LOCATION	IDENTIFICATION			VESSEL DESCRIPTION						SERVICE DATA			INSPECTION DATES			INSPECTION REVIEW										POST REVIEW	
LSD	JUR#	SERIAL#	CRN	EQUIPMENT DESCRIPTION	EQUIPMENT TYPE	MANWAY (INTERNAL ACCESS)	YEAR BUILT	MANUFACTURER	STATUS	SHELL MAWP (kPa)	TUBE MAWP (kPa)	SWEET/SOUR	LAST REGULATORY INSP	LAST PSV SERVICE	CURRENT INSP. INTERVAL (MONTHS)	INSP. METHODS	LAST INSP. SERVICE PROVIDER	MAINTENANCE NOTES/COMMENTS	LAST INSP. COMMENTS	CORROSION RATE (mm/yr)	REMAINING LIFE (Years)	WORST CORRISION LOCATION (Head, Shell, Piping)	FFS ? (YES/NO)	REQUIRED ACTIONS FOR INTERVAL EXTENTION	RISK RANKING (HIGH, MEDIUM, LOW)	CNRL REVIEW COMPLETE	NEW INSP. INTERVAL (MONTHS)	NEXT REGULATORY INSP.
04-01-013-13W4	161444	LM-1671	C-8805.2	Free Water Knockout	Separator	Yes	1980	CE Natco	In Service	75		Sour	5/9/2019	5/1/2016	36	VE/UT/VI	Vitus		Overall good condition. 4 Anodes in the vessel, middle two anodes were 40% consumed. Associated piping showing some signs of corrosion, general thinning. Good life still remaining.	0.007	32.5	Piping	Yes		Low	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	227925	L-6-348	D-781.2134	Test Treater	Treater	Yes	1987	CE Natco	In Service	50		Sour	5/9/2019	5/1/2016	36	VE/UT/VI	Vitus		Overall good condition of the vertical test treater. Bottom head has multiple coating repairs. MPI on tube showed no cracks on Mitred End Tube. Associated piping with a low corrosion rate. TML 40 Small piping inspection completed as well with a iso drawing.	0.007	23.9	Piping	Yes		Low	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	227943	L-8-1237-C	A-6344.2	Water Syphon	Vessel	No	1987	CE Natco	In Service	75		Sour	2/18/2019	5/1/2016	36	VE/UT	Vitus		Good condition. UT done on the vertical leg of the water dump for the vertical treater.	0.005	41	Shell	Yes		Low	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	227978	LM-2262	B1175.2	Gas Boot	Vessel	Yes	1987	CE Natco	In Service	50		Sour	2/18/2019	5/1/2016	36	VE/VI/UT	Vitus		Godd condition inside. Coating appears to be in good shape. Associated piping is below the Corrosion Allowance. TML 125 Nom 0.216 ACT 0.145	0.004	40.6	Piping	Yes		Low	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	242007	L-6-370	F-7404.2	Group Treater	Treater	Yes	1987	CE Natco	In Service	75		Sour	5/9/2019	5/1/2016	36	VE/VI/UT	Vitus		Small blistering of the coating. MPI performed on the firetube. Coating repairs done at TA. Anodes only 5% consumed. Good UT inspection, TML 90 Associated piping Nom 0.216 Act 0.166	0.007	23	Piping	Yes		Low	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	564347	C260793B-2	T7975.2135	Oil Separator	Separator	No	2007	Henry Technologies	In Service	350		Sour	2/19/2019	5/1/2016	36	VE/UT	Vitus		Good conditon. Very low corrosion rate. Need to access U1A, but the found thicknesses are the same as in 2016. Associated piping showing general thinning however its very low.	0.001	109	Piping	Yes		Low	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	564348	C260793A-2	T7964.2135	Inlet Separator	Separator	No	2007	Henry Technologies	In Service	285		Sour	2/19/2019	5/1/2016	36	VE/UT	Vitus		Good condition, UT done no major corrosion evident.	0.004	70	Shell	Yes		Low	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	C21004	LGSB4218	D-775.213	Fuel Gas Scrubber	Separator	No	1987	CE Natco	In Service	150		Sour	2/18/2019	N/A	36	VE/UT	Vitus	No PSV presesnt. Fuel Scrubber may be protected elsehwere in the system. Need to check for carseal program.	Good condition, UT done no major corrosion evident.	0.004	35	Shell	Yes		Low	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	C21005	S4835375	F 516.1234	Air Receiver	Air Receiver	No	1987	Manchester	In Service	200		Sweet	2/19/2019	6/1/2016	36	VE/UT	Vitus	Reset PSV to 150psi. Replacement necessary within 5 years.	Low corrosion rate. Corrosino found on bottom head. Current state is above Tmin @ 200psi. Rerate the PSV to 150psi. Given current corrosion rate, this vessel will hit Tmin in 1 year or less. Resetting the PSV to 150 psi will give us a window of time to replace this vessel within 5 years. Lowering the PSV gives us a safe thickness of 0.085" bottom head. See attached worksheet for calculations	0.005	0.8	Head	Yes		Medium	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	C21006	31563		VRU Scrubber	Separator	No		Continental EMSCO	In Service	14.9		Sour	2/19/2019		36	VE/UT	Vitus		VRU Scrubber, low pressure non code 14.9psi vessel. Severe corrosion throughout the bottom head of vessel. Nominal unknown. Low reading in 2016 is 0.252" Current reading is 0.160" RL 5 years.	0.030	4.9	Head	Yes		Medium	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	C18332	80248	Non-code	Flare Knockout	Vessel	Yes	2006	Tornado Technologies	In Service	14.9		Sour	2/19/2019		36	VE/UT	Vitus		Internal inspection was completed. Overall good condition. Some general corrosion and general thinning. Corr rate is minor. Some associated piping is getting near the Tmin, but it will be fine till the enxt inspection cycle.	0.012	13	Piping	Yes		Low	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	CN6041	LGS-4210	D-775.213	Fuel Gas Scrubber	Separator	No	1987	CE Natco	In Service	150		Sour	2/18/2019		36	VE/UT	Vitus	No PSV presesnt. Fuel Scrubber may be protected elsehwere in the system. Need to check for carseal program.	Good overall condition. Low corrosion rate.	0.001	198	Shell	Yes		Low	Matthew Morvik API 510 #90255	36	2022
04-01-013-13W4	NB10S9438	N/S	E7399.2C	Air Receiver	Air Receiver	No	2009	Manchester	In Service	200		Sweet	2/18/2019	5/31/2016	36	VE/Ut	Vitus	Mention to Ops the importance of draining the tanks daily.	Bottom head showing signs of corrosion, likely water pooling there and staring to corrode.	0.002	8.3	B Head	Yes		Low	Matthew Morvik API 510 #90255	36	2022

FFS Box Guidance:
Is the vessel fit for service for the next inspection cycle. The assessor must evaluate all of the inspection reports, the repairs, history and all relevant information to determine whether the vessle is safe to operate. The assessor cannot base the fit for service evaluation on the inspectors evaluation. This must be based on the

Required Action Box Guidance:
These are the outstanding issues identified by the assessor that will need to be corrected before the vessel interval can be extended to the next inspection grade. The assessor cannot consider the NCRs or maintenance items not associated with the vessel when making this determination. If the PSV is overdue it does not affect the condition of the vessel. The assessor must critically analyse the factors for te

Risk Ranking Box Guidance:
High risk must have follow up immediately. These would be vessels with issues that could see an immediate failure of the vessel. Mediumm risk are issues that could develop into failures within the inspection cycle.
Low risk vessels are not likely to cause failures in the inspection cycle given the the operational conditions.

C21005

P= Semi Elliptical head

P= 200 S= 17,500 (SA 83)

t_{act} = 0.117 E=1 Seamless head

t_{act} / 2014 Finding

$$P = \frac{2SEt}{D+0.2t} = \frac{2(17{,}500)(1)(0.117)}{19.736+0.2(0.117)} = \frac{4095}{19.7594} = 207 \text{ psi}$$

$$t_{min} = \frac{PD}{2SE-0.2P} = \frac{200(19.736)}{2(17{,}500)(1)-0.2(200)} = 0.113'' \; t_{min} \; @ \; 1=E$$

$$= 0.133 \; t_{min} \; @ \; E \rightarrow 0.85$$

Assumed E=1

$$RL = \frac{t_{actual} - t_{min}}{\text{Corr rate}} = \frac{0.117 - 0.113}{0.0048/yr} = 0.833 \text{ yr till } t_{min}$$

t_{min} @ 150psi = 0.085"

→ Drop PSV to 150psi

$$RL = \frac{t_{act} - t_{min}}{\text{Corr rate}} = \frac{0.117 - 0.085}{0.0048/yr} = 6.667 \text{ yr}$$

→ Consider replacement in 5 years

Canadian Natural

☐ AS BUILT ☐ PRECONSTRUCTION AS BUILT ☐ ISSUED FOR CONSTRUCTION

FIELD:

LOCATION:

DRAWN BY:

DATE: SHEET ____ OF ____

ITEM #	QTY	DESCRIPTION	MATERIAL


11/07/19