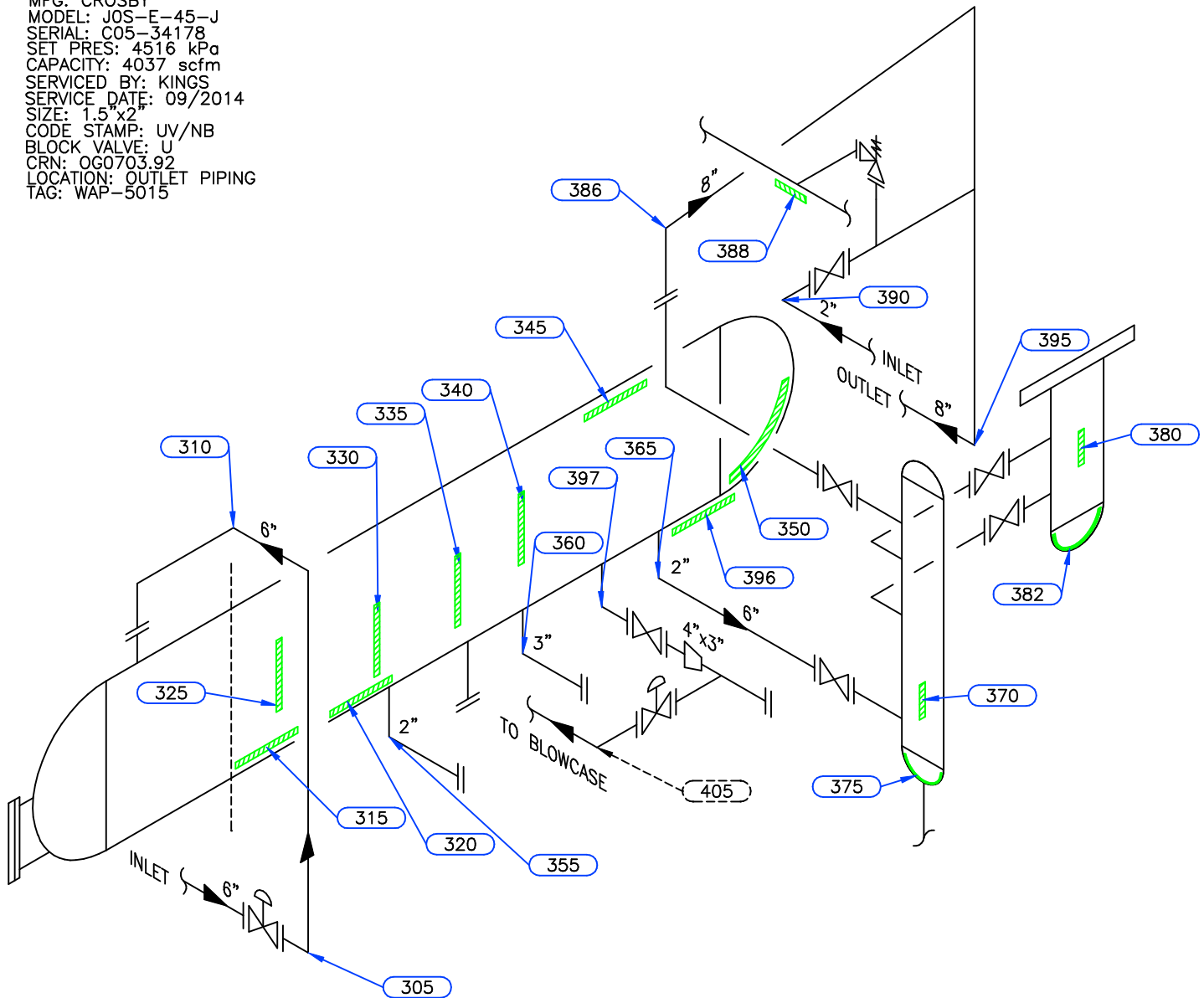


PSV DATA

MFG: CROSBY
 MODEL: J05-E-45-J
 SERIAL: C05-34178
 SET PRES: 4516 kPa
 CAPACITY: 4037 scfm
 SERVICED BY: KINGS
 SERVICE DATE: 09/2014
 SIZE: 1.5"x2"
 CODE STAMP: UV/NB
 BLOCK VALVE: U
 CRN: OG0703.92
 LOCATION: OUTLET PIPING
 TAG: WAP-5015



Equip. No. _____ Prov. Reg. No. Ⓐ 554565 C.R.N. T-3913.2 Serial No. 3783-1 Yr. Inst. _____
 Code/Div. ASME VIII DIV 1 Size: 48in x 240in Manufacturer: MOSS FABRICATION LTD Yr. Bld. 2006
 C. Stamp: U Service: SWEET PWHT: HT Radiography: RT-1 Insulated: 10%

Design & Materials Data

HEAD:
 Top Mat'l. SA 516 70N Top Nom. 54.6mm Top C.A. 1.6mm
 Btm. Mat'l. _____ Btm. Nom. _____ Btm. C.A. _____

CHANNEL:
 Material: _____ Nominal: _____ C.A. _____

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

SHELL
 Material: SA 516 70N Nominal: 57.2mm C.A. 1.6mm

MAWP Shell Side: 9928 kPa @ Temp. 54°C
 MAWP Tube Side: _____ @ Temp. _____

CLIENT	CANADIAN NATURAL RESOURCES	
FACILITY	SOUTH WAPITI COMPRESSOR LSD 10-01-68-09 W6M	
ITEM	INLET SEPARATOR	
BY: CEB/KR	DATE: 12/2014	DWG.# 3

UTS DATA

CLIENT: CANADIAN NATURAL RESOURCES
EQUIPMENT: INLET SEPARATOR
CRN#: T-3913.2
PROV REG: A 554565
TESTED ON STREAM

FACILITY: SOUTH WAPITI COMPRESSOR 10-01
SERVICE: SWEET
LOCATION: 10-01-68-09 W6M
RTD JOB #: 4019229
REFER TO DRAWING: 3

Test Point	THICKNESS DATA				Flag	T-Min	C.A.	Nom.	Short Term	Long Term	Ave. mm/py	Retirement Date
315												
Description:	BOTTOM SHELL											
	2014	12	2020	7								
Min. Thick.	58.1		58.1		55.60		1.6	57.20	0		0	
Average:	58.2		58.2						0		0	
Analysis:												
320												
Description:	BOTTOM SHELL											
	2014	12	2020	7								
Min. Thick.	58.2		58.2		55.60		1.6	57.20	0		0	
Average:	58.4		58.4						0		0	
Analysis:												
325												
Description:	LOWER SHELL											
	2014	12	2020	7								
Min. Thick.	58.3		58.3		55.60		1.6	57.20	0		0	
Average:	58.4		58.4						0		0	
Analysis:												
330												
Description:	MID SHELL											
	2014	12	2020	7								
Min. Thick.	58.3		58.3		55.60		1.6	57.20	0		0	
Average:	58.4		58.4						0		0	
Analysis:												
335												
Description:	MID SHELL											
	2014	12	2020	7								
Min. Thick.	58.3		58.3		55.60		1.6	57.20	0		0	
Average:	58.4		58.4						0		0	
Analysis:												
340												
Description:	UPPER SHELL											
	2014	12	2020	7								
Min. Thick.	58.4		58.4		55.60		1.6	57.20	0		0	
Average:	58.5		58.5						0		0	
Analysis:												

UTS DATA

CLIENT: CANADIAN NATURAL RESOURCES
EQUIPMENT: INLET SEPARATOR
CRN#: T-3913.2
PROV REG: A 554565
TESTED ON STREAM

FACILITY: SOUTH WAPITI COMPRESSOR 10-01
SERVICE: SWEET
LOCATION: 10-01-68-09 W6M
RTD JOB #: 4019229
REFER TO DRAWING: 3

Test Point	THICKNESS DATA				Flag	T-Min	C.A.	Nom.	Short Term	Long Term	Ave. mm/py	Retirement Date			
345															
Description:	TOP SHELL														
	2014	12	2020	7											
Min. Thick.	58.4		58.4		55.60		1.6	57.20	0	0					
Average:	58.5		58.5									0	0		
Analysis:															
350															
Description:	BOTTOM HEAD														
	2014	12	2020	7											
Min. Thick.	57		57		53.00		1.6	54.60	0	0					
Average:	57.5		57.5									0	0		
Analysis:															
355															
Description:	2" 90° NOZZLE														
	2014	12	2020	7											
Min. Thick.	5.3		3.5		7.10	2.5	1.6	8.70	.32	.32					
Average:	7.3		7									.05	.05	2021	
Analysis:	2020/07 ISOLATED PIT AT D.S.W. THICKNESS CALCULATIONS CARRIED OUT TO 2.1mm. API 510 REFERENCES 2.5mm AS MINIMUM THICKNESS REQUIRED FOR PRESSURE VESSELS AND PIPING.														
360															
Description:	3" 90° NOZZLE														
	2014	12	2020	7											
Min. Thick.	10.8		9.4		13.60	3.1	1.6	15.20	.25	.25					
Average:	12.8		11.8									.18	.18	2050	
Analysis:	2020/07 LARGE PIT AT D.S.W.														
365															
Description:	2" 90° NOZZLE														
	2014	12	2020	7											
Min. Thick.	8.1		7.9		7.60	2.5	1.1	8.70	.04	.04					
Average:	8.2		8.1									.02	.02	2182	
Analysis:	2020/07 THICKNESS CALCULATIONS CARRIED OUT TO 2.1mm. API 510 REFERENCES 2.5mm AS MINIMUM THICKNESS REQUIRED FOR PRESSURE VESSELS AND PIPING.														
370															
Description:	BRIDAL MID SHELL														
	2014	12	2020	7											
Min. Thick.	8.5		8.5		0.00					0	0				
Average:	8.6		8.6									0	0		
Analysis:															

UTS DATA

CLIENT: CANADIAN NATURAL RESOURCES
EQUIPMENT: INLET SEPARATOR
CRN#: T-3913.2
PROV REG: A 554565
TESTED ON STREAM

FACILITY: SOUTH WAPITI COMPRESSOR 10-01
SERVICE: SWEET
LOCATION: 10-01-68-09 W6M
RTD JOB #: 4019229
REFER TO DRAWING: 3

Test Point	THICKNESS DATA				Flag	T-Min	C.A.	Nom.	Short Term	Long Term	Ave. mm/py	Retirement Date
380	Description: CONTROLLER MID SHELL											
	2014	12	2020	7								
Min. Thick.	8.4		8.4		0.00				0	0		
Average:	8.5		8.5						0	0		
Analysis:												
382	Description: CONTROLLER HEAD											
	2014	12	2020	7								
Min. Thick.	8.1		7.8		0.00				.05	.05		
Average:	8.6		8.1						.09	.09		
Analysis:												
396	Description: BOTTOM SHELL											
	2020	7										
Min. Thick.	58.4				55.60	1.6	57.20					
Average:	58.6								0	0		
Analysis:												
397	Description: 4" 90° NOZZLE											
	2020	7										
Min. Thick.	15.3				13.60	1.6	15.20					
Average:	15.5								0	0		
Analysis:												

UTS DATA

CLIENT: CANADIAN NATURAL RESOURCES
EQUIPMENT: INLET SEPARATOR PIPING
CRN#:
PROV REG:
TESTED ON STREAM

FACILITY: SOUTH WAPITI COMPRESSOR 10-01
SERVICE: SWEET
LOCATION: 10-01-68-09 W6M
RTD JOB #: 4019229
REFER TO DRAWING: 3

Test Point	THICKNESS DATA				Flag	T-Min	C.A.	Nom.	Short Term	Long Term	Ave. mm/py	Retirement Date
305												
Description:	6" 90° ELBOW											
	2014	12	2020	7								
Min. Thick.	12.1		12.1		9.63		1.4	11.00	0		0	
Average:	12.4		12.4						0		0	
Analysis:												
310												
Description:	6" 90° ELBOW											
	2014	12	2020	7								
Min. Thick.	12.7		12.7		9.63		1.4	11.00	0		0	
Average:	13		13						0		0	
Analysis:												
365												
Description:	2" 90° ELBOW											
	2014	12	2020	7								
Min. Thick.	8.1		7.9		7.61	2.5	1.1	8.70	.04		.04	
Average:	82		8.1						13.24		13.24	
Analysis:	2020/07 THICKNESS CALCULATIONS CARRIED OUT TO 2.1mm. API 510 REFERENCES 2.5mm AS MINIMUM THICKNESS REQUIRED FOR PRESSURE VESSELS AND PIPING. RETIREMENT DATE 2182.											
386												
Description:	8" 90° ELBOW											
	2014	12	2020	7								
Min. Thick.	12.1		12.1		11.11		1.6	12.70	0		0	
Average:	12.4		12.4						0		0	
Analysis:												
388												
Description:	8"x2" TEE											
	2014	12	2020	7								
Min. Thick.	8		8		7.17		1	8.20	0		0	
Average:	8.2		8.2						0		0	
Analysis:												
390												
Description:	2" 90° ELBOW											
	2014	12	2020	7								
Min. Thick.	5.5		5.5		4.81		.7	5.50	0		0	
Average:	5.6		5.6						0		0	
Analysis:												

UTS DATA

CLIENT: CANADIAN NATURAL RESOURCES
EQUIPMENT: INLET SEPARATOR PIPING
CRN#:
PROV REG:
TESTED ON STREAM

FACILITY: SOUTH WAPITI COMPRESSOR 10-01
SERVICE: SWEET
LOCATION: 10-01-68-09 W6M
RTD JOB #: 4019229
REFER TO DRAWING: 3

Test Point	THICKNESS DATA			Flag	T-Min	C.A.	Nom.	Short Term	Long Term	Ave. mm/py	Retirement Date
395	Description: 8" 90° ELBOW										
	2014	12	2020	7							
Min. Thick.	13		13		7.17	1	8.20	0		0	
Average:	13.4		13.4					0		0	
Analysis:											

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

Job 4019229

District: Grande Prairie, AB	Skid No.
Facility: South Wapiti Compressor Station	Location (LSD): 10-01-68-09 W6M
Vessel Name Equipment Number: Inlet Separator	
Orientation: Horizontal	
Status: In Service	Regulatory Inspection

PRESSURE VESSEL NAMEPLATE DATA

"A" or "G" or "S" (Sask.) or BC Registration Number. A0554565		CRN Number: T 3913.2	
Vessel serial number: 3783-1		Size: 48 in x 120 in	
Shell thickness: 57.2 mm		Shell material: SA 516 70N	
Head thickness: 54.6 mm		Head material: SA 516 70N	
Tube wall thickness:		Tube material:	
Tube diameter:		Tube length:	
Channel thickness:		Channel material:	
Design pressure	Shell: 9928 kPa	Operating pressure	Shell:
	Tubes:		Tubes:
Design Temp.	Shell: 54°C	Operating temperature	Shell:
	Tubes:		Tubes:
X-ray: RT-1		Heat treatment: HT	
Code parameters: ASME Section VIII Div 1		Coated: No	
Manufacturer: Moss Fabrication Ltd.		Year built: 2006	
Corrosion allowance: 1.6 mm		Manway: Yes	

PRESSURE SAFETY VALVE NAMEPLATE DATA

PSV Tag #	Manufacture / Model / Serial	Set Pressure (PSI / kPa)	Capacity (scfm)	Size	Block Valve	Location	Service by / Date
WAP 5015	Crosby / JOS-E-45-J /C05-34178	4516 kPa	4037 scfm	1.5 x 2	No	Outlet piping	Kings / 09/2014

SERVICE CONDITIONS-INDICATE ALL THAT APPLY

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

Inspection Interval _____ **PSV Service Interval** _____
(Determined by MIC in conjunction with Chief Inspector following guidelines of Canadian Natural Resources Limited's Owner-User Inspection Program)

Reports reviewed and accepted by:
Mechanical Integrity Coordinator _____ **Date** _____

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				Vessel is 10% insulated - no open or torn section – no exposed metal. No evidence of wet insulation – no stains on cladding.
External Condition Assess paint condition, areas peeling, record any corrosion, damage, etc (record location, size and depth of corrosion or damage)	X				Paint is in good overall condition – no exposed metal.
Leakage Record any leakage at flanges, threaded joints, weep holes on repads, etc.	X				No leaks observed.
Saddle/skirt Assess condition of paint, fire protection, and 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				Saddles: No distortion. No corrosion at saddle to shell area – no leaks. Skid Package is grounded.
Anchor Bolts Hammer tap to ensure secure. Look for cracking in treads or signs of deformation.	X				All bolts in place and secure.
Concrete foundation Check for cracks, spalling, etc.				X	
Ladder / Platform Describe general condition, ensure support is secure to vessel, and describe any hazards.				X	No ladder on this vessel
Nozzle Assess paint, look for leakage, and ensure stud threads are fully engaged. Record any damage, deflection, etc. Are nozzles gusseted?	X				Threaded and flanged connections fully engaged. No deflection – no leaks. No gussets.
Gauges Ensure gauges are visible, working, no leakage, and suitable for range of MAWP/ Temp.	X				Temperature gauge: -40 to 120°F Pressure gauge: 0 to 1500 PSI
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			Piping is well supported; no deflection, all clamps and supports are in place. Paint is in fair condition – minor surface corrosion to outlet piping-no pitting.
Valving Ensure no leaks are visible. Valves are properly supported and chained if necessary.	X				Well supported – no leaks.
PSV Ensure PSV is set at pressure at or below that of vessel.	X				Located on outlet piping – set below MAWP of vessel. Discharge piping is same size as valve outlet. PSV seal in place. No block valve between vessel and PSV inlet.

<p>NDE methods Was UT/ MPI done on vessel (MI coordinator to review results)</p>	X			<p>Ultrasonic corrosion survey carried out – pipe metal thickness detected below nominal minus corrosion allowance. Thickness calculations carried out: UT point 365 (2” elbow) – nominal thickness is 8.7mm / min thickness is 7.9mm / T min thickness is 2.5mm. 2” nozzle – nominal thickness is 8.7mm / min thickness is 3.5mm / T min thickness is 2.5mm. 3” nozzle – nominal thickness is 15.2mm / min thickness is 9.4mm / T min thickness is 3.1mm.</p>
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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: 1. Plan for nozzle replacements on this vessel in the future.

Summary: This vessel is in good condition, visual external and ultrasonic thickness inspection carried out –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 (nozzle) 0.300mm per year. Retirement Date to “T”min is year 2023.

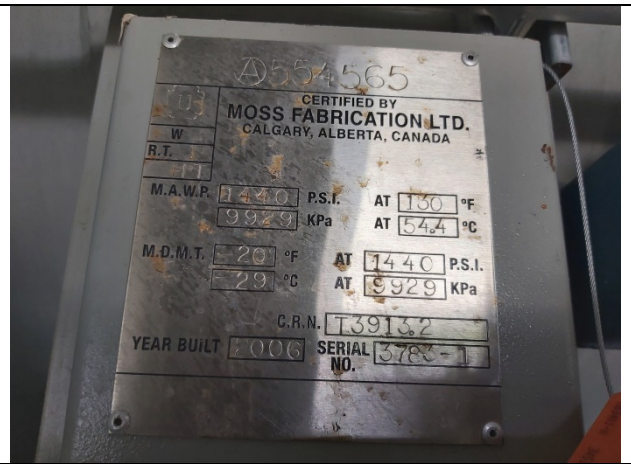
Vessel is Fit for Service

Inspected By: Dellas Wiedman *D. Wiedman*
API 20981 / IBPV 275
Assistant: Garrett Tatton

Date: July 16, 2020



LSD



Data plate



Overview



Overview



Wall to shell sealed



Wall to shell sealed



Saddle



Anchor bolts



South head



Bottom shell



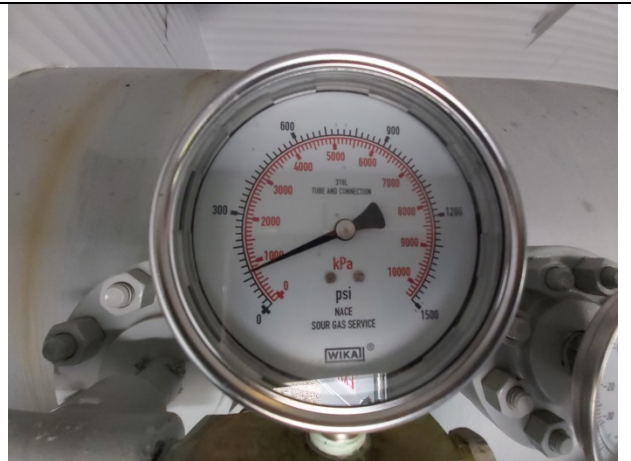
Outlet piping – surface corrosion – no pitting



Ground cable attached



Liquid level



Pressure gauge – 0-1500 PSI



Temperature gauge -40 to 120°F



PSV location



PSV service tag



3 in xxs – 9.4/11.8mm isolated pit at DS weld



2 in 160 – 3.5/7.0mm isolated pit at DS weld