Canadian Natural

PRESSURE VESSEL VISUAL INSPECTION REPORT

Report #:	156825-KK-16
Inspect Date:	05/23/2012
Page:	1 of 21
Insp. Co. Job #:	156825

Criticality Designation: Green

Insp. Comp:	Matrix_Inspection	District:	St Albert - South	Field:	Duhamel
Location:	04-07 Battery	Unit / Skid #:	N/A	LSD:	04-07-045-21W4M
Jurisdiction #:	A0220737	Equip Tag #:	N/A	Serial #:	HT-4662
CRN #:	F2429.213	Nat'l Bd #:	N/A	Year Built:	1985
Manufacturer:	Larson & D'amico	Equipment Description:	Other: Treater		
Status:	Out of Service - 999 - Standby	Equip. Type:	Vessel: Treater	Service:	Sour
MAWP Shell:	50 Psi @ 200 °F	Volume:	N/A	Code Stamp:	☒ Y ☐ N
MAWP Tube:	N/A @ N/A	Height/Length:	N/A	Insulated:	☐ Y ☒ N
MDMT:		RT:		PWHT:	☒ Y ☐ N
Support	Saddle	Vessel on Original CNRL Inventory List:	☒ Y ☐ N	Manway:	☒ Y ☐ N
C.A.:	N/A	Coated: No	Clad: No	J.E.: N/A	Remote Access: ☐ -
Size/Diameter.:	48 in. O.D.				

	Component	Material	Nominal Thk	Diameter	OD/ID	Tube Side	Shell Side
1	Main - Shell	SA 36	6.100 mm	48.000 in.	OD	☐	☒
2	East - Head	SA 516-70	4.800 mm	48.000 in.	OD	☐	☒
3	West - Head	SA 516-70	4.870 mm	48.000 in.	OD	☐	☒
4	-					☐	☐
5	-					☐	☐

Static Data: Confirmed ☐ Changed (See Comments) ☒

Comments:
Data not provided from MaxiTrack prior to inspections.
Confirm data before overwriting database.
Limited data available from data plate.

PSV Static Data

PSV –1 Tag #:	E10155	Serial #:	10086-*660	CRN:	OG1316.2C
Model #:	T-8200-2	Capacity:	474 SCFM	Set Pressure:	50 psi
Manufacturer:	Taylor			Service Company:	POWELL
Inlet Size & Type:	2.00 in. - Threaded			Last Service Date:	05-23-2012
Outlet Size & Type:	2.00 in. - Threaded			Block Valve:	N/A - -
Carseal Intact:	Yes			Code Stamp:	Yes
Shell Side / Tube Side:	Shell Side	Out for Service During Insp.:	Y	Location of PSV:	On Vessel

PSV –2 Tag #:	N/A	Serial #:	N/A	CRN:	N/A
Model #:	N/A	Capacity:	N/A	Set Pressure:	
Manufacturer:	N/A			Service Company:	N/A
Inlet Size & Type:	-			Last Service Date:	N/A
Outlet Size & Type:	-			Block Valve:	- -
Carseal Intact:				Code Stamp:	
Shell Side / Tube Side:		Out for Service During Insp.:		Location of PSV:	

PSV Comments

PSV was removed during the external visual inspection and UT corrosion survey.
PSV data was provided at a later date for updating reports with current service data.

Insp. Company: Matrix Inspection LSD: 04-07-045-21W4M Jurisdiction #: A0220737

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	☐	Accept	secure and legible	☐	☐	☐
Foundation and Supports	☐	Accept	Secure and level	☐	☐	☐
Anchor Bolts	☐	Accept	secure and level	☐	☐	☐
Grounding	☐	Accept	grounded through building	☐	☐	☐
Insulation Condition	☐	Accept	good condition	☐	☐	☐
PSV	☒		PSV removed for service at time of inspection	☐	☐	☐
Shell Heads & Nozzles	☐	Accept	good condition	☐	☐	☐
Metal Surfaces (Paint)	☐	Accept	isolated mild surface corrosion and scale	☐	☐	☐
Aux Equipment	☐	Accept	good condition	☐	☐	☐
Cathodic Protection	☒		not applicable	☐	☐	☐
Alignment	☐	Accept	good alignment	☐	☐	☐
Flange Connections	☐	Accept	proper bolt engagment	☐	☐	☐
Pressure Gauge	☐	Accept	clear and legible	☐	☐	☐
Temperature Gauge	☐	Accept	clear and legible	☐	☐	☐
Sight Glass	☐	Accept	clear and clean	☐	☐	☐
Ladder / Platform	☒		no ladders or platforms attached	☐	☐	☐
Leaks	☐	No	no leaks noted	☐	☐	☐
Piping from Vessel	☐	Accept	isolated surface corrosion and flaking paint			
Previous UT Survey	☐	Yes	evidence of previous survey	UT Company: unknown		

External Visual Observations

This vessel is not in service at the time of inspection. A "dirty" inspection was performed to determine if equipment is worthy to relocate and inspect thoroughly.
Nameplate is secure and easy to read, and contains adequate information.
The vessel is secure and level, with properly aligned piping and external attachments.
The paint is in fair condition, with scale and minor surface corrosion noted.
The paint is thick and rough in some locations.
The attached piping is in good condition with isolated areas of surface corrosion.
The vessel piping to wall and vessel to roof interface is in fair condition, and could use minor sealant repairs.
The PSV is removed for service at the time of the inspection.
The plumbing for the PSV appears to be in good condition, and of adequate size and proper rating.
The PSV service data has been supplied from the service company to update the static information in this report.

The overall condition of this vessel is good.

A UT corrosion survey was performed at the time of the inspection by IRISNDT using DMS2 SN 020448.
Typical locations on the vessel heads, shell, and attachments were selected for the UT survey.
No thickness values of concern were noted during the UT survey.
See attached UT values and drawing for complete details.

Recommendations:

Continue to perform regular maintenance and regulatory inspections to maintain equipment integrity and continued safe operation.
Monitor the vessel and piping paint and building conditions.

Ensure PSV's are serviced, installed, and rated correctly before putting this equipment back into service post TAR.

Insp. Company: Matrix Inspection LSD: 04-07-045-21W4M Jurisdiction #: A0220737

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	☐	Accept	good condition	☐	☐	☐
Heads	☐	Accept	good condition	☐	☐	☐
Manway	☐	Reject	coating damage	☐	☐	☒
Gasket Surfaces	☐	Reject	coating damage at flange faces	☐	☐	☒
Welds	☐	Accept	good condition	☐	☐	☐
Refractory	☒		no refractory	☐	☐	☐
Heating Coils	☒		no heating coil	☐	☐	☐
Demister Pad	☒		no demister	☐	☐	☐
Vane Pack	☒		no vanes	☐	☐	☐
Baffles	☐		good condition	☐	☐	☐
Trays	☒		no trays	☐	☐	☐
Filter	☐	Reject	drain fliters plugged	☐	☐	☒
Internal Coating	☐	Reject	coating damage at manways	☐	☐	☐
Tubesheet	☐	Accept	good condition	☐	☐	☐
Tube Bundle	☐	Accept	good condition	☐	☐	☐

Internal Visual Observations

This vessel is not in service at the time of inspection.
A "dirty" inspection was performed to determine if equipment is worthy to relocate and inspect thoroghly.
Multiple areas of coating failure noted on the shell and manway openings.
Superficial coating damage noted on the internal supports.
No active corrosion was noted on the supports where the coating had failed.
The firetube support structure has similar superficial coating failure.

The inlet diverter was not dissassembled and limited the inspection.

The inlet diverter, and weirs are in overall good condition.
The bottom drain filters are plugged solid.
The anodes are in good condition.

Recommendations:

Perform an installation inspection once this vessel is relocated or determined to be put back into service.
Replace the drain filters.
Repair coating damage on the shell and manway throats.

Insp. Company: Matrix Inspection LSD: 04-07-045-21W4M Jurisdiction #: A0220737

Firetube Static Data Firetube Inspection Performed

Diameter: Nom Thickness: Bend:

Length: Firetube Description:

Firetube NDE Performed:

UT ☒ Report#: included ET ☐ Report#:

MT ☒ Report#: included RT ☐ Report#:

PT ☐ Report#: Other ☐ Report#:

Firetube Inspection Results

Item	N/A	Condition	Comment (Check Status Bar or Press F1 for Help)	NCR	Action Item Integrity	Action Item Maintenance
Burner	☐	Accept	good condition	☐	☐	☐
Stack	☐	Accept	good condition	☐	☐	☐
Flange (Throat)	☐	Accept	coating damage noted	☐	☐	☒
Tube Sheet	☐	Accept	good condition	☐	☐	☐
Hot Side	☐	Accept	good condition	☐	☐	☐
Miter	☐	Accept	good condition	☐	☐	☐
Return Bend	☐	Accept	good condition	☐	☐	☐
Supports	☐	Accept	superficial coating damage noted	☐	☐	☐
Butt Welds	☐	Accept	good condition	☐	☐	☐
Fillet Welds	☐	Accept	good condition	☐	☐	☐

Firetube Visual Observations

There is mild product scale noted along top dead center of the hot side of the firetubes.

A magnetic particle (black on white) inspection was performed on all accessible welds using IRISNDT yoke SN 40225.
All locations were inspected to the full access of the equipment and inspector.
No indications were noted at the time of the inspection.

A UT corrosion survey was performed on the tubes at the time of the inspection by IRISNDT using DMS2 SN 020448.
Typical locations on the tube (as applicable) were selected for the UT survey.
Some mild erosion losses (up to 0.025") were noted throughout the tube.
Nominal Thickness 0.375"
No thickness values of concern were noted during the UT survey.
See attached UT values and drawing for complete details.

Recommendations:

Perform an installation inspection once this vessel is relocated or determined to be put back into service.
Replace the drain filters.
Repair coating damage on the shell and manway throats.

Insp. Company: Matrix Inspection LSD: 04-07-045-21W4M Jurisdiction #: A0220737

Vessel NDE and Final Summary:

NDE Performed:	UT	☒	Report#: Included	ET	☐	Report#:
	MT	☒	Report#: included	RT	☐	Report#:
	PT	☐	Report#:	Other	☐	Report#:

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

Coating damage noted at manway openings. Drain filters plugged. Overall vessel is in good condition.

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

Repair coating damage as required. Perform an installation inspection before this vessel is put into service.

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

None required.

Additional Visual Observations

Overall site conditions are very good.
It is clear that operations and maintenance staff take pride in the plant, and maintain a tidy and clean workplace.

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

None noted

Insp. Company: Matrix Inspection LSD: 04-07-045-21W4M Jurisdiction #: A0220737

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

Insp. Company: Matrix Inspection LSD: 04-07-045-21W4M Jurisdiction #: A0220737

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

Insp. Company: Matrix Inspection LSD: 04-07-045-21W4M Jurisdiction #: A0220737

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? : ***No***
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 Green

Vehicle #: Kms:

Time In: 00:00 Time Out: 00:00 Hrs

Time In: 00:00 Time Out: 00:00 Hrs

Personnel:

Billing Info: :

Inspector (Name): Kris Katryniuk PESL: N/A

Inspector (Signature): Inspector Signature 06/30/2010 08:43:20 am API: 510-35238

CNRL Coordinator (Name):

CNRL Coordinator (Signature): Coordinator Signature

CNRL Chief Inspector (Signature): 06/30/2010 08:44:03 am (I am in full agreement with report contents) Chief Inspector Signature

06/30/2010 08:45:29 am (I am in full agreement with report contents)

Equipment Photographs:

01-A0220737 Data Plate

02-A0220737 Overview Inside

03-A0220737 Overview Outside

04-A0220737 Vessel to Wall Interface

05-A0220737 Manway Opening

06-A0220737 Firetube Support Coating Damage

07-A0220737 Firetube Support Coating Damage

08-A0220737 Anode Condition

09-A0220737 Internal Overview

10-A0220737 Drain Filter Plugged

11-A0220737 Internal Overview

12-A0220737 Coating Damage at Manway

13-A0220737 Coating Chips on Flange

14-A0220737 Side Manway Coating Chips

15-A0220737 Firetube Overview

16-A0220737 Firetube Hot Side Scale

IRISNDT

MAGNETIC PARTICLE INSPECTION REPORT

156825-MT-01
Page 1 of 1

Procedures: MT-1V Black on White **Code:** Client infomation	**Job / P.O. #:** **IRISNDT #:** 156807 **Date:** 01-May- **Client:** CNRL **Location:** 04-07-045-21W4M Duhamel Battery **Item Inspected:** A0202737 Treater firetube welds

Surface Condition: Painted ☐ Sandblasted ☐ Machined ☐ As Cast ☐ As Forged ☐ Weldment ☐ Other ☒			
Magnetizing Equipment:		Yoke ☒ Coil ☐ Prod ☐	Bench: Headshot ☐ Central Conductor ☐ Coil ☐
	IRISNDT #: 40225	Mfg: Contour Probe	Calibration Date: 25-Apr-
Blacklight: ☐	IRISNDT #:	Mfg:	Calibration Date: -Jan-03
Whitelight:	Battery Powered Min. 3V ☒	Held within 30cm (12in) of the inspection surface	
	110V Power Min. 60W Bulb ☐	Held within 30cm (12in) of the inspection surface	
Method of Magnetization:		AC ☒ DC ☐ Continuous ☒ Residual ☐	
Magnetic Particles:	Dry ☐ Wet ☒	Red ☐ Grey ☐ Black ☒ Fluorescent ☐	
	Batch #: 10203	Mfg: Magnaflux	Type: 7C & Water
Background: ☒	Batch #: 1048	Mfg: Ardrox	Type: 8901W

Scope:

As per client request a Black on white magnetic particle inspection was carried out on Treater A0220737 firetube welds.

Results:

No indications were noted during the inspection.

Inspection Limitation(s): None

Unit #: Kilometers: In: See Out: Time Hrs: Sheet In: Out: Hrs: Personnel: Kris Katryniuk Rodney Charchuk	Consumables: White contrast 7C and Water	Interpretation by: SNT-TC-1A II Rodney Charchuk C.G.S.B. II C.G.S.B. # 8996 _____ (Signature) I am in full agreement with report contents: Client Representative: _____

5908 – 96 Street	Barrhead	(780) 674-3018	Lloydminster	(780) 875-6455	5442 – 56 Avenue S.E.
Edmonton, Alberta T6E 3G3	Fort McMurray	(780) 743-1536	Cold Lake	(780) 594-1114	Calgary, Alberta T2C 4M6
Ph. (780) 437-2022	Grande Prairie	(780) 532-2283	Red Deer	(403) 347-1742	Ph. (403) 279-6121
Fax. (780) 436-4873	Rainbow Lake	(780) 956-4094	Tulsa, OK	(918) 446-8773	Fax. (403) 236-0716

IRISNDT	**ULTRASONIC INSPECTION REPORT**	**156825-UT-01** Page 1 of 1

Procedures: BW-1A Thickness/Lamination **Code:** Client Information	**Job / P.O. #:** **IRISNDT #:** 156825 **Date:** 23-May-12 **Client:** CNRL **Location:** 04-07-045-21W4M Duhamel Battery **Item Inspected:** Vessel UT Thickness survey on Treater A0220737 Firetube

Material: Carbon Steel **Surface Condition:** Buffed **Heat Treatment:** Not Applicable

Equipment: GE DMS2 Mfg. S/N: 020448 Calibration Date: 22-Mar-12

Calibration Block(s): IIW ☐ Other ☒ Step Wedge

Test Piece: 1/2" Step Wedge 4027

Cable Type: dual Length: 30"

Transducer:

S/N	022XTY			
Angle	0			
Frequency (MHz)	7.5			
Crystal Size	0.312"			

Dis. AMPL. Calibration: Not Applicable **Couplant:** Exosen 30 Batch #: 1023

Transfer Loss Calibration: Direct Comparison: ☒ Other: ☐ **TL:** +3 db

Reference Flaw Size: Backwall **Primary Reference Level:** 82% **Reference Gain:** 56 db

Lamination ☒ **Shear Wave** ☐ **Volumetric** ☐ **Thickness** ☒ **Scan Methods:** Contact ☒ Immersion ☐

Inspection Results:

Per client request perform a UT thickness survey on Treater A0220737 Firetube.

See attached pages for UT thickness survey locations and thickness values.

No readings of concern were recorded during the inspection.

Inspection Limitation(s): None

5311 – 86 Street Edmonton, Alberta, T6E 5T8 Phone: (780) 437-2022 Fax: (780) 438-1436

Calgary	(403) 279-6121	Cold Lake	(780) 594-1114	Corpus Christi, TX	(361) 888-4700
Lloydminster	(780) 875-6455	Fort McMurray	(780) 743-1536	Deer Park, TX	(281) 476-4444
Barrhead	(780) 674-3018	High Level	(780) 956-4094	Matrix,Houston, TX	(713) 722-7177
Nisku	(780) 955-7616	Red Deer	(403) 347-1742	Texas City, TX	(490) 945-2262
		Medicine Hat	(403) 427-6284	Tulsa, OK	(918) 446-8773

Unit#: _____ Kilometers: _____

In: see Out: time Hrs: sheet

In: _____ Out: _____ Hrs: _____

Personnel:

Kris Katryniuk
Justin Dittrick

Consumables:

Interpretation by:

Kris Katryniuk
(Print)

(Signature)

SNT-TC-1A II
C.G.S.B. II (Level)
C.G.S.B. # 12095

Client Representative:
(Print)

I am in full agreement with report contents

(Sign)

5311 – 86 Street Edmonton, Alberta, T6E 5T8 Phone: (780) 437-2022 Fax: (780) 438-1436

Calgary	(403) 279-6121	Cold Lake	(780) 594-1114	Corpus Christi, TX	(361) 888-4700
Lloydminster	(780) 875-6455	Fort McMurray	(780) 743-1536	Deer Park, TX	(281) 476-4444
Barrhead	(780) 674-3018	High Level	(780) 956-4094	Matrix,Houston, TX	(713) 722-7177
Nisku	(780) 955-7616	Red Deer	(403) 347-1742	Texas City, TX	(490) 945-2262
		Medicine Hat	(403) 427-6284	Tulsa, OK	(918) 446-8773

MATRIX INSPECTION

CORROSION INSPECTION SERVICES

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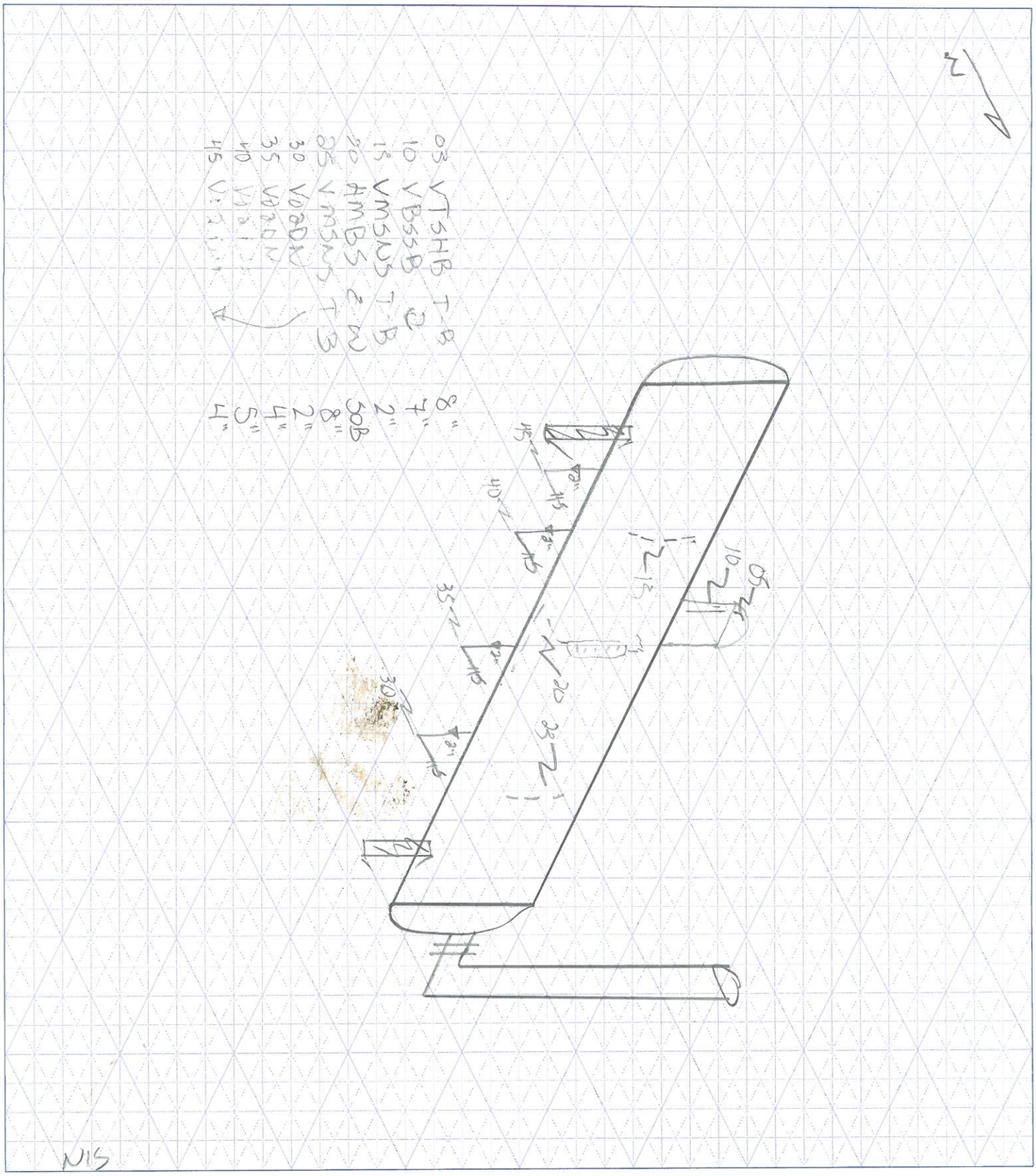

CUSTOMER: CNRL **FACILITY:** 04-07 Dhammed Battery **LSD:** 04-07-045-21W4M

P & ID: _____ **DRAWN BY:** KK **DATE:** 09-23-12 **DRAWING NO.** 156825-KK-16

VESSEL DESCRIPTION: Treater

Equip. No. _____ Pro.Reg.No. (A) AB220737 C.R.N. F2429.213 Serial No. HT-4662 Yr. Inst. _____

Code/Div. _____ Size: 48" ID / OD X 18' Manufacturer: Faisand D'Amico Yr. Blt. 1985

C. Stamp _____ Service: Sour PWHT: NT J.E.: _____ Radiography: _____ Insulated: Yes

HEAD

Top Mat'l 516-70 Top Nom. 4.8 Top C.A. —

Btm Mat'l 516-70 Btm Nom. 21.8 Btm C.A. —

SHELL:

Material SA 36 Nominal 61 C.A. —

MDMT _____ @Temp _____

BOOT

Head Mat'l _____ Head Nom. _____ Head C.A. _____

Shell Mat'l _____ Shell Nom. _____ Shell C.A. _____

CHANNEL:

Top Mat'l _____ Top Nom. _____ Top C.A. _____

Btm Mat'l _____ Btm Nom. _____ Btm C.A. _____

MAWP Shell side: 50psi @ Temp. 200°F MAWP Tube side: _____ @ Temp. _____

PIPING INFORMATION:

Circuit. No. _____ Line No. (s) **(PLEASE PUT LINE NUMBERS ON APPLICABLE LINES ON THE DRAWING)**

Piping Class _____ Service: _____ Yr. Blt. _____

MAWP: _____ @ Temp. _____ Size & Schedule of Piping **(PLEASE PUT APPROPRIATE SIZES AND SCHEDULES OF PIPING ON DRAWING)**

A0220737 UT Readings
Readings in Inches

	SOB	EOB	MIN
LOC 5	0.361	0.396	40.250
LOC 10	0.317	0.340	0.282
LOC 15	0.265	0.271	0.265
LOC 20	0.274	0.274	0.271
LOC 25	0.258	0.256	0.238
LOC 30	0.213	0.211	0.208
LOC 35	0.200	0.204	0.196
LOC 40	0.223	0.210	0.201
LOC 45	0.232	0.217	0.203

IRIS NDT

CORROSION
INSPECTION SERVICES

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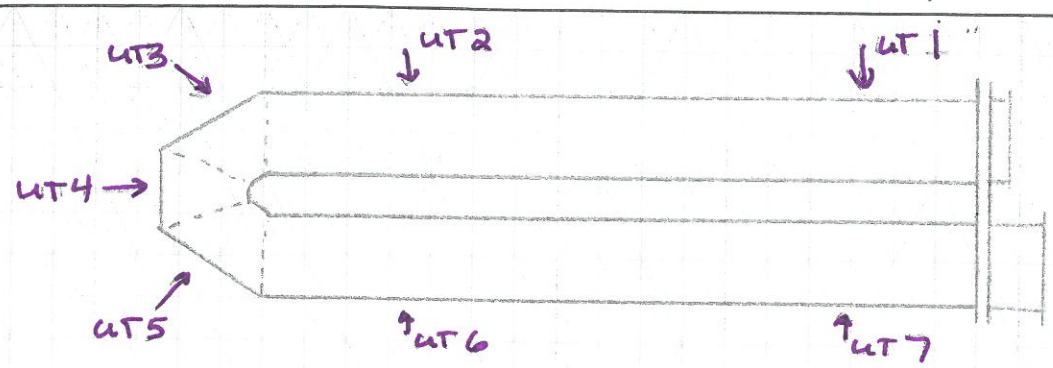

A0220737 Firetube UT Values

	Top	Outside	Bottom	Inside
UT 1	.370"	.368"	.366"	.368"
UT 2	.366"	.370"	.368"	.370"
UT 3	.364"	.366"	.364"	.363"
UT 4	.364"	.368"	.373"	.369"
UT 5	.363"	.367"	.381"	.366"
UT 6	.357"	.368"	.372"	.369"
UT 7	.344"	.392"	.374"	.372"

CUSTOMER: _____ FACILITY: _____ LSD: _____

P & ID: _____ DRAWN BY: _____ DATE: _____ DRAWING NO. _____

VESSEL INFORMATION:

A0220737 Firetube UT Readings
Readings in Inches

	PNT1	PNT2	PNT3	PNT4
LOC1	0.370	0.368	0.366	0.368
LOC2	0.366	0.370	0.368	0.370
LOC3	0.364	0.366	0.364	0.363
LOC4	0.364	0.368	0.373	0.369
LOC5	0.363	0.367	0.381	0.366
LOC6	0.357	0.368	0.372	0.369
LOC7	0.344	0.392	0.374	0.372

Equipment Photographs:

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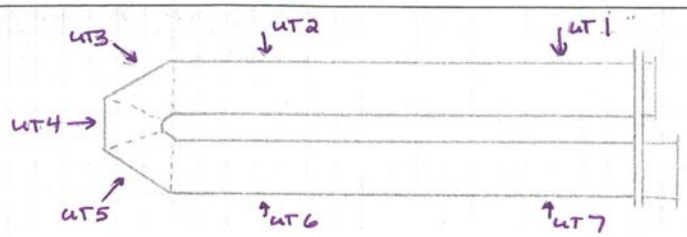

A0220737 Firetube UT Values

	Top	Outside	Bottom	Inside
UT 1	.370"	.368"	.366"	.368"
UT 2	.366"	.370"	.368"	.370"
UT 3	.364"	.366"	.364"	.363"
UT 4	.369"	.368"	.373"	.369"
UT 5	.363"	.367"	.381"	.366"
UT 6	.357"	.368"	.372"	.369"
UT 7	.344"	.392"	.374"	.372"

CUSTOMER: _____ FACILITY: _____ LSD: _____

P & ID: _____ DRAWN BY: _____ DATE: _____ DRAWING NO. _____

VESSEL INFORMATION:

01a-A0220737_firetube_IRISNDT UT INSP MAY2012