

66096451



Out of Service Tank Inspection

Tank #: **TK-553**

Terminal: **Sylvan Lake Gas Plant**

Location: **Sylvan Lake Gas Plant**

Inspected:

October 20, 2010

Prepared for:

Husky Energy

Attention:

Dale Martin

Prepared By:

Ken Nobert

API 653 Certification # 29194

Acuren Job #: 306-0055205-62

Acuren Group Inc.

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Scope of Service

The agreement of Acuren to perform the Services extends only to those Services provided for in writing. Under no circumstances shall such Services extend beyond the performance of the requested Services provided for in writing and the preparation of reports or similar documents reflecting the data obtained or the opinion formulated on the basis of such Services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinion or observations of the examiner/engineer and are not intended, nor can they be construed, as representations or warranties as to the actual circumstances. Acuren does not assume any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, repair and use decisions as a result of the data or other information provided by Acuren. In no event shall Acuren's liability in respect of the Services referred to herein exceed the amount paid for such Services.

Standard of Care

In performing the Services provided, Acuren uses the degree of care and skill ordinarily exercised under similar circumstances by others performing such Services in the same or similar locality. If at any time during the performance of the Services or within one (1) year thereafter, Purchaser discovers that the Services do not conform to the warranty, Acuren shall, upon receipt of written notice from Purchaser, promptly provide technicians/engineers to reperform the Services to the extent necessary to conform to the warranty and Acuren shall have no other liability whatsoever. No other warranty, expressed or implied, is made or intended by Acuren.

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Nothing in this Agreement shall be construed to mean that Acuren assumes any liability on account of injury to persons or property, including death, except those directly caused by negligent acts of Acuren or its employees and that Purchaser's own responsibility for injury to persons or properties while on or about Purchaser's property or equipment is in no way affected by this Agreement. Acuren shall not be held responsible or liable for any loss, damage, detention or delay caused by accidents, strikes, labour shortages, lock-outs, fire, flood, severe weather conditions, acts of civil or military authorities, or by insurrection or riot, or by any other cause that is unavoidable or beyond Acuren's control or in any event for consequential damages including, without limitation, downtime, loss of use or loss of profits.

Contacts:

Customer

API Inspector

**Asset Owner and Tank
Location**

Prepared by:

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Husky Energy

Sylvan Lake Gas Plant
Alberta, Canada

Ken Nobert API 653 Inspector #29194



(Signed)

General Information:

Client: Husky Energy Location: Sylvan Lake Gas Plant Inspection Date: October 20, 2010

Tank No.: TK-553 Terminal: Sylvan Lake Gas Plant Type of Inspection: Out of Service

Acuren Job No.: 306-0055205-62 Name Plate Present: Yes Internal Liner Present: None

Tank Data

Tank Diameter (feet): 17' 3" Floor Material: Carbon Steel Year Built: 2005

Nominal Height (feet): 18' Product: Lean Oil Nominal Floor Plate Thickness (inches): 0.250"

Capacity: 750 BBLS Number of Courses: 2 Foundation: Earth and gravel

Tank Type: Fixed Roof Shell Material: Carbon Steel Tank Bottom Type: Flat

Construction Data

Manufacturer: Universal Industries Manufacturer Contract Number: 11812 Serial No.: 05-04-06-13849

Comments:	No comments
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Bottom Plate Inspection:

Work Performed

An internal visual inspection and MFL floor scan was performed on the tank bottom plates. These inspections were performed to determine the integrity of the floor and identify any areas of concern where corrosion or mechanical damage may be occurring. UT was performed on six areas of the floor covering approximately 1 square foot at each location. UT thickness readings were acquired externally around the perimeter of the tank every 5 feet to assess the condition of the floor projection.

Observations

Topside pitting was identified as seen in Photos 7 and 8. This pitting measured an internal depth of 0.050" with no bottom side corrosion present. Actual remaining thickness of the floor plates is 0.198", considering a t-min of 0.100" the remaining life of the tank floor would be 9.8 years as shown in the calculations below.

Internal UT on the floor in 6 locations measured remaining thickness readings of 0.246" to 0.249" with nominal thickness readings of 0.255".

UT readings were taken every 5' around the perimeter of the tank on the projection. The minimum thickness recorded is noted as 0.239" and is due to a mechanical defect at that location. All other measurements were between 0.259" and 0.267".

Corrosion Rate =	$\frac{\text{Material Loss}}{\text{Time}}$	Material Loss = 0.05 Time (years) = 5 Corrosion Rate = 0.01 / Year
Rem Corr Allowance =	$t_{\text{actual}} - t_{\text{min}}$	$t_{\text{actual}} = 0.198$ $t_{\text{min}} = 0.1$ Rem Corr All = 0.098
Rem Service Life =	$\frac{t_{\text{actual}} - t_{\text{min}}}{\text{Corrosion Rate}}$	$t_{\text{actual}} = 0.198$ $t_{\text{min}} = 0.1$ Corrosion Rate (year) = 0.01 Remaining Life = 9.8 / Years

Recommendations

No repairs were recommended at the time of this inspection.

Nominal
Thickness: 0.250 inch
Imperial or Imperial
Number of Floor
Plates: 2

Liner Thickness: n/a
Liner Type: n/a
Liner Condition: n/a

Minimum: N/A
Maximum: N/A

Shell Inspection:

Work Performed
A visual and UT inspection was performed on the internal and external shell plates. The visual inspection was performed to determine the integrity of the coating and identify any areas of concern where corrosion or mechanical damage may be occurring.
Observations
Minor areas of external coating damage can be seen in Photo 17 near the bottom of the tank. The internal surface of the tank displayed no evidence of damage at the time of this inspection. Ultrasonic thickness measurements taken on the first shell course ranged between 0.240" and 0.244", no evidence of damage was seen ultrasonically or visually.
Recommendations
It is recommended that these small areas of damaged coating be sanded and spot repaired.

Number of Courses: 2

Nominal Thickness (inches): 0.250" 0.188"
1st Course 2nd Course

Internal Shell Coating Condition: n/a

External Shell Coating Condition: Good

Internal Shell Coating Thickness: n/a

External Shell Coating Thickness: Thin film paint (not measured)

Nozzle and Attachment Inspection:

Work Performed
<p>A visual inspection was performed on the internal and external nozzles. The visual inspection was performed to determine the integrity of the coating and identify any areas of concern where leaking, corrosion or mechanical damage may be occurring. UT thickness results for attached nozzles on the inside of the tank are located on the drawing page of this report.</p>
Observations
<p>No evidence of damage is noted on any of the attached nozzles at the time of this inspection. All valve packings and bolted and gasketed attachments (as seen in Photo 11) were checked for evidence of in service leakage. Weep holes were dry and clean on all repads and gaskets appeared to be sealing properly. Photo 15 shows the open to atmosphere nozzle on top of the tank which has a screen securely attached. The screen is free and clear of blockages and debris which could inhibit it from performing its required task. The radar level gauge on the roof of the tank is securely attached and all wires appear to be in good condition. Photo 16 shows the vacuum breaker which is attached to a roof nozzle on top of the tank, it is fully functional and the gaskets and springs are in good condition. The vacuum breaker was disassembled to check for blockages and build-up in the spring mechanisms, none were noted.</p>
Recommendations
<p>No repairs were recommended at the time of this inspection.</p>

Fixed Roof Inspection:

Work Performed
A visual inspection was performed on the internal and external fixed roof plates. The visual inspection was performed to determine the integrity of the coating and identify any areas of concern where corrosion or mechanical damage may be occurring.
Observations
No relevant indications were observed at the time of this inspection. Visual inspection of the underside of the roof was accomplished using binoculars and a flashlight from the floor as there was no scaffold for access to the roof inside the tank. External inspection of the roof was performed from the top of the attached ladder on the outside of the tank.
Recommendations
No repairs were recommended at the time of this inspection.

External Coating: Paint
Coating Condition: Acceptable
Roof Access: Ladder

Nominal Thickness: 0.188"
Imperial or
Metric: Imperial

Containment Area and Other Observations:

Work Performed
<p>A visual inspection was performed on the internal and external nozzles. The visual inspection was performed to determine the integrity of the coating and identify any areas of concern where leaking, corrosion or mechanical damage may be occurring.</p>
Observations
<p>The autogauge assembly is in good working condition and appears as though it should function correctly under actual operating conditions. Anchor points on the tank are not being utilized likely because the tank is sitting on an earth foundation and not on a concrete pad. The containment area and foundation in general do not appear to slope in a fashion which would provide proper drainage (see Photo 17) but internal and external UT show no signs of corrosion on the bottom of the tank. Buildup of soil is present in areas around the bottom of the tank as seen in Photo 17. Photos 4 and 5 show damage on the containment area which appear to be mechanical damage.</p>
Recommendations
<p>Remove buildup of soil from around the bottom of the tank.</p>

Recommendations / Summary:

- 1.) It is recommended that small areas of external damaged coating be sanded and spot repaired (Photo 17).
- 2.) It is recommended that the accumulated soil (Photo 17) from around the base of the tank be removed, as this could lead to moss and vegetation growth which may promote corrosion over time.

INSPECTION PHOTOGRAPHS

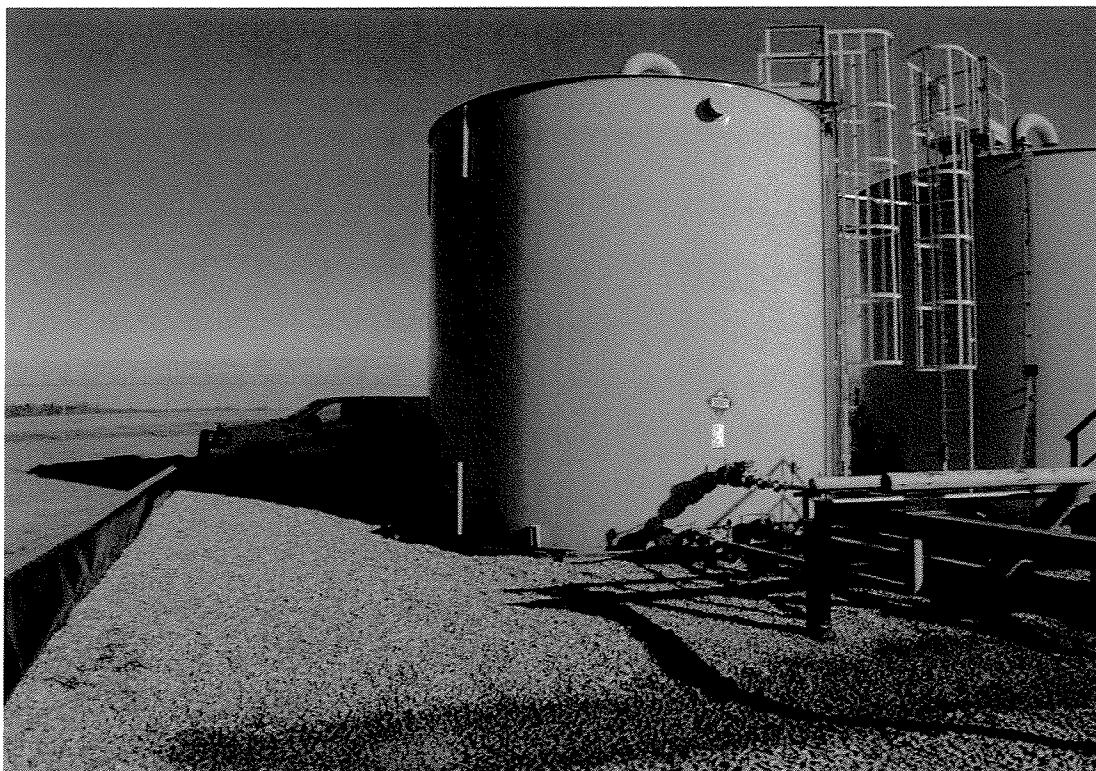


Photo #1: Overview of Lean Oil Tank

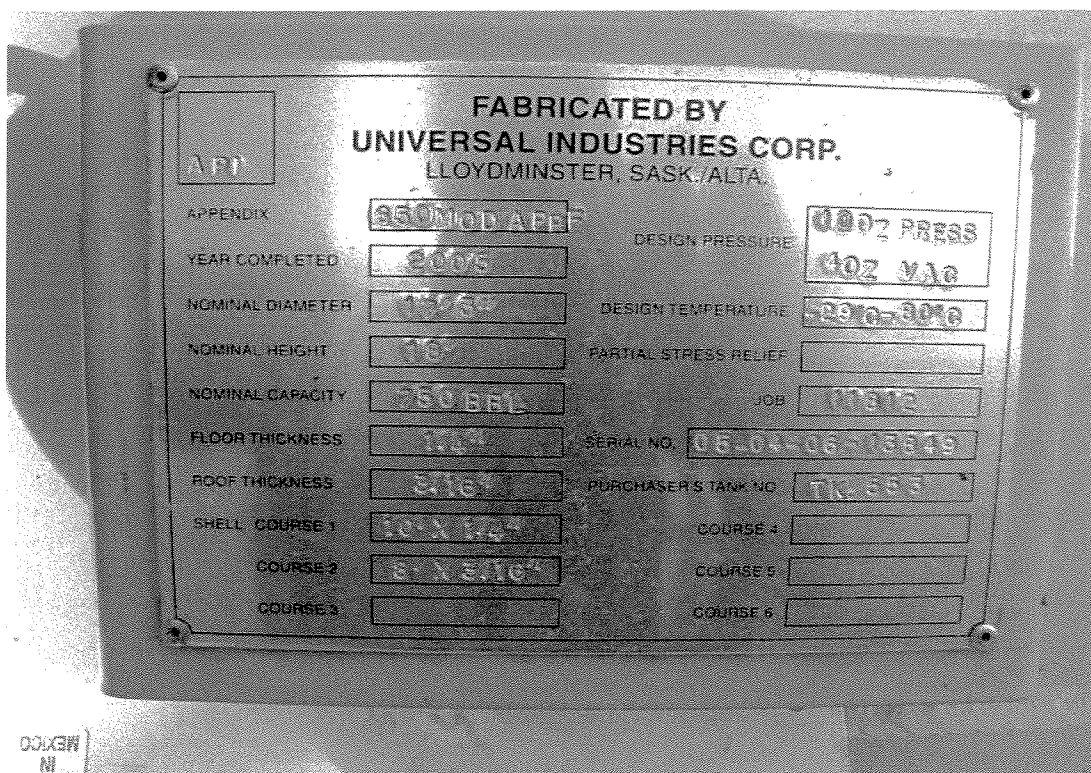


Photo #2: Tank nameplate data

INSPECTION PHOTOGRAPHS

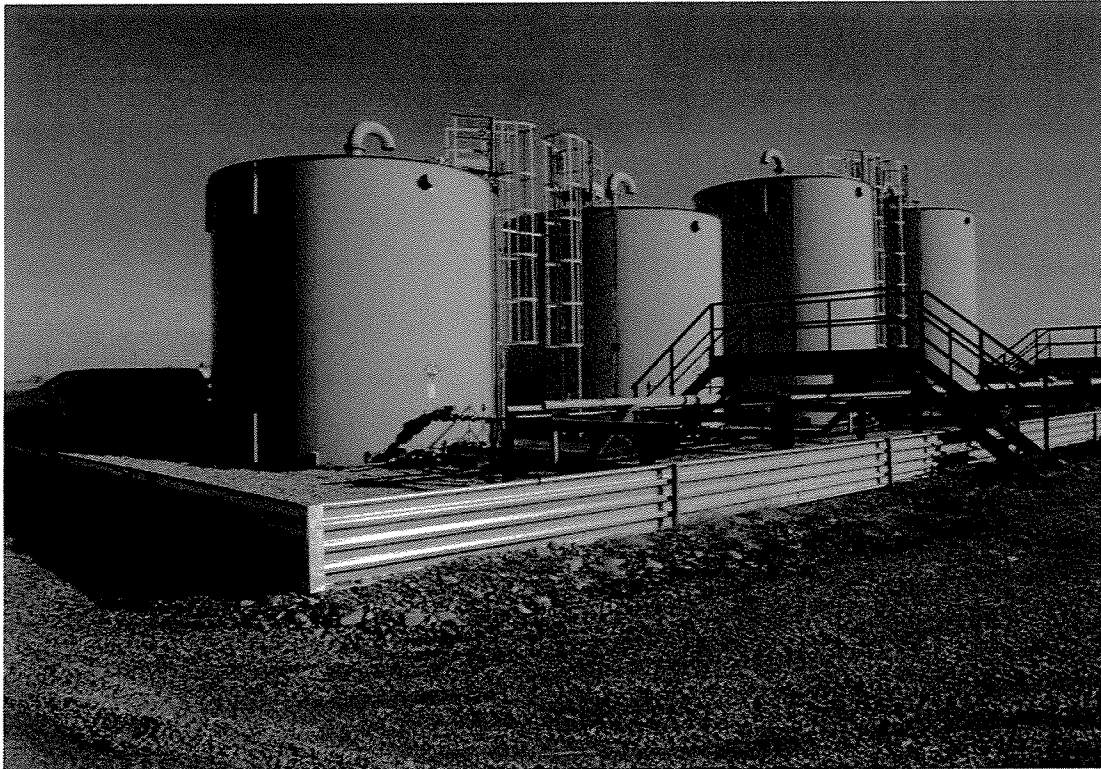


Photo #3: Tank farm containment

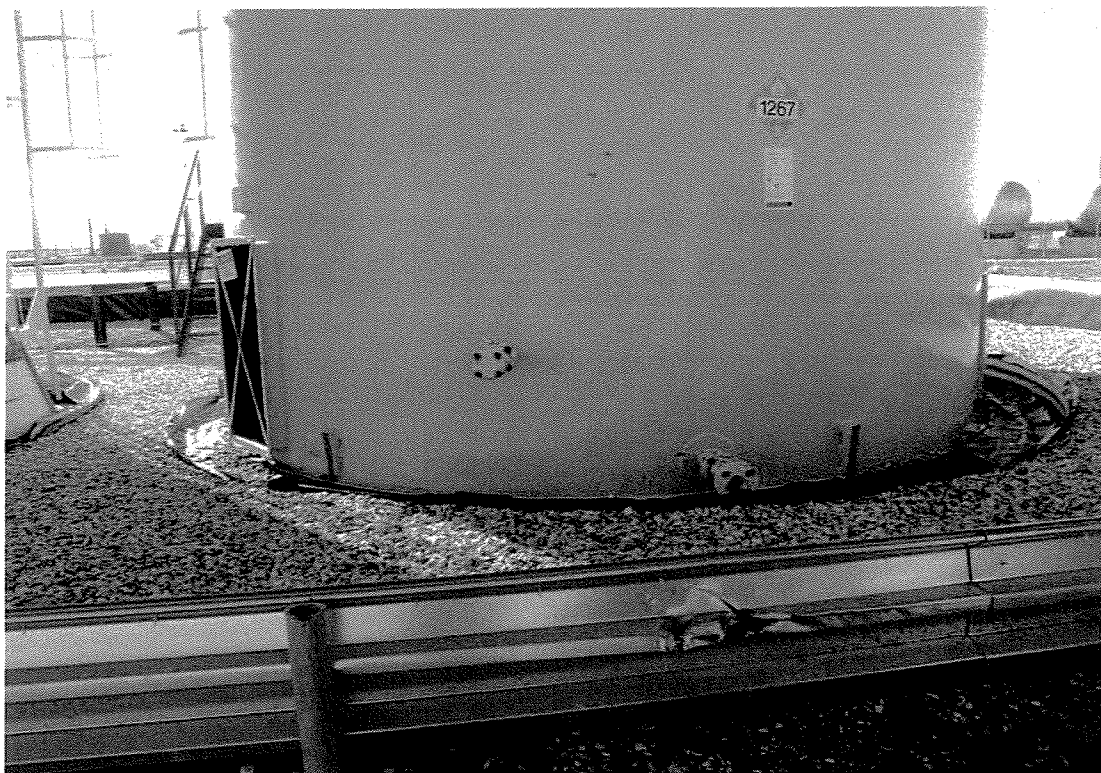


Photo #4: Containment damage area

INSPECTION PHOTOGRAPHS



Photo #5: Closeup of containment damage

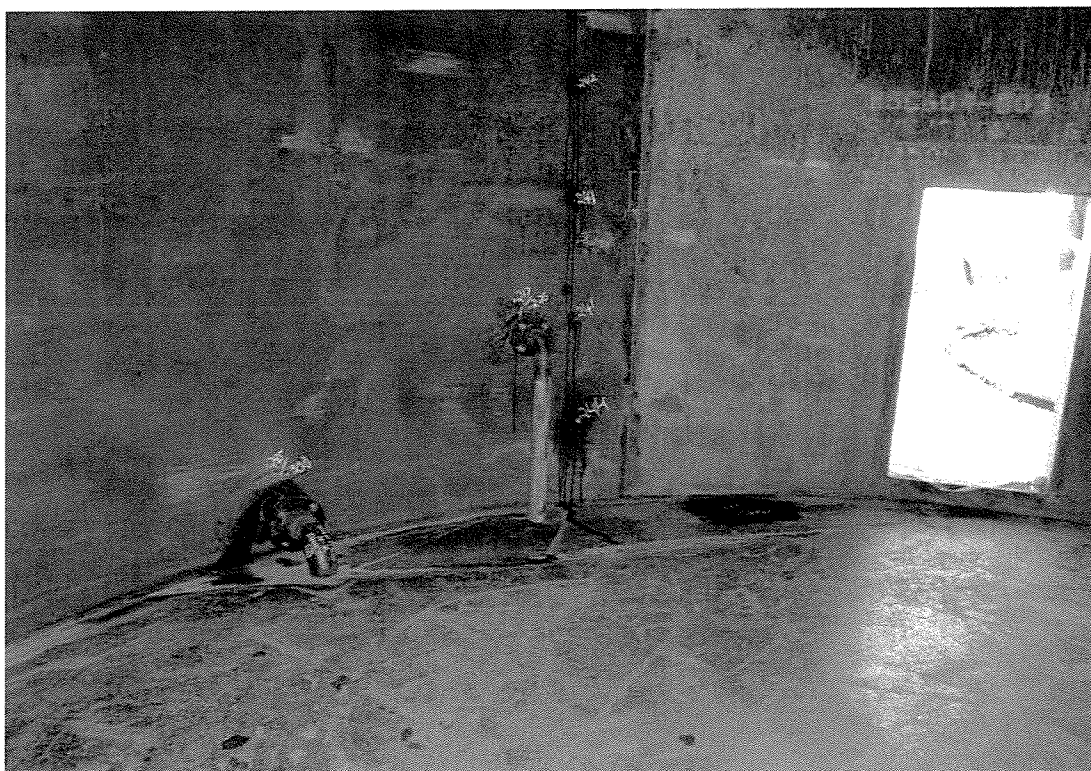


Photo #6: View of lower shell and floor

INSPECTION PHOTOGRAPHS

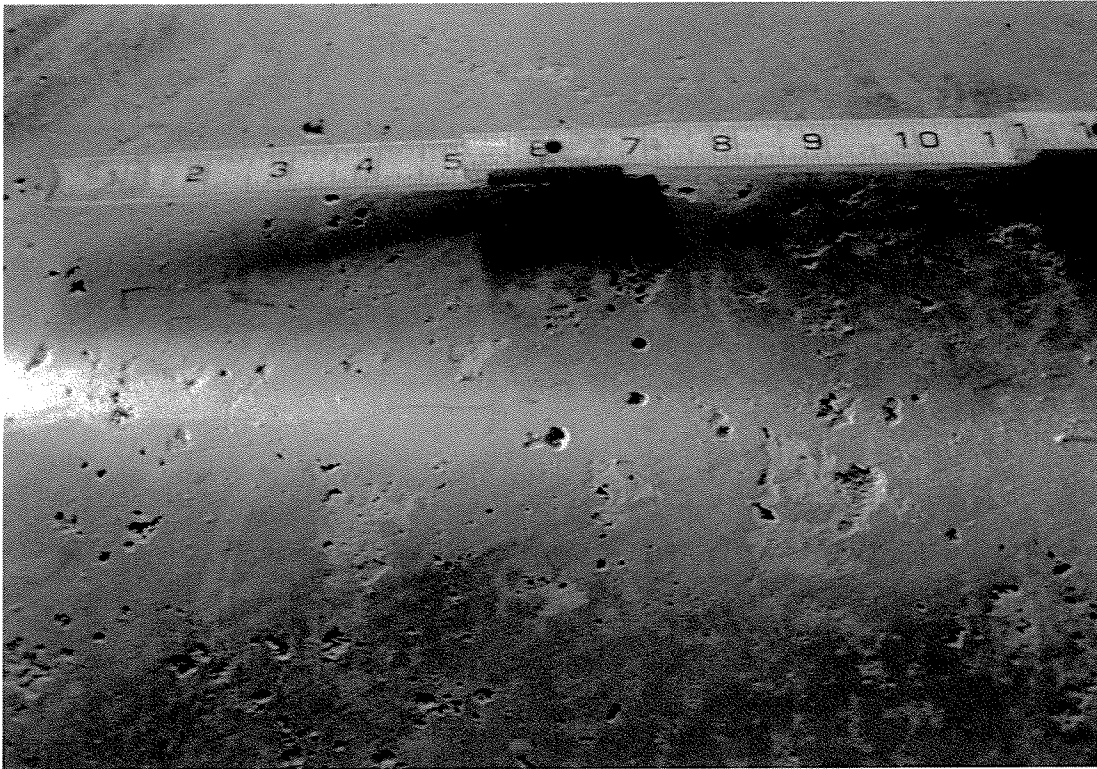


Photo #7: Internal floor pitting



Photo #8: Pit gauge showing 0.050" pitting

INSPECTION PHOTOGRAPHS

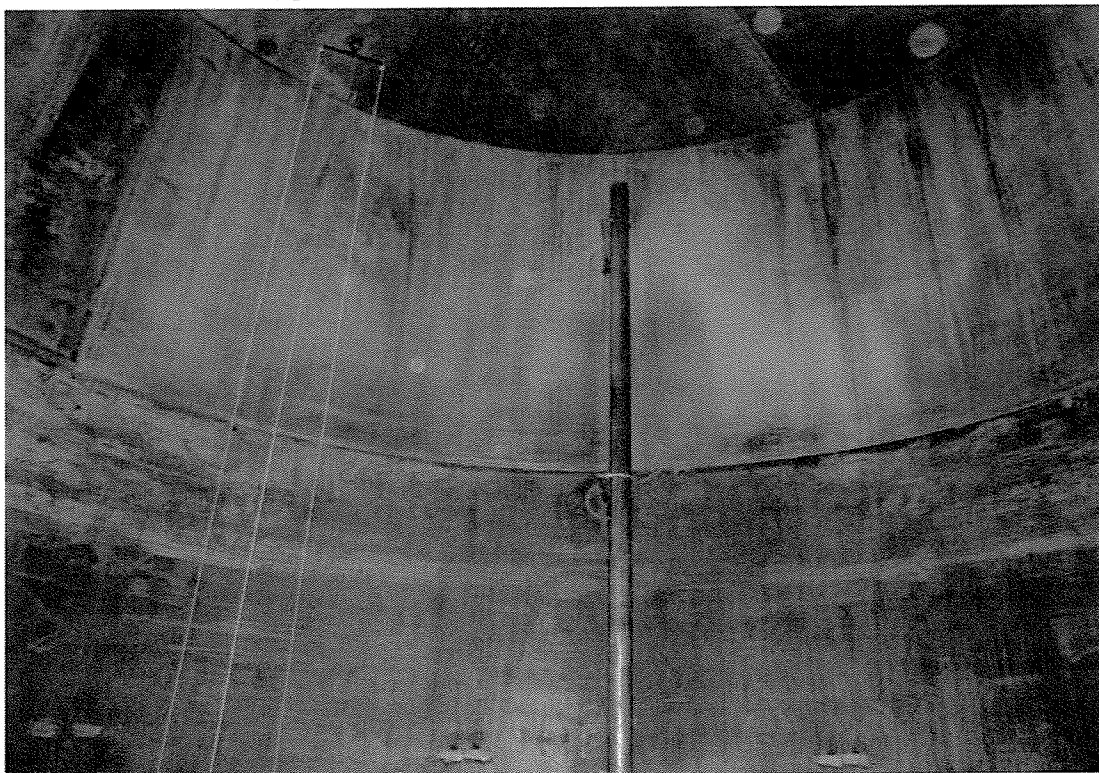


Photo #9: Upper portion of shell

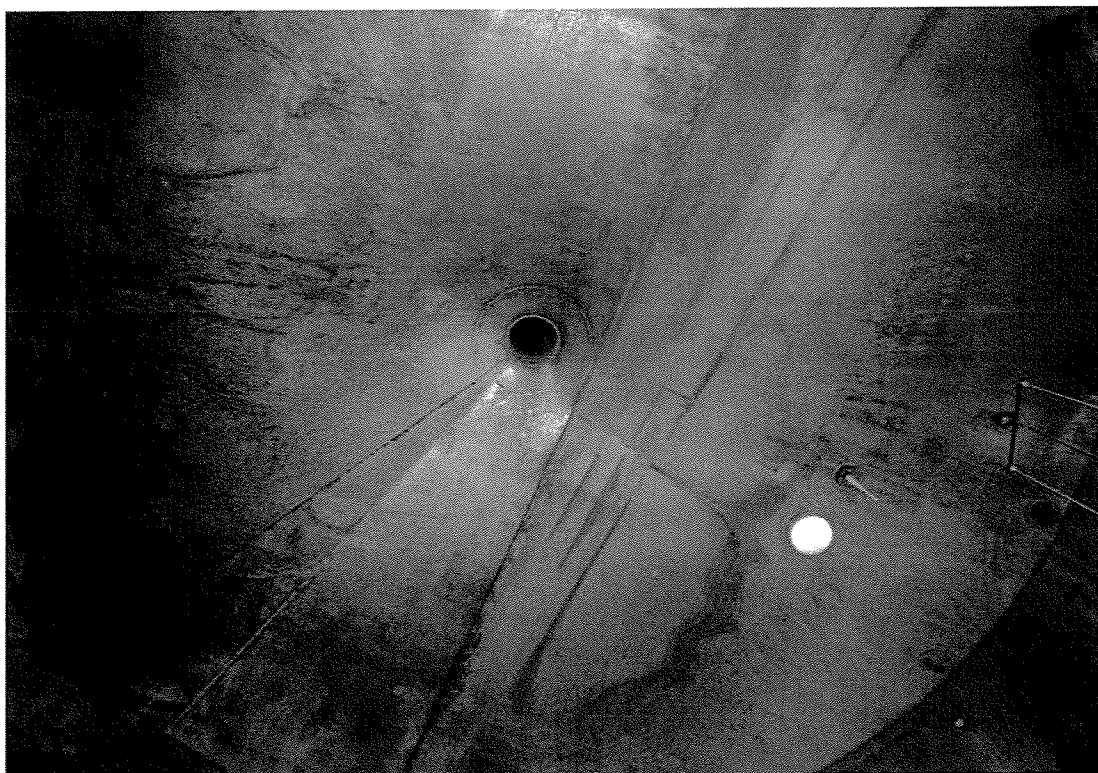


Photo #10: View of roof from inside

INSPECTION PHOTOGRAPHS

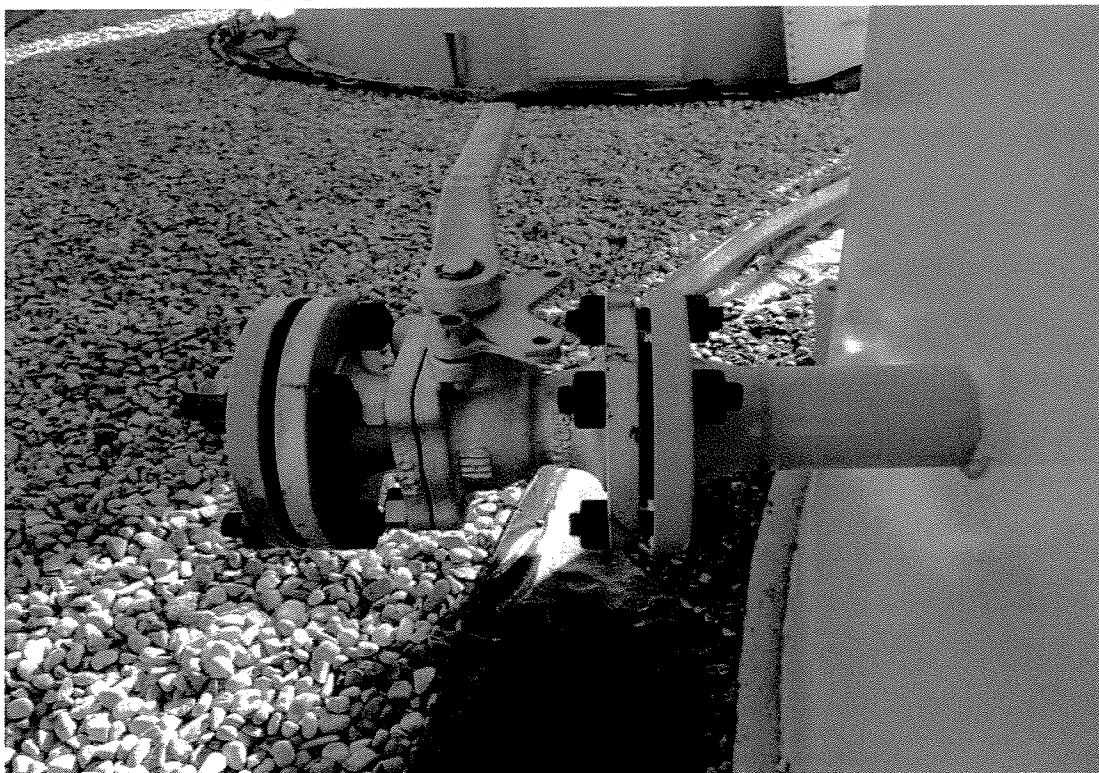


Photo #11: Nozzle showing no indications of leaks

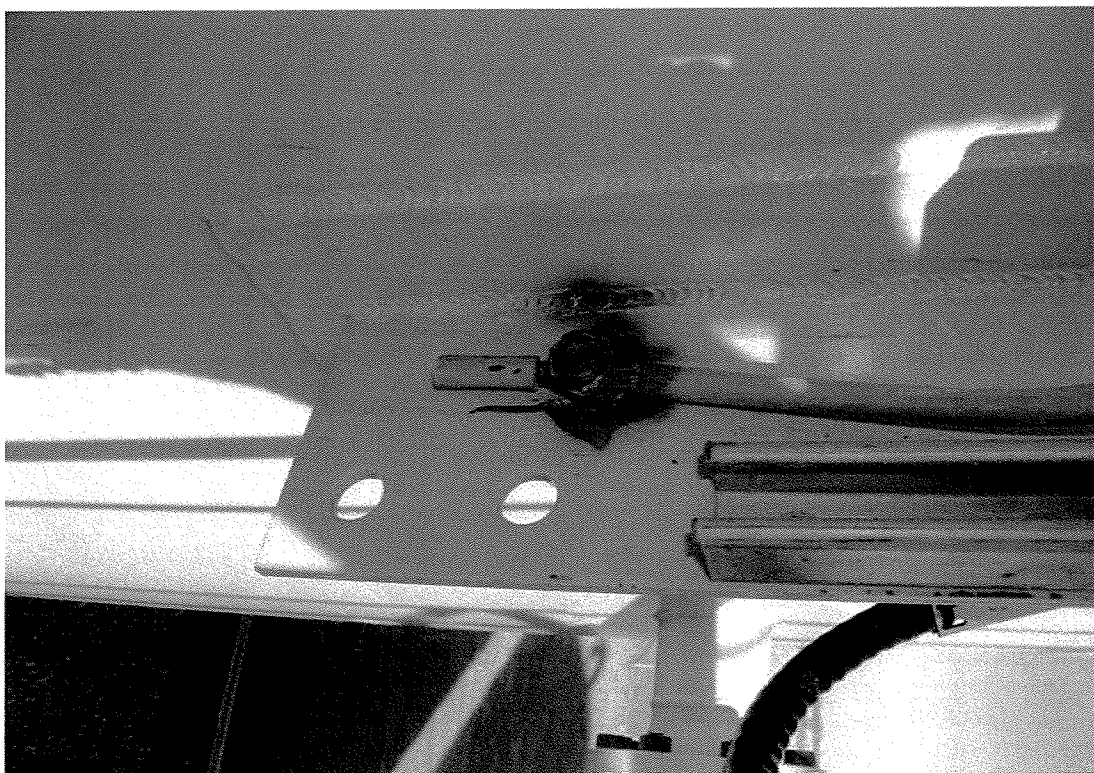


Photo #12: Ground cable attached near upper cable tray

INSPECTION PHOTOGRAPHS

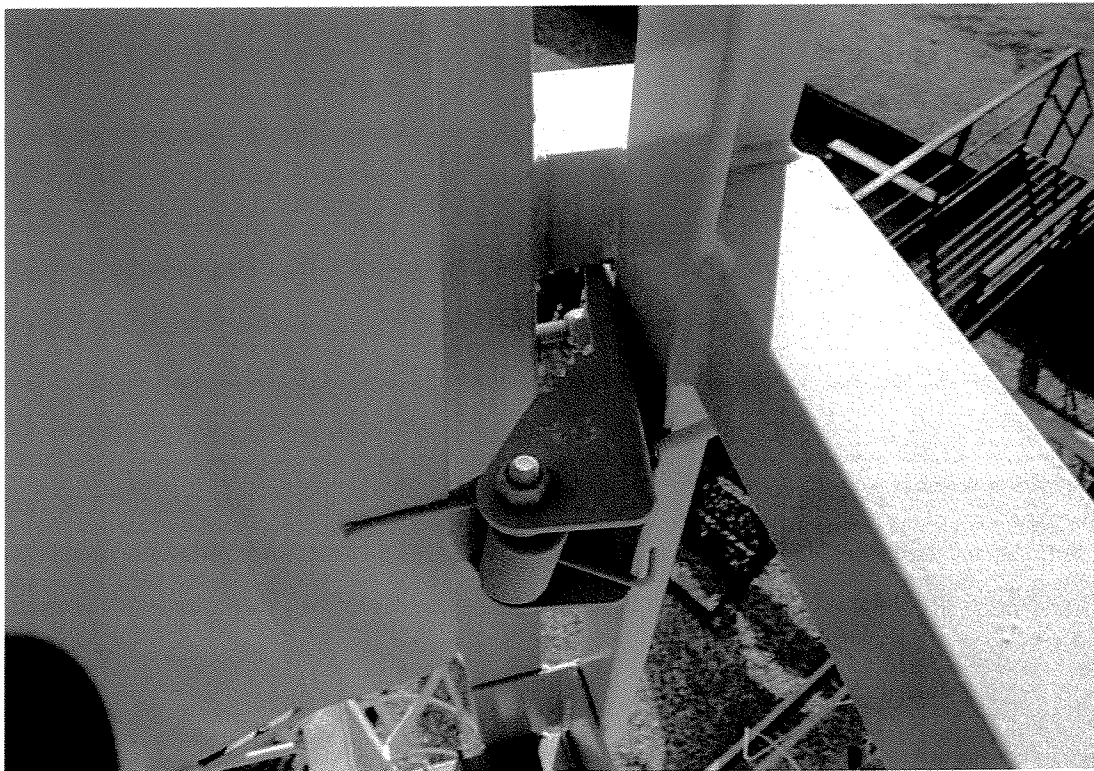


Photo #13: Loose hinge on safety gate

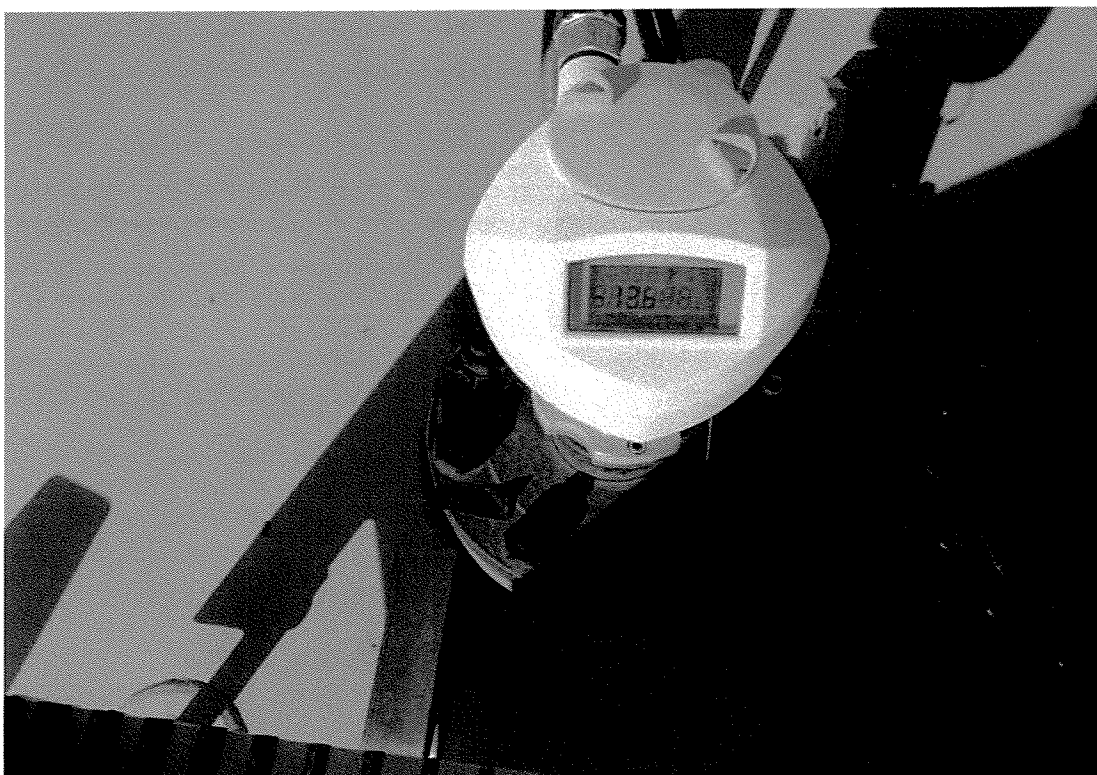


Photo #14: Tank level radar unit

INSPECTION PHOTOGRAPHS

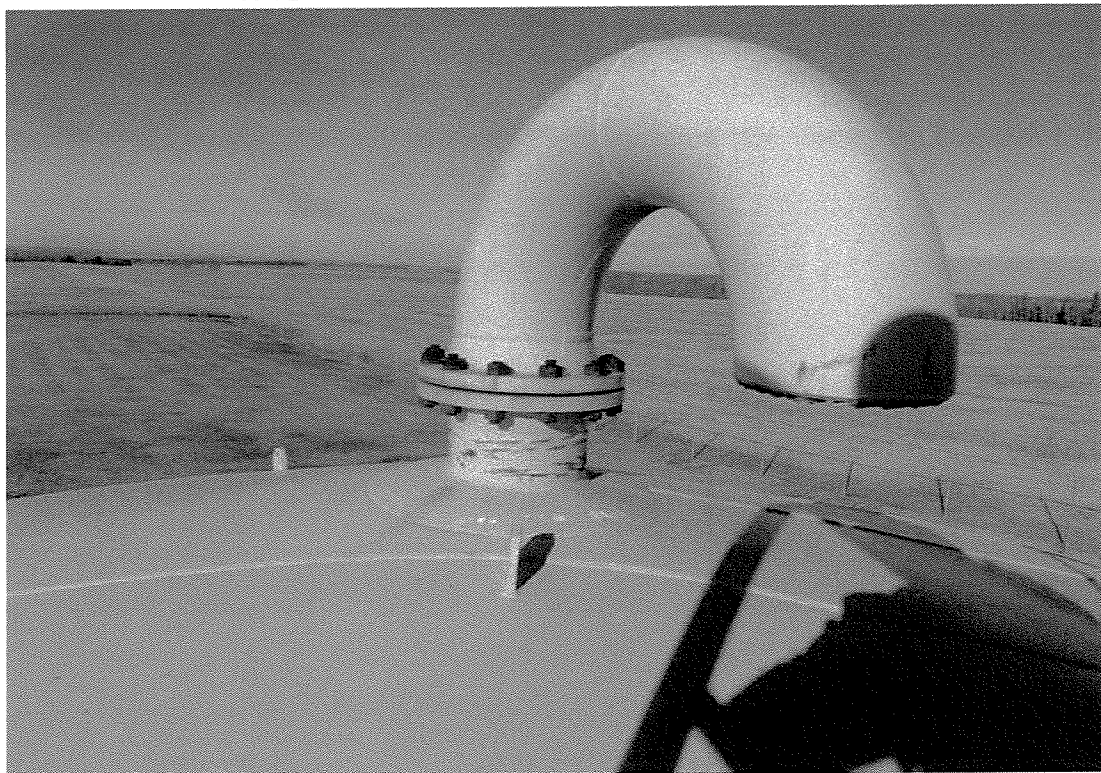


Photo #15: Open atmosphere vent screen covered and clean



Photo #16: Fully functional vacuum breaker

INSPECTION PHOTOGRAPHS



Photo #17: Soil piled up around shell bottom, anchor points not utilized

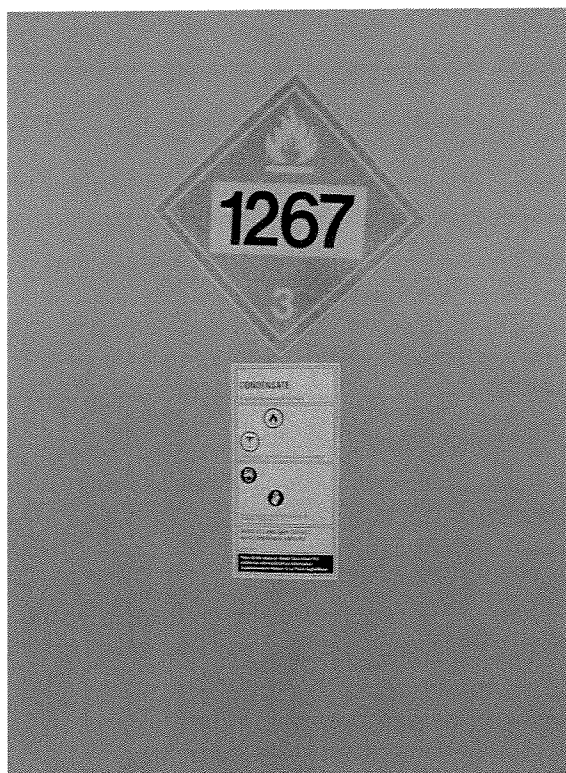
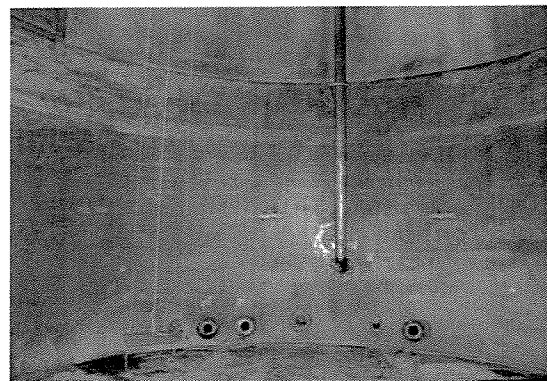
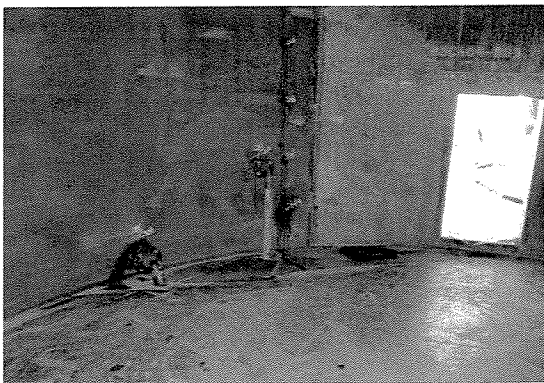
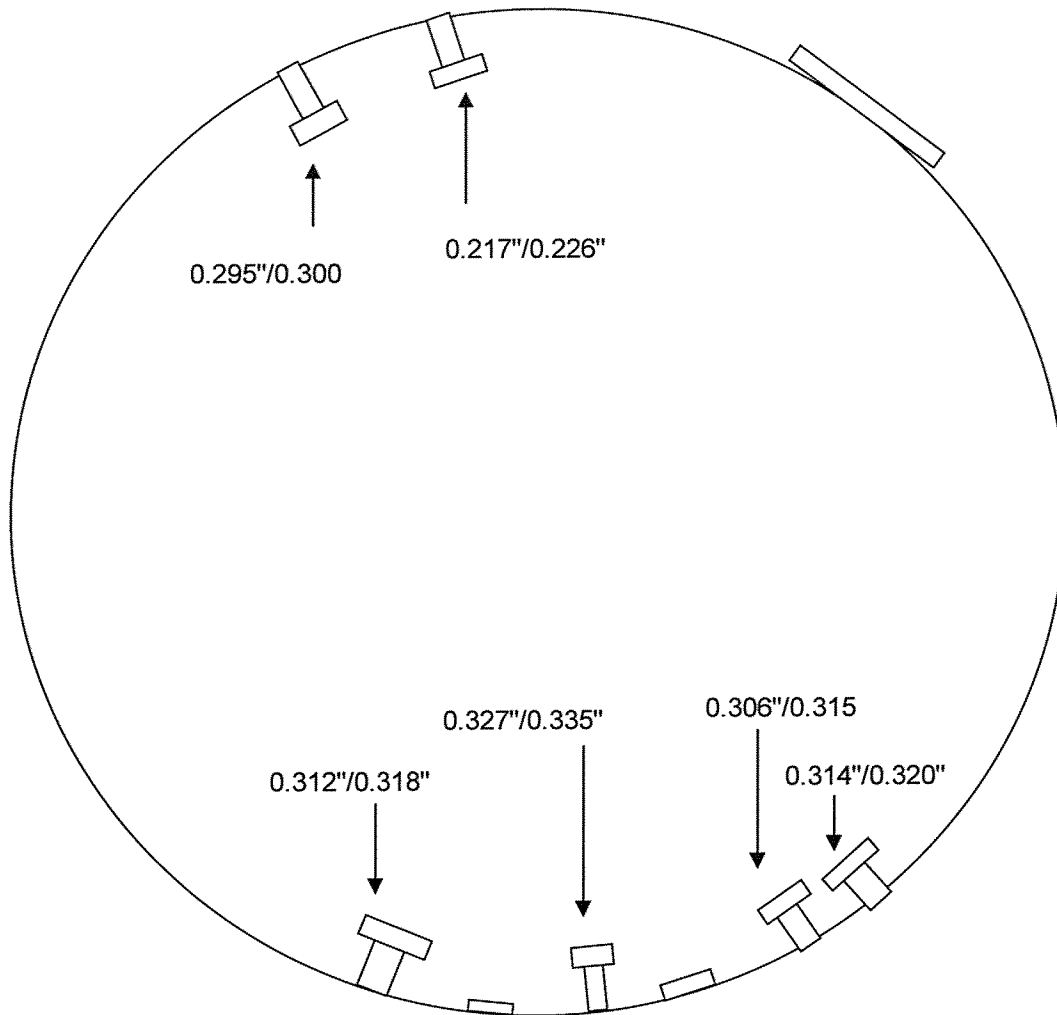


Photo #18: Tank service label

FLOOR DRAWING





ISO 9001:2000

ULTRASONIC EXAMINATION FORM

UT-KJN-20101020

ACUREN

PAGE 1 OF 1

CLIENT	HUSKY ENERGY	DATE	OCTOBER 20, 2010	TIME	10:00 AM
ATTENTION	DALE MARTIN	ACUREN JOB No.	306-0055205-62		
ADDRESS	707 - 8 TH AVE SW	POWOW No.	5289728		
	CALGARY, AB	WORK LOCATION	SYLVAN LAKE GAS PLANT		
PROJECT	TANK INSPECTION SUPPORT	ACCEPTANCE			
ITEM(S) EXAMINED	LEAN OIL TANK	STANDARD	CLIENT INFO	REV./DATE	
		PROCEDURE No.	UT-0017	REV./DATE	APRIL 20, 2007
		TECHNIQUE No.	2	REV./DATE	APRIL 20, 2007

JOB DESCRIPTION

PART No.	TANK ITEMS AS LISTED IN API REPORT	MATERIAL	CARBON STEEL	THICKNESS	0.250"
SCOPE	UT THICKNESS MEASUREMENTS AS REQUIRED				

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> THICKNESS	<input type="checkbox"/> FLAW DETECTION	<input checked="" type="checkbox"/> CONTACT	<input type="checkbox"/> IMMERSION
INSTRUMENT	Epoch	MODEL	LTC	S/N 090099201
CAL. BLOCK	0.100" - 0.500"	S/N	5188	CAL. DUE DATE
				January 19 2011
CAL. BLOCK		S/N		CABLE - TYPE
				ARMoured MICRODOT
CAL. BLOCK		S/N		COUPLANT
				Couplant / H2O
				SPECIAL EQUIP.

INFORMATION - TRANSDUCERS & CALIBRATIONS - ALL MEASUREMENTS IN - ☐ METRIC ☒ IMPERIAL

TEST ANGLE	PROBE TYPE		FREQ. (MHz)	SER. No.	PROBE DIA.	TRANSFER VALUE	TEST FROM		REFERENCE REFLECTOR	REFERENCE		SCAN SENSITIVITY	RANGE
	SINGLE	DUAL					FRONT	BACK		dB	% FSH		
1 <input checked="" type="checkbox"/> 0°	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5	701500	0.250	0	X		BW	48	80	AS REQ'D	1 INCH
2 <input type="checkbox"/> 45°	<input type="checkbox"/>	<input type="checkbox"/>											
3 <input type="checkbox"/> 60°	<input type="checkbox"/>	<input type="checkbox"/>											
4 <input type="checkbox"/> 70°	<input type="checkbox"/>	<input type="checkbox"/>											
5	<input type="checkbox"/>	<input type="checkbox"/>											

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> <0°C(32°F)	<input checked="" type="checkbox"/> 0°C(32°F) to 120°C(250°F)	<input type="checkbox"/> 120°C(250°F) to 260°C(500°F)	<input type="checkbox"/> >260°C(500°F)	

RESULTS

DRAWING

SEE API REPORT FOR RESULTS

SIGNATURES

CLIENT REPRESENTATIVE	PRINT	SIGNATURE	DTR No.	A 308062
TECHNICIAN (SIGN)			REPORT REVIEW	
PRINT NAME	KEN NOBERT		INITIAL	
	1 ST TECHNICIAN	2 ND TECHNICIAN		
CGSB LEVEL	1	SNT LEVEL		
CGSB REG. No	11491	CGSB REG. No		

Scope of Services

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