube and a thickness range of 0.350"-0.369" was recorded (20" OD pipe). MT was carried out on all external welds on the product side of the tube sheet. No rejectable indications were noted; refer to IRINDT report #137922-MT-WF-02 for details.

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VESSEL INSPECTION SUMMARY

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Inspect Date: 08/22/2009
Page: 4 of 10
IRISNDT #: 137922

Client: CNRL LSD: 12-09-081-22W4 Jurisdiction #: A0403456

Attached to Vessel Inspection Report #

Additional Attachments # of pages Specify

NDE UT [checked] MT [checked] PT [] ET [] RT [] OTHER []

NDE Report #:

Items Raised: NCR No Operational Action Item No Repair Action Item Yes Deferred Action Item Yes

Action Items / Recommendations:

- Ensure the vessel is 100% clean at future inspection intervals.
Replace the wooden anode support rollers.
Clean and paint the bottom shell, nozzles and gas dome to assist surface condition.
Seal the upper shell insulation to prevent moisture ingress, which is collecting on the bottom shell. Replace the insulation on the bottom shell as required.
Remove the oil stains from the top shell insulation.

Actions Corrected at Time of Inspection: (If actions were corrected at the time of inspection - note the corrected actions here.)

- The corroded areas to be welded were cleaned to sound metal and inspected with MT and UT prior to welding. No rejectable indications were noted; refer to IRISNDT report# 137922-MT-WF-01 & 137922-UT-WF-01 for details.
Murland Projects Inc completed all repair work.
The nozzle projections were preheated to 180F prior to welding. The weld overlay was completed with E-7018 electrodes. The weld cap was blended flush with the adjacent parent material of the nozzles. All repair work on the nozzles was visually acceptable.
All welding was inspected with MT 12 hours after welding was completed. The MT was carried out by Team inspection. No rejectable indications were noted; refer to Team report #MT-262-BG for details.
No hydrostatic test was required. Refer to the attached photos and drawing for details.

Meets Code Criteria: - Yes

Re-Inspection Required - No

Recommended Inspection Intervals:

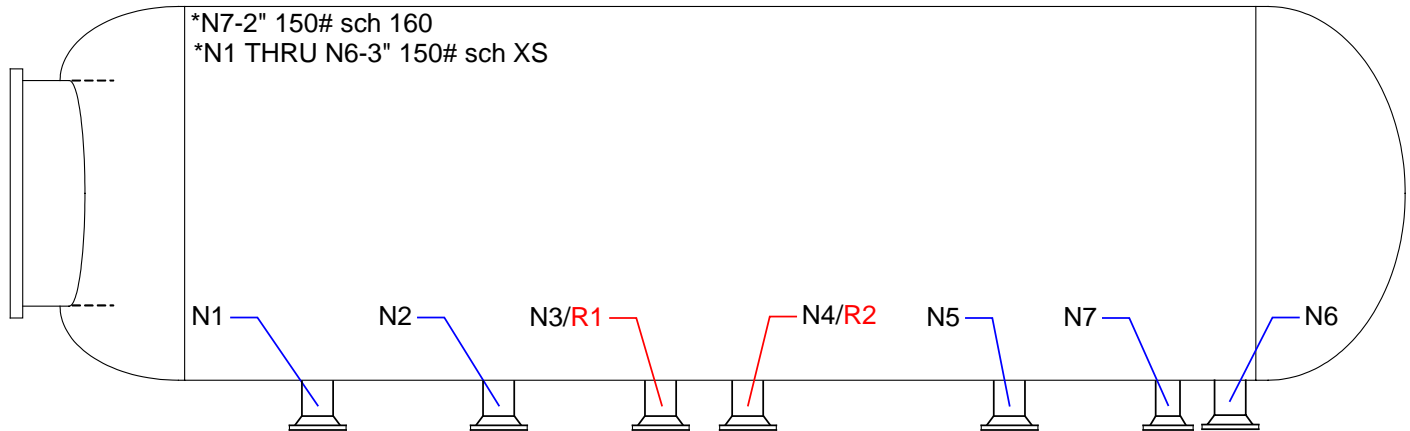
Table with 6 columns: Inspection Type, Last Inspection, Interval (yrs), Next Inspection, etc.

Unit # Kilometers: In 00:00 Out 00:00 Hrs Personnel: P.O.# / W.O.#/AFE #:

Consumables:

Inspector: Wes Farquhar (Print) PESL: 462 (Sign) API: 29669 / 32195 Client Representative: I am in full agreement with report contents: (Print) (Sign)

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Treater – A0403456


Nozzle No.	Wall Loss	Remaining Wall "t"	Repair Method
N1	0.020"	0.280"	N/A
N2	0.040"	0.260"	N/A
N3	0.090"	0.210"	Weld Overlay
N4	0.125"	0.175"	Weld Overlay
N5	0.010"	0.290"	N/A

*Note: No corrosion noted on nozzles N6 & N7. No corrosion noted on the shell adjacent to any of the nozzles.



Equipment Photographs:



Figure 001_Nameplate_22Aug10



Figure 002_Repair Nameplate_22Aug10



Figure 003_Treater_22Aug10



Figure 004_Gas Dome & Oil Stain_22Aug10

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Figure 005_Top Shell Nozzle & Oil Stain_22Aug10



Figure 006_Fire Tubes_22Aug10



Figure 007_Nozzle N1_22Aug10



Figure 008_Nozzle N2_22Aug10



Figure 009_Nozzle N3_22Aug10



Figure 010_Nozzle N3_22Aug10



Figure 011_Nozzle N4_22Aug10



Figure 012_Nozzle N4_22Aug10



Figure 013_Compiled Repairs to Nozzles N3 & N4_22Aug10



Figure 014_Fluid on Bottom Shell_22Aug10



Figure 015_Product Between Weir Plates_22Aug10



Figure 016_Product on Shell_22Aug10



Figure 017_Broken Anchor Bolt for Vortex Breaker_22Aug10



Figure 018_Bent Firetube Support_22Aug10