

**Canadian Natural Resources Limited
GENERAL PRESSURE VESSEL INFORMATION**

10.114808

District: Swan hills , AB	Skid No. Dehy 2
Facility: Waskahigan Gas Gathering	Location (LSD): 06-14-63-24W5M
Vessel Name Equipment Number: Glycol contactor	
Orientation: Vertical	
Status: In service	Regulatory Inspection

PRESSURE VESSEL NAMEPLATE DATA

"A" or "G" or "S" (Sask.) or BC Registration Number. A0416743		CRN Number: F-9578,231	
Vessel serial number: 97C5832 09B		Size: 20 in x 29 ft	
Shell thickness: 0.875 in		Shell material: SA 516 70N	
Head thickness: 0.819 in		Head material: SA 516 70N	
Tube wall thickness:		Tube material:	
Tube diameter:		Tube length:	
Channel thickness:		Channel material:	
Design pressure	Shell: 1440 PSI	Operating pressure	Shell:
	Tubes:		Tubes:
Design Temp.	Shell: 130 Deg F	Operating temperature	Shell:
	Tubes:		Tubes:
X-ray: RT-2		Heat treatment: Yes	
Code parameters: ASME VIII, Div 1		Coated: Nil	
Manufacturer: Alco Gas & Oil		Year built: 1997	
Corrosion allowance: 1.6mm		Manway: No	

PRESSURE SAFETY VALVE NAMEPLATE DATA

PSV Tag	Manufacture / Model / Serial	Set Pressure (PSI / Kpa)	Capacity (scfm / usgpm)	Size	Block Valve	Location	Service by / Date
G36242	Mercer // 814421117R // 738065	1440 PSI	2925 Scfm	1 X 1	No	Mid Shell	Pentair 06/2014

SERVICE CONDITIONS-INDICATE ALL THAT APPLY

Sweet X	Sour	Oil	Gas X	Water X
Amine	LPG	Condensate	Air	Glycol X

Other (Describe):

Inspection Interval _____ PSV Service Interval _____
(Determined by MIC in conjunction with Chief Inspector following guidelines of Canadian Natural Resources Limited Owner-User Inspection Program)
Reports reviewed and accepted by:

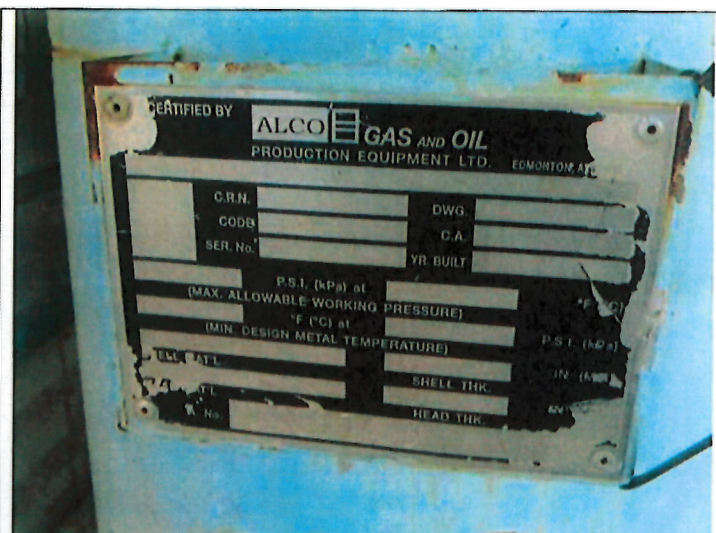
Mechanical Integrity Coordinator *R. Linder* Date *Mar 20 / 2015*
Fill out all forms as completely as possible. All information is important! Use back of sheets to record additional information or sketch if required.
Copy of report to be filed by MIC at site, and copy sent to Chief Inspector

External Inspection Items	G	F	P	N/A	Comments
Insulation Verify sealed around manways, nozzles, no damage present, and there is no egress of moisture.	X				The top half of the vessel is insulated - no open or torn sections.
External Condition Assess paint condition, areas peeling, record any corrosion, damage, etc (record location, size and depth of corrosion or damage)		X			The bottom half of the vessel Paint is in fair condition with minor chips in the paint- No corrosion or exposed metal.
Leakage Record any leakage at flanges, threaded joints, weep holes on repads, etc.	X				No leaks present.
Saddle/Skirt Assess condition of paint, fire protection, concrete. Look for corrosion, buckling, dents, etc. Look at vessel surface area near supports. Verify no signs of leakage at attachment to vessel and attachment welds are acceptable. Ground wire attached?	X				Skirt is firmly bolted to skid deck – no buckling or dents present. Paint is in good condition – no corrosion – no leaks. Skid package is grounded.
Anchor Bolts Hammer tap to ensure secure. Look for cracking in treads or signs of deformation.	X				Skirt is firmly bolted to skid deck.
Concrete foundation Check for cracks, spalling, etc.				X	
Ladder / Platform Describe general condition, ensure support is secure to vessel, describe any hazards.				X	
Nozzle Assess paint, look for leakage, and ensure stud threads are fully engaged. Record any damage, deflection, etc. Are nozzles gusseted?	X				All studs fully engaged to nuts – no short bolts. No distortion – no leaks. No gussets present.
Gauges Ensure gauges are visible, working, no leakage, and suitable for range of MAWP/ Temp.	X				Pressure gauge (0-1500 PSI) Suitable for MAWP of Vessel Temperature Gauge (0-250 °F) Suitable for Range Gauges are clear and visible.
External Piping Ensure pipe is well supported. All clamps, supports, shoes, etc. in place. Look for evidence of structural overload, deflection, etc. Paint condition, external corrosion?	X				Well supported, no deflection, all clamps in place. Paint is in good condition – no corrosion.
Valving Ensure no leaks are visible. Valves are properly supported and chained if necessary.	X				Valves are properly supported, no leaks.
PSV Ensure PSV is set at pressure at or below that of vessel. Discharge piping is same size as inlet to valve and is properly supported and routed. Ensure no block valves between PSV and vessel or if there are they are locked open.	X				Located on mid shell – set at mawp of vessel. Seal is intact / no block valve / discharges to closed header.
NDE methods Was UT/ MPI done on vessel (MI coordinator to review results)	X				Ultrasonic corrosion survey carried out – pipe metal thickness detected below nominal minus corrosion allowance. Thickness calculations carried out: UT point 4430(3" elbow) – nominal thickness is 5.5mm / min thickness is 4.7mm / T min thickness is 3.1mm
Recommendations or corrective actions: (Vessel is Fit for Service or describe corrective actions required) (MIC to review corrective actions with Operations, discuss with Chief Inspector where necessary, and get remedial action implemented) Recommendations: No recommendations at this time. Summary: Vessel is in overall good condition, visual external inspection and ultrasonic corrosion survey performed - pipe metal thickness detected below nominal minus corrosion allowance. Thickness calculations carried out to ensure sufficient metal exists for safe operation. Corrosion rate based on greatest thickness loss – no corrosion rate to assess. Vessel is fit for service.					

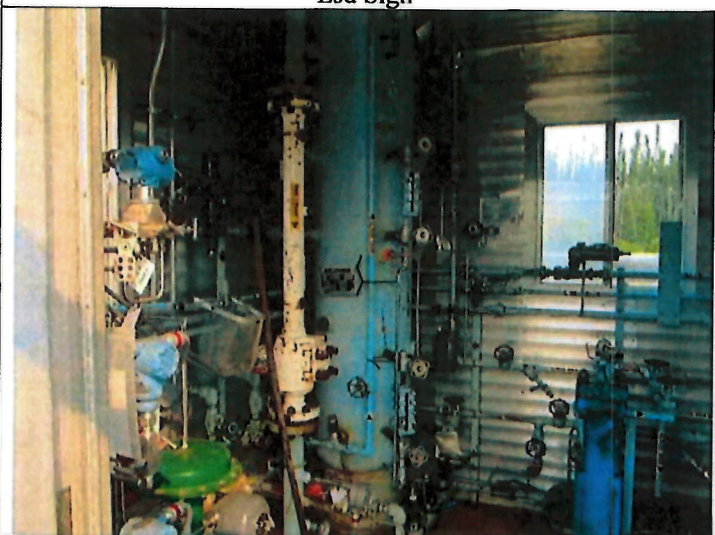
Photo Table



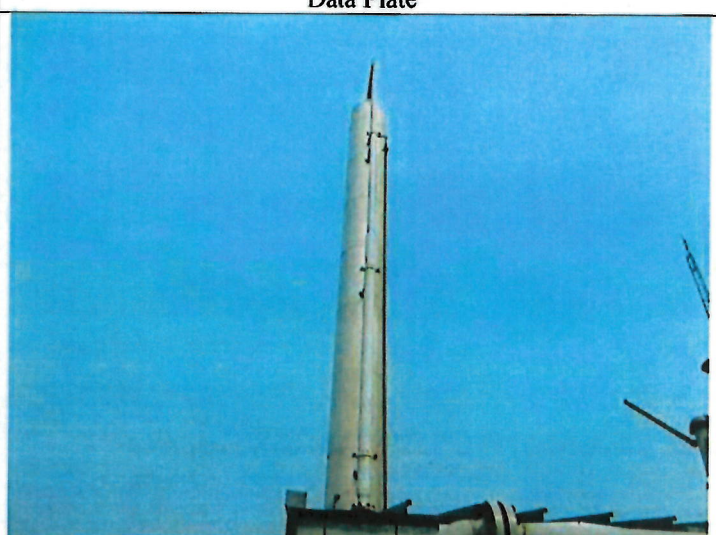
Lsd Sign



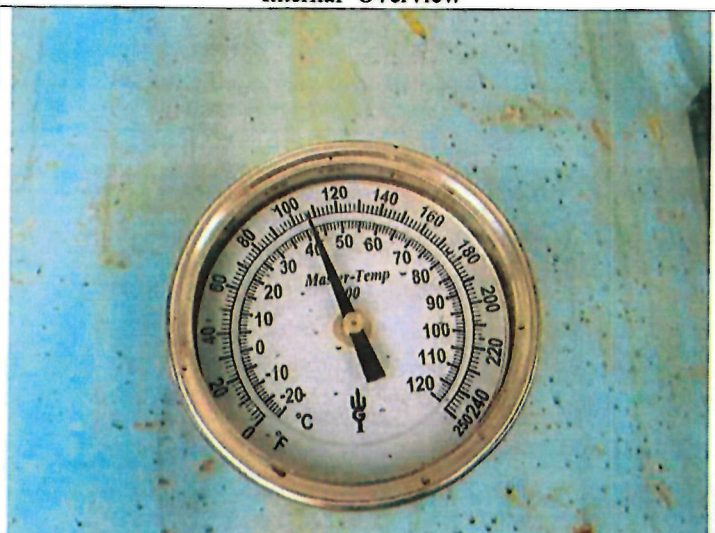
Data Plate



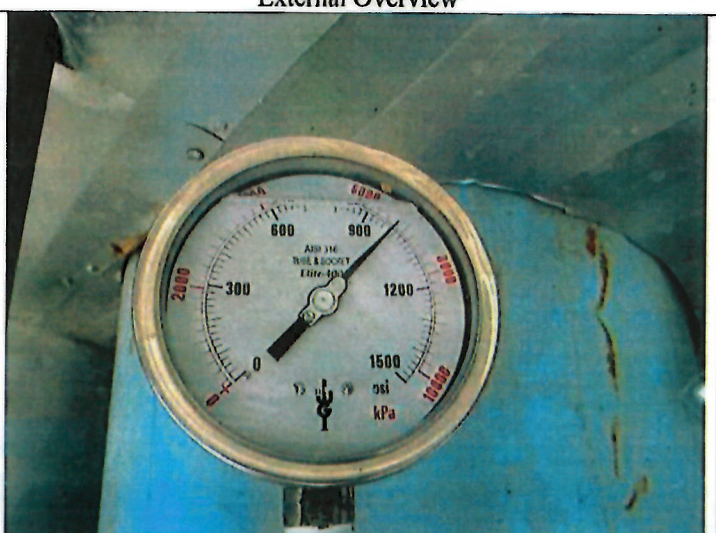
Internal Overview



External Overview



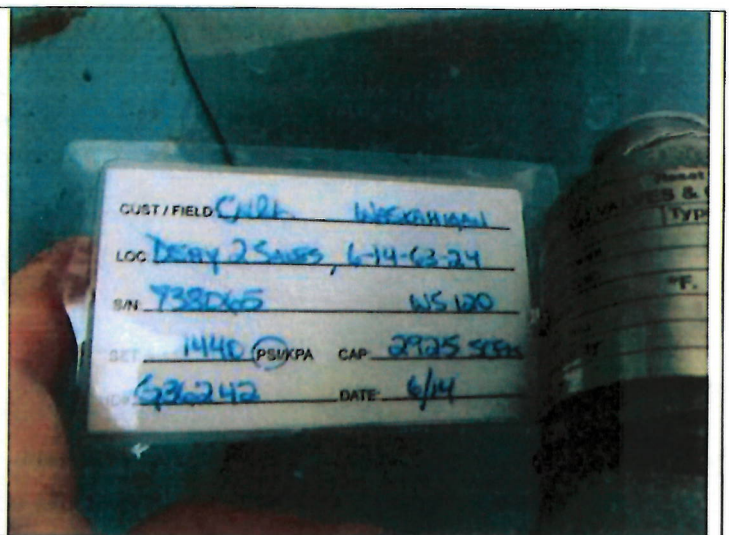
Temperature gauge



Pressure Gauge

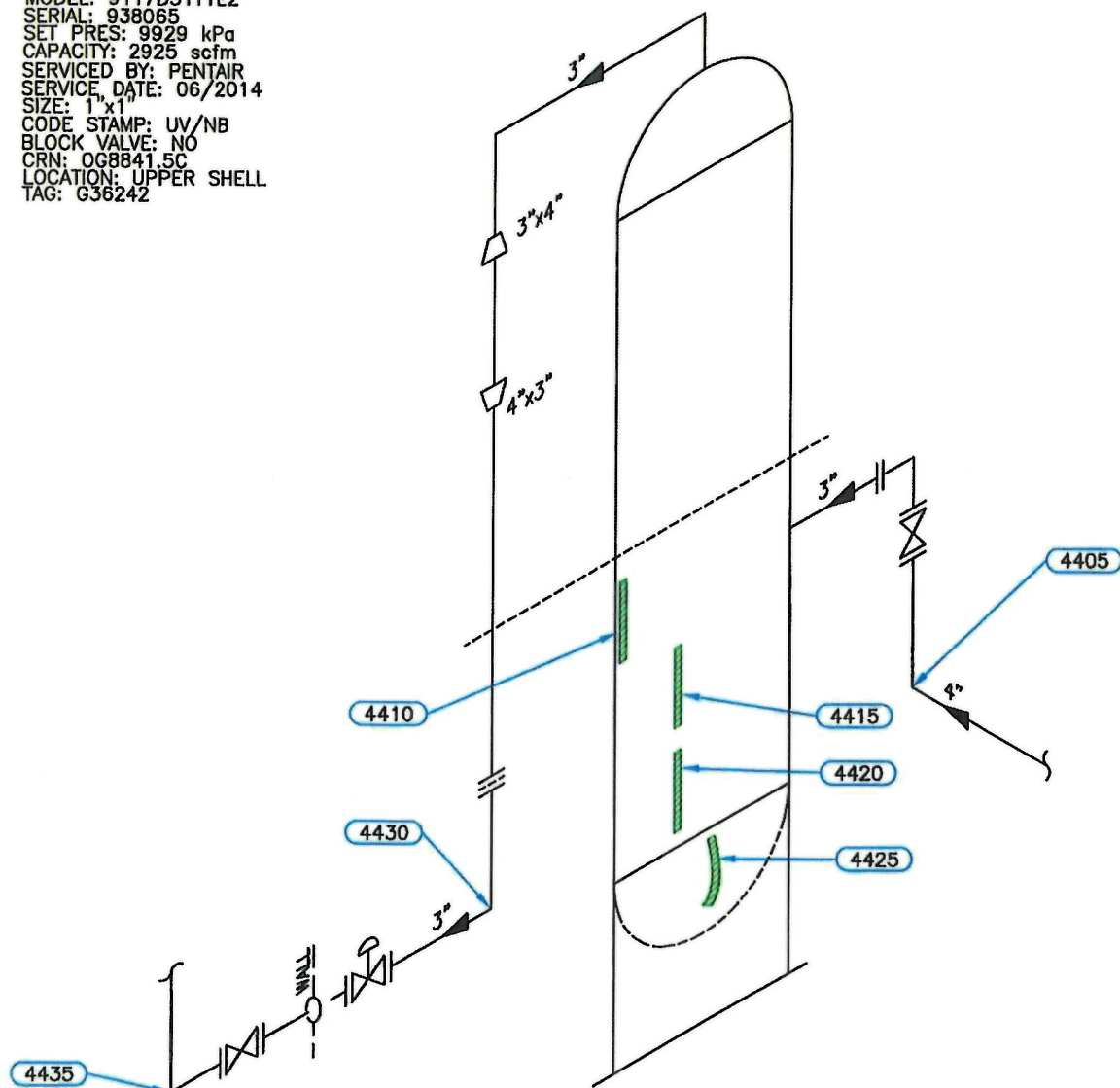


PSV Overview



PSV Service Tag

MFG: MERCER
MODEL: 9117D51T1E2
SERIAL: 938065
SET PRES: 9929 kPa
CAPACITY: 2925 scfm
SERVICED BY: PENTAIR
SERVICE DATE: 06/2014
SIZE: 1" x 1"
CODE STAMP: UV/NB
BLOCK VALVE: NO
CRN: OGB841.5C
LOCATION: UPPER SHELL
TAG: G36242



Design & Materials Data

MAWP Tube Side: _____ ① Temp. _____

DWG.# 277

UTS DATA

CLIENT: CANADIAN NATURAL RESOURCES
EQUIPMENT: GLYCOL CONTACTOR
CRN#: F-9578.231

PROV REG: A 46743

TESTED ON STREAM

FACILITY: WASKAHIGAN GAS GATHERING

SERVICE: SWEET

LOCATION: 06-14-63-24 W5M

RTD JOB #:10.114808

REFER TO DRAWING: 277

Test Point	THICKNESS DATA				Flag	T-Min	C.A.	Nom.	Short Term	Long Term	Ave. mm/py	Retirement Date
4410												
Description: MID SHELL												
2014 7												
Min. Thick.	22.7		20.60		1.6		22.20					
Average:	22.8							0		0		
Analysis:												
4415												
Description: LOWER SHELL												
2014 7												
Min. Thick.	22.8		20.60		1.6		22.20					
Average:	22.9							0		0		
Analysis:												
4420												
Description: LOWER SHELL												
2014 7												
Min. Thick.	22.5		20.60		1.6		22.20					
Average:	22.6							0		0		
Analysis:												
4425												
Description: BOTTOM HEAD												
2014 7												
Min. Thick.	21.5		19.20		1.6		20.80					
Average:	22.7							0		0		
Analysis: 2014/07 MIN SCAN @ SKIRT WELD.												

FACILITY: WASKAHIGAN GAS GATHERING
SERVICE: SWEET
LOCATION: 06-14-63-24 W5M
RTD JOB #: 10.114808

PROV REG:
TESTED ON STREAM

REFER TO DRAWING: 277

Test Point	THICKNESS DATA				Flag	T-Min	C.A.	Nom.	Short Term	Long Term	Ave. mm/pt	Retirement Date
4405												
Description: 4" 90° ELBOW												
2014 7												
Min. Thick.	7.8				7.53		1.1	8.60				
Average:	8.3								0	0		
Analysis:												
4430												
Description: 3" 90° ELBOW												
2014 7												
Min. Thick.	4.7				4.81	3.1	.7	5.50				
Average:	5.2								0	0		
Analysis: RETIREMENT DATE: 2048												
4435												
Description: 3" 90° ELBOW												
2014 7												
Min. Thick.	8				6.65		1	7.60				
Average:	8.3								0	0		
Analysis:												