

Pressure Vessel Assessment Report

Project Information		
Client: RARE Oilfield	Location: Nisku, AB	Date: 1/23/2021
Contact: Rob Gryba	API Inspector: Skye Bowman	
Rare Project#: 44750	SL Project#: 1005	
Vessel Description:	10' O.D x 40' S/S 75 Psi Horizontal Heated Treater	
Vessel Identification:	A-451115 / SN. 980577-1 / CRN. N8753.2	



1.0 Summary:

An internal and external visual inspection was performed on vessels SN. 980577-1. This vessel was out of service at the time of inspection. There was a U1 document available prior to performing the inspection.

There is some minor surface corrosion at CML at insulation cutouts but overall, the shell and heads are in serviceable condition. Internal inspection prior to steam cleaning looked acceptable but will need internal coating inspection completed after cleaning. Based on initial Firtube inspections they have surface corrosion but will need to be sandblasted for further inspection. Further UT scans are required on nozzles and firtube to determine thickness readings and to preform calculations. The UT reports supplied for inspection were completed 06-Mar-18 (CA0619-UT1-619 and CA0619-UT1-619) by Iris NDT.

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2.0 References:

- API 510 – Pressure Vessel Inspection Code
- ASME Section VIII Division 1
- ASME Section V

3.0 General Discussion:

The contents of this report are based on the data acquired during the visual inspection and ultrasonic thickness inspection results. UT data was taken at specific locations to determine the remaining thickness. The internal and external visual inspection results provide an account of the visual condition and presence of any visual degradation.

There was not any historical inspection prior to a Vessel Inspection Summary completed by Iris NDT, supporting document attached (CA1246-VIS-46). No original operational information or past UT reports available for review.

4.0 Inspection Details:

4.1 External Inspection:

Saddle Supports:

There are 2 saddles supports for this vessel. The supports are located near each end approx. 18" from heads. There were no visible distortions, and the supports appear to be in serviceable condition. Caulking was missing/degraded where insulation meets the saddle and requires repairs.

Shell:

Completely Insulated with 3" thick insulation and partially located inside of building. Caulking around penetrating nozzles and clips needs to be repaired where applicable. CML need to be cleaned and coating applied to prevent further corrosion and insulation patches installed to limit exposure.

Nozzles:

The nozzles necks require UT scans to confirm thickness readings and calculations. Drain nozzles have minor corrosion and require bolt-up to be removed for inspection or replaced.

Heads:

Externally insulated with CML's on bottom knuckle to crown cutouts. Caulking missing and needs to be repaired and insulation patched installed.

Firetubes:

The Firetubes require blast and mag particle inspection to be completed on existing welds. Minor pitting was found inside the stack side of the tubes do to atmosphere contaminants. UT inspection to be completed to determine thickness of existing material.

PSV:

Vessel PSV looked in good condition and was hooked up to piping at time of inspection.

Data Plate:

The data plate was intact and legible.

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4.2 Internal Inspection:

Shell:

An internal visual inspection was completed prior to vessel being cleaned. Internal coating looked intact at time of inspection but requires a complete coating inspection after cleaning is completed. No major defects were found at time of inspection and looked in serviceable condition.

Internal Weirs and Pipes:

Inlet diverter to be removed during cleaning and inspected (visually and coating inspecting on vessel shell) to ensure no defects and proper clearance. Internal Weir has coalescing pack attached and appeared plugged at time of inspection and requires to be cleaned thoroughly in place or removed and cleaned to ensure proper communication between the two sections of the vessel. Oil box removable to be removed and clean internally and inspection completed prior to reassembling.

Nozzles:

Inspection was completed on accessible nozzles and looked in good condition. Lower nozzles had liquid and sand build up, inspection to be completed after steam cleaning. Complete coating inspection required after cleaning to confirm internal coating is acceptable. Removable vortex breaker is resting in drain nozzle N3C, nozzle N3B was undetermined at time of inspection due to liquid and sand build up in nozzle (TBC after cleaning).

Heads:

Heads internally looked in good condition at time of inspection but will require coating inspection after vessel is cleaned.

Firetubes:

Pitting was located on fire tubes where they penetrate into the vessel and require sandblast for further inspection. Based on these findings, special attention should be taken in these areas and may require repairs. Firetubes require meg particle inspection on plate and miter welds to ensure no cracks or defects are present and UT to verify thickness.

Preheat Coil:

An internal preheat coil is present and should have a UT completed to verify thickness to prevent future failure. Coil runs from vessel head inside the building (control end) to external head (Firetube end).

4.3 Conclusion:

Based on the UT's provided and visual inspection completed, vessel looks in good working condition. Once vessel is cleaned and internals removed further inspection is required.

4.4 Recommendations:

External defect (caulking and surface corrosion) shall be addressed and repaired prior to being put back into service. Internal parts (diverters, vortex breaker, weirs, oil box and coalescing pack) to be cleaned and inspected to verify parts are in good working order. Internal pictures and documentation to be preformed before closing manways to confirm proper installation of removable plates and Firetubes.

Firetubes need special attention and care to confirm they are in good working order with no defects present and/or future potential damages that may occur due to existing issues/damages. Install rain caps on stacks to prevent future contaminants to enter Firetubes while in service.

Internal coating inspection is required to ensure lining to vessel wall integrity and to confirm no under lining corrosion is present.

PSV to be re-certified and shipped lose upright properly secured to shipping platform/pallet.

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Recommended to preform leak test on assembled vessel to confirm no leaks are present that are not visible, defects under insulation, flange faces and components, manways, etc.

Additionally, any applicable rules for the jurisdiction and a future inspection plan will need to be developed in accordance with ABSA and API 510.

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5.0 Ultrasonic Thickness Inspection:

Details:

Reference customer supplied reports (CA0619-UT1-619, CA1246-VIS-46). UT on vessel nozzles and Firetubes shall be completed to confirm thickness and calculations.

5.1 Summary Information:

See customer supplied reports as per paragraph 5.0.

5.2 UT Thickness Data

See customer supplied reports as per paragraph 5.0.

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6.0 Pictures:



Data Plate Picture
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Firetube end picture of internal Weir



Inlet diverter prior to cleaning



Oil end internal picture of oil box and
sample connections



Weir and Coalescing pack prior to
cleaning

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Top tube of Firetube corrosion due to rain and contaminants through stack



External corrosion on Firetubes due to oil and sand build up



External corrosion on plate to tube weld due to oil and sand build up



Vessel PSV installed on Nozzle N10

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Vessel side picture



Package/building side picture



Overall picture of Firetubes



Firetube identification tag picture