



**PRESSURE VESSEL
VISUAL INSPECTION
REPORT**

Report #: **156732-MD-52**
 Inspect Date: 06/06/2012
 Page: 1 of 17
 Insp. Co. Job #: 156732

Criticality Designation:



Yellow

Insp. Comp: Matrix_Inspection District: Grande Prairie - North Field: Firebird
 Location: 14-01-098-08W6 Unit / Skid #: 16825 LSD: 14-01-098-08W6
 Jurisdiction #: A3004650 Equip Tag #: N/A Serial #: 1369 V201
 CRN #: M5051.2 Nat'l Bd #: N/A Year Built: 1994
 Manufacturer: Plains Oil Ltd Equipment Description: Other: Inlet Separator
 Status: In Service - Equip. Type: Vessel: Separator Service: Sweet
 MAWP Shell: 1348 Psi @ 200 °F Volume: N/A Code Stamp: Y N
 MAWP Tube: @ Height/Length: 16 Ft. Insulated: Y N
 MDMT: -28 °C RT: RT-1 Size/Diameter.: 60 in. O.D. PWHT: Y N
 Support Saddle Vessel on Original CNRL Inventory List: Y N Manway: Y N
 C.A.: 1.59 mm Coated: N/A Clad: N/A J.E.: 1.00 Remote Access: - Winter Road

Component	Material	Nominal Thk	Diameter	OD/ID	Tube Side	Shell Side
1 Main - Shell	SA-516-70N	57.200 mm	48.000 in.	OD	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 East - Head	SA-516-70N	55.800 mm	48.000 in.	OD	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 West - Head	SA-516-70N	55.800 mm	48.000 in.	OD	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4 Boot - Shell	SA-516-70 MT		20.000 in.	OD	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5 Boot - Head	SA-516-70 MT	0.875 in.	20.000 in.	OD	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Static Data: Confirmed Changed (See Comments)

Comments:

Static data updated

PSV Static Data

PSV -1 Tag #: G709470 Serial #: CE-40477-A10 CRN: 0G2369.5C
 Model #: 26HA13-120 Capacity: 20480 SCFM Set Pressure: 1345 psi
 Manufacturer: Farris Service Company: Unified Valve
 Inlet Size & Type: 2.00 in. - Flanged Last Service Date: 10/06/2011
 Outlet Size & Type: 3.00 in. - Flanged Block Valve: N/A - -
 Carseal Intact: Yes Code Stamp: Yes
 Shell Side / Tube Side: Shell Side Out for Service During Insp.: N Location of PSV: Upstream

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: _____ Out for Service During Insp.: _____ Location of PSV: _____

PSV Comments

Blank area for PSV comments.



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External Inspection Results – VE External Inspection Performed

Item	N/A	Condition	Comment (Check Status Bar or Press F1 for Help)	NCR	Action Item Integrity	Action Item Maintenance
Nameplate	<input type="checkbox"/>	Accept	Firmly affixed and legible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation and Supports	<input type="checkbox"/>	Accept	Welded saddle anchored to skid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anchor Bolts	<input type="checkbox"/>	Accept	Well anchored with no deformation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grounding	<input type="checkbox"/>	Accept	Grounded directly to East saddle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation Condition	<input checked="" type="checkbox"/>		No insulation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PSV	<input type="checkbox"/>	Accept	Carsealed and vented adequately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shell Heads & Nozzles	<input type="checkbox"/>	Accept	Mild surface corrosion noted throughout	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Metal Surfaces (Paint)	<input type="checkbox"/>	Accept	Coating chipped on exposing base metal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Aux Equipment	<input type="checkbox"/>	Accept	Secure and well supported	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cathodic Protection	<input checked="" type="checkbox"/>		No external anode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alignment	<input type="checkbox"/>	Accept	Level with skid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flange Connections	<input type="checkbox"/>	Accept	Adequate threaded engagement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pressure Gauge	<input type="checkbox"/>	Reject	0-6800 kPa: Not within MAWP range	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Temperature Gauge	<input type="checkbox"/>	Reject	-40-70°C: not within range	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sight Glass	<input type="checkbox"/>	Accept	Intact and visible liquid level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ladder / Platform	<input checked="" type="checkbox"/>		No ladders or platform	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leaks	<input type="checkbox"/>	No	No leaks noted at time of inspection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Piping from Vessel	<input type="checkbox"/>	Accept	Adequately supported piping circuit			
Previous UT Survey	<input type="checkbox"/>	Yes	Locations marked, no history provided	UT Company: N/A		

External Visual Observations

There are 3 float cells with nameplates and visible liquid levels

Dust and bird turds on top shell and head sections which may accelerate the corrosion rate

The weep holes are open on the boot drain reinforcement pad with no evidence of leaks noted at the time of inspection

Mild surface corrosion noted throughout the heads, shells, nozzles, piping and between the flanges.

The pressure gauge is not within range of the MAWP. Currently 800 kPa

The temperature gauge is not within range. Currently 12°C

The manway, davit arm and hardware are in acceptable condition (located on East side)

The coating is chipped and flaked exposing the base metal to minor surface corrosion with no evidence of pitting noted.

A UT corrosion survey was performed at the time of inspection with no significant wall losses recorded

Recommendations:

Clean loose coating and touch-up to aid in corrosion protection
 Confirm with operations that the pressure and temperature do not exceed gauge ratings. Replace as required

TA Recommendation:
 Open manway clean vessel and perform internal inspection



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Internal Inspection Results – VI Internal Inspection Performed

Item	N/A	Condition	Comment (Check Status Bar or Press F1 for Help)	NCR	Action Item Integrity	Action Item Maintenance
Shell	<input type="checkbox"/>	Accept	0.062" deep pitting at 6 o'clock position	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heads	<input type="checkbox"/>	Accept	Minor flash corrosion noted from oxidation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manway	<input type="checkbox"/>	Accept	Minor flash corrosion noted from oxidation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gasket Surfaces	<input type="checkbox"/>	Accept	Good serrated sealing surfaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Welds	<input type="checkbox"/>	Accept	general corrosion noted around seams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Refractory	<input checked="" type="checkbox"/>		Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heating Coils	<input type="checkbox"/>	Accept	Located in drain boot, acceptable condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demister Pad	<input type="checkbox"/>	Accept	Removed, cleaned and reinstalled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vane Pack	<input checked="" type="checkbox"/>		Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baffles	<input type="checkbox"/>	Accept	Diverter plates show no damage mechanisms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trays	<input checked="" type="checkbox"/>		Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Filter	<input checked="" type="checkbox"/>		Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Coating	<input checked="" type="checkbox"/>		Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tubesheet	<input checked="" type="checkbox"/>		Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tube Bundle	<input checked="" type="checkbox"/>		Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Internal Visual Observations

An internal visual inspection was performed during 2012 TA - June 06 2012

0.062" deep by 0.250" diameter pit recorded on the bottom shell (6 o'clock position) below the inlet diverter plate. Multiple locations below the diverter plate on the shell has near surface pitting

Minor flash corrosion noted throughout the vessel from washing and oxidization

There are multiple locations in the vapour section of the vessel with near surface to ~0.015" pitting due to corrosion on and adjacent to the long seams and circ welds.

The heating coil in the drain boot is in acceptable condition with no service related issues

The diverter plate shows no evidence of knife edging or service related damage

The demister was found to be plugged with solids with mild segregation

Recommendations:

Remove, clean and reinstall the demister pad or replace the demister pad
 Remove all solids trapped the demister pad on the support plate
 Monitor the pitting during the next TA to determine if it has grown in depth, size or severity



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Firetube Static Data N/A (Not Applicable)

Diameter: Not Applicable Nom Thickness: Not Applicable Bend: Not Applicable
 Length: Not Applicable Firetube Description: Not Applicable
 Firetube NDE Performed: UT Report#: Not Applicable ET Report#: Not Applicable
 MT Report#: Not Applicable RT Report#: Not Applicable
 PT Report#: Not Applicable Other Report#: Not Applicable

Firetube Inspection Results

Item	N/A	Condition	Comment (Check Status Bar or Press F1 for Help)	NCR	Action Item Integrity	Action Item Maintenance
Burner	<input checked="" type="checkbox"/>		No Firetube Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stack	<input checked="" type="checkbox"/>		No Firetube Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flange (Throat)	<input checked="" type="checkbox"/>		No Firetube Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tube Sheet	<input checked="" type="checkbox"/>		No Firetube Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hot Side	<input checked="" type="checkbox"/>		No Firetube Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Miter	<input checked="" type="checkbox"/>		No Firetube Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Return Bend	<input checked="" type="checkbox"/>		No Firetube Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supports	<input checked="" type="checkbox"/>		No Firetube Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Butt Welds	<input checked="" type="checkbox"/>		No Firetube Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fillet Welds	<input checked="" type="checkbox"/>		No Firetube Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Firetube Visual Observations

No Firetube Inspection Carried Out

Recommendations:

No Firetube Inspection Carried Out



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Vessel NDE and Final Summary:

NDE Performed: UT Report#: _____ ET Report#: _____
MT Report#: _____ RT Report#: _____
PT Report#: _____ Other Report#: _____

Maxi-Trak Observations Summary (Summarize inspection results Max 255 Characters):

Minor surface corrosion throughout shells, heads, nozzles , piping and between the flanges
Dust and bird turds on shell and heads
Pressure and temperature gauge not within range of the vessel
TA 2012 - pitting on bottom shell and welds vapour section

Maxi-Trak Recommendations Summary (Summarize Recommendations Max 255 Characters):

Clean loose coating and touch-up to aid in corrosion protection
Confirm with operations that the pressure and temperature do not exceed gauge ratings. Replace as required
TA 2012 - Monitor pitting during next outage to determine if conditions worsen

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

TA 2012 - The demister pad was removed, cleaned and reinstalled after removing all solids

Additional Visual Observations

No additional observations noted at the time of inspection

Any other safety concerns or observations from associated equipment: (for example associated piping, buildings, pumps etc...)

No safety concerns noted at the time of inspection



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Thickness and Remaining Life Evaluation “ Must be Completed”

MUST BE COMPLETED AND RESOLVED WITH CNRL IMMEDIATELY UPON DISCOVERY OF LOW WALL THICKNESS AREAS

Step 1: Was any thickness measurement location found to be less than (Nominal WT – Corrosion Allowance)?: **No**

If YES, proceed to Step 2; if NO, proceed to “Crack Evaluation” and “CNRL Criticality Designation”.

Step 2: Which component(s) were found below (Nominal WT – Corrosion Allowance)?

Components found below Nom - CA:

Components
N/A - N/A
N/A - N/A
N/A - N/A
N/A - N/A
N/A - N/A

Perform Steps 3 – 8 for each component with actual thickness less than (Nominal WT – Corrosion Allowance).

Step 3: Describe Location and Extent of Corrosion:

Components	Location and Extent of Corrosion
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection

Notes:
 Not Applicable for this Inspection

Step 4:

- For shells and nozzles, calculate minimum required thickness (T-min) as per ASME Section VIII UG-27.
- For heads, calculate minimum required thickness (T-min) as per ASME Section VIII UG-32.

Components	T-Min
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A



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Thickness and Remaining Life Evaluation (Continued)

Step 5: Is any measured thickness less than calculated minimum required thickness (T-min)? **N/A**

*If YES, complete Step 6
If NO, proceed to Step 7..*

Step 6: Is nature and extent of pitting acceptable as per API 510? **N/A**

Step 7: Calculate Remaining Life as per API 510. How? (Find last reading; use nominal thickness if nothing available). Short Term Corrosion Rates and Long Term Corrosion Rates.

Components	Remaining Life (Yrs)
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A

Step 8: Contact CNRL Integrity Coordinator to discuss above results.

- Name of CNRL contact: Not Applicable for this Inspection
- Date and time of conversation: Not Applicable for this Inspection

Summary/results of conversation:
Not Applicable for this Inspection

Crack Evaluation by Magnetic Particle or Alternative Inspection “Must be Completed”

MUST BE COMPLETED AND RESOLVED WITH CNRL IMMEDIATELY UPON DISCOVERY OF CRACK-LIKE INDICATIONS

Were any indications found to suggest the vessel contained cracks? **N/A**

If NO, proceed to “CNRL Criticality Designation”.

If YES, Contact CNRL Integrity Coordinator to discuss results.

- Name of CNRL contact: Not Applicable for this Inspection
- Date and time of conversation: Not Applicable for this Inspection

Summary/results of conversation:
Not Applicable for this Inspection



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CNRL Criticality Evaluation – “MUST BE COMPLETED”

The CNRL In-Service Pressure Vessel Inspector MUST answer all the following questions

1. Is the vessel fit-for-service? : **Yes**
2. Was the measured thickness less than the calculated minimum required thickness (T-min) for any component?: **No**
3. Were MT indications found?: **N/A**
4. Was the remaining life less than 6 years for sour service vessels or less than 10 years for sweet service vessels?: **No**
5. Were NCR's or Action Items generated as a result of the inspection? : **Yes**
6. Were UT readings below (Nominal WT – Corrosion Allowance) found? : **No**

Information on CNRL Owner User Program - Criticality Designation and Required Review

RED – Vessel Inspection Results are deemed RED if one of the following occurred:

- The measured thickness was less than the calculated minimum required thickness (T-min) for any component.
- MT indications were found.
- The remaining life was calculated to be less than 6 years for sour-service vessels or less than 10 years for sweet-service vessels.

RED inspection reports must be signed off by the CNRL Chief Inspector.

YELLOW – Vessel Inspection Results are deemed YELLOW if one or more of the following occurred:

- The vessel was declared NOT fit-for-service by the 3rd Party In-Service PV Inspector.
- NCR's or Action Items were generated as a result of the inspection.
- UT readings below (Nominal WT – Corrosion Allowance) were found.

YELLOW inspection reports must be signed off by the CNRL Pressure Equipment Integrity Coordinator.

GREEN – Vessel Inspection Results are deemed GREEN if all of the following are true:

- The vessel was declared fit-for-service by the 3rd Party In-Service PV Inspector.
- UT readings below (Nominal WT – Corrosion Allowance) were NOT found.
- MT indications were NOT found.
- NCR's or Action Items were NOT generated as a result of the VE inspection.

GREEN inspection reports must be signed off by the 3rd Party In-Service Pressure Vessel Inspector.

Criticality Designation



Yellow

Vehicle #: 380 Kms: _____
 Time In: 00:00 Time Out: 00:00 Hrs _____
 Time In: 00:00 Time Out: 00:00 Hrs _____
 Personnel: SR, LP
 Billing Info: AFE :

Inspector (Name): Matthew B Dickinson PESL: 601
 Inspector (Signature): _____ API: 39483
 CNRL Coordinator (Name): _____
 CNRL Coordinator (Signature): _____
 CNRL Chief Inspector (Signature): _____
 (I am in full agreement with report contents) _____
 (I am in full agreement with report contents) _____

Equipment Photographs:



01 nameplate



02 overview



03 manway overview



04 boot overview



05 coating deterioration



06 not within range



07 not within range



08 bird turds



09 PSV overview

Equipment Photographs:



10 internal overview



11 plugged demister



12 coil & boot overview



13 pitting in bottom shell



14 largest recorded pit



15 corrosion on circ seam



16 inlet overview



17 demister removed