



TO: THERMO DESIGN ENGINEERING LTD
 BOX 5557 STATION L
 EDMONTON ALTA
 T6C 4E9

Account # 19971
 Date: 98/03/18
 Journal # 18766

Attn: JASON HARGREAVES
 Re: THERMO DESIGN ENGINEERING LTD

DESIGN REGISTRATION

C.R.N.

N9969.2

Drawings / Documents	Description		
RECYCLE SUCT SCRUBBER 9097-0850-217 REV 1	MDMT	MAWT	MAWP
	-20 F	250 F	245 psi
	REGISTERED Code of Compliance: ASME Sec VIII Div 1, 95 Ed, A96.		

Remarks: This design has been registered as noted above. An invoice for survey will follow in the amount of \$ 174.00

CRN issued in accordance with the ACI Policies on Reciprocal Recognition of Design Review for Registration. Alberta issued CRN N9969.2 on Feb 26, 1998.

cb
 Encl:
 cc:

Yours truly,

R. Tuazon
 R. TUAZON
 Design Surveyor

Ministry of
 Municipal Affairs
 and Housing

Boiler and Elevator
 Safety Branch

3rd Floor
 750 Pacific Boulevard South - Unit 300
 Vancouver BC V6B 5E7

Telephone: (604) 660-8254
 Facsimile: (604) 775-2345

CTC

W
RT-2

MANUFACTURED AND CERTIFIED BY



THERMO DESIGN
ENGINEERING LTD.

EDMONTON ALBERTA CANADA

UNIT NAME	TAG NUMBER
RECYCLE SUCTION SCRUBBER	V-800

CR. NUMBER	SERIAL NUMBER	Ⓐ NUMBER
N-9969.21	#1631	

M.A.W.P.	AT TEMP.	M.D.M.T.	AT PRESSURE
245 PSIG	250 °F	-20 °F	245 PSIG

YEAR BUILT	CORR. ALL	DRAWING NUMBER
1998	0.0625 IN	9197-0850-217

DIAMETER	LENGTH	CAPACITY	WEIGHT
12.75 IN	6-0 S/S	5.2 CU FT	500 LBS

SHELL MATL.	HEAD MATL.	TBSHT. MATL.	COIL MATL.
SA-106-B	SA-234-WPB SA-234-WPB		

SHELL THK.	HEAD MIN. THK.	TBSHT. THK.	COIL THK.
0.375 IN	0.328 IN 0.328 IN		

M



TAQA NORTH DATA								
EQUIP NO.:	603VS015	RAMS ID TAG NO.:	NEW	PRN: N/A	NAT'L BOARD #:	N/A	CATEGORY:	
PLANT/FIELD:	CHINCHAGA GAS PLANT		LSD:	C-032-H / 094-H-08	LOCATION:	GAS PLANT		
EQUIP. NAME :	RECYCLE SUCTION SCRUBBER		CLASS :	VS	TYPE:	SCRUBBER		
SERVICE:	<input checked="" type="checkbox"/> Sweet <input type="checkbox"/> Sour	H2S:	N/A	PPM	FLUID:	NATURAL GAS	S/D REQT.:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial
OPERATING PRESSURE:	0	<input checked="" type="checkbox"/> kPa <input type="checkbox"/> PSI	OPERATING TEMPERATURE:	30	<input checked="" type="checkbox"/> °C <input type="checkbox"/> °F			
OPERATING STATUS:	<input checked="" type="checkbox"/> IN SERVICE <input type="checkbox"/> Not In Service		M/WAY(16"AND ABOVE):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	SIZE:			

MANUFACTURING DATA											
MFG.:	THERMO ENG	DWG. NO.:	9097-0850-217	SERIAL NO.:	1631	YR. BUILT:	1998	STAMP:	W		
CRN:	N9969.21	CODE/DIV.:	ASME VIII DIV 1	PARA.:	N/A	SUPPORT:	<input checked="" type="checkbox"/> Skirt <input type="checkbox"/> Saddles <input type="checkbox"/> Nozzles				
MAWP:	1689	<input checked="" type="checkbox"/> kPa <input type="checkbox"/> PSI	@ TEMP:	121	<input checked="" type="checkbox"/> °C <input type="checkbox"/> °F	MDMT:	-29	<input checked="" type="checkbox"/> °C <input type="checkbox"/> °F	VOLUME:	N/A	<input type="checkbox"/> M ³ <input type="checkbox"/> FT ³
FLANGE RATING:	N/A	PWHT:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	RADIOGRAPHY:	<input type="checkbox"/> RT1 <input checked="" type="checkbox"/> RT2 <input type="checkbox"/> RT3 <input type="checkbox"/> RT4	<input type="checkbox"/> Spot <input type="checkbox"/> Full <input type="checkbox"/> N/A					
SIZE :	324	<input checked="" type="checkbox"/> mm. <input type="checkbox"/> inch. <input type="checkbox"/> ID <input checked="" type="checkbox"/> OD	LENGTH:	N/A	<input type="checkbox"/> mm. <input type="checkbox"/> inch.	HEIGHT:	1829	<input checked="" type="checkbox"/> mm <input type="checkbox"/> inch.			
INSULATION TYPE:	<input type="checkbox"/> Fiberglass <input type="checkbox"/> Wool <input type="checkbox"/> Low Temp <input type="checkbox"/> Asbestos Other: N/A					INSULATION THK:	N/A	<input type="checkbox"/> mm <input type="checkbox"/> inch.			
SECTION	MATERIAL		NOMINAL mm		C.A. mm						
SHELL	SA-106-B		9.5 MM		1.6 MM						
HEAD	SA-234-WPB		8.3 MM		1.6 MM						
COMMENTS:											

TUBING DATA									
MAWP:	N/A	<input type="checkbox"/> kPa <input type="checkbox"/> PSI	@ TEMP:	N/A	<input type="checkbox"/> °C <input type="checkbox"/> °F	TEMA CLASS:	N/A	TYPE:	N/A
TUBE SIZE:	N/A	mm. <input type="checkbox"/> ID <input type="checkbox"/> OD	NUMBER (QTY OF TUBES):	N/A	GAUGE (BWG):	N/A	JOINT:	<input type="checkbox"/> Welded <input type="checkbox"/> Rolled	
SECTION	MATERIAL		NOMINAL mm		C.A. mm				
N/A	N/A		N/A		N/A				

TRAY/PACKING DATA					
TRAY TYPE:	N/A	NUMBER (# OF TRAYS):	N/A	PACKING TYPE:	N/A
MATERIAL:	N/A	MANUFACTURER:	N/A		

COATING/LINING/CLADDING DATA			
AREA	TYPE	MATERIAL	YR. APPLIED
EXTERNAL:	EPOXY	N/A	N/A
INTERNAL:	N/A	N/A	N/A
LINING:	N/A	N/A	N/A
CLADDING:	N/A	N/A	N/A

PRESSURE RELIEF DEVICES DATA		<input type="checkbox"/> PSV not located		<input type="checkbox"/> No PSV	
EQUIP. NO.	TAG NO.	SET	CAPACITY	CAP UNITS/OTHER	
603SVVS015	N/A	1689 <input checked="" type="checkbox"/> kPa <input type="checkbox"/> PSI	310	<input checked="" type="checkbox"/> SCFM <input type="checkbox"/> LB/hr. <input type="checkbox"/> GAL/min.	
N/A	N/A	N/A <input type="checkbox"/> kPa <input type="checkbox"/> PSI	N/A	<input type="checkbox"/> SCFM <input type="checkbox"/> LB/hr. <input type="checkbox"/> GAL/min.	
N/A	N/A	N/A <input type="checkbox"/> kPa <input type="checkbox"/> PSI	N/A	<input type="checkbox"/> SCFM <input type="checkbox"/> LB/hr. <input type="checkbox"/> GAL/min.	

FORM U-1A MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
 (Alternative Form for Single Chamber, Completely Shop-Fabricated Vessels Only)
 As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

CTC, PG. 1 OF 2

1. Manufactured and certified by THERMO DESIGN ENGINEERING LTD., 1624 - 70 AVENUE, EDMONTON, ALBERTA CANADA T6P 1P5
(Name and address of manufacturer)

2. Manufactured for Chauvco Res. Ltd. c/o Tartan Eng. Ltd., 1700, 800 - 6th Avenue S.W., Calgary, AB T2P 3G3
(Name and address of purchaser)

3. Location of installation Chinchaga Gas Plant, British Columbia, LSD: C-32-H/94-H-8
(Name and address)

4. Type Vertical #1631 N-9969.21 9097-0850-217/Rev.1 1998
(Horiz. or vert. tank) (Mfg's serial No.) (CRN) (Drawing no.) (Nat'l Bd. No.) (Year built)

5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction, and workmanship conform to ASME Rules, Section VIII, Division 1
 Year 1995

to 1996
Addenda (Date) Code Case Nos. Special Service per UG 120(d)

6. Shell: SA-106-B 0.375" 0.0625" 12.00" ID 6'-0" S/S
Mat'l. (Spec. No., Grade) Nom. Thk. (in.) Corr. Allow. (in.) Diam. I.D. (ft. & in.) Length (overall) (ft. & in.)

7. Seams: Sml's Pipe N/A 100 N/A N/A Sgl "V" CS:Spot 1
Long. (Welded, Dbl., Sngl., Lap, Butt) R.T. (Spot or Full) Eff. (%) H.T. Temp (F) Time (hr) Girth (welded, Dbl., Sngl., Lap, Butt) R.T. (Spot, Partial, or Full) No. of Courses

8. Heads: (a) Mat'l. SA-234-WPB (b) Mat'l. SA-234-WPB
(Spec No., Grade) (Spec No., Grade)

	Location (Top, Bottom, Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a)	Top	0.328"	0.625"							Concave
(b)	Bottom	0.328"	0.625"							Concave

If removable, bolts used (describe other fastenings) N/A
(Mat'l., Spec. No., Gr., Size, No.)

9. MAWP 245 psi at max. temp. 250 ° F
 Min. design metal temp. -20 ° F at 245 psi. Hydro., pneu., or comb. test pressure 367.5 psi.

10. Nozzles, inspection and safety valve openings:

Purpose (Inlet, Outlet, Drain)	No.	Diam. or Size	Type	Mat'l.	Nom. Thk.	Reinforcement Mat'l.	How Attached	Location
N1	1	2"	RFWN	SA-106-B	150#Sch.80	N/A	UW-16.1(c)	Shell
N2	1	2"	RFWN	SA-106-B	150#Sch.80	N/A	UW-16.1(c)	Head
C1A/B	2	1"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
C2	1	1"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell

11. Supports: Skirt Yes Lugs (No.) Legs (No.) Other (Describe) Attached (Where and how) Welded (Where and how)

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report:

(Name of part, item number, Mfg's name and identifying stamp)
12 3/4" OD x 6'-0" S/S, Recycle Suction Scrubber "V-800"
 Capacity: 5.2 Cu Ft.
 Impact Test: Exempt Per UG-20 (f) See Attached U-4 Form

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. "U" Certificate of Authorization No. 22,145 expires August 22, 19 99.
 Date 98.03.19 Co. Name THERMO DESIGN ENGINEERING LTD. Signed [Signature]
(Manufacturer) (Representative)

CERTIFICATE OF SHOP INSPECTION

Vessel constructed by THERMO DESIGN ENGINEERING LTD. at EDMONTON, ALBERTA CANADA T6P 1P5.
 I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of AB and employed by Alberta Boilers' Safety Association in Edmonton have inspected the component described in this Manufacturer's Data Report on March 19, 19 98, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.
 Date 98-3-19 Signed [Signature] Commissions 39R
(Authorized Inspector) (Nat'l Board (incl. endorsements) State, Prov. and No.)

FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET
 As Required by the provisions of the ASME Code Rules, Section VIII, Division 1

Manufactured and certified by THERMO DESIGN ENGINEERING LTD., 1624 - 70 AVENUE, EDMONTON, ALBERTA CANADA T6P 1P5

(Name and address of Manufacturer)

Manufactured for Chauvco Res. Ltd. c/o Tartan Eng. Ltd., 1700, 800 - 6th Avenue S.W., Calgary, AB T2P 3G3

(Name and address of Purchaser)

Location of Installation Chinchaga Gas Plant, British Columbia, LSD: C-32-H/94-H-8

(Name and address)

Type: Vertical

(Horiz., vert., or sphere)

Scrubber

(Tank separator, heat exh., etc)

#1631

(Mfg's serial No.)

N-9969.21

(CRN)

9097-0850-217/Rev.1

(Drawing No.)

(Nat'l. Bd. No.)

1998

(Year built)

Data Report Item Number	Remarks								
0 - Nozzles	C3A/B	2	1 1/2"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
	C4A/B	2	3/4"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
	C5	1	3/4"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
	C6	1	3/4"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
	C7	1	1 1/2"	CPLG	SA-333-6	6000#Sch.160	N/A	UW-16.1(c)	Head
	C8	1	1 1/2"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
	C9A/B	2	2"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell

2 - Remarks

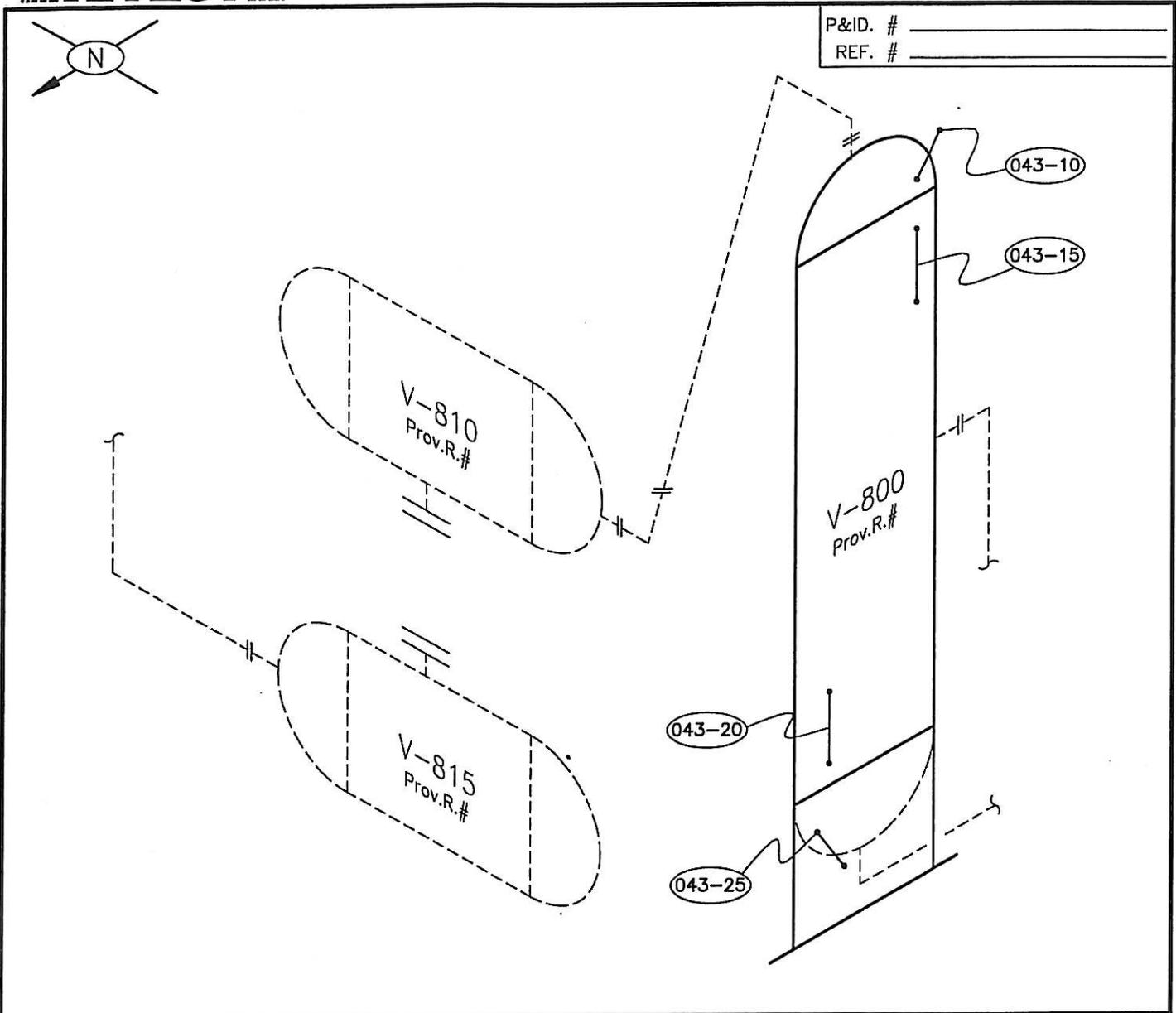
Registered Drawing No.: 9097-0850-217/Rev.1 (Alberta & British Columbia)

PSV: On CPLG C2

Certificate of Authorization: Type U No. 22,145 Expires August 22, 19 99

Date 08-03-19 Name THERMO DESIGN ENGINEERING LTD. Signed OBicharic
(Manufacturer) (Representative)

Date 08-3-19 Name R. Hujas Commission 39R
Authorized Inspector (Nat'l Board (incl. endorsements) State, Province and No.)



P&ID. # _____
REF. # _____

VESSEL DATA

P.E. No. V-800 Serial No. 1631 Prov. Reg. No. A C.R.N. N9969.21
MFR. THERMO DESIGN Code/Div. _____ Para _____ Code Stamp U
Yr. Bit. 1998 Yr. Inst. _____ Size 12 3/4" x 6' Service _____ PWHT _____
RT RT-2 Insulated NO

Nominal Thickness & Material

Head: .328" (8.3mm) Mat'l: SA 234 WPB C.A.: .0625"
Head: _____
Shell: .375" (9.5mm) SA 106 B .0625"
Shell: _____
Chan Hd: _____
Chan Sh: _____
Boot Hd: _____
Boot Sh: _____

MAWP Shell Side 245PSI @ Temp. -20/250°F
MAWP Tube Side _____ @ Temp. _____

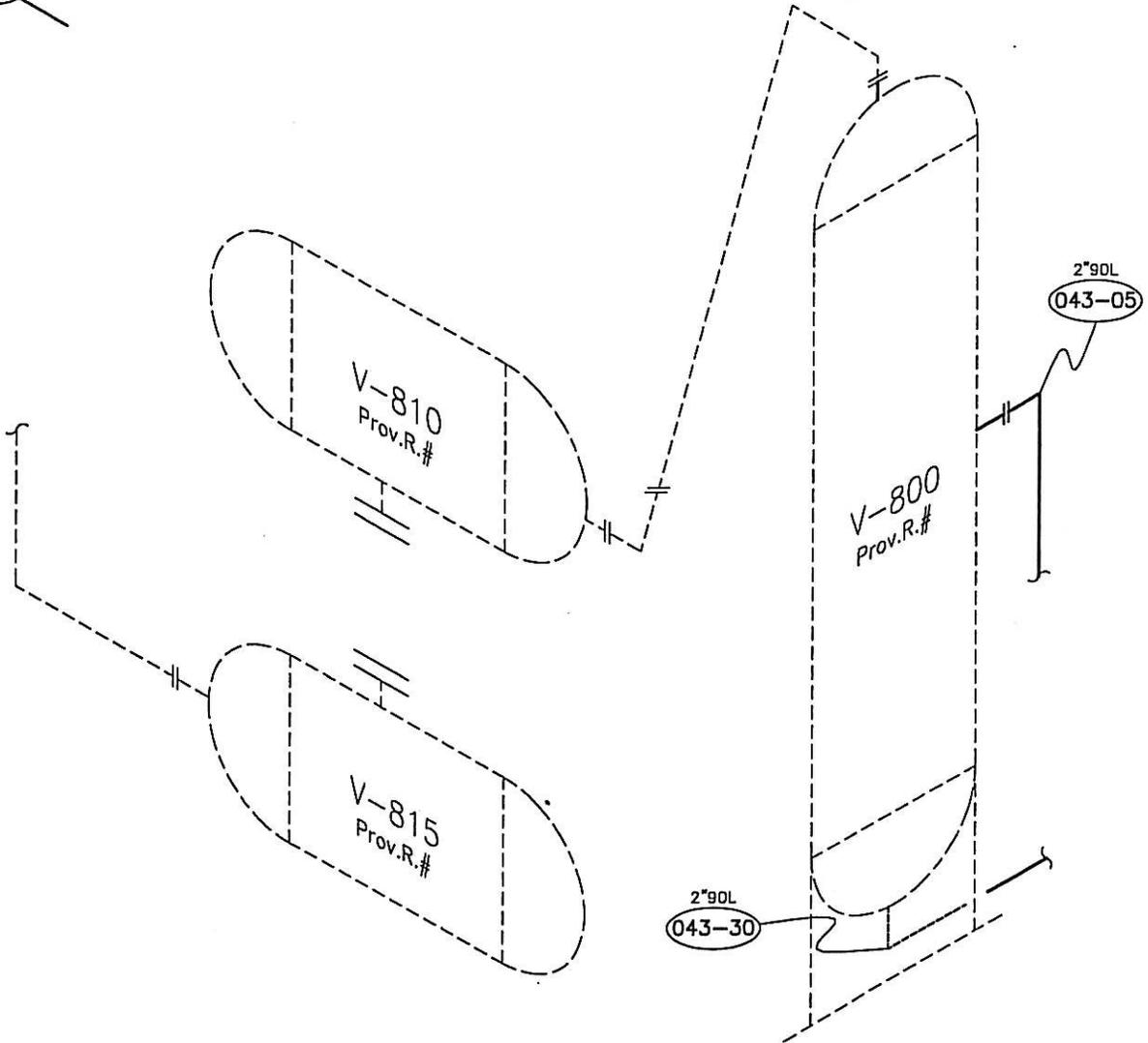
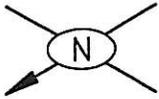
COMMENTS: _____

PIONEER NATURAL RESOURCES CANADA INC.
CHINCHAGA GAS PLANT
LSD C-32-H / 84-H-8
RECYCLE COMPRESSOR, C 810

RECYCLE SUCTION SCRUBBER

TECH.: J.O.	REV. DATE:	DWG DATE: 99/08
CAD: WO	REVISION:	DRAWING: 043

P&ID # _____
REF. # _____



PIPING DATA

THICKNESS MEASUREMENT LOCATION:	SIZE	PROC.	LINE #	SPEC.	SCH.	NOM.THK.	API	MIN.THK.	CAL.THK.	FLG. RATING	
							* CORR. ALLW.				
							** CALCULATED CORR.ALLW.				
043-05,30	2"				40	3.9mm	ASTM	3.4mm			
043-30	2"				160	8.7mm	ASTM	7.6mm			

COMMENTS: _____

PIONEER NATURAL RESOURCES CANADA INC.
CHINCHAGA GAS PLANT
LSD C-32-H \ 94-H-8
RECYCLE COMPRESSOR, C-810

RECYCLE SUCTION SCRUBBER PIPING

TECH.: JO REV.DATE: DWG.DATE: 99/12
CAD: WO REVISION: DRAWING: 043A

Item Desc.:	C-32-H/94-H-8/RECYCLE COMP.C-810/RECYCLE SUC.SCR		
Equip. No.:	V-800	Ser. No.:	1631
		Prov. Reg.:	N/A

Pt.Desc.: 2"90L B-T Point No.: 043-05
 Line No.: N/A
 Nominal: 3.900 Mths. Rem. To Min. Nom: Good For Continued Service: YES
 Corr. Allowance: ASTM Min. Cal. Wall Thk.: Additional Assessment Of Data: YES
 Min. Nominal: 3.413 Suggested Max Insp. Interval In Mths.: 12

Survey Dates: 1999-12

Data Readings	1	4.700	____.____
	2	4.500	____.____
	3	4.700	____.____
	4	4.800	____.____
	5	4.800	____.____

Data Evaluation
 Lowest Reading : 4.500
 Average - Low 3 : 4.633
 Thk.Remaining Above Min. : 1.087
 Indv. Short Term Rate (mm/yr) :
 Short Term Rate (mm/yr) :
 LongTerm Rate (mm/yr) :

Pt.Desc.: TOP HEAD Point No.: 043-10
 Nominal: 8.300 Mths. Rem. To Min. Nom: Good For Continued Service: YES
 Corr. Allowance: 1.600 Min. Cal. Wall Thk.: Additional Assessment Of Data: YES
 Min. Nominal: 6.700 Suggested Max Insp. Interval In Mths.: 12

Survey Dates: 1999-12

Data Readings	1	10.000	____.____
	2	9.900	____.____
	3	9.900	____.____
	4	9.400	____.____
	5	10.800	____.____

Data Evaluation
 Lowest Reading : 9.400
 Average - Low 3 : 9.733
 Thk.Remaining Above Min. : 2.700
 Indv. Short Term Rate (mm/yr) :
 Short Term Rate (mm/yr) :
 LongTerm Rate (mm/yr) :

Item Desc.:	C-32-H/94-H-8/RECYCLE COMP.C-810/RECYCLE SUC.SCR		
Equip. No.:	V-800	Ser. No.:	1631
		Prov. Reg.:	N/A

Pt.Desc.: TOP SHELL

Point No.: 043-15

Nominal: 9.500 Mths. Rem. To Min. Nom:
Corr. Allowance: 1.600 Min. Cal. Wall Thk.:
Min. Nominal: 7.900

Good For Continued Service: YES
Additional Assessment Of Data: YES
Suggested Max Insp. Interval In Mths.: 12

Survey Dates: 1999-12

Data Readings	1	10.100	____.____
	2	10.100	____.____
	3	9.900	____.____
	4	9.700	____.____
	5	9.800	____.____
	6	9.800	____.____

Data Evaluation

Lowest Reading : 9.700
Average - Low 3 : 9.767
Thk.Remaining Above Min. : 1.800
Indv. Short Term Rate (mm/yr) :
Short Term Rate (mm/yr) :
LongTerm Rate (mm/yr) :

Pt.Desc.: BTM.SHELL

Point No.: 043-20

Nominal: 9.500 Mths. Rem. To Min. Nom:
Corr. Allowance: 1.600 Min. Cal. Wall Thk.:
Min. Nominal: 7.900

Good For Continued Service: YES
Additional Assessment Of Data: YES
Suggested Max Insp. Interval In Mths.: 12

Survey Dates: 1999-12

Data Readings	1	9.700	____.____
	2	10.000	____.____
	3	9.600	____.____
	4	9.500	____.____
	5	9.500	____.____
	6	9.700	____.____

Data Evaluation

Lowest Reading : 9.500
Average - Low 3 : 9.533
Thk.Remaining Above Min. : 1.600
Indv. Short Term Rate (mm/yr) :
Short Term Rate (mm/yr) :
LongTerm Rate (mm/yr) :

Item Desc.:	C-32-H/94-H-8/RECYCLE COMP.C-810/RECYCLE SUC.SCR		
Equip. No.:	V-800	Ser. No.:	1631
		Prov. Reg.:	N/A

Pt.Desc.: BTM.HEAD

Point No.: 043-25

Nominal:	8.300	Mths. Rem. To Min. Nom:	Good For Continued Service:	YES
Corr. Allowance:	1.600	Min. Cal. Wall Thk.:	Additional Assessment Of Data:	YES
Min. Nominal:	6.700		Suggested Max Insp. Interval In Mths.:	12

<u>Survey Dates:</u>		<u>1999-12</u>	
Data Readings	1	8.900	____.____
	2	8.900	____.____
	3	9.000	____.____
	4	8.900	____.____

Data Evaluation

Lowest Reading	:	8.900
Average - Low 3	:	8.900
Thk.Remaining Above Min.	:	2.200
Indv. Short Term Rate (mm/yr)	:	
Short Term Rate (mm/yr)	:	
LongTerm Rate (mm/yr)	:	

Pt.Desc.: PIPING - 2"90L T-B

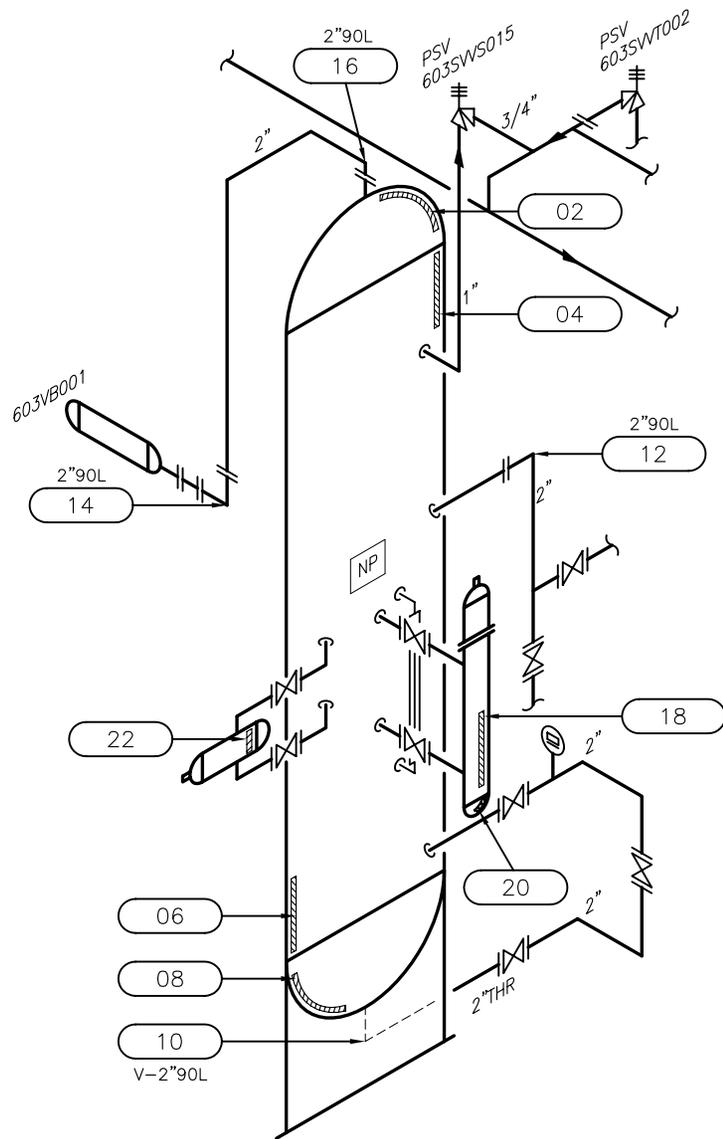
Point No.: 043-30

Nominal:	8.700	Mths. Rem. To Min. Nom:	Good For Continued Service:	YES
Corr. Allowance:	2.700	Min. Cal. Wall Thk.:	Additional Assessment Of Data:	YES
Min. Nominal:	6.000		Suggested Max Insp. Interval In Mths.:	12

<u>Survey Dates:</u>		<u>1999-12</u>	
Data Readings	1	7.100	____.____
	2	7.000	____.____
	3	6.900	____.____
	4	6.900	____.____
	5	7.000	____.____

Data Evaluation

Lowest Reading	:	6.900
Average - Low 3	:	6.933
Thk.Remaining Above Min.	:	0.900
Indv. Short Term Rate (mm/yr)	:	
Short Term Rate (mm/yr)	:	
LongTerm Rate (mm/yr)	:	



P.E. No.:	<u>N/S</u>	Yr. Bt.:	<u>1998</u>
OIP#	<u>603VS015</u>	Manway:	<u>NO</u>
Serial No.:	<u>1631</u>	Size:	<u>324mm x 1829mm</u>
P.R.N. (A)	<u>N/S</u>	Service:	<u>SWEET</u>
C.R.N.:	<u>N9969.21</u>	PWHT:	<u>NO</u>
Code/Div.:	<u>ASME VIII DIV. 1</u>	RT:	<u>2</u>
Para:	<u>N/S</u>	Insulated:	<u>N/S</u>
C. Stamp:	<u>W</u>	N.B. No:	<u>N/S</u>
Manufacturer: <u>THERMO ENG.</u>			

Design & Materials Data

HEAD	SHELL
Material: <u>SA-234-WPB</u>	Material: <u>SA-106-B</u>
Nom.: <u>8.3mm</u>	Nom.: <u>9.5mm</u>
C.A.: <u>N/S</u>	C.A.: <u>1.6mm</u>
BOOT HEAD	BOOT SHELL
Material: _____	Material: _____
Nom.: _____	Nom.: _____
C.A.: _____	C.A.: _____
CHANNEL HEAD	CHANNEL SHELL
Material: _____	Material: _____
Nom.: _____	Nom.: _____
C.A.: _____	C.A.: _____
MAWP Shell Side: <u>1689 KPA</u>	@ Temp.: <u>121°C</u>
MAWP Tube Side: _____	@ Temp.: _____

CLIENT	TAQA NORTH
FACILITY	CHINCHAGA GAS PLANT
	LSD C-032-H/094-H-08
ITEM	RECYCLE SUCTION SCRUBBER

Comments: _____

TAQA North

Unit: N-603

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08	DESIGN PRESSURE:	1689 kPa / 245 psi
ITEM DESC.:	RECYCLE SUCTION SCRUBBER	DESIGN TEMP.:	121 C / 250 F
EQUIP / OIP#:	603VS015	RECOMMENDED NEXT INSP. DATE:	06/2002
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	06/2009
SERIAL #:	1631	REM. LIFE (from last survey 04/2008):	1.20 yrs.
CRN.:	N9969.21	TOTAL CAUTION / ACTION TML:	5

Item # (033)

TML No.: 2 TOP HD T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.92 mm.

MATERIAL: SA-234

MINIMUM THICKNESS MEASURED: 9.10 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey	Prev. Survey Date mm/yyyy	Prev. Survey	Last Survey Date mm/yyyy	Last Survey	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/ Caution Required Item
2.01	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	9.90	0.000	0.000	04/2013	12/3074	NO
2.02	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	9.80	0.000	0.000	04/2013	08/3041	NO
2.03	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	9.80	0.000	0.000	04/2013	08/3041	NO
2.04	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	9.90	0.000	0.000	04/2013	12/3074	NO
2.05	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	9.10	0.000	0.000	04/2013	04/2808	NO
2.06	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	11.00	0.000	0.000	04/2013	08/3441	NO

TML No.: 4 TOP SH T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.93 mm.

MATERIAL: SA106-B

MINIMUM THICKNESS MEASURED: 9.80 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey	Prev. Survey Date mm/yyyy	Prev. Survey	Last Survey Date mm/yyyy	Last Survey	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/ Caution Required Item
4.01	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	10.10	0.000	0.000	04/2013	08/2741	NO
4.02	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	10.20	0.000	0.000	04/2013	12/2774	NO
4.03	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.90	0.000	0.000	04/2013	12/2674	NO
4.04	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.80	0.000	0.000	04/2013	08/2641	NO
4.05	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.80	0.000	0.000	04/2013	08/2641	NO
4.06	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.80	0.000	0.000	04/2013	08/2641	NO

(*) and GREEN Represent 25% of the TMLs, which have the earliest retirement dates.

BLUE (Caution TML) Corrosion Rate greater than 0.250mm/yr. or TML Remaining Life is less than 1.00 year.

RED (Action TML) TML with negative life.

If Baseline Survey Thickness Measurement was not taken at the time of Manufacture, then Nominal Thickness is used as Baseline Thickness.

TAQA North

Unit: N-603

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08	DESIGN PRESSURE:	1689 kPa / 245 psi
ITEM DESC.:	RECYCLE SUCTION SCRUBBER	DESIGN TEMP.:	121 C / 250 F
EQUIP / OIP#:	603VS015	RECOMMENDED NEXT INSP. DATE:	06/2002
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	06/2009
SERIAL #:	1631	REM. LIFE (from last survey 04/2008):	1.20 yrs.
CRN.:	N9969.21	TOTAL CAUTION / ACTION TML:	5

Item # (033)

TML No.: 6 BTM SH T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.70 mm.

MATERIAL: SA106-B

MINIMUM THICKNESS MEASURED: 9.60 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey	Prev. Survey Date mm/yyyy	Prev. Survey	Last Survey Date mm/yyyy	Last Survey	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/ Caution Required Item
6.01	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.80	0.000	0.000	04/2013	08/2641	NO
6.02	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.70	0.000	0.000	04/2013	04/2608	NO
6.03	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.70	0.000	0.000	04/2013	04/2608	NO
6.04	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.60	0.000	0.000	04/2013	12/2574	NO
6.05	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.70	0.000	0.000	04/2013	04/2608	NO
6.06	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.70	0.000	0.000	04/2013	04/2608	NO

TML No.: 8 BTM HD T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.02 mm.

MATERIAL: SA-234

MINIMUM THICKNESS MEASURED: 8.90 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey	Prev. Survey Date mm/yyyy	Prev. Survey	Last Survey Date mm/yyyy	Last Survey	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/ Caution Required Item
8.01	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	9.10	0.000	0.000	04/2013	04/2808	NO
8.02	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	9.10	0.000	0.000	04/2013	04/2808	NO
8.03	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	9.00	0.000	0.000	04/2013	12/2774	NO
8.04	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	9.00	0.000	0.000	04/2013	12/2774	NO
8.05	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	8.90	0.000	0.000	04/2013	08/2741	NO
8.06	8.30	1.60	6.70	01/1998	8.30	N/A	N/A	04/2008	9.00	0.000	0.000	04/2013	12/2774	NO

(*) and GREEN Represent 25% of the TMLs, which have the earliest retirement dates.

BLUE (Caution TML) Corrosion Rate greater than 0.250mm/yr. or TML Remaining Life is less than 1.00 year.

RED (Action TML) TML with negative life.

If Baseline Survey Thickness Measurement was not taken at the time of Manufacture, then Nominal Thickness is used as Baseline Thickness.

TAQA North

Unit: N-603

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08	DESIGN PRESSURE:	1689 kPa / 245 psi
ITEM DESC.:	RECYCLE SUCTION SCRUBBER	DESIGN TEMP.:	121 C / 250 F
EQUIP / OIP#:	603VS015	RECOMMENDED NEXT INSP. DATE:	06/2002
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	06/2009
SERIAL #:	1631	REM. LIFE (from last survey 04/2008):	1.20 yrs.
CRN.:	N9969.21	TOTAL CAUTION / ACTION TML:	5

Item # (033)

TML No.: 10 2"90L T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 6.88 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 6.70 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey	Prev. Survey Date mm/yyyy	Prev. Survey	Last Survey Date mm/yyyy	Last Survey	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/Caution Required Item
10.01	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	6.70	0.000	0.000	04/2013	08/2641	NO
10.02	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	6.70	0.000	0.000	04/2013	08/2641	NO
10.03	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	6.80	0.000	0.000	04/2013	12/2674	NO
10.04	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	7.20	0.000	0.000	04/2013	04/2808	NO
10.05	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	7.00	0.000	0.000	04/2013	08/2741	NO

TML No.: 12 2"90L T-B 150

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 4.22 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 4.20 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey	Prev. Survey Date mm/yyyy	Prev. Survey	Last Survey Date mm/yyyy	Last Survey	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/Caution Required Item
12.01	3.90	0.50	3.40	01/1998	3.90	N/A	N/A	04/2008	4.20	0.000	0.000	04/2013	12/2274	NO
12.02	3.90	0.50	3.40	01/1998	3.90	N/A	N/A	04/2008	4.20	0.000	0.000	04/2013	12/2274	NO
12.03	3.90	0.50	3.40	01/1998	3.90	N/A	N/A	04/2008	4.20	0.000	0.000	04/2013	12/2274	NO
12.04	3.90	0.50	3.40	01/1998	3.90	N/A	N/A	04/2008	4.20	0.000	0.000	04/2013	12/2274	NO
12.05	3.90	0.50	3.40	01/1998	3.90	N/A	N/A	04/2008	4.30	0.000	0.000	04/2013	04/2308	NO

(*) and GREEN Represent 25% of the TMLs, which have the earliest retirement dates.

BLUE (Caution TML) Corrosion Rate greater than 0.250mm/yr. or TML Remaining Life is less than 1.00 year.

RED (Action TML) TML with negative life.

If Baseline Survey Thickness Measurement was not taken at the time of Manufacture, then Nominal Thickness is used as Baseline Thickness.

CALCULATE PRESSURE VESSEL TMIN or DESIGN PRESSURE

FACILITY: Chinchaga Gas Plant--32-H/94-H-8
DESCRIPTION: Recycle Suction Scrubber piping spool
ITEM NO.: #033
TML: #14
MATERIAL: NS-USE SA234-WPB
PRN #: SN-1631--603VS015
RT: 2
TYPE: 2" 90° Elbow

PRESSURE VESSEL TMIN CALCS (Cylindrical shells INSIDE RADIUS)

$t = PR/SE - 0.6P$ Minimum Required Thickness, inches

P=	245	Design Pressure, psi
R=	0.997	INSIDE Radius of shell, inches
S=	17100	Maximum Allowable Stress, psi
E=	1.00	Joint Efficiency
T=	100°F	
t=	0.014	inches, per ASME Sect 8 UG-27(c)1
t=	0.36	mm

$$t = 0.0144" + C/A \text{ NS } 0.0625" = 0.0769"$$

TAQA North

Unit: N-603

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08	DESIGN PRESSURE:	1689 kPa / 245 psi
ITEM DESC.:	RECYCLE SUCTION SCRUBBER	DESIGN TEMP.:	121 C / 250 F
EQUIP / OIP#:	603VS015	RECOMMENDED NEXT INSP. DATE:	06/2002
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	06/2009
SERIAL #:	1631	REM. LIFE (from last survey 04/2008):	1.20 yrs.
CRN.:	N9969.21	TOTAL CAUTION / ACTION TML:	5

Item # (033)

TML No.: 14 2"90L T-B 150 #

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 4.90 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 4.70 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey	Prev. Survey Date mm/yyyy	Prev. Survey	Last Survey Date mm/yyyy	Last Survey	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/Caution Required Item	
14.01	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	5.10	0.000	0.038	03/2012	02/2016	NO	*
14.02	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	5.00	0.000	0.048	05/2010	05/2012	NO	*
14.03	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	4.70	0.000	0.079	12/2006	12/2006	ACTION	*
14.04	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	4.80	0.000	0.069	04/2008	04/2008	CAUTION	*
14.05	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	4.90	0.000	0.058	02/2009	12/2009	NO	*

TML No.: 16 2"90L T-B 150 #

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 4.16 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 4.10 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey	Prev. Survey Date mm/yyyy	Prev. Survey	Last Survey Date mm/yyyy	Last Survey	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/Caution Required Item	
16.01	3.90	0.50	3.40	01/1998	3.90	N/A	N/A	04/2008	4.10	0.000	0.000	04/2013	08/2241	NO	
16.02	3.90	0.50	3.40	01/1998	3.90	N/A	N/A	04/2008	4.20	0.000	0.000	04/2013	12/2274	NO	
16.03	3.90	0.50	3.40	01/1998	3.90	N/A	N/A	04/2008	4.10	0.000	0.000	04/2013	08/2241	NO	
16.04	3.90	0.50	3.40	01/1998	3.90	N/A	N/A	04/2008	4.30	0.000	0.000	04/2013	04/2308	NO	
16.05	3.90	0.50	3.40	01/1998	3.90	N/A	N/A	04/2008	4.10	0.000	0.000	04/2013	08/2241	NO	

(*) and GREEN Represent 25% of the TMLs, which have the earliest retirement dates.

BLUE (Caution TML) Corrosion Rate greater than 0.250mm/yr. or TML Remaining Life is less than 1.00 year.

RED (Action TML) TML with negative life.

If Baseline Survey Thickness Measurement was not taken at the time of Manufacture, then Nominal Thickness is used as Baseline Thickness.

CALCULATE PRESSURE VESSEL TMIN or DESIGN PRESSURE

FACILITY: Chinchaga Gas Plant C-32-H/94-H-8
DESCRIPTION: Recycle Suction Scrubber piping spool
ITEM NO.: #033
TML: #20
MATERIAL: NS-USE SA234-WPB
PRN #: SN-1631--603VS015
RT: 2
TYPE: Bottom Head

FORMED ELLIPSODIAL HEADS, PRESSURE ON CONCAVE SIDE (INSIDE DIAMETER)

$t = PD/2SE - 0.2P$ Minimum Required Thickness, inches

P=

245

D=

6.1

S=

17100

 Maximum Allowable Stress, psi

*E=

1.00

 Joint Efficiency

t=

0.044

 inches, per ASME Sect 8 UG-32(d)

t=

1.12

 mm

$$t = 0.044" + C/A 0.0625" = 0.1065"$$

TAQA North

Unit: N-603

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08	DESIGN PRESSURE:	1689 kPa / 245 psi
ITEM DESC.:	RECYCLE SUCTION SCRUBBER	DESIGN TEMP.:	121 C / 250 F
EQUIP / OIP#:	603VS015	RECOMMENDED NEXT INSP. DATE:	06/2002
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	06/2009
SERIAL #:	1631	REM. LIFE (from last survey 04/2008):	1.20 yrs.
CRN.:	N9969.21	TOTAL CAUTION / ACTION TML:	5

Item # (033)

TML No.: 18 6" SH T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 6.43 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 6.30 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey	Prev. Survey Date mm/yyyy	Prev. Survey	Last Survey Date mm/yyyy	Last Survey	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/Caution Required Item
18.01	7.10	0.90	6.20	01/1998	7.10	N/A	N/A	04/2008	6.40	0.000	0.069	09/2009	03/2011	NO *
18.02	7.10	0.90	6.20	01/1998	7.10	N/A	N/A	04/2008	6.60	0.000	0.048	05/2012	07/2016	NO
18.03	7.10	0.90	6.20	01/1998	7.10	N/A	N/A	04/2008	6.30	0.000	0.079	11/2008	07/2009	NO *
18.04	7.10	0.90	6.20	01/1998	7.10	N/A	N/A	04/2008	6.40	0.000	0.069	09/2009	03/2011	NO *
18.05	7.10	0.90	6.20	01/1998	7.10	N/A	N/A	04/2008	6.40	0.000	0.069	09/2009	03/2011	NO *
18.06	7.10	0.90	6.20	01/1998	7.10	N/A	N/A	04/2008	6.50	0.000	0.058	11/2010	05/2013	NO *

TML No.: 20 6" BTM HD T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 5.60 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 5.00 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey	Prev. Survey Date mm/yyyy	Prev. Survey	Last Survey Date mm/yyyy	Last Survey	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/Caution Required Item
20.01	7.10	0.90	6.20	01/1998	7.10	N/A	N/A	04/2008	6.40	0.000	0.069	09/2009	03/2011	NO *
20.02	7.10	0.90	6.20	01/1998	7.10	N/A	N/A	04/2008	6.50	0.000	0.058	11/2010	05/2013	NO *
20.03	7.10	0.90	6.20	01/1998	7.10	N/A	N/A	04/2008	5.00	0.000	0.206	06/2002	06/2002	ACTION *
20.04	7.10	0.90	6.20	01/1998	7.10	N/A	N/A	04/2008	5.00	0.000	0.206	06/2002	06/2002	ACTION *
20.05	7.10	0.90	6.20	01/1998	7.10	N/A	N/A	04/2008	5.10	0.000	0.196	08/2002	08/2002	ACTION *

(*) and GREEN Represent 25% of the TMLs, which have the earliest retirement dates.

BLUE (Caution TML) Corrosion Rate greater than 0.250mm/yr. or TML Remaining Life is less than 1.00 year.

RED (Action TML) TML with negative life.

If Baseline Survey Thickness Measurement was not taken at the time of Manufacture, then Nominal Thickness is used as Baseline Thickness.

TAQA North

Unit: N-603

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08	DESIGN PRESSURE:	1689 kPa / 245 psi
ITEM DESC.:	RECYCLE SUCTION SCRUBBER	DESIGN TEMP.:	121 C / 250 F
EQUIP / OIP#:	603VS015	RECOMMENDED NEXT INSP. DATE:	06/2002
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	06/2009
SERIAL #:	1631	REM. LIFE (from last survey 04/2008):	1.20 yrs.
CRN.:	N9969.21	TOTAL CAUTION / ACTION TML:	5

Item # (033)

TML No.: 22 4" BOTTLE T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 6.50 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 6.40 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey	Prev. Survey Date mm/yyyy	Prev. Survey	Last Survey Date mm/yyyy	Last Survey	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/Caution Required Item
22.01	6.00	0.70	5.30	01/1998	6.00	N/A	N/A	04/2008	6.60	0.000	0.000	04/2013	08/2441	NO
22.02	6.00	0.70	5.30	01/1998	6.00	N/A	N/A	04/2008	6.60	0.000	0.000	04/2013	08/2441	NO
22.03	6.00	0.70	5.30	01/1998	6.00	N/A	N/A	04/2008	6.60	0.000	0.000	04/2013	08/2441	NO
22.04	6.00	0.70	5.30	01/1998	6.00	N/A	N/A	04/2008	6.40	0.000	0.000	04/2013	12/2374	NO
22.05	6.00	0.70	5.30	01/1998	6.00	N/A	N/A	04/2008	6.40	0.000	0.000	04/2013	12/2374	NO
22.06	6.00	0.70	5.30	01/1998	6.00	N/A	N/A	04/2008	6.40	0.000	0.000	04/2013	12/2374	NO

(*) and GREEN Represent 25% of the TMLs, which have the earliest retirement dates.

BLUE (Caution TML) Corrosion Rate greater than 0.250mm/yr. or TML Remaining Life is less than 1.00 year.

RED (Action TML) TML with negative life.

If Baseline Survey Thickness Measurement was not taken at the time of Manufacture, then Nominal Thickness is used as Baseline Thickness.



DETAIL VESSEL AND PIPING INSPECTION REPORT

(Imperial)

GENERAL PRESSURE VESSEL INFORMATION

Company:	Pioneer Natural Resources Canada Inc.	LSD:	BC	C-32-H/94-H-8
Area/Facility:	Chinchaga Gas Plant	Inspection Date	06-Feb-02	Interval: 2 yrs
Vessel Name:	Recycle Suction Scrubber	A No:	BC	MTL No: VSL213
Internal Coating Type:		Next External:	2/6/2003	Next Internal: Feb, 2004
Vessel Orientation:	Vertical	Internal Coating Lining:	0	
Vessel Type:	Vertical Vessel	Fluid Type:		
Tag No:	V-800	Serial Number:	1631	
Separator Type:		Business Unit:		
Direct Fired Vessel:	N/A	Fired Tube:		
Current Status:	In Service	Flame Arrester Date Required:	Date	
Thermal Insulation:	No	Asbestos:	No	

PRESSURE VESSEL NAMEPLATE INFORMATION

MTL Number:	VSL213	Volume:	5.200 F3	CRN Number:	N-9969.21	Registered:	No
Serial Number:	1631	Size:	12.750 in O.D.	x	6 ft	0 in	Seam to Seam
Drawing Number:	9097-0850-217	P & ID Number:					
Shell Material:	SA-106-B	Bottom	Shell Thickness:	0.375 In			
		Top	Shell Thickness:	0.375 In			
Head Material:	SA-234WPB	Bottom	Head Thickness:	0.328 In			
		Top	Head Thickness:	0.328 In			
Tube Material:		Tube Size(OD):	In	Tube Thickness:	In		
Tubesheet Material:		Tubesheet Thickness:	In				
Channel Material:		Channel Type:		Channel Thickness:	In		
Design Pressure:	Shell:	245 psi	Operating Pressure:	Shell:	psi		
	Tube:	psi		Tube:	psi		
Design Temperature:	Shell:	250 F	Operating Temperature:	Shell:	F		
	Tube:	F		Tube:	F		
RT (XRay):	RT2		Heat Treatment:	No			
Code Parameters:			Joint Efficiency:				
Manufacturer:	Thermo Design Engineering		Year Built:	1998			
Corrosion Allowance:	0.063		Manway:	No			

DETAIL VESSEL AND PIPING INSPECTION REPORT**(Imperial)**

GENERAL PRESSURE VESSEL INFORMATION

Company:	Pioneer Natural Resources Canada Inc.	LSD:	BC	C-32-H/94-H-8
Area/Facility:	Chinchaga Gas Plant	Inspection Date	06-Feb-02	Interval: 2 yrs
Vessel Name:	Recycle Suction Scrubber	A No:	BC	MTL No: VSL213

VESSEL SHELL / HEADS / PIPING

External / Instrumentation Condition

The external surface of this vessel was painted with some minor chips but no evidence of corrosion or mechanical damage. The associated instrumentation appeared to be in good working order.

Internal Condition

No internal access

Nozzle Condition

The external surface of the nozzle assemblies and associated welds were noted in good condition. No visible evidence of external corrosion was noted during this inspection.

Flange Condition

The flanges are bolted properly and there was no visible evidence of leakage.

Internal Piping

Not Applicable

External Piping

The external piping was painted with no evidence of corrosion or distortion.

Pipe Support Condition

All of the supports are in place, secure and functioning proeprly.

Bolting Condition

The associated bolting and gaskets were in place and appeared to be tight.

Firetube Condition

Not Applicable

Demister Pad Condition

Not Applicable

Anode Condition

Not Applicable

Vessel Support

The skid base and base plate skirt were noted in good condition.



DETAIL VESSEL AND PIPING INSPECTION REPORT

(Imperial)

GENERAL PRESSURE VESSEL INFORMATION

Company:	Pioneer Natural Resources Canada Inc.	LSD:	BC	C-32-H/94-H-8
Area/Facility:	Chinchaga Gas Plant	Inspection Date	06-Feb-02	Interval: 2 yrs
Vessel Name:	Recycle Suction Scrubber	A No:	BC	MTL No: VSL213

VESSEL COATING INSPECTION

Type of Coating

Coating Manufacturer and Type

Location

Coating Condition

VESSEL NONDESTRUCTIVE TESTING

NDE Type UT Survey

Location of Test

Contractors Name

Rivest

Qualifications

Last UT Survey Date

Feb 3, 2002

Interval

2 yrs

Next UT Date: Feb 3, 2004

Survey By

MTL Testing Inc.

Test Results

VESSEL STATUS

Suitable for Further Service?	Yes	Repairs Required?	No
Owners Representative		Repairs Completed?	
Owners Date		Repairs Completed By	
		Repair Date	

Recommendations

Perform internal inspection next turnaround or in 3 years
 Service PSV in 3 years
 Repeat UT in 3 years

Details of Repairs



INSPECTION GROUP INC.

DETAIL VESSEL AND PIPING INSPECTION REPORT

(Imperial)

GENERAL PRESSURE VESSEL INFORMATION

Company:	Pioneer Natural Resources Canada Inc.	LSD:	BC	C-32-H/94-H-8
Area/Facility:	Chinchaga Gas Plant	Inspection Date	06-Feb-02	Interval: 2 yrs
Vessel Name:	Recycle Suction Scrubber	A No:	BC	MTL No: VSL213

PSV DATA

Side	Set Pressure psi	CRN Number	Manufacturer PSV Number	Model Serial Number	Capacity	Size Inches	Set Date
Shellside	245	06-0386-5C	Farris PNR8000	27-CA-23-120 32411-26-KT	310 SCFM	0.75 x 1	Dec/1999

CURRENT VESSEL PROCESS CONDITIONS

Sweet Gas	LPG
-----------	-----

Name (Printed)	Signature	Date
Visual Inspector Paul Gorman API510	<i>Admission for Paul Gorman</i>	February 06, 2002
QA Supervisor: (Chief Inspector)		
QA Administrator:		
ABSA Inspector:		

EQUIPMENT NO: 603VS015

Page of

FACILITY: Chinchaga Gas Plant		PROV. REG. NO:	
EQUIPMENT NAME: Recycle Suction Scrubber		TAG NO:	
SIZE: 324mm	OD x	L/H 1829mm	MAWP: 1689
LSD : C-032-H / 094-H-08		MANWAY	kPa @ 121/-29 °C
		<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO

SERVICE: FLUID: Natural Gas

<input type="checkbox"/> SOUR	<input checked="" type="checkbox"/> SWEET	<input type="checkbox"/> CRYOGENIC		
SCOPE OF INSPECTION		TYPE OF INSPECTION:		CLEANING:
<input type="checkbox"/> PRECOMMISSIONING	<input type="checkbox"/> AE	<input type="checkbox"/> MT	<input type="checkbox"/> RT	<input checked="" type="checkbox"/> GOOD
<input checked="" type="checkbox"/> INITIAL	<input type="checkbox"/> ET	<input type="checkbox"/> MFL	<input checked="" type="checkbox"/> UT	<input type="checkbox"/> FAIR
<input type="checkbox"/> REINSPECTION	<input type="checkbox"/> LT	<input type="checkbox"/> PT	<input checked="" type="checkbox"/> VT	<input type="checkbox"/> INADEQUATE
	<input type="checkbox"/> OTHER			ACCESS:
				<input type="checkbox"/> FULL
				<input type="checkbox"/> PARTIAL
				<input checked="" type="checkbox"/> EXTERNAL

PLEASE ADD PAGES AND SKETCHES AS NEEDED (TURN OVER FOR SKETCH)

OBSERVATIONS: EXTERNAL

1. LADDERS, STAIRWAYS, PLATFORMS AND WALKWAYS
2. FOUNDATIONS AND SUPPORTS
3. NOZZLES
4. GROUNDING CONNECTIONS
5. PROTECTIVE COATINGS AND INSULATION Epoxy
6. EXTERNAL METAL SURFACES N/A
7. FANS AND OTHER ANCILLARY EQUIPMENT N/A
8. PRESSURE RELIEF DEVICES
9. NAME PLATE
10. ULTRASONIC INSPECTION SURVEY
11. INSPECTION REPORT COMPLETED
12. NON CONFORMANCE COMPLETED N/A
13. OIP LABEL APPLIED
14. PICTURE ON FILE

COMMENTS

CHECKED BOX INDICATES ACCEPTANCE

RECOMMENDATIONS:

SUITABLE FOR

REMEDIAL ACTION

FURTHER SERVICE: YES NO

PRIORITY: HIGH MEDIUM LOW

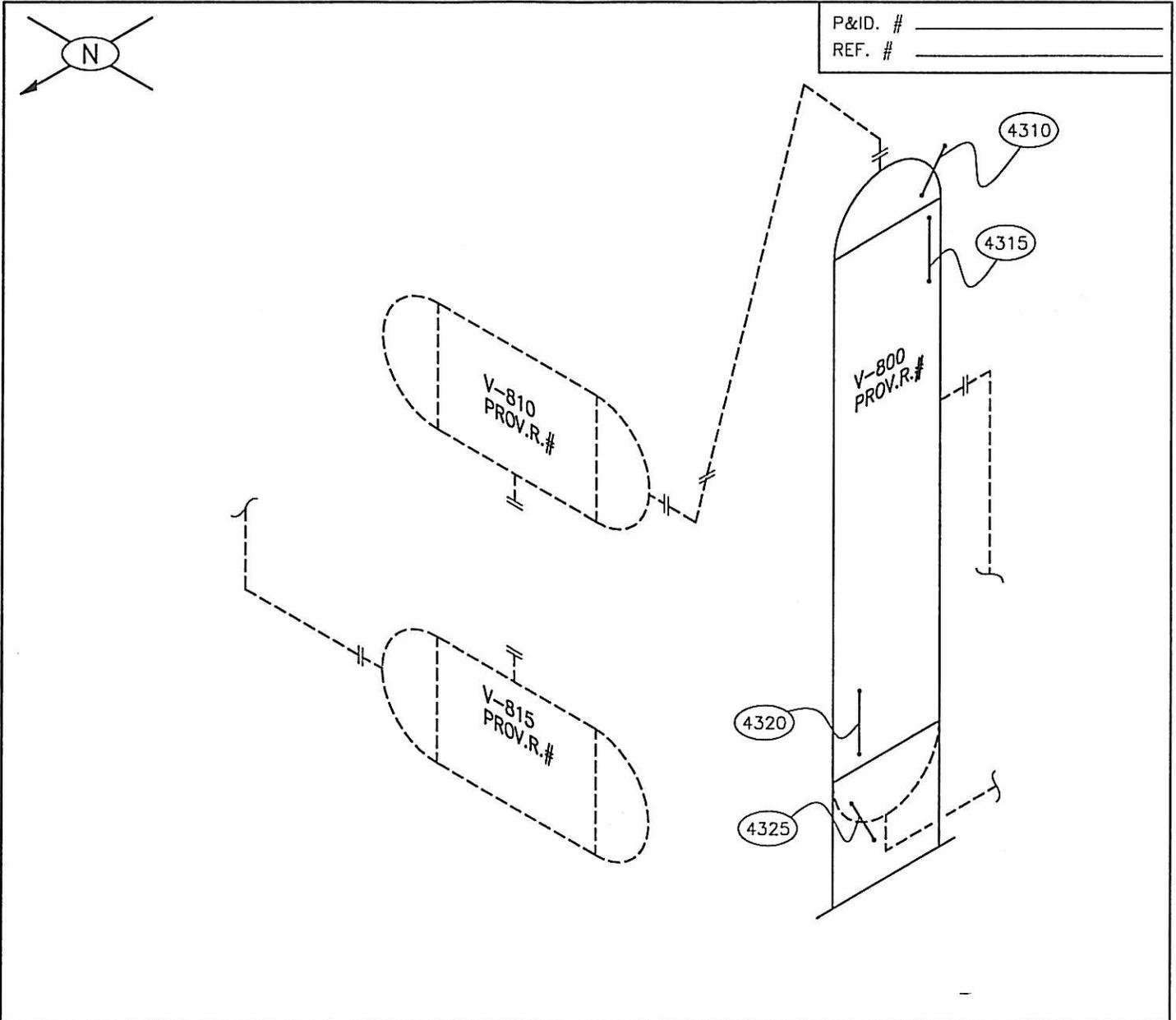
INSPECTION PERFORMED BY: Mark Tomko

DATE OF INSPECTION 08 04 2008
(DD MONTH YYYY)

FOLLOW-UP INSPECTION REQ'D:

YES NO BY DATE:

(DD MONTH YYYY)



P&ID. # _____
 REF. # _____

VESSEL DATA

Prov. Reg. No. _____ C.R.N. N9969.21 P.E. No. V-800 Serial No. 1631
 MFR. THERMO DESIGN Code/Div. _____ Para _____ Code Stamp U
 Yr. Bilt. 1998 Yr. Inst. _____ Size 12 3/4"X6' Vol.: _____ Service _____ PWHT _____

Nominal Thickness & Material
 Head: 8.3mm Mat'l: SA 234 WPB C.A.: 0.0625" Insulated NO R.T. 2
 Head: _____ Repairs _____
 Shell: 9.5mm SA 106 B C.A.: 0.0625" COMMENTS _____
 Shell: _____

Chan Hd: _____ C.A.: _____
 Chan Sh: _____
 Gas Boot Hd: _____ C.A.: _____
 Gas Boot Sh.: _____
 Liq. Boot Hd.: _____ C.A.: _____
 Liq Boot Sh.: _____

MAWP Shell Side 245psi @ Temp. -20/250°F
 MAWP Tube Side _____ @ Temp. _____

PIONEER NATURAL RESOURCES CANADA INC.
 CHINCHAGA GAS PLANT
 LSD C-32-H \ 94-H-8
 RECYCLE COMPRESSOR C-810
 RECYCLE SUCTION SCRUBBER
 TECH.: J.OLIVER | REV.DATE: _____ | DWG DATE: 02/2002
 CAD: MKM | REVISION: _____ | DRAWING: 043

Equip No V-800	Serial No 1631	Prov Reg No N/A
Description RECYCLE SUCTION SCRUBBER		

043 - 010

<p>TML Description: TOP HEAD</p> <p>T Nominal: 8.3</p> <p>Min Nominal: 6.7</p> <p>Corr Allowance: 1.6</p>																																																		
<i>Data Readings</i>																																																		
<i>Data Evaluations</i>		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Dec-99</th> <th style="text-align: center;">Feb-02</th> </tr> </thead> <tbody> <tr><td>Point 1</td><td style="text-align: center;">10.0</td><td style="text-align: center;">9.9</td></tr> <tr><td>Point 2</td><td style="text-align: center;">9.9</td><td style="text-align: center;">10.0</td></tr> <tr><td>Point 3</td><td style="text-align: center;">9.9</td><td style="text-align: center;">9.9</td></tr> <tr><td>Point 4</td><td style="text-align: center;">9.4</td><td style="text-align: center;">9.9</td></tr> <tr><td>Point 5</td><td style="text-align: center;">10.8</td><td style="text-align: center;">9.9</td></tr> <tr><td>Point 6</td><td></td><td></td></tr> <tr><td>Point 7</td><td></td><td></td></tr> <tr><td>Point 8</td><td></td><td></td></tr> <tr><td>Point 9</td><td></td><td></td></tr> <tr><td>Point 10</td><td></td><td></td></tr> <tr><td>Point 11</td><td></td><td></td></tr> <tr><td>Point 12</td><td></td><td></td></tr> <tr><td>Average</td><td style="text-align: center;">10.0</td><td style="text-align: center;">9.9</td></tr> <tr><td>Avg Low 3</td><td style="text-align: center;">9.7</td><td style="text-align: center;">9.9</td></tr> <tr><td>Lowest</td><td style="text-align: center;">9.4</td><td style="text-align: center;">9.9</td></tr> </tbody> </table>		Dec-99	Feb-02	Point 1	10.0	9.9	Point 2	9.9	10.0	Point 3	9.9	9.9	Point 4	9.4	9.9	Point 5	10.8	9.9	Point 6			Point 7			Point 8			Point 9			Point 10			Point 11			Point 12			Average	10.0	9.9	Avg Low 3	9.7	9.9	Lowest	9.4	9.9
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<p>Months Remaining to T Min: 999</p> <p>Min Calc'd Wall Thickness: N/A</p> <p>Thick Remain Above T Min: 3.2</p> <p>Short Term Corr Rate: N/A</p> <p>Long Term Corr Rate: N/A</p> <p>Months Remain to LFL: 83</p> <p>Lowest Value - Last Reading: 9.9</p>																																																		
Comment:																																																		

043 - 015

<p>TML Description: TOP SHELL</p> <p>T Nominal: 9.5</p> <p>Min Nominal: 7.9</p> <p>Corr Allowance: 1.6</p>																																																		
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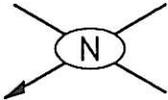
* Unless otherwise displayed, all measurements displayed in millimeters

TML Description: BTM. SHELL T Nominal: 9.5 Min Nominal: 7.9 Corr Allowance: 1.6			
<i>Data Readings</i>			
<i>Data Evaluations</i>		Dec-99	Feb-02
Months Remaining to T Min:	999	Point 1	9.7 9.8
Min Calc'd Wall Thickness:	N/A	Point 2	10.0 10.0
Thick Remain Above T Min:	1.6	Point 3	9.6 9.7
Short Term Corr Rate:	N/A	Point 4	9.5 9.5
Long Term Corr Rate:	N/A	Point 5	9.5 9.7
Months Remain to LFL:	N/A	Point 6	9.7 9.8
Lowest Value - Last Reading:	9.5	Point 7	
Comment:		Point 8	
		Point 9	
		Point 10	
		Point 11	
		Point 12	
		Average	9.7 9.8
		Avg Low 3	9.5 9.6
		Lowest	9.5 9.5

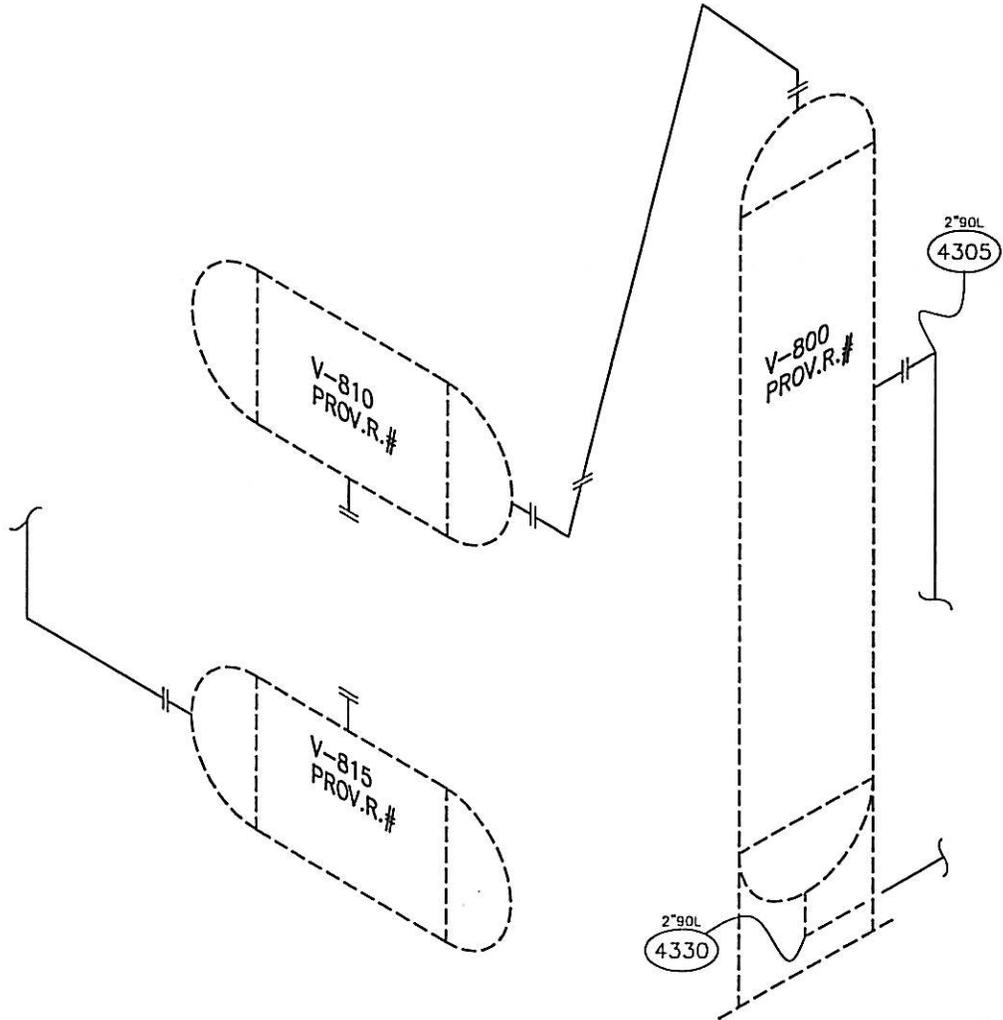
TML Description: BTM. HEAD T Nominal: 8.3 Min Nominal: 6.7 Corr Allowance: 1.6			
<i>Data Readings</i>			
<i>Data Evaluations</i>		Dec-99	Feb-02
Months Remaining to T Min:	999	Point 1	8.9 9.0
Min Calc'd Wall Thickness:	N/A	Point 2	8.9 9.1
Thick Remain Above T Min:	2.3	Point 3	9.0 9.1
Short Term Corr Rate:	N/A	Point 4	8.9 9.0
Long Term Corr Rate:	N/A	Point 5	
Months Remain to LFL:	182	Point 6	
Lowest Value - Last Reading:	9.0	Point 7	
Comment:		Point 8	
		Point 9	
		Point 10	
		Point 11	
		Point 12	
		Average	8.9 9.1
		Avg Low 3	8.9 9.0
		Lowest	8.9 9.0

TML Description: 2" 90' L T-B T Nominal: 8.7 Min Nominal: 7.1 Corr Allowance: 1.6		
<i>Data Readings</i>		
<i>Data Evaluations</i>		Dec-99 Feb-02
	Months Remaining to T Min: 999	Point 1 7.1 7.2
	Min Calc'd Wall Thickness: N/A	Point 2 7.0 7.2
	Thick Remain Above T Min: N/A	Point 3 6.9 7.2
	Short Term Corr Rate: N/A	Point 4 6.9 6.9
	Long Term Corr Rate: N/A	Point 5 7.0 7.1
	Months Remain to LFL: N/A	Point 6
	Lowest Value - Last Reading: 6.9	Point 7
		Point 8
		Point 9
		Point 10
		Point 11
		Point 12
	Average 7.0 7.1	
	Avg Low 3 6.9 7.1	
	Lowest 6.9 6.9	
Comment:		

* Unless otherwise displayed, all measurements displayed in millimeters



P&ID. # _____
 REF. # _____



PIPING DATA

CORR. ALL

* ASTM

TML	SIZE	MAT'L	FLG. RATING	PROC.	LINE #	SPEC.	SCH.	NOM. THK.	** DESIGN *** CALC.	MIN. THK.	CAL. THK.	CODE
4305	2"						40	3.9mm	ASTM	3.4mm		
4330	2"						160	8.7mm	ASTM	7.6mm		

COMMENTS: _____

PIONEER NATURAL RESOURCES CANADA INC.
 CHINCHAGA GAS PLANT
 LSD C-32-H \ 94-H-8

RECYCLE COMPRESSOR C-810
 RECYCLE SUCTION SCRUBBER PIPING

TECH.: J.OLIVER REV.DATE: DWG DATE: 02/2002
 CAD: MKM REVISION: DRAWING: 043A

Equip No	N/A	Serial No	N/A	Prov Reg No	N/A
Description					

043 - 005

TML Description: 2" 90' L B-T	
T Nominal:	3.9
Min Nominal:	3.4
Corr Allowance:	ASTM

Data Readings

<i>Data Evaluations</i>		<u>Dec-99</u> <u>Feb-02</u>	
		Point 1	4.7
Point 2	4.5	4.6	
Point 3	4.7	4.6	
Point 4	4.8	4.8	
Point 5	4.8	4.9	
Point 6			
Point 7			
Point 8			
Point 9			
Point 10			
Point 11			
Point 12			
Average	4.7	4.7	
Avg Low 3	4.6	4.6	
Lowest	4.5	4.6	

Months Remaining to T Min: 999
 Min Calc'd Wall Thickness: N/A
 Thick Remain Above T Min: 1.2
 Short Term Corr Rate: N/A
 Long Term Corr Rate: N/A
 Months Remain to LFL: 182
 Lowest Value - Last Reading: 4.6

Comment:

Unique OUP #: 603VS015 Old OUP #: _____ LSD: C-032-H/094-H-08
 PLANT / FIELD: Chinchaga Gas Plant Down Hole Location: _____ RENTAL: No
 EQUIPMENT NAME: Recycle Suction Scrubber Unique # of Compressor this equipment is related to: _____
 VESSEL STATUS: Active PRIMARY LOCATION: Gas Plant Vessel Car-Sealed Out? _____
 PHYSICAL LOCATION: Refrigeration Building YEAR INSTALLED: _____

SERVICE: Sweet H₂S _____ PROCESS FLUID: Natural Gas, Wet CYCLIC: _____

MANUFACTURER: Thermo Design Engineering Ltd. DWG.# 9097-0520-217 Rev.1 S N: 1631
 PRN _____ for VESSEL or SHELL CRN N9969.21 YR. BUILT 1998
 NB: _____ CODE/DIV. ASME VIII DIV.1 PARA. _____ STAMP U

SHELL-TANK RADIOGRAPHY: RT2 JOINT EFF. 100% PWHT: Not Stated
 MAWP 1689 kPa AT 121 °C MDMT -29 °C AT 1689 kPa
 DIA. ID 304.8 mm LENGTH: _____ mm HEIGHT: 1828.8 mm VOLUME: _____ m³
 Shell Longitudinal Seam Present _____ Pipe _____

<u>SECTION</u>	<u>MATERIAL</u>	<u>NOMINAL THICKNESS</u>	<u>C.A.</u>
Head	SA-234-WPB	8.33 mm	1.59 mm
Shell	SA-106-B	9.53 mm	1.59 mm
		mm	mm
		mm	mm
		mm	mm
		mm	mm

Heat Exchangers, Tubing, Channel, Line Heater coil PRN _____ CRN _____ RADIOGRAPHY: _____
 MAWP _____ kPa AT _____ °C MDMT _____ °C AT _____ kPa S N: _____
 CODE/DIV. _____ PARA. _____ STAMP _____ TUBE/TUBE SHEET _____ TEMA CLASS _____
 DIA. _____ mm LENGTH: _____ mm TUBE SIZE _____ mm # of Tubes _____

<u>SECTION</u>	<u>MATERIAL</u>	<u>NOMINAL THICKNESS</u>	<u>C.A.</u>
		mm	mm
		mm	mm
		mm	mm
		mm	mm

TUBING: PRN _____ CRN _____ TEMA CLASS _____ TYPE _____ S N: _____
 MAWP _____ kPa AT _____ °C TUBE SIZE _____ mm GAUGE, BWG _____ TUBE/TUBE SHEET JT. _____
of Tubes MATERIAL NOMINAL THICKNESS C.A.

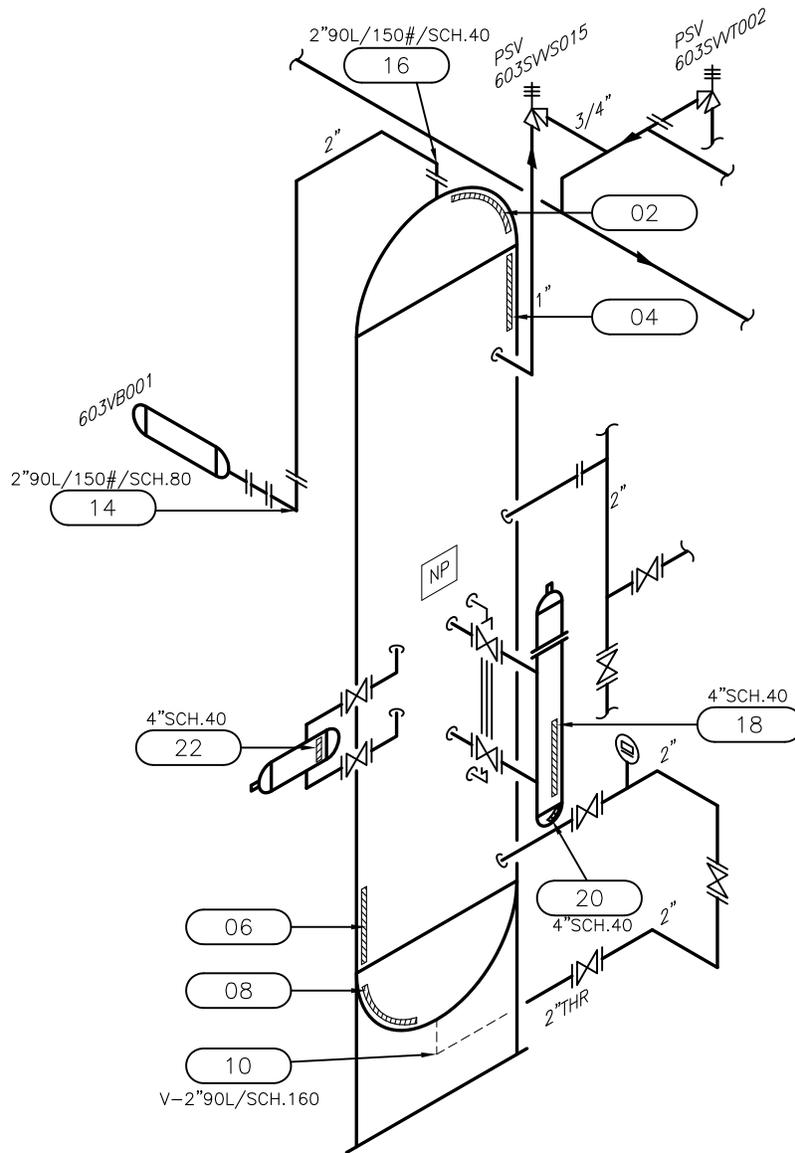
<u># of Tubes</u>	<u>MATERIAL</u>	<u>NOMINAL THICKNESS</u>	<u>C.A.</u>
		mm	mm

COIL: PRN _____ CRN _____ COIL NAME: _____ HP, LP, FG, HS
 MAWP _____ kPa AT _____ °C TUBE SIZE _____ mm S N: _____
of Tubes MATERIAL NOMINAL THICKNESS C.A.

<u># of Tubes</u>	<u>MATERIAL</u>	<u>NOMINAL THICKNESS</u>	<u>C.A.</u>
		mm	mm

P&ID NO.: N/S

REF. NO.: N/A



U1A ON FILE

P.E. NO.: N/S OUP#: 603VS015
 PROV. REG. NO.: N/S C.R.N.: N9969.21
 SERIAL NO.: 1631 N.B. NO.: N/S

Code/Div.: ASME VIII DIV.1 Size: 304.8mm ID X 1828.8mm S/S
 Radiography: RT-2 Service: SWEET
 Insulated: NO PWHT: N/S
 Year Built: 1998 Manway: NO Size: N/A
 Manufacturer: THERMO DESIGN ENGINEERING LTD.

Design & Materials Data

HEAD
 Mat'l: SA-234-WPB Nom.: 8.33mm C.A.: 1.59mm
 Mat'l: _____ Nom.: _____ C.A.: _____

SHELL
 Mat'l: SA-106-B Nom.: 9.53mm C.A.: 1.59mm
 Mat'l: _____ Nom.: _____ C.A.: _____

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

CHANNEL
 Mat'l: _____ Nom.: _____ C.A.: _____

MAWP Shell Side: 1689 KPA @ Temp.: 121°C/-29°C
 MAWP Tube Side: _____ @ Temp.: _____

CLIENT	TAQA NORTH	
FACILITY	CHINCHAGA GAS PLANT	
	LSD C-032-H/ 094-H-08	
ITEM	RECYCLE SUCTION SCRUBBER	
TECH/CAD: C.R.E./F.Y.C.	DATE: 07/2018	DWG. No.: 033

CLIENT:	TAQA North	PROV. REG. #:	Not Stated
FACILITY:	Chinchaga Gas Plant	SERIAL #:	1631
UNIT/AREA:		OIP NO.:	603VS015
LSD:	C-032-H/094-H-08		
DESCRIPTION:	Recycle Suction Scrubber		

Description: TOP HEAD T-B
CML: 033-02

 NOM. THICK.: 8.33 mm
 MILL. TOL.: ASTM
 CA: 1.59 mm
 MIN. NOM.: 5.70 mm

 MATERIAL: SA-234-WPB
 MINIMUM THICKNESS MEASURED: **9.50 mm**
 AVERAGE THICKNESS MEASURED: 9.93 mm
 CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	04/08/08	07/09/18			
1	9.90	10.00	0.0000	0.0000	100.00
2	9.80	9.80	0.0000	0.0000	100.00
3	9.80	9.60	0.0195	0.0000	100.00
4	9.90	9.70	0.0195	0.0000	100.00
5	9.10	9.50	0.0000	0.0000	100.00
6	11.00	11.00	0.0000	0.0000	100.00

Description: TOP SHELL T-B
CML: 033-04

 NOM. THICK.: 9.53 mm
 MILL. TOL.: ASTM
 CA: 1.59 mm
 MIN. NOM.: 6.75 mm

 MATERIAL: SA-106-B
 MINIMUM THICKNESS MEASURED: **9.70 mm**
 AVERAGE THICKNESS MEASURED: 9.90 mm
 CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	04/08/08	07/09/18			
1	10.10	10.10	0.0000	0.0000	100.00
2	10.20	10.10	0.0097	0.0000	100.00
3	9.90	9.90	0.0000	0.0000	100.00
4	9.80	9.70	0.0097	0.0000	100.00
5	9.80	9.80	0.0000	0.0000	100.00
6	9.80	9.80	0.0000	0.0000	100.00

CLIENT:	TAQA North	PROV. REG. #:	Not Stated
FACILITY:	Chinchaga Gas Plant	SERIAL #:	1631
UNIT/AREA:		OIP NO.:	603VS015
LSD:	C-032-H/094-H-08		
DESCRIPTION:	Recycle Suction Scrubber		

Description: BOTTOM SHELL T-B

CML: 033-06

NOM. THICK.: 9.53 mm
MILL. TOL.: ASTM
CA: 1.59 mm
MIN. NOM.: 6.75 mm

MATERIAL: SA-106-B
MINIMUM THICKNESS MEASURED: **9.50 mm**
AVERAGE THICKNESS MEASURED: 9.62 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	<input type="text" value="04/08/08"/>	<input type="text" value="07/09/18"/>			
1	9.80	9.70	0.0097	0.0000	100.00
2	9.70	9.80	0.0000	0.0000	100.00
3	9.70	9.50	0.0195	0.0000	70.51
4	9.60	9.50	0.0097	0.0000	100.00
5	9.70	9.60	0.0097	0.0000	100.00
6	9.70	9.60	0.0097	0.0000	100.00

Description: BOTTOM HEAD T-B

CML: 033-08

NOM. THICK.: 8.33 mm
MILL. TOL.: ASTM
CA: 1.59 mm
MIN. NOM.: 5.70 mm

MATERIAL: SA-234-WPB
MINIMUM THICKNESS MEASURED: **9.00 mm**
AVERAGE THICKNESS MEASURED: 9.05 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	<input type="text" value="04/08/08"/>	<input type="text" value="07/09/18"/>			
1	9.10	9.10	0.0000	0.0000	100.00
2	9.10	9.10	0.0000	0.0000	100.00
3	9.00	9.10	0.0000	0.0000	100.00
4	9.00	9.00	0.0000	0.0000	100.00
5	8.90	9.00	0.0000	0.0000	100.00
6	9.00	9.00	0.0000	0.0000	100.00

CLIENT:	TAQA North	PROV. REG. #:	Not Stated
FACILITY:	Chinchaga Gas Plant	SERIAL #:	1631
UNIT/AREA:		OIP NO.:	603VS015
LSD:	C-032-H/094-H-08		
DESCRIPTION:	Recycle Suction Scrubber		

Description: 1 1/2" 90L NOZZLE T-B

CML: 033-10

NOM. THICK.: 7.14 mm
MILL. TOL.: ASTM
CA: 1.59 mm
MIN. NOM.: 4.66 mm

MATERIAL: SA-333-6
MINIMUM THICKNESS MEASURED: **7.00 mm**
AVERAGE THICKNESS MEASURED: 7.12 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	04/08/08	07/09/18			
1	6.70	7.30	0.0000	0.0000	100.00
2	6.70	7.10	0.0000	0.0000	100.00
3	6.80	7.10	0.0000	0.0000	100.00
4	7.20	7.10	0.0097	0.0000	100.00
5	7.00	7.00	0.0000	0.0000	100.00

Description: 2" 90L T-B 150#

CML: 033-14

NOM. THICK.: 5.54 mm
MILL. TOL.: ASTM
CA: Not Stated
MIN. NOM.: 4.85 mm

MATERIAL:
MINIMUM THICKNESS MEASURED: **4.90 mm**
AVERAGE THICKNESS MEASURED: 5.00 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	04/08/08	07/09/18			
1	5.10	5.00	0.0097	0.0000	7.73
2	5.00	4.90	0.0097	0.0000	2.58
3	4.70	5.00	0.0000	0.0000	100.00
4	4.80	5.00	0.0000	0.0000	100.00
5	4.90	5.10	0.0000	0.0000	100.00

CLIENT:	TAQA North	PROV. REG. #:	Not Stated
FACILITY:	Chinchaga Gas Plant	SERIAL #:	1631
UNIT/AREA:		OIP NO.:	603VS015
LSD:	C-032-H/094-H-08		
DESCRIPTION:	Recycle Suction Scrubber		

Description: 2" 90L T-B 150#

CML: 033-16

NOM. THICK.: 3.91 mm
MILL. TOL.: ASTM
CA: Not Stated
MIN. NOM.: 3.42 mm

MATERIAL:
MINIMUM THICKNESS MEASURED: **4.10 mm**
AVERAGE THICKNESS MEASURED: 4.18 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	<input type="text" value="04/08/08"/>	<input type="text" value="07/09/18"/>			
1	4.10	4.10	0.0000	0.0000	100.00
2	4.20	4.10	0.0097	0.0000	35.05
3	4.10	4.20	0.0000	0.0000	100.00
4	4.30	4.30	0.0000	0.0000	100.00
5	4.10	4.20	0.0000	0.0000	100.00

Description: 4" FLOAT SHELL T-B

CML: 033-18

NOM. THICK.: 6.02 mm
MILL. TOL.: ASTM
CA: Not Stated
MIN. NOM.: 5.27 mm

MATERIAL:
MINIMUM THICKNESS MEASURED: **6.20 mm**
AVERAGE THICKNESS MEASURED: 6.30 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	<input type="text" value="04/08/08"/>	<input type="text" value="07/09/18"/>			
1	6.40	6.30	0.0097	0.0000	53.09
2	6.60	6.30	0.0292	0.0000	17.64
3	6.30	6.40	0.0000	0.0000	100.00
4	6.40	6.20	0.0195	0.0000	23.85
5	6.40	6.40	0.0000	0.0000	100.00
6	6.50	6.20	0.0292	0.0000	15.92

CLIENT:	TAQA North	PROV. REG. #:	Not Stated
FACILITY:	Chinchaga Gas Plant	SERIAL #:	1631
UNIT/AREA:		OIP NO.:	603VS015
LSD:	C-032-H/094-H-08		
DESCRIPTION:	Recycle Suction Scrubber		

Description: 4" FLOAT BOTTOM HEAD T-B
CML: 033-20

 NOM. THICK.: 6.02 mm
 MILL. TOL.: ASTM
 CA: Not Stated
 MIN. NOM.: 5.27 mm

 MATERIAL:
 MINIMUM THICKNESS MEASURED: **5.40 mm**
 AVERAGE THICKNESS MEASURED: 5.84 mm
 CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	04/08/08	07/09/18			
1	6.40	6.40	0.0000	0.0000	100.00
2	6.50	6.40	0.0097	0.0000	58.25
3	5.00	5.60	0.0000	0.0000	100.00
4	5.00	5.40	0.0000	0.0000	100.00
5	5.10	5.40	0.0000	0.0000	100.00

Description: 4" FLOAT SHELL T-B
CML: 033-22

 NOM. THICK.: 6.02 mm
 MILL. TOL.: ASTM
 CA: Not Stated
 MIN. NOM.: 5.27 mm

 MATERIAL:
 MINIMUM THICKNESS MEASURED: **6.60 mm**
 AVERAGE THICKNESS MEASURED: 6.70 mm
 CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	04/08/08	07/09/18			
1	6.60	6.70	0.0000	0.0000	100.00
2	6.60	6.80	0.0000	0.0000	100.00
3	6.60	6.70	0.0000	0.0000	100.00
4	6.40	6.70	0.0000	0.0000	100.00
5	6.40	6.60	0.0000	0.0000	100.00
6	6.40	6.70	0.0000	0.0000	100.00

EQUIPMENT EXTERNAL INSPECTION REPORT

Customer:	TAQA North	ITS Job No.:	1-4012
District:	North Area	Date:	09-Jul-2018
Facility:	Chinchaga Gas Plant	LSD:	C-032-H/094-H-08
Equip. Description:	Recycle Suction Scrubber	Serial No.:	1631
Equip./OIP No.:	603VS015	PRN:	Not Stated
Equip. Type: <input type="checkbox"/> Column <input type="checkbox"/> Cooler <input type="checkbox"/> Exchanger <input type="checkbox"/> Furnace <input type="checkbox"/> Heater <input type="checkbox"/> Plate Exchanger <input type="checkbox"/> Reboiler <input checked="" type="checkbox"/> Vessel <input type="checkbox"/> Other:			

Remedial Action	Service	Associated Components	Shell
<input checked="" type="checkbox"/> No Action Required	<input checked="" type="checkbox"/> Sweet <input type="checkbox"/> Sour	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N: Name Plate Secure	<input checked="" type="checkbox"/> Good Condition
<input type="checkbox"/> Paint/Coating Repairs	Access and Coverage	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N: Name Plate Legible	<input type="checkbox"/> External Corrosion
<input type="checkbox"/> Insulation Repairs	<input checked="" type="checkbox"/> External Inspection	External Grounding	<input type="checkbox"/> Pitting: (max depth)
<input type="checkbox"/> PSV Service Required	<input type="checkbox"/> Part. External Inspection	<input type="checkbox"/> Direct <input checked="" type="checkbox"/> Indirect <input type="checkbox"/> N	<input type="checkbox"/> Scale
<input type="checkbox"/> Further Assessment Required	<input type="checkbox"/> Internal Inspection (VI) NDE Examination	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> NA: Ladders/ Handrail/ Walkway/ Grating in safe condition?	<input type="checkbox"/> Blistered
<input type="checkbox"/> Condition Damage	<input checked="" type="checkbox"/> UT	<input type="checkbox"/> See Attached Pictures	<input type="checkbox"/> Mechanical Damage
<input type="checkbox"/> Does not comply with applicable code/safe operating requirement.	<input type="checkbox"/> MT	<input type="checkbox"/> Excessive Vibration	<input type="checkbox"/> Deformation/Distortion
<input type="checkbox"/> Repairs Required	<input type="checkbox"/> PT	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> NA: Pressure Gauge within MAWP	<input type="checkbox"/> Condensation/Sweating
<input type="checkbox"/> See Comments	<input type="checkbox"/> RT	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N <input type="checkbox"/> NA: Temp. Gauge within MDMT	<input type="checkbox"/> No Access
Status	<input type="checkbox"/> BH	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N <input type="checkbox"/> NA: Attached Piping and Instrumentation in Good Condition	<input type="checkbox"/> No Access Insulated
<input checked="" type="checkbox"/> Operational; <input type="checkbox"/> Idle;	<input type="checkbox"/> Other	<input type="checkbox"/> See Comments	<input type="checkbox"/> No Access Ice Build Up
<input type="checkbox"/> Shut In; <input type="checkbox"/> New Install;			<input checked="" type="checkbox"/> Weld(s) in Good Condition
<input type="checkbox"/> Surplus/Boneyard;			<input type="checkbox"/> Weld(s) Corroded
<input type="checkbox"/> Other:			<input type="checkbox"/> Weld(s) Poor Quality
			<input type="checkbox"/> Weld(s) Cracked
			<input type="checkbox"/> See Comments

Head (1)	Head (2)	Nozzles
<input checked="" type="checkbox"/> Top <input type="checkbox"/> North <input type="checkbox"/> West	<input checked="" type="checkbox"/> Bottom <input type="checkbox"/> South <input type="checkbox"/> East	<input checked="" type="checkbox"/> RF <input type="checkbox"/> RTJ <input type="checkbox"/> NPT
<input type="checkbox"/> Flat <input type="checkbox"/> FLG <input checked="" type="checkbox"/> ELL <input type="checkbox"/> ECC <input type="checkbox"/> HEMI <input type="checkbox"/> Other	<input type="checkbox"/> Flat <input type="checkbox"/> FLG <input checked="" type="checkbox"/> ELL <input type="checkbox"/> ECC <input type="checkbox"/> HEMI <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Good Condition
<input type="checkbox"/> Quick Open Closure	<input type="checkbox"/> Quick Open Closure	<input checked="" type="checkbox"/> Fasteners Engaged
<input type="checkbox"/> Quick Actuating Closure	<input type="checkbox"/> Quick Actuating Closure	<input type="checkbox"/> Repad Weep Holes Clear
<input checked="" type="checkbox"/> Good Condition	<input checked="" type="checkbox"/> Good Condition	<input type="checkbox"/> Nozzles are Gusseted
<input type="checkbox"/> External Corrosion	<input type="checkbox"/> External Corrosion	<input type="checkbox"/> External Corrosion
<input type="checkbox"/> Pitting: (max depth)	<input type="checkbox"/> Pitting: (max depth)	<input type="checkbox"/> Leaking/Weeping
<input type="checkbox"/> Scale	<input type="checkbox"/> Scale	<input type="checkbox"/> Damaged/Cracked
<input type="checkbox"/> Blistered	<input type="checkbox"/> Blistered	<input type="checkbox"/> Bolts Missing/Loose
<input type="checkbox"/> Mechanical Damage	<input type="checkbox"/> Mechanical Damage	<input type="checkbox"/> Deflection/Distortion
<input type="checkbox"/> Deformation/Distortion	<input type="checkbox"/> Deformation/Distortion	<input type="checkbox"/> Partial Internal Inspection
<input type="checkbox"/> Condensation/Sweating	<input type="checkbox"/> Condensation/Sweating	<input type="checkbox"/> No Access Insulated
<input type="checkbox"/> No Access	<input type="checkbox"/> No Access	<input checked="" type="checkbox"/> Weld(s) in Good Condition
<input type="checkbox"/> No Access Insulated	<input type="checkbox"/> No Access Insulated	<input type="checkbox"/> Weld(s) Corroded
<input type="checkbox"/> No Access Ice Build Up	<input type="checkbox"/> No Access Ice Build Up	<input type="checkbox"/> Weld(s) Poor Quality
<input type="checkbox"/> External Protection Only	<input type="checkbox"/> External Protection Only	<input type="checkbox"/> Weld(s) Cracked
<input type="checkbox"/> See Comments	<input type="checkbox"/> See Comments	<input type="checkbox"/> See Comments



External Surface	Supports	Associated Piping	PRD 1	PRD 2
<input checked="" type="checkbox"/> Good Condition	<input checked="" type="checkbox"/> Good Condition	<input checked="" type="checkbox"/> Good Condition	Location: Shell	Location: Not Applicable
<input checked="" type="checkbox"/> Painted <input checked="" type="checkbox"/> Full <input type="checkbox"/> Part.	<input checked="" type="checkbox"/> Anchor Bolts Secure	<input type="checkbox"/> Corrosion	PSV Tag No.: 603SVVS015	PSV Tag No.: Not Applicable
<input type="checkbox"/> Coated <input type="checkbox"/> Full <input type="checkbox"/> Part.	<input type="checkbox"/> Welded to Skid	<input type="checkbox"/> Pitting: <small>(max depth)</small>	<input checked="" type="checkbox"/> Service Date within Interval	<input type="checkbox"/> Service Date within Interval
<input type="checkbox"/> Insulated <input type="checkbox"/> Full <input type="checkbox"/> Part.	<input type="checkbox"/> Supported by Nozzle(s)	<input type="checkbox"/> Bolts Missing/ Loose/ Damaged	<input checked="" type="checkbox"/> Set Pressure within MAWP	<input type="checkbox"/> Set Pressure within MAWP
<input type="checkbox"/> Insulation Damaged	<input type="checkbox"/> Piping Supported	<input type="checkbox"/> Short Bolting	<input checked="" type="checkbox"/> Safety Seal Intact	<input type="checkbox"/> Safety Seal Intact
<input type="checkbox"/> Penetration Seals Broken	<input type="checkbox"/> Expansion Slots	<input type="checkbox"/> Valves leaking	<input checked="" type="checkbox"/> Service Seal Intact	<input type="checkbox"/> Service Seal Intact
<input type="checkbox"/> Corrosion Under Insulation (CUI)	<input type="checkbox"/> Bolts Missing/ Loose/ Damaged	<input type="checkbox"/> Connections Leaking	<input checked="" type="checkbox"/> Current Service Tag Attached	<input type="checkbox"/> Current Service Tag Attached
<input type="checkbox"/> Visible Moisture Contamination	<input type="checkbox"/> Short Bolting	<input checked="" type="checkbox"/> Piping and Valves Supported	<input type="checkbox"/> PSV inlet Gusseted	<input type="checkbox"/> PSV inlet Gusseted
<input type="checkbox"/> Paint Deterioration	<input type="checkbox"/> Deflected/Distorted	<input type="checkbox"/> Piping Deflected/ Distorted	<input type="checkbox"/> Inlet Block Valve	<input type="checkbox"/> Inlet Block Valve
<input type="checkbox"/> Coating Deterioration	<input type="checkbox"/> Poor Insulation	<input type="checkbox"/> No Access Insulated	Locked Open <input type="checkbox"/> Y <input type="checkbox"/> N	Locked Open <input type="checkbox"/> Y <input type="checkbox"/> N
<input type="checkbox"/> Fireproofing Cracked	<input type="checkbox"/> Fire Proofing Cracked	<input type="checkbox"/> See Comments	Sealed Open <input type="checkbox"/> Y <input type="checkbox"/> N	Sealed Open <input type="checkbox"/> Y <input type="checkbox"/> N
<input type="checkbox"/> External Protection Only	<input checked="" type="checkbox"/> Vessel is level		<input type="checkbox"/> Outlet Block Valve	<input type="checkbox"/> Outlet Block Valve
<input type="checkbox"/> See Comments	<input type="checkbox"/> See Comments		Locked Open <input type="checkbox"/> Y <input type="checkbox"/> N	Locked Open <input type="checkbox"/> Y <input type="checkbox"/> N
			Sealed Open <input type="checkbox"/> Y <input type="checkbox"/> N	Sealed Open <input type="checkbox"/> Y <input type="checkbox"/> N
			<input type="checkbox"/> See Comments	<input type="checkbox"/> See Comments

Observations:

Equipment in Good, Fair, or Poor Condition

Good: No concerns found (may still have recommendations)
Fair: Minor issues found that do not impair the "fitness for service" of the equipment, (paint deterioration, general external surface corrosion - no measurable metal loss, not mounted to skid, etc.)
Poor: Equipment had moderate to major concerns found (equipment is damaged, severe external corrosion noted, cracked or broken component, etc.)

Based on API 510 Visual External Inspection this vessel is fit for service

(This piece of equipment meets the jurisdictional requirements based on the information available at the time of the inspection.)

- Vessel is in good condition.
- Paint is in good condition.

Recommendations:

- None.

Non-Conformance Conditions and Corrective Actions:

Note: Reference any and all Non-Conformance Report (NCR) numbers and Corrective Action Report (CAR) numbers.

- None.

Recommended Inspection Intervals:

Recommended Maximum Inspection Interval:	60	Months	PRD 1 Recommended Service Interval:	60	Months	PRD 2 Recommended Not Applicable Service Interval:	Months
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External Inspection Performed By:		ABSA IPV PESL: 000782	
Print Name:	Christopher Russell Earl	Certification No.:	API 510: 45377
Signature:		Report Reviewed:	 Initial

Chief Inspector / Client Representative:	_____	_____	_____
	Name (Print)	Signature	Date: