ALTEC INSPECTION LTD.

GENERAL INSPECTION FORM

Company Name: Canadian Natural Resources Limited	**Inspection Date: December 11th, 2023**
Facility: West Blueberry	**Location (LSD): 12-29-88-25 W6**
Vessel Name & Equipment Number: Low Pressure Flare Knockout	
Orientation: Horizontal ☑ or Vertical ☐	**Status: operating ☐ or shut –in ☑**
Internal Inspection ☑ and / or External Inspection ☑	**Commissioning Inspection ☐ or Corporate Inspection ☑**

PRESSURE VESSEL NAMEPLATE DATA

"A" or BC Registration Number:		Company Tag # (if applicable): C23407	
CRN Number: Non-code		Associated PSV Tag # (if applicable):	
Vessel serial number: 98120-001		Size (diameter x length- estimate if necessary): 36" ID x 10'- 0" S/S	
Shell thickness: 0.312" (based on nominal thickness for 36")		Shell material:	
Head thickness: 0.312" (based on nominal thickness for 36")		Head material:	
Tube wall thickness:		Tube material:	
Tube diameter:		Tube length:	
Channel thickness:		Channel material:	
MAWP	Shell: 14.9 psi	Operating pressure	Shell:
	Tubes:		Tubes:
Design Temp.	Shell:	Operating temperature	Shell:
	Tubes:		Tubes:
Radiography:		Heat treatment: Yes ☐ No ☑	
Code parameters:		Joint efficiency (if on nameplate): W	
Manufacturer: Black, Sivalls & Bryson (Canada) Ltd.		Year built: 1998	
Corrosion allowance:		Manway? Yes ☑ No ☐	

PRESSURE SAFETY VALVE NAMEPLATE DATA

Location	Set Pressure	Model / Serial #	Capacity (ie:SCFM/ GPM,etc)	Size (Inlet x Outlet)	Manufacturer	Set Date (mm/dd/yyyy)

SERVICE CONDTIONS-INDICATE ALL THAT APPLY

Sweet ☐	Sour ☑	Oil ☑	Gas ☑	Water ☑
Amine ☐	LPG ☐	Condensate ☑	Air ☐	Glycol ☐
Other (Describe):				

Inspected By: Justin Bolog, API 510 Certification # 48892 Justin Bolog Digitally signed by Justin Bolog Date: 2023.12.15 14:39:39 -07'00' **Date**: December 11th, 2023

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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. Are straps secure?	✓				Vessel was 100% insulated. Insulation appeared to be in good condition, straps in place, no egress of moisture.
External Condition Assess paint condition, areas peeling, record any corrosion, damage, distortion etc (record location, size and depth of corrosion or damage)				✓	Vessel was 100% insulated. No signs of external corrosion, damage or distortion.
Leakage Record any leakage at flanges, threaded joints, weep holes on repads, etc.				✓	No leaks noted
Skirt/ Saddle 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. Is ground wire attached?	✓				The vessel is supported by saddles. The saddles were in good condition. No signs of corrosion, buckling or dents. All attachment welds appeared to be in good condition, no leaks.
Anchor Bolts Hammer tap to ensure secure. Look for corrosion, cracking in threads or signs of deformation.				✓	N/A
Concrete foundation Check for cracks, spalling, etc.				✓	N/A
Ladder / Platform Describe general condition, ensure support is secure to vessel, describe any hazards.				✓	N/A
Nozzle Assess paint, look for leakage, and ensure stud threads are fully engaged. Record any damage, deflection, etc. Are nozzles gusseted? Inspect gussets for cracking.	✓				All nozzles appeared to be in good condition. Stud threads were fully engaged. No signs of damage or deflection. Nozzles were not gusseted.
Gauges Ensure gauges are visible, working, no leakage, and suitable for range of MAWP/ Temp.				✓	No gauges noted at time of inspection.
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?	✓				Piping was in good condition. No signs of external corrosion, damage or distortion. Piping was well supported with no structural overload or deflection noted. Inlet and outlet piping was constructed with fiberglass, nozzles to vessel are steel.
Valving: Ensure no leaks are visible. Valves are properly supported and chained if necessary.	✓				Valves appeared to be in good condition. No leaks noted.
	YES		**NO**	**N/A**	
PSV Ensure PSV is set at pressure at or below that of vessel. Discharge piping is same size as valve outlet and is properly supported and routed. Are psv seals in place? Ensure no block valves between psv and vessel, or if there are that they are locked/sealed open.			✓		Non-code.
NDE methods: was UT/ MPI done on vessel	✓				Ultrasonic inspection completed at time of inspection. Note: see separate report for U/T results
Fit For Service Inspection did not identify any NCR's? The equipment does not require any repairs? The equipment is safe to operate?	✓				No NCR's identified. Equipment does not require any repairs.

Other Observations:

Overall, the vessel was in good condition. No obvious deficiencies noted.

Inspected By: Justin Bolog, API 510 Certification # 48892 Justin Bolog Digitally signed by Justin Bolog Date: 2023.12.15 14:39:54 -07'00' **Date**: December 11th, 2023

ALTEC INSPECTION LTD.

Internal Inspection Items	G	F	P	N/A	Comments
Coating Assess coating. Describe area coated, general condition of coating. Look at nozzles, coupling, and areas of most severe corrosion to ensure coating is intact. If coating is in poor condition make decision now if re-coating necessary? If so, when?	✓				Vessel was 100% internally coated. Coating damage / failure noted at manway and top of internal piping. Coating is burned and blistered in area where external catadyne heater is located.
Anodes. How many, type, condition. % consumed. Are they being replaced?				✓	No anodes were installed at the time of internal inspection.
Internal Components Is there any? If so, carbon or stainless steel. Describe condition, dents, corrosion, erosion, etc. Ensure supports are secure and any bolts are suitable for future use.	✓				Internal components consisted of inlet deflector plate, downcomer and some supports (not sure what supports are for). No signs of external corrosion, damage or distortion.
Trays How many? Type of material. Are valves in place? Check for erosion/ corrosion; wear on tray valve legs. Cleanliness?				✓	No trays present
Baffles, deflector plates, etc. If present, describe condition. Look closely at welds attached to vessel wall.	✓				The inlet had a deflector housing around it, no signs off corrosion damage. But limited visual from manway only.
East Head Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	✓				The head appeared to be in good condition, with no corrosion damage noted. But limited visual from manway only.
West Head Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	✓				The head appeared to be in good condition, with no corrosion damage noted. But limited visual from manway only.
Shell Sections Record number of shell sections. Record location, size and depth of all erosion, corrosion or mechanical damage. Describe general condition. If any corrosion greater than corrosion allowance is observed in either shell or head, discuss with Chief Inspector before closing vessel.	✓				The shell appeared to be in good condition, with no corrosion damage noted. But limited visual from manway only.
Demister pad Is it in place? Is it clean? If any corrosion is apparent in vessel, lift pad and check top head for corrosion.				✓	N/A
Welds Inspect all welds, including attachment welds. Record all service-related damages and if there is any discuss with Chief Inspector before closing.	✓				All welds inspected, appeared to be in good condition. No deficiencies noted.
	YES		**NO**	**N/A**	
Repairs Required. If yes, ensure corporate procedure is followed	✓				Coating repairs should be completed prior to putting back into service.
NDE Was any NDE done. (MI coordinator to review results)	✓				Internal visual, external U/T was completed.
Fit For Service Inspection did not identify any NCR's? The equipment does not require any repairs? The equipment is safe to operate?	✓				No NCR's identified.

Other Observations:

Overall, the vessel was in good condition. Coating repairs should be completed prior to putting back into service.

Inspected By: Justin Bolog, API 510 Certification # 48892

Justin Bolog

Digitally signed by Justin Bolog
Date: 2023.12.15 14:40:08 -07'00'

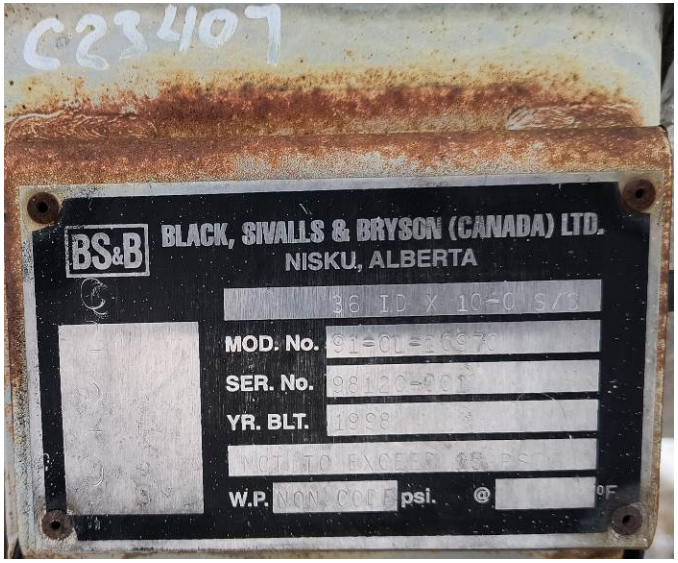
Date: December 11th, 2023

EQUIPMENT EXTERNAL PICTURES: Page 4 Vessel Ser # (Tag #): 98120-001

Picture 1:

Picture 2:

Picture 3:

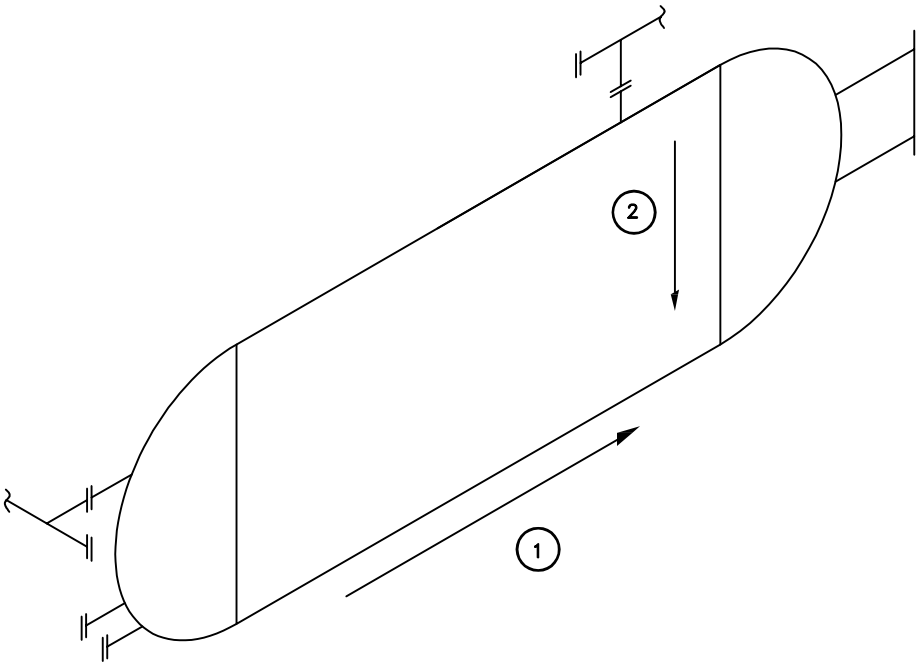


Picture 4:

EQUIPMENT EXTERNAL PICTURES: Page 5	Vessel Ser # (Tag #): 98120-001
Picture 5: 	Picture 6: 
Picture 7: Paint burned form catadyne 	Picture 8:

EQUIPMENT INTERNAL PICTURES: Page 6	Vessel Ser # (Tag #): 98120-001
Picture 1: Manway door 	Picture 2: Manway / Coating damage 
Picture 3: Coating damage 	Picture 4: East head / inlet deflector plate 

EQUIPMENT INTERNAL PICTURES: Page 6	Vessel Ser # (Tag #): 98120-001
Picture 5: Coating burned for catadyne heater 	Picture 6: 
Picture 7:	Picture 8:



EQUIPMENT DATA:	
MAKE:	BLACK SIVALLS & BRYSON (CANADA) LTD.
SER. NO.:	91-0L-10970
CRN NO.:	-
CNRL NO.:	C23407
ALTA. NO.:	-
MFG. DATE:	1998
MAWP:	15 PSI
't' SHELL:	-
't' HEAD:	-
SIZE:	36" ID x 10'-0"
CORR. ALLOW.:	-
XRAY/STRESS REL.:	-

ALTEC INSPECTION LTD.

	DRAWN:	13020 BEATTON PARK ROAD, BOX 283, CHARLIE LAKE, B.C. V0C 1H0 (250)785 6295
BY:	T.NINAN	
DATE:	DECEMBER 12th, 2023	

LOW PRESSURE FLARE KNOCKOUT

WEST BLUEBERRY COMPRESSOR STATION
12-29-88-25

COMPANY:	DRAWING NUMBER:
CANADIAN NATURAL RESOURSES	CNRL_WEST_BLUEBERRY_12-29_LPFK

ALTEC INSPECTION LTD.

ENGINEERING – OIL AND GAS COMMISSION SUBMISSIONS – U/T & MPI TESTING – CATHODIC PROTECTION – WELDING PROCEDURES

Client: Canadian Natural Resources Ltd.

Ultrasonic Inspection

District: FSJ North	Equipment Name: Low Pressure FKO	Serial No: 98120-001
Facility: West Blueberry	Provincial Reg #:	Operating Status: Out of Service
Location: 12-29-88-25 W6	Equipment No: C23407	Inspection Date: December 11th, 2023

Thickness Data

Band #'s	Size	Sch	Nom.	Mill Tol.	Dec 11, 2023		M_{low}	Piping Flag Criteria	T_{min} (calc.)	S_{tcr}	L_{tcr}	Remaining Life (Years)	% T_{min}
Low Pressure Flare Knockout													
Band #1	Bottom Shell	0.312	N/A		0.305		0.305	0.312	0.100	0.007	0.007	29.29	205.00
Band #2	Shell	0.312	N/A		0.304		0.304	0.312	0.100	0.008	0.008	25.50	204.00

Notes

M_{low}	Measured lowest thickness reading for given data
Piping Flag Criteria	Nominal thickness - mill tolerance - C.A.
T_{min} (Calc.)	ASME B31.3 minimum thickness calculation
S_{TCR}	Short term corrosion rate
L_{TCR}	Long term corrosion rate
% T_{min}	White background indicates above 25% of T_{min} (Calc.) Yellow background indicates at / or below 25% of T_{min} (Calc.)

Assumptions made for the analysis of obtained data:

1. The MAWP for the filter was considered as 170 psi.

Inspected By:	Signature	CGSB Cert. #	CGSB Level	Equipment Detail	Transducer Detail	Date
Justin Bolog		11938	UT 2	DMS GO	7.5 MHz FH2E	December 11th, 2023