

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

**Job # 10.111479**

District: **Grande Prairie, AB** Skid No.:

Facility: **South Spirit River Unit #1 Battery** Location (LSD): **08-09-77-07 W6M**

Vessel Name Equipment Number: **Flare Knock-Out Drum**

Orientation: **Horizontal**

Status: **In Service** **Regulatory Inspection**

**PRESSURE VESSEL NAMEPLATE DATA**

“A” or “G” or “S” (Sask.) or BC Registration Number.  <b>A0462576</b>	CRN Number:  <b>P 6520.2</b>
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Vessel serial number: 11796	Size: 48 in x 12 ft
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Shell thickness: 9.5 mm	Shell material: SA 516-70N
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Head thickness: 7.9 mm	Head material: SA 516-70N
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Tube wall thickness:	Tube material:
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Tube diameter:	Tube length:
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Channel thickness:	Channel material:
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Design pressure	Shell: 345 kPa (50 PSI)	Operating pressure	Shell:
	Tubes:		Tubes:

Design Temp.	Shell: 149°C	Operating temperature	Shell:
	Tubes:		Tubes:

X-ray: RT-1	Heat treatment: Nil
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Code parameters: ASME VIII, Div 1	Coated: 100% epoxy
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Manufacturer: E & D Pipe and Process Equipment Ltd.	Year built: 2001
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Corrosion allowance: 1.6 mm	Manway: Yes
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**PRESSURE SAFETY VALVE NAMEPLATE DATA**

PSV Tag #	Manufacturer	Model #	Serial #	Set Pressure (PSI)	Capacity (scfm)	Service Date
<b>Atmos</b>						
CRN #	Service By	Block Valve	Location	Size	Code Stamp	

**SERVICE CONDITIONS-INDICATE ALL THAT APPLY**

Sweet <input checked="" type="checkbox"/>	Sour	Oil	Gas <input checked="" type="checkbox"/>	Water <input checked="" type="checkbox"/>
Amine	LPG	Condensate <input checked="" type="checkbox"/>	Air	Glycol

Other (Describe):

**Inspection Interval** \_\_\_\_\_ **PSV Service Interval** \_\_\_\_\_

(Determined by MIC in conjunction with Chief Inspector following guidelines of CNRL Owner-User Inspection Program)

Reports reviewed and accepted by:  
**Mechanical Integrity Coordinator** \_\_\_\_\_ **Date** \_\_\_\_\_

<b>External Inspection Items</b>	G	F	P	N/A	<b>Comments</b>
<b>Insulation</b> Verify sealed around manways, nozzles, no damage present, and there is no egress of moisture.	X				<b>Vessel is 100% insulated. One area of loose insulation approx 1 ft x 1 ft area at midshell 6:00 position.</b>
<b>External Condition</b> Assess paint condition, areas peeling, record any corrosion, damage, etc (record location, size and depth of corrosion or damage)	X				<b>No damage. No corrosion.</b>
<b>Leakage</b> Record any leakage at flanges, threaded joints, weep holes on repads, etc.	X				<b>No leaks observed.</b>
<b>Saddle/Skirt</b> 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				<b>Vessel saddle is bolted to steel beams. No evidence of corrosion at shell to saddle weld – no leaks. Paint in good condition – no exposed metal. No distortion. No buckles. Vessel is mounted on I-beams above ground level. Vessel has ground wire attached.</b>
<b>Anchor Bolts</b> Hammer tap to ensure secure. Look for cracking in treads or signs of deformation.	X				<b>Anchor bolts are secure.</b>
<b>Concrete foundation</b> Check for cracks, spalling, etc.				X	<b>Steel foundation.</b>
<b>Ladder / Platform</b> Describe general condition, ensure support is secure to vessel, describe any hazards.				X	<b>No ladder or platform attached.</b>
<b>Nozzle</b> Assess paint, look for leakage, and ensure stud threads are fully engaged. Record any damage, deflection, etc. Are nozzles gusseted?	X				<b>Threaded nozzle joints are fully engaged. Studs are fully engaged to nuts – no short bolts. Nozzles are not gusseted. No damage. No deflections. Paint in good condition – no exposed metal.</b>
<b>Gauges</b> Ensure gauges are visible, working, no leakage, and suitable for range of MAWP/ Temp.	X				<b>Liquid level gauge attached to side shell Clean, clear and in working condition. No leaks.</b>
<b>External Piping</b> 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				<b>Piping is well supported. All clamps, supports and shoes are in place. No structural overloads or deflections noted. Piping is 100% insulated. No exposed metal.</b>
<b>Valving</b> Ensure no leaks are visible. Valves are properly supported and chained if necessary.	X				<b>Valves are properly supported. No leak detected.</b>
<b>PSV</b> Ensure PSV is set at pressure at or below that of vessel.				X	<b>None required.</b>
<b>NDE methods</b> Was UT/ MPI done on vessel (MI coordinator to review results)	X				<b>Ultrasonic thickness survey carried out – no metal thickness detected below nominal minus corrosion allowance.</b>
<b>Other</b>					
<b>Recommendations or corrective actions : Vessel is Fit for Service or describe corrective actions required)</b> (MIC to review corrective actions with Operations, discuss with Chief Inspector where necessary, and get remedial action implemented)					
<b>See internal report for summary and recommendations</b>					

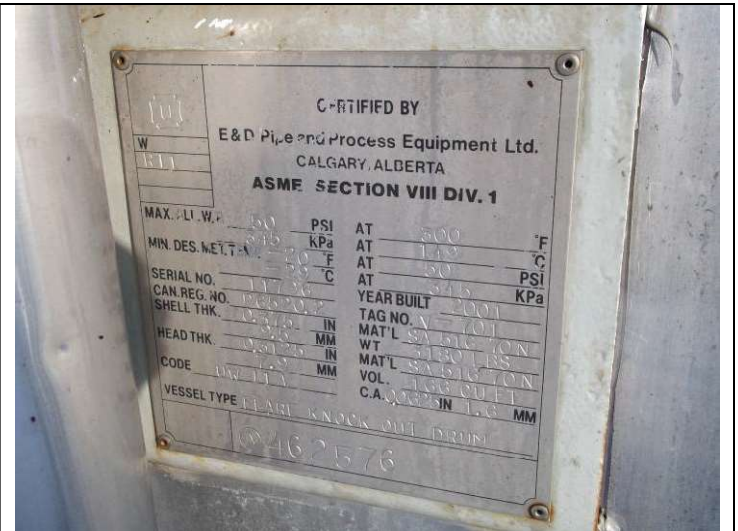
**Inspected By:** Chris Maxsom

**Date:** March 7, 2012

Internal Inspection Items	G	F	P	N/A	Comments
<b>Coating</b> Assess coating. Describe area coated, general condition of coating.	X				<b>Vessel is 100% epoxy coated. Several minor coating chips identified at manway and mid shell. Coating was repaired at time of inspection. One area of previous coating repair at manway. Repair remains intact.</b>
<b>Anodes.</b> How many, type, condition. % consumed. Are they being replaced?				X	<b>No anodes.</b>
<b>Internal Piping</b> Is there any?				X	<b>No internal piping.</b>
<b>Trays</b> How many? Type of material. Are valves in place. Check for erosion/ corrosion; wear on tray valve legs. Cleanliness?				X	<b>No trays.</b>
<b>Baffles, deflector plates, etc.</b> If present, describe condition. Look closely at welds attached to vessel wall.	X				<b>Two deflector plates and one vortex breaker in good condition. No corrosion. No damage.</b>
<b>West Head</b> Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				<b>100% coated no areas of failed coating. No damage. No corrosion. Electric heating coil installed. Good condition –no damage.</b>
<b>East Head</b> Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				<b>100% coated no areas of failed coating. No damage. No corrosion. Electric heating coil installed. Good condition- no damage.</b>
<b>Shell Sections</b> Record number of shell sections. Record location, size and depth of all erosion, corrosion or mechanical damage. Describe General condition.	X				<b>Two shell sections in good condition. No damage. No corrosion.</b>
<b>Demister pad</b> Is it in place? Is it clean? If any corrosion is apparent in vessel, lift pad and check top head for corrosion.				X	<b>None</b>
<b>Welds</b> Inspect all welds, including attachment welds. Record all service-related damages and if there is any discuss with Chief Inspector before closing.	X				<b>Welds are coated and are in good condition. No pitting. No corrosion.</b>
<b>Repairs Required.</b> If yes, ensure procedure and copy of AB 40 is on file, and one sent to local ABSA, and Chief Inspector				X	<b>None.</b>
<b>Other</b>				X	
<b>NDE Inspections</b>				X	<b>No internal NDE at this time.</b>
<p><b>Recommendations or corrective actions : Vessel is Fit for Service or describe corrective actions required)</b> (MIC to review corrective actions with Operations, discuss with Chief Inspector where necessary, and get remedial action implemented)</p> <p><b>Recommendations: 1. Repair loose insulation at shell 6:00 position.</b></p> <p><b>Summary:</b> Vessel is in overall good condition, visual external, visual internal and ultrasonic corrosion survey carried out – no metal thickness detected below nominal minus corrosion allowance. Coating repair was carried out at the request of the client, however ambient temperature may not have been ideal.</p> <p><b>Long term corrosion rate based on greatest thickness loss – no corrosion rate to assess.</b></p> <p><b>Vessel is fit for service.</b></p>					

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LSD

Data plate



Overview - Vessel

Overview - Vessel



Loose insulation at bottom shell

Liquid level gauge





**Manway**



**Bottom shell**



**West head**



**West heater bundle and lower shell**



**East head**



**East heater bundle and lower shell**





**Inlet deflector plate**



**Previous coating repair – no exposed metal**



**Chipped coating at mid shell**



**Chipped coating at manway**



**Coating repair at mid shell**



**Coating repairs at manway**