



Head Office: 4810 - 93 Street NW, Edmonton, Alberta, Canada T6E 5M4
Tel: 780-469-2401 Fax: 780-468-2422 www.raeengineering.ca

Report No: EE000089

Client	Petronas Energy Canada Ltd.	Inspection Date	Jul 12, 2024
Prov. Reg. #	AB 0627641 BPV-010571	Inspection Type	VE / PSV / UT
Equipment Type	Vertical Separator	Location	Jedney
Tag/Equip.		LSD	BC C-026-B/094-G-08
Status	Not in Service	Downhole LSD	
Manufacturer	Platinum Energy Services Corp	Area	Jedney
Serial Number	21206	Year Built	2013
CRN #	R3788.213	Service	Sour
Comp/Unit Id	Separator Building	Manway	None
Nat.Board #		Coating	No
Interim Insp'n		Interim Type	
Next Thorough Insp		Next Insp Type	VE / PSV / UT
Length		Height	
Volume	22 ft ³	Client Reference	1003614
Owner	Petronas Energy Canada Ltd.	RT	2 HT NO
Foreman	NBU	RAE Job No.	PR0003305
ABSA	Plant: H Vessel: K Process: W Special: B	ASME	Sec. VIII div. 1
History Log	AB-10 - internal entry - LSD changed - entered August 27, 2014. AB-10 – internal entry – Vessel out of province - entered September 5, 2014. MDR - U1A Manufacturer's Data Report attached Sept 9, 2016 Inspection Report Complete - Inspection Date: 2024-July-12 Inspection Type: VE/PSV/UT		

Component	Shell		
MAWP	1440.0 PSI @ 100 °F	MDMT	-20 °F @ 1440.0 PSI
Material	SA-516-70N	Material Thickness	1 in
Diameter	22 in	Length	90 in
Corrosion Allowance	0.125 in		



Valve Tag No	025494-19	Relief Type	Pressure Safety Valve
Manufacturer	Taylor Valve	Set Pressure	1400 PSI
Serial Number	025494-19	Capacity	10871 SCFM
Model	82G12651311	Last Service	May 1, 2013
CRN	0G01316.2C	Next Service	9999
Service Co.		Service Interval	48 Months
Service Co. Tag		Inlet Size	2 in
ASME Stamp	UV	Outlet Size	2 in
NB Stamp	YES	Connection	Threaded
Relief Dest.	To Atmosphere	Valve Loc.	On Piping
Comments		Client Reference	1010605

Component	Top and Bottom Heads 2:1 Concave		
Material	SA-516-70N	Material Thickness	0.938 in
Corrosion Allowance	0.125 in		



Comments

The following RAE Procedure(s) was/were used in inspecting this vessel:

INS-645B PRV Inspection Procedure

INS-670B Separator Inspection Procedure

NDE-701B UT-1 Ultrasonic Thickness Measurement Procedure

NDE Technical Manual

Figure: 1



LSD



Building Observations

Number of Access Doors:1 Building Supported by: Skid
Gas test port: Yes Gas Detection: Yes
Fire eye: No Catalytic Heater: Yes
Lighting: Good Floors : Checker plate steel
Drainage/Condition: Acceptable
Equipment placed ergonomically: Yes

The building was secured to a portable skid unit.
The building was generally in good condition and well supported.
The building had adequate lighting for visual inspection.
The doors and windows functioned well and were in good condition.
The building structure was level.
The ground wire was securely attached to the building structure.

Figure: 2



Building

Figure: 3



Not in Service-Identified



Piping Observations

General condition: Acceptable

Mechanical connections acceptable for service?: Acceptable

Clad: No Painted: Yes Insulated: No

Are there any dead legs: No

Support type: U-Bolt

Supported adequately: Yes

The inlet and outlet piping as well as the piping associated with the vessel were in place, properly bolted, and supported.

All piping was coated and in good condition.

There was no evidence of pipe strain due to poor fit up.

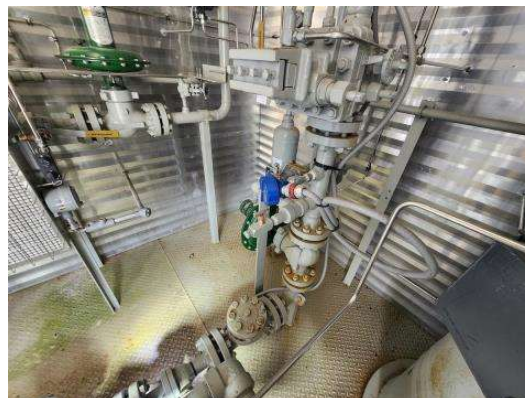
There were no concerns with the piping.

Figure: 4



Inlet Piping

Figure: 5



Outlet Piping 1

Figure: 6



Outlet Piping 2

Figure: 7



Outlet Drain 1



Figure: 8



Outlet Drain 2

PSV Observations

Drainage : Acceptable Supports : Acceptable
Bolting : Acceptable Seal wire : Acceptable
Gasket : Acceptable Service tag : Acceptable
CRN : Acceptable Set pressure : Acceptable
Installation vertical : Yes Required Capacity : Verified acceptable
PSV block valves : No
PSV service report available : No

The nameplate was securely attached and legible.
The vent size was adequate and vent lines were positioned safely.
The outlet piping provided positive drainage for the PSV.

Figure: 9



PSV Nameplate

Figure: 10



PSV Overview



External Observations

Installation : In Building
Grounded : Yes
Drains : Manual
Attachments : Yes
CUI checked : N/A
Vessel Orientation : Vertical
Manway : No
Certificate of inspection permit : No
Nameplate attached and legible : Yes

Support Structure : Support skid
Securement Type : N/A
Securement Condition : Acceptable
Ladders/Platforms : N/A
External Covering : Coated

The vessel was identified per A-number and serial number stamped on the nameplate of the vessel.
The heads, shell, nozzles and bolting appeared to be in good condition.
There was no damage or distortion evident on the vessel surface.
There was no stress evident on piping or nozzle connections.
The gauges were in good condition.

Figure: 11



Nameplate

Figure: 12



Vessel Overview 1

Figure: 13



Vessel Overview 2

Figure: 14



Vessel Support



Figure: 15



Vessel Pressure Gauge

Figure: 16



Vessel Level Gauge

UT1 Observations

See attached appendices for ultrasonic testing (UT) report.

At the time of inspection CML's 02 & 20 on the piping noted to be below minimum thickness as per 12.5% mill tolerance. These areas should be monitored.

Recommendations

1. The PSV needs to be serviced before putting back to service and service report needs to be sent to RAE Engineering and Inspection Ltd. for data entry.
2. CML's 02 & 20 on the piping noted to be below minimum thickness as per 12.5% mill tolerance. These areas should be monitored.
3. When vessel is returned to service an installation must be completed.

Based on the scope and results of this inspection the vessel appears suitable for continued service.



RAE Engineering and Inspection Ltd.

Field Inspection Report

Head Office: 4810 - 93 Street NW, Edmonton, Alberta, Canada T6E 5M4
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Report No: EE000089

Inspector : Efe Erhigbare

Marnes du Plessis

Alberta IBPV #A-74773
TSASK Pressure Equipment Class I #250
CWB Level II #8117

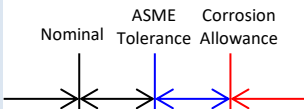
Reviewed By: Marnes du Plessis

 RAE Engineering and Inspection Ltd 4810 - 93 Street Edmonton, AB, T6E 5M4 ph: 780-469-2401 fx: 780-468-2422				Inspection Date: 12-Jul-24 Report Date: 13-Jul-24 Page: 1 of 8		Ultrasonic Thickness Examination							
Client:		Petronas Energy Canada Ltd.		Report Number:		24-PR0003305-EE-UT-01							
Facility:		6954 Airport Rd, RR 1, Site 10, Comp 30, Fort		Location/LSD:		HZ Jedney / c-26-B /94-G-8							
Equipment Number:		A0627641		Client Representative:		NA							
Equipment Description:		Vertical Separator and Piping		Client Contact:		NA							
JOB DESCRIPTION													
Procedure:		NDE Technical Manual Rev. 2 (NDE-701B)		Surface		<input type="checkbox"/> Coated <input type="checkbox"/> Bare Steel <input checked="" type="checkbox"/> Painted							
Acceptance Code:		ASME Sec. VIII Div. 1 / ASME B31.3		Condition:		<input type="checkbox"/> Ground <input type="checkbox"/> Blasted <input type="checkbox"/> Buffed							
Material:		Carbon Steel		Surface Temp:		<input type="checkbox"/> < 0 °C <input checked="" type="checkbox"/> 0 - 120 °C <input type="checkbox"/> 120 - 260 °C <input type="checkbox"/> > 260 °C							
EQUIPMENT, TECHNIQUE & CALIBRATION													
Instrument 1 Mfr:		Waygate		Model:		DSMGO+		S/N: GOPLS21120043		Cal. Due: 15-Dec-24			
Instrument 2 Mfr:				Model:				S/N:		Cal. Due:			
Cal Block 1 S/N:		09-1475		1 or 2 Point Cal:		<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2		Calibrated Range:		0.250"-1.000"			
Cal Block 2 S/N:		15-1096		1 or 2 Point Cal:		<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2		Calibrated Range:		1.000"-4.000"			
	Probe Model	Freq MHz	Angle	Dia. (in)	Probe Type		Manufacturer	Serial #	Cable Length	Vel. (m/sec)	Ref dB	Scan dB+BU17:CJ5	Range (in)
					Single	Dual							
1	FH2E	5.0	0°	0.25	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Stresstel	22F01YMK	4'	5850	62	As Needed	5
2					<input type="checkbox"/>	<input type="checkbox"/>							

Scope: Conduct 0° straight beam ultrasonic testing on **Vertical Separator & Piping** assessing the *components* for any signs of wall thinning due to corrosion, erosion, laminations, or inclusions.

Results: The measurements obtained from the inspection locations show the thickness of all the components inspected to be at or around nominal with the exceptions of **CML 02 & 20** showed signs of wall thinning, and the thicknesses were found to be below the 12.5% mill tolerance as per ASTM specifications indicating corrosion/erosion has occurred in these areas. (Refer to flag summary page)

Please see the following pages for the pictures of the nameplate and the overall view, the isometric drawings, and the thickness measurements.



- 1) Black – Within ASME Tolerance
- 2) Blue – ≤ Nominal minus ASME Tolerance
- 3) Red – ≤ Nominal minus ASME Tolerance minus CA or ≤ Nominal minus ASME Tolerance (if CA = N/S)
- 4) Orange – Nominal Not Specified (N/S)

1 ST Technician	Efe Erhigbare		CGSB#:	27134	CGSB Level:	1
	PRINT	SIGNATURE	SNT#:	710B-059	SNT Level:	1
2 ND Technician			CGSB#:		CGSB Level:	
	PRINT	SIGNATURE	SNT#:		SNT Level:	



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Ultrasonic Thickness Examination


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Equipment Number:	A0627641	Client Representative:	NA
Equipment Description:	Vertical Separator and Piping	Client Contact:	NA

FLAGGED CMLs

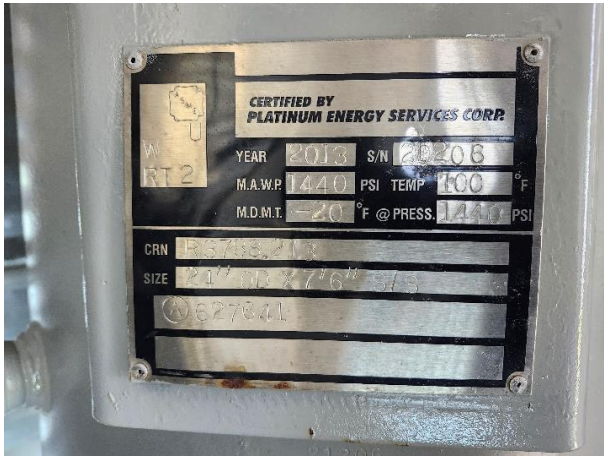
CML #	CML Description	Nom. [in]	Mil. [in]	CA [in]	Ave. [in]	Min. [in]
02	2 XH 90° Elbow	0.218	0.027	N/S	0.188	0.183
20	2 XH 90° Elbow	0.218	0.027	N/S	0.179	0.172



- 1) Black – Within ASME Tolerance
- 2) Blue – \leq Nominal *minus* ASME Tolerance
- 3) Red – \leq Nominal *minus* ASME Tolerance *minus* CA or \leq Nominal *minus* ASME Tolerance (if CA = N/S)
- 4) Orange – Nominal Not Specified (N/S)

 <div>RAE Engineering and Inspection Ltd 4810 - 93 Street Edmonton, AB, T6E 5M4 ph: 780-469-2401 fx: 780-468-2422</div>		Inspection Date:	12-Jul-24	Ultrasonic Thickness Examination
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		Page:	3 of 8	
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PHOTOGRAPHS



Building & View of Nameplates



Overall View of Equipment



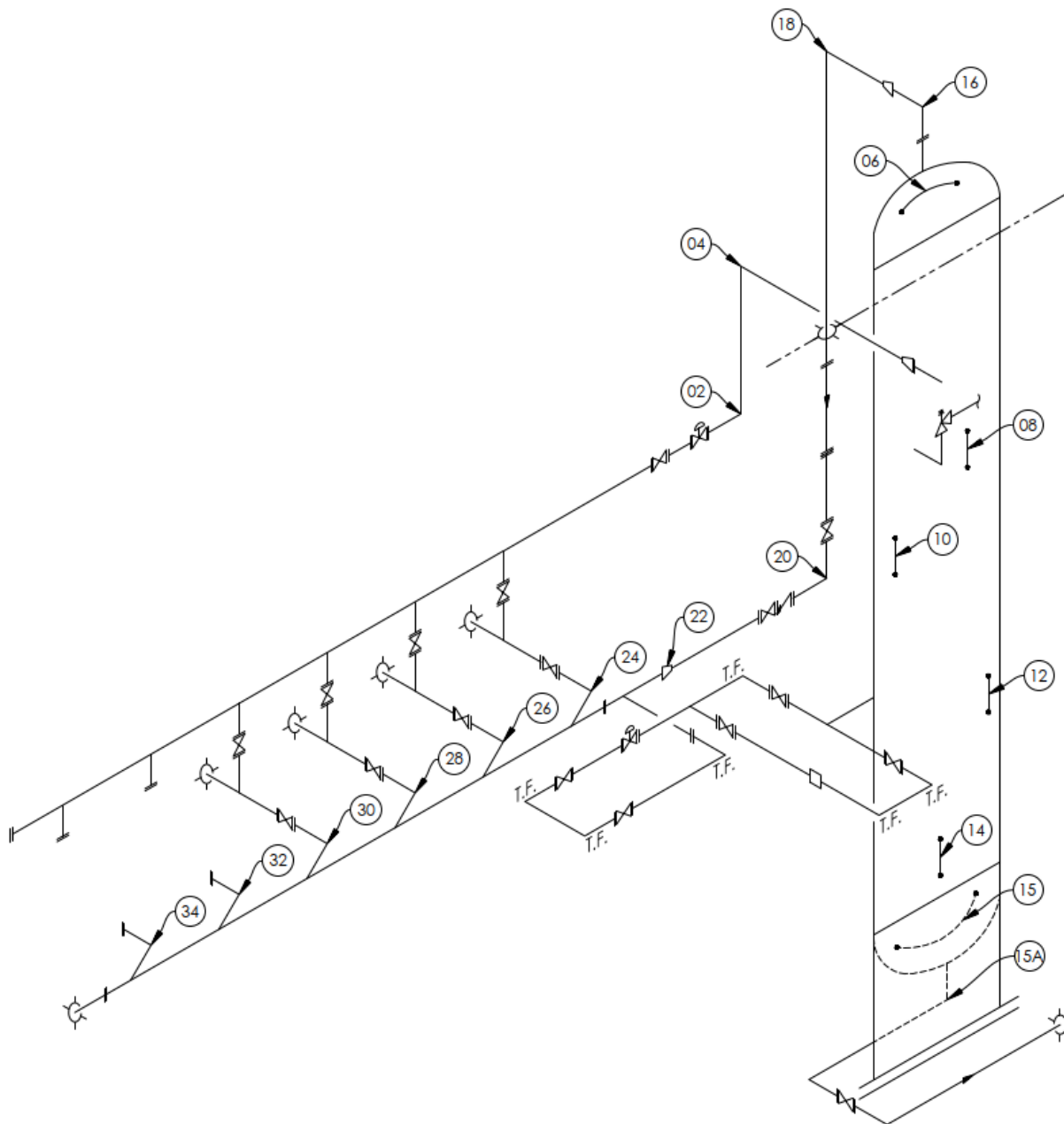
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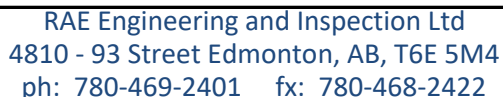
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EQUIPMENT CML ISO DRAWING





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Ultrasonic Thickness Examination

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Equipment Description:	Vertical Separator and Piping	Client Contact:	NA

Units: inches

Units: inches

CML	Description						01	02	03	04	05	06	07	08	09	10	11	12		
02	2		XH		90° Elbow										Min. =		0.183	Ave. =		0.188
	Nom:	0.218	Mil:	0.027	CA:	N/S	0.192	0.188	0.187	0.183										
04	2		XH		Cushion Tee										Min. =		0.197	Ave. =		0.201
	Nom:	0.218	Mil:	0.027	CA:	N/S	0.202	0.197	0.204	0.202										
06	Top Head														Min. =		0.989	Ave. =		0.993
	Nom:	0.938	Mil:	0.010	CA:	0.125	0.989	0.991	0.991	0.996	0.995	0.996	0.992	0.995	0.995	0.993	0.991	0.991		
08	Upper Shell														Min. =		1.019	Ave. =		1.026
	Nom:	1.000	Mil:	0.010	CA:	0.125	1.029	1.029	1.028	1.029	1.027	1.030	1.028	1.019	1.020	1.025	1.024	1.026		
10	Mid Shell														Min. =		1.022	Ave. =		1.025
	Nom:	1.000	Mil:	0.010	CA:	0.125	1.026	1.026	1.027	1.025	1.023	1.025	1.022	1.026	1.025	1.025	1.028	1.026		
12	Lower Shell														Min. =		1.021	Ave. =		1.028
	Nom:	1.000	Mil:	0.010	CA:	0.125	1.021	1.022	1.023	1.025	1.027	1.027	1.030	1.028	1.030	1.033	1.031	1.033		
14	Bottom Shell														Min. =		1.012	Ave. =		1.023
	Nom:	1.000	Mil:	0.010	CA:	0.125	1.022	1.025	1.025	1.025	1.027	1.024	1.022	1.024	1.023	1.024	1.019	1.012		
15	Bottom Head														Min. =		0.986	Ave. =		0.990
	Nom:	0.938	Mil:	0.010	CA:	0.125	0.991	0.986	0.988	0.987	0.995	0.993	0.991	0.990	0.992	0.990	0.988	0.994		
15A	2		160		Drain Elbow										Min. =		0.325	Ave. =		0.330
	Nom:	0.344	Mil:	0.043	CA:	N/S	0.334	0.334	0.325	0.326										
16	3		XH		90° Elbow										Min. =		0.306	Ave. =		0.316
	Nom:	0.300	Mil:	0.038	CA:	N/S	0.324	0.318	0.317	0.315	0.306									
18	2		XH		90° Elbow										Min. =		0.198	Ave. =		0.201
	Nom:	0.218	Mil:	0.027	CA:	N/S	0.202	0.198	0.202	0.201										
20	2		XH		90° Elbow										Min. =		0.172	Ave. =		0.179
	Nom:	0.218	Mil:	0.027	CA:	N/S	0.172	0.182	0.176	0.184										
22	2		XH		Circular Band										Min. =		0.279	Ave. =		0.284
	Nom:	0.218	Mil:	0.027	CA:	N/S	0.281	0.280	0.295	0.279										
24	3		XH		45° Elbow										Min. =		0.295	Ave. =		0.303
	Nom:	0.300	Mil:	0.038	CA:	N/S	0.313	0.305	0.297	0.295										
26	3		XH		45° Elbow										Min. =		0.286	Ave. =		0.289
	Nom:	0.300	Mil:	0.038	CA:	N/S	0.288	0.289	0.293	0.286	0.291									
28	3		XH		45° Elbow										Min. =		0.286	Ave. =		0.291
	Nom:	0.300	Mil:	0.038	CA:	N/S	0.292	0.295	0.286	0.288	0.293									
30	3		XH		45° Elbow										Min. =		0.289	Ave. =		0.292
	Nom:	0.300	Mil:	0.038	CA:	N/S	0.293	0.291	0.293	0.292	0.289									
32	3		XH		45° Elbow										Min. =		0.286	Ave. =		0.291
	Nom:	0.300	Mil:	0.038	CA:	N/S	0.292	0.290	0.298	0.291	0.286									

NPS = Nominal Pipe Size **Sch** = Schedule **Rating** = Flange Pressure Rating **Nom** = Nominal **CA** = Corrosion Allowance **Ave** = Average **Min** = Minimum

Mil = Manufacturer's Undertolerance = Piping - 12.5% - ASME IIA-2, SA-530 OR Plate - 0.01in/0.25mm or 6% - ASME VIII Div. 1, UG-16



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CALIBRATION RECORDS



RAE Engineering and Inspection Ltd.

OVER
50
YEARS


NDE-709D Thickness Gage Horizontal Linearity Certificate of Calibration

Instrument Make: Weygate Technologies Transducer Make: Stresstel
Instrument Model: DMSGO+ Transducer Model: 0.250" 5MHz
Instrument S/N: GOPLS21120043 Transducer S/N: 23H01PNU
Temperature: 20°C Couplant: UTX



Table 1: Thickness Gage Horizontal Linearity Data


CALIBRATION BLOCK S/N	CALIBRATION BLOCK THICKNESS (IN)	BACKWALL NUMBER	MEASURED LENGTH (IN)	DEVIATION (IN)	TOLERANCE (IN)	ACCEPTABLE
20-3222	0.040	1st	0.039	0.001	±0.006	Yes
22-1408	0.100	1st	0.100	0.000	±0.006	Yes
22-1408	0.200	1st	0.200	0.000	±0.006	Yes
22-1408	0.300	1st	0.300	0.000	±0.006	Yes
22-1408	0.400	1st	0.400	0.000	±0.006	Yes
22-1408	0.500	1st	0.500	0.000	±0.006	Yes
15-1096	1.000	1st	1.000	0.000	±0.006	Yes
15-1096	2.000	1st	2.000	0.000	±0.006	Yes
15-1096	3.000	1st	3.000	0.000	±0.006	Yes
15-1096	4.000	1st	4.000	0.000	±0.006	Yes

Technician Name: Hyekyong Jun (CGSB 17600) Signature: _____
Date: DEC 15TH, 2023 Calibration Due: DEC 15th, 2024

 RAE Engineering and Inspection Ltd 4810 - 93 Street Edmonton, AB, T6E 5M4 ph: 780-469-2401 fx: 780-468-2422		Inspection Date:	12-Jul-24	Ultrasonic Thickness Examination
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Certifications

Method	Level	Expiry Date	 RAE Engineering and Inspection Ltd. Certification Record This is to certify that: Efe Erhigbare The above named employee has satisfactorily met the qualification requirements of the RAE Engineering and Inspection Ltd. written practice that meets the requirements of ASNT recommended practice SNT-TC-1A 2020 edition
UT	1	18-Sep-28	
MT	2	01-May-29	
Corrective Lenses Required:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
By:	Zong Jun Wang		Certification No.: RAE-710B-059
Title:	NDE Level 3		
Signature:			
Date:	01-May-24		



ORGANISME DE CERTIFICATION NATIONAL EN ESSAIS NON DESTRUCTIFS DE RNCAN

Name | Nom **Efe Erhigbare**

Reg. Number | No. matricule **27134**


Issue Date | Date d'émission **2023/12/13**

Corrective lenses for vision required
Verres correctifs pour la vision sont nécessaires **Yes | Oui**

Colour vision limitation
Limitation de la vision des couleurs **No | Non**

This certification card does not identify that the stated individual is an employee or representative of Natural Resources Canada, Government of Canada.

Cette carte de certification n'identifie pas l'individu d'être un employé ou un représentant de Ressources naturelles Canada, Gouvernement du Canada.



Canada



ORGANISME DE CERTIFICATION NATIONAL EN ESSAIS NON DESTRUCTIFS DE RNCAN

Name | Nom **Efe Erhigbare**

Reg. Number | No. matricule **27134**

Certified to CAN/CGSB-48.9712-2014 | Certifié selon CAN/CGSB-48.9712-2014

METHOD MÉTHODE	LEVEL NIVEAU	SECTOR SECTEUR	EFFECTIVE DATE DATE EFFECTIVE	EXPIRY DATE EXPIRATION
UT	1	EMC	2022/10/14	2027/01/15

For verification of certification status, policies and definitions visit the Natural Resources Canada (NRC) National Non-Destructive Testing Certification Body (NDTCB) website.
Pour la vérification de la certification, les politiques et les définitions, visitez le site web de l'organisme de certification national en essais non destructifs (OCEND) de Ressources naturelles Canada (RNCAN).

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 P. K. Yuen | Director, NDTCB | Directeur, OCEND

Canada

