



**PRESSURE VESSEL
VISUAL INSPECTION
REPORT**

Report #: **155741-MD-21**
 Inspect Date: 02/16/2012
 Page: 1 of 13
 Insp. Co. Job #: 155741

Criticality Designation:



Yellow

Insp. Comp: Matrix_Inspection District: Grande Prairie - North Field: South Hamburg
 Location: 12-29-096-11W6 Unit / Skid #: 7714 LSD: 12-29-096-11W6
 Jurisdiction #: A3074903 Equip Tag #: E-2102 Serial #: 95-1207
 CRN #: M8509.2 Nat'l Bd #: N/A Year Built: 1995
 Manufacturer: EXCHANGER INDUSTRIES Equipment Description: Other: Propane Chiller
 Status: In Service - Equip. Type: Exch.: Chiller Service: Sweet
 MAWP Shell: 285 Psi @ 100 °F Volume: _____ Code Stamp: Y N
 MAWP Tube: 1037 Psi @ 100 °F Height/Length: 576 in. Insulated: Y N
 MDMT: -20 °F RT: RT-3 Size/Diameter.: 18 in. O.D. PWHT: Y N
 Support Saddle Vessel on Original CNRL Inventory List: Y N Manway: Y N
 C.A.: 0.063 in. Coated: No Clad: No J.E.: 0.90 Remote Access: -

Component	Material	Nominal Thk	Diameter	OD/ID	Tube Side	Shell Side
1 Main - Shell	SA- 516-70	0.500 in.	18.000 in.	OD	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 West - Head	SA- 516-70	3.750 in.	18.000 in.	OD	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 East - Head	SA- 516-70	3.750 in.	18.000 in.	OD	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4 - Shell	SA- 516-70	0.750 in.	18.000 in.	OD	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5 -					<input type="checkbox"/>	<input type="checkbox"/>

Static Data: Confirmed Changed (See Comments)

Comments:

Static data updated
 Shell CA = 0.126" Channel CA = 0.063"

PSV Static Data

PSV -1 Tag #: 79 Serial #: VA0090042 01 CRN: 02176.52
 Model #: JBS 15J Capacity: 21134 SCFM Set Pressure: 284.9 psi
 Manufacturer: Crosby Service Company: Tyco
 Inlet Size & Type: 3.00 in. - Flanged Last Service Date: 06/12/2007
 Outlet Size & Type: 6.00 in. - Flanged Block Valve: Upstream - Carsealed - Open
 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

PSV is due for service



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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	Acceptable condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anchor Bolts	<input type="checkbox"/>	Accept	Secure & tight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grounding	<input type="checkbox"/>	Accept	Grounded by skid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation Condition	<input type="checkbox"/>	Reject	Cladding damage allowing for moss growth	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PSV	<input type="checkbox"/>	Reject	Due for service	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Shell Heads & Nozzles	<input type="checkbox"/>	Accept	Minor surface corrosion on exposed nozzles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Metal Surfaces (Paint)	<input checked="" type="checkbox"/>		Exchanger is insulated with no access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aux Equipment	<input type="checkbox"/>	Accept	Secure and intact	<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	Acceptable condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flange Connections	<input type="checkbox"/>	Accept	Adequate thread engagement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pressure Gauge	<input type="checkbox"/>	Accept	0-2100 kPa: acceptable range	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temperature Gauge	<input checked="" type="checkbox"/>		No temperature gauge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sight Glass	<input type="checkbox"/>	Accept	Clear and visible sight glass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ladder / Platform	<input type="checkbox"/>	Accept	Ladder and platform are acceptable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leaks	<input type="checkbox"/>	No	No evidence of leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Piping from Vessel	<input type="checkbox"/>	Accept	Adequately supported			
Previous UT Survey	<input type="checkbox"/>	No	No ports, no history provided	UT Company: N/A		

External Visual Observations

The Chiller is completely insulated with ice build-up on many of the exposed flanges.

The cladding is punctured exposing the foam glass with moss growth noted in the punctured cladding as well as around the nameplate. This may lead to microbiological induced corrosion.

There is loose banding on the cladding that has allowed for the cladding the split and expose the foam glass.

The insulation on the bottom of the sight glass is deteriorated and weathered which may have entrapped moisture and accelerate the corrosion due to CUI.

The PSV is due for service

A UT corrosion survey could not be performed at the time of inspection due to no ports cut, limited access (no scaffold or platforms) and the vessel is cold service which could risk brittle fracture if chipped in this condition.

TA 2012 - UT corrosion survey was completed with the chiller off-line with no significant recordable wall losses

Recommendations:

Service the PSV
 Consider removing the moss and treating with a biocide (multiple applications may be required)
 Repair the insulation, banding and caulking seals

TA Recommendations:

Using a travel restraint device perform UT corrosion survey on the exchanger - COMPLETED TA 2012



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Internal Inspection Results – VI N/A (Not Applicable)

Item	N/A	Condition	Comment (Check Status Bar or Press F1 for Help)	NCR	Action Item Integrity	Action Item Maintenance
Shell	<input type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heads	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manway	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gasket Surfaces	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Welds	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Refractory	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heating Coils	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demister Pad	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vane Pack	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baffles	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trays	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Filter	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Coating	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tubesheet	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tube Bundle	<input checked="" type="checkbox"/>		No Internal Inspection Carried Out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Internal Visual Observations

No Internal Inspection Carried Out

Recommendations:

No Internal Inspection Carried Out



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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):

PSV is due for service
Damage cladding exposing the foam glass and moss growth. Loose banding on cladding
Deteriorated insulation on sight glass with weathered and deteriorated mineral wool
No UT due to chipping ice may risk brittle fracture

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

Service the PSV
Consider removing the moss and treating with a biocide (multiple applications may be required)
Repair the insulation, banding and caulking seals
Perform UT at TA - COMPLETED AT TA

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

No actions were corrected at the time of inspection

Additional Visual Observations

No additional visual observations were made at the time of inspection

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

Proper tie off required when outside of the platforms, use a spotter as well



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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

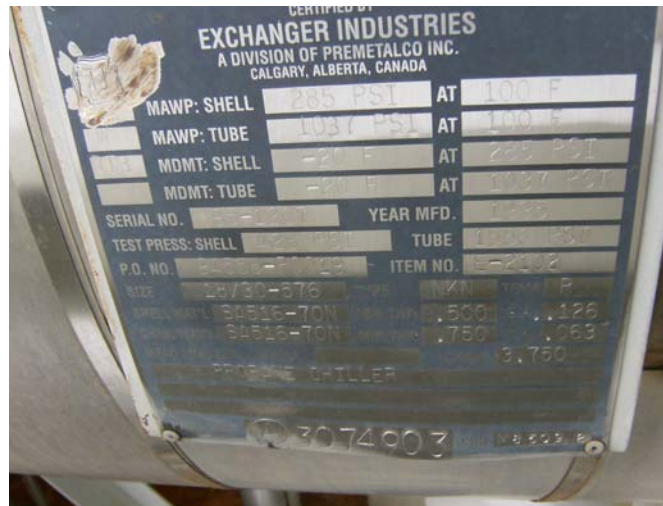


Yellow

Vehicle #: 501 Kms: _____
 Time In: 00:00 Time Out: 00:00 Hrs _____
 Time In: 00:00 Time Out: 00:00 Hrs _____
 Personnel: BI, 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 East overview



03 West overview



04 overview



05 punctured cladding with moss



06 deteriorated insulation



07 loose banding



08 moss growth around nameplate



09 PSV overview