

V-655

REFRIGERANT SUCTION SCRUBBER

Quality Control Documentation

CTC

W
RT-2

MANUFACTURED AND CERTIFIED BY

THERMO DESIGN
ENGINEERING LTD.

EDMONTON

ALBERTA

CANADA

UNIT NAME

TAG NUMBER

REFRIGERANT SUCTION SCRUBBER

V-655

CR. NUMBER

SERIAL NUMBER

④ NUMBER

N-9967.21

#1620

M.A.W.P.

AT TEMP.

M.D.M.T.

AT PRESSURE

260 PSIG

150°F

-49°F

260 PSIG

YEAR BUILT

CORR. ALL

DRAWING NUMBER

1998

0.0625 IN

9097-0850-207

DIAMETER

LENGTH

CAPACITY

WEIGHT

30 IN OD

7-6 S/S

39.5 CU FT

1750 LBS

SHELL MATL.

HEAD MATL.

TBSHT. MATL.

COIL MATL.

SA-516-70N

SA-516-70N
SA-516-70N

SHELL THK.

HEAD MIN. THK.

TBSHT. THK.

COIL THK.

0.375 IN

0.345 IN
0.345 IN



TO: THERMO DESIGN ENGINEERING LTD

BOX 5557 STATION L
EDMONTON ALTA
T6C 4E9

Account # 19971

Date: 98/03/25

Journal # 18824

Attn: JASON HARGREAVES

Re: THERMO DESIGN ENGINEERING LTD

DESIGN REGISTRATION

C.R.N.

N9967.2

Drawings / Documents	Description
REF SUCT SCRUBBER 9097-0850-207 REV 0	REGISTERED MDMT ----- -49 F MAWT ----- 150 F MAWP ----- 260 psi 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 \$ 225.00

CRN issued in accordance with the ACI Policies on Reciprocal Recognition of Design Review for Registration. Alberta issued CRN N9967.2 on March 17, 1998.

cb
Encl:
cc:

Yours truly,

R. TUAZON
Design Surveyor

Ministry of
Municipal Affairs
and Housing

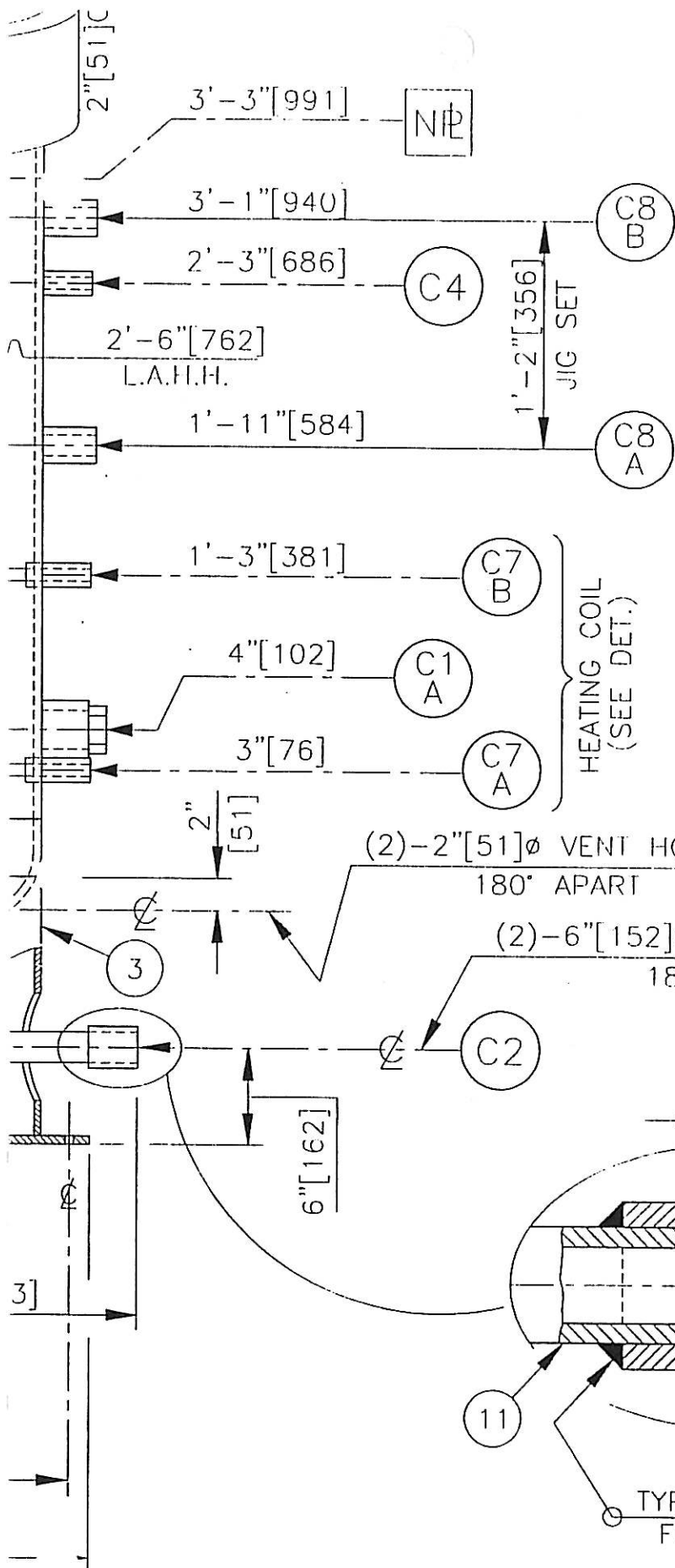
Boiler and Elevator
Safety Branch

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

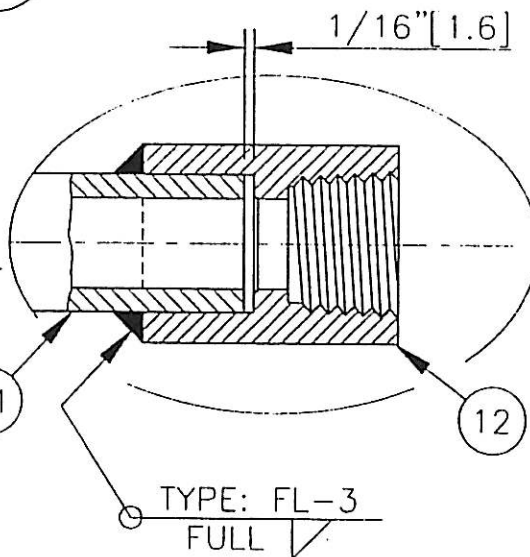
Telephone: (604) 680-6254
Facsimile: (604) 775-2345

INLET DEFLECTOR DET

SCALE: 1:10



ALBERTA BOILERS SAFETY ASSOCIATION PROVINCE OF ALBERTA SAFETY CODES ACT		
REG. No. N-9967.2		
DWG. No. 9097-0850-207 Rev. 0		
Design Press. MPa	Design Temp. °C	
1793	-45/66	
MAR 17 1998 ACCEPTED		
Date	Signed	DJORDJE SRNIC DESIGN SURVEY ENGINEER



1



MANUFACTURED AND CERTIFIED BY
**THERMO DESIGN
ENGINEERING LTD.**

EDMONTON

ALBERTA

CANADA

UNIT NAME

TAG NUMBER

REFRIGERANT SUCTION SCRUBBER

N-655

CR. NUMBER

SERIAL NUMBER

Ⓐ NUMBER

N-655-21

1620

Ⓐ

M.A.W.P.

AT TEMP.

M.D.M.T.

AT PRESSURE

260 PSIG

150

-49

260 PSIG

YEAR BUILT

CORR. ALL.

DRAWING NUMBER

1998

00625N

9097-0350-207

DIAMETER

LENGTH

CAPACITY

WEIGHT

30 IN OD

7-5 S/S

39.5 CU FT

1730 LBS

SHELL MATL.

HEAD MATL.

TBSHT. MATL.

COIL MATL.

SA-516-70N

SA-516-70N

SHELL THK.

HEAD MIN. THK.

TBSHT. THK.

COIL THK.

0.375 IN

0.375 IN

[illegible]



TAQA NORTH DATA					
EQUIP NO.: 603VS010		RAMS ID TAG NO.: NEW		PRN: N/A	
CATEGORY:		PLANT/FIELD: CHINCHAGA GAS PLANT		LSD: C-032-H / 094-H-08	
LOCATION: GAS PLANT		EQUIP. NAME : REFRIGERANT SUCTION SCRUBBER		CLASS : VS	
TYPE: SCRUBBER		SERVICE: ☒ Sweet ☐ Sour		H2S: N/A PPM	
FLUID: LPG,NGL, PROPANE		S/D REQT.: ☐ Yes ☐ No ☐ Partial		OPERATING PRESSURE: 83 ☒ kPa ☐ PSI	
OPERATING TEMPERATURE: -14 ☒ °C ☐ °F		OPERATING STATUS: ☒ IN SERVICE ☐ Not In Service		M/WAY(16"AND ABOVE): ☐ Yes ☒ No	
SIZE:					

MANUFACTURING DATA					
MFG.: THERMO ENG.		DWG. NO.: 9097-0850-207		SERIAL NO.: 1620	
YR. BUILT: 1998		STAMP: W		CRN: N9967.21	
CODE/DIV.: ASME VIII DIV 1		PARA.: N/A		SUPPORT: ☒ Skirt ☐ Saddles ☐ Nozzles ☐ N/A	
MAWP: 1763 ☒ kPa ☐ PSI		@ TEMP: 66 ☒ °C ☐ °F		MDMT: -45 ☒ °C ☐ °F	
VOLUME: 39.5 ☐ M ³ ☒ FT ³		FLANGE RATING: N/A		PWHT: ☐ Yes ☒ No	
RADIOGRAPHY: ☐ RT1 ☒ RT2 ☐ RT3 ☐ RT4 ☐ Spot ☐ Full ☐ N/A		SIZE : 762 ☒ mm. ☐ inch. ☐ ID ☐ OD		LENGTH: N/A ☐ mm. ☐ inch.	
HEIGHT: 2286 ☒ mm. ☐ inch.		INSULATION TYPE: ☐ Fiberglass ☐ Wool ☒ Low Temp ☐ Asbestos Other:		INSULATION THK: 40 ☒ mm. ☐ inch.	
SECTION		MATERIAL		NOMINAL mm	
C.A. mm		SHELL		SA-516-70N	
9.5 MM		HEAD		SA-516-70N	
1.6 MM					
COMMENTS:					

TUBING DATA					
MAWP: N/A ☐ kPa ☐ PSI		@ TEMP: N/A ☐ °C ☐ °F		TEMA CLASS: N/A	
TYPE: N/A		TUBE SIZE: N/A mm. ☐ ID ☐ OD		NUMBER (QTY OF TUBES): N/A	
GAUGE (BWG): N/A		JOINT: ☐ Welded ☐ Rolled			
SECTION		MATERIAL		NOMINAL mm	
C.A. mm		N/A		N/A	
N/A		N/A		N/A	
N/A		N/A		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	
INTERNAL:		N/A	
LINING:		N/A	
CLADDING:		N/A	

PRESSURE RELIEF DEVICES DATA			☐ PSV not located		☐ No PSV	
EQUIP. NO.		TAG NO.		SET		
CAPACITY		CAP UNITS/OTHER		603SVVS010		
N/A		N/A		1763 ☒ kPa ☐ PSI		
N/A		N/A		14992 ☒ SCFM ☐ LB/hr. ☐ GAL/min.		
N/A		N/A		N/A ☐ SCFM ☐ LB/hr. ☐ GAL/min.		
N/A		N/A		N/A ☐ SCFM ☐ LB/hr. ☐ 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 II, 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 #1620 N-9967.21 9097-0850-207/Rev.0 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

1995
Year

to 1996

Addenda (Date)

Code Case Nos.

Special Service per UG 120(d)

6. Shell: SA-516-70N 0.375" 0.0625" 29.25" ID 7'-6" S/S
Mat'l. (Spec. No., Grade) Nom. Thk. (in.) Corr. Allow. (in.) Diam. I.D. (ft. & in.) Length (overall) (ft. & in.)

7. Seams: Dbt"V" Full 100 N/A N/A Sgl"V" CS: Spot 1
Long. (Welded, Dbt., Sngl., Lap, Butt) R.T. (Spot or Full) Eff. (%) H.T. Temp (F) Time (hr) Girth (welded, Dbt., Sngl., Lap, Butt) R.T. (Spot, Partial, or Full) No. of Courses

8. Heads: (a) Mat'l. SA-516-70N (b) Mat'l. SA-516-70N
(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	0.345"	0.0625"			2:1				Concave
(b)	Bottom	0.345"	0.0625"			2:1				Concave

If removable, bolts used (describe other fastenings)

N/A

(Mat'l., Spec. No., Gr., Size, No.)

9. MAWP 260 psi at max. temp. 150 ° F
Min. design metal temp. -49 ° F at 260 psi. Hydro., pneu., or comb. test pressure 390 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	8"	RFWN	SA-333-6	150#Sch.80	N/A	UW-16.1(c)	Shell
N2	1	8"	RFWN	SA-333-6	150#Sch.80	N/A	UW-16.1(c)	Head
C1A/B	2	2"	CPLG	SA-350-LF2	6000#	N/A	UW-16.1(c)	Shell
C2	1	1 1/2"	CPLG	SA-333-6	6000#Sch160	N/A	UW-16.1(c)	Head

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

2. 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)

10"OD x 7'-6" S/S, Refrigerant Suction Scrubber "V-655"

Capacity: 39.5 Cu Ft.

Impact Test: As Per UG-84 / Exempt Per UCS-66(a) (b)

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 98-03-25 Co. Name THERMO DESIGN ENGINEERING LTD. Signed Bikhar
(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 25, 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 98-3-25 Signed L Hajos Commissions 39R
(Authorized Inspector) (Nat'l Board (incl. endorsements) State, Prov. and No.)

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 exch., etc)

#1620

(Mfg's serial No.)

n-9967.21

(CRN)

9097-0850-207/Rev.0

(Drawing No.)

(Nat'l. Bd. No.)

1998

(Year built)

Data Report

Item Number

Remarks

0 - Nozzles	C3A/B	2	1 1/2"	CPLG	SA-350-LF2	6000#	N/A	UW-16.1(c)	Shell
	C4	1	3/4"	LG CPLG	SA-350-LF2	6000#	N/A	UW-16.1(c)	Shell
	C5A/B	2	3/4"	LG CPLG	SA-350-LF2	6000#	N/A	UW-16.1(c)	Shell
	C6	1	3/4"	LG CPLG	SA-350-LF2	6000#	N/A	UW-16.1(c)	Shell
	C7A/B	2	1/2"	LG CPLG	SA-350-LF2	6000#	N/A	UW-16.1(c)	Shell
	C8A/B	2	1"	LG CPLG	SA-350-LF2	6000#	N/A	UW-16.1(c)	Shell

2 - Remarks

Registered Drawing No.: 9097-0850-207/Rev.0

CS:Spot Radiography: As PEr UW-11(a) (5) (b)

PSV: On Piping

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

Date 98-03-25 Name THERMO DESIGN ENGINEERING LTD.

(Manufacturer)

Signed Bill Harris

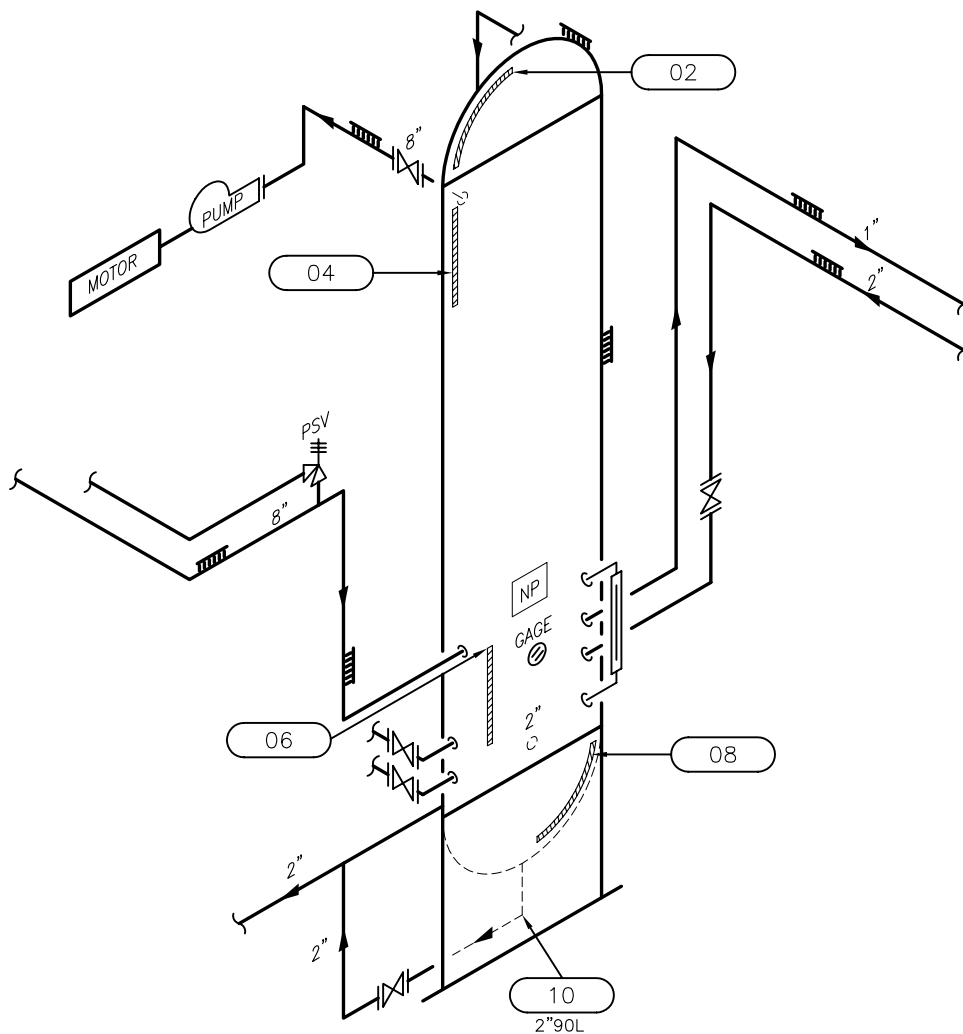
(Representative)

Date 98-3-25 Name R. Hajaj

(Authorized Inspector)

Commission 39R

(Nat'l Board (incl. endorsements) State, Province and No.)



Integrity Testing
SERVICES

P.E. No.: <u>N/S</u>	Yr. Blt.: <u>1998</u>
OIP# <u>603VS010</u>	Manway: <u>NO</u>
Serial No.: <u>1620</u>	Size: <u>762mm x 2286mm</u>
P.R.N. (A) <u>N/S</u>	Service: <u>SWEET</u>
C.R.N.: <u>N9967.21</u>	PWHT: <u>NO</u>
Code/Div.: <u>ASME VIII DIV. 1</u>	RT: <u>2</u>
Para: <u>N/S</u>	Insulated: <u>LOW TEMP</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-516-70N</u>	Material: <u>SA-516-70N</u>
Nom.: <u>8.8mm</u>	Nom.: <u>9.5mm</u>
C.A.: <u>1.6mm</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>1763 KPA</u>	@ Temp.: <u>66°C</u>
MAWP Tube Side: _____	@ Temp.: _____

CLIENT

TAQA NORTH

FACILITY

CHINCHAGA GAS PLANT

LSD C-032-H/094-H-08

ITEM

REFRIGERANT SUCTION SCRUBBER

Comments: _____

BY: M.T.

DATE: 2008/04

DWG.# 020

TAQA North

Unit: N-603

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08	DESIGN PRESSURE:	1763 kPa / 256 psi
ITEM DESC.:	REFRIGERANT SUCTION SCRUBBER	DESIGN TEMP.:	66 C / 151 F
EQUIP / OIP#:	603VS010	RECOMMENDED NEXT INSP. DATE:	04/2008
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	04/2129
SERIAL #:	1620	REM. LIFE (from last survey 04/2008):	121.00 yrs.
CRN.:	N9967.21	TOTAL CAUTION / ACTION TML:	2

Item # (020)

COMMENTS:

2008/04 - DRAIN ELBOW WELDED TO VESSEL AND PIPE IS COMMING OFF. IT IS A
THREADED FITTING.

TML No.: 2 TOP HD T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.33 mm.

MATERIAL: SA516-70

MINIMUM THICKNESS MEASURED: 9.20 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey Date mm/yyyy	Prev. Survey Date mm/yyyy	Prev. Survey Date mm/yyyy	Last Survey Date mm/yyyy	Last Survey Date mm/yyyy	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/Caution Required Item
2.01	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	9.40	0.000	0.000	04/2013	08/2741	NO
2.02	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	9.40	0.000	0.000	04/2013	08/2741	NO
2.03	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	9.40	0.000	0.000	04/2013	08/2741	NO
2.04	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	9.20	0.000	0.000	04/2013	12/2674	NO
2.05	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	9.30	0.000	0.000	04/2013	04/2708	NO
2.06	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	9.30	0.000	0.000	04/2013	04/2708	NO

TML No.: 4 TOP SH T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.95 mm.

MATERIAL: SA516-70

MINIMUM THICKNESS MEASURED: 9.60 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey Date mm/yyyy	Prev. Survey Date mm/yyyy	Prev. Survey Date mm/yyyy	Last Survey Date mm/yyyy	Last Survey Date mm/yyyy	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	9.60	0.000	0.000	04/2013	12/2574	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	10.00	0.000	0.000	04/2013	04/2708	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	10.00	0.000	0.000	04/2013	04/2708	NO
4.06	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

(*) 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:	1763 kPa / 256 psi
ITEM DESC.:	REFRIGERANT SUCTION SCRUBBER	DESIGN TEMP.:	66 C / 151 F
EQUIP / OIP#:	603VS010	RECOMMENDED NEXT INSP. DATE:	04/2008
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	04/2129
SERIAL #:	1620	REM. LIFE (from last survey 04/2008):	121.00 yrs.
CRN.:	N9967.21	TOTAL CAUTION / ACTION TML:	2

Item # (020)

COMMENTS:

2008/04 - DRAIN ELBOW WELDED TO VESSEL AND PIPE IS COMMING OFF. IT IS A
THREADED FITTING.

TML No.: 6 BTM SH T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.47 mm.

MATERIAL: SA516-70

MINIMUM THICKNESS MEASURED: 9.40 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey Date mm/yyyy	Prev. Survey Date mm/yyyy	Prev. Survey Date mm/yyyy	Last Survey Date mm/yyyy	Last Survey Date mm/yyyy	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	9.50	0.000	0.000	04/2013	08/2541	NO *
6.02	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.40	0.000	0.010	04/2013	11/2155	NO *
6.03	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.50	0.000	0.000	04/2013	08/2541	NO *
6.04	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.40	0.000	0.010	04/2013	11/2155	NO *
6.05	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.50	0.000	0.000	04/2013	08/2541	NO *
6.06	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.50	0.000	0.000	04/2013	08/2541	NO *

TML No.: 8 BTM HD T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.98 mm.

MATERIAL: SA516-70

MINIMUM THICKNESS MEASURED: 9.80 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey Date mm/yyyy	Prev. Survey Date mm/yyyy	Prev. Survey Date mm/yyyy	Last Survey Date mm/yyyy	Last Survey Date mm/yyyy	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/Caution Required Item
8.01	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	10.20	0.000	0.000	04/2013	04/3008	NO
8.02	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	10.20	0.000	0.000	04/2013	04/3008	NO
8.03	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	10.00	0.000	0.000	04/2013	08/2941	NO
8.04	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	9.80	0.000	0.000	04/2013	12/2874	NO
8.05	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	9.80	0.000	0.000	04/2013	12/2874	NO
8.06	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	9.90	0.000	0.000	04/2013	04/2908	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:	1763 kPa / 256 psi
ITEM DESC.:	REFRIGERANT SUCTION SCRUBBER	DESIGN TEMP.:	66 C / 151 F
EQUIP / OIP#:	603VS010	RECOMMENDED NEXT INSP. DATE:	04/2008
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	04/2129
SERIAL #:	1620	REM. LIFE (from last survey 04/2008):	121.00 yrs.
CRN.:	N9967.21	TOTAL CAUTION / ACTION TML:	2

Item # (020)

COMMENTS:

2008/04 - DRAIN ELBOW WELDED TO VESSEL AND PIPE IS COMING OFF. IT IS A
THREADED FITTING.

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

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 7.40 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 7.10 mm.

Pts.	Nom. Thick.	Corr. Allow.	Min. Thick.	B/L Survey Date mm/yyyy	B/L Survey Date mm/yyyy	Prev. Survey Date mm/yyyy	Prev. Survey Date mm/yyyy	Last Survey Date mm/yyyy	Last Survey Date mm/yyyy	Short Term Rate	Long Term Rate	TML Insp. Due	TML Retire. Date	Action/Caution Required Item	
10.01	8.70	1.60	7.10	01/1998	8.70	N/A	N/A	04/2008	7.30	0.000	0.137	12/2008	09/2009	NO	*
10.02	8.70	1.60	7.10	01/1998	8.70	N/A	N/A	04/2008	7.10	0.000	0.155	04/2008	04/2008	CAUTION	*
10.03	8.70	1.60	7.10	01/1998	8.70	N/A	N/A	04/2008	7.10	0.000	0.155	04/2008	04/2008	CAUTION	*
10.04	8.70	1.60	7.10	01/1998	8.70	N/A	N/A	04/2008	8.10	0.000	0.058	04/2013	05/2025	NO	*

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

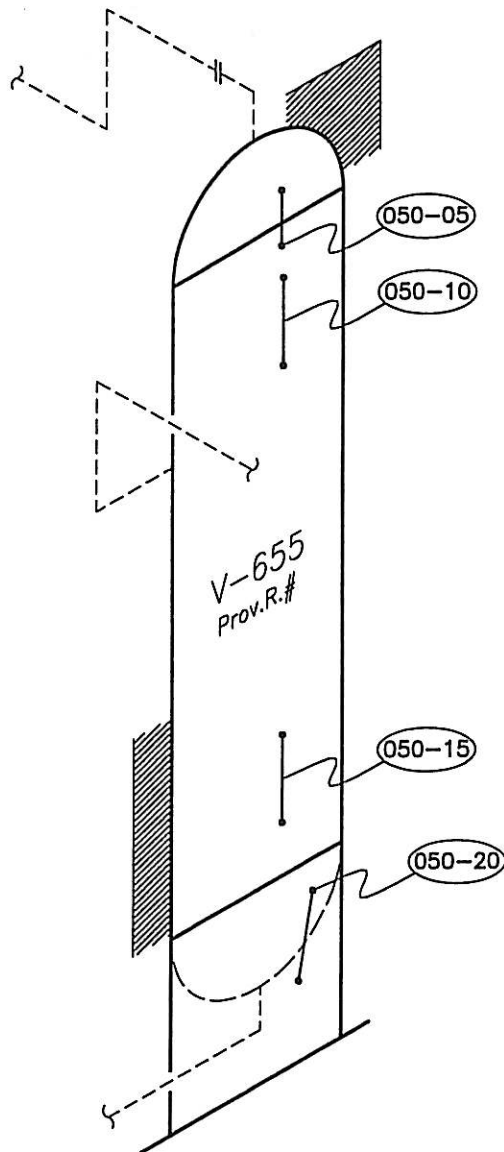
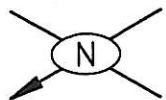
BLUE (Caution TML) Corrosion Rate greater than 0.250mm/yr. or TML Remaining Life is less than 1.00 year.

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.



TESTING INC.

P&ID. # _____
REF. # _____

VESSEL DATA

P.E. No. V-655 Serial No. 1620 Prov. Reg. No. A C.R.N. N9967.21
MFR. THERMO DESIGN Code/Div. _____ Para _____ Code Stamp U
Yr. Bld. 1998 Yr. Inst. _____ Size 30"Ø x 7'6" Service _____ PWHT _____
RT RT-2 Insulated YES

Nominal Thickness & Material

Head: .345" / 8.8mm Mat'l: SA 516 70N C.A. .0625" (1.6mm)
Head: _____
Shell: .375" / 9.5mm SA 516 70N .0625" (1.6mm)

Shell: _____
Chan Hd: _____
Chan Sh: _____
Boot Hd: _____
Boot Sh: _____

MAWP Shell Side 260PSI @ Temp. -49/150°F

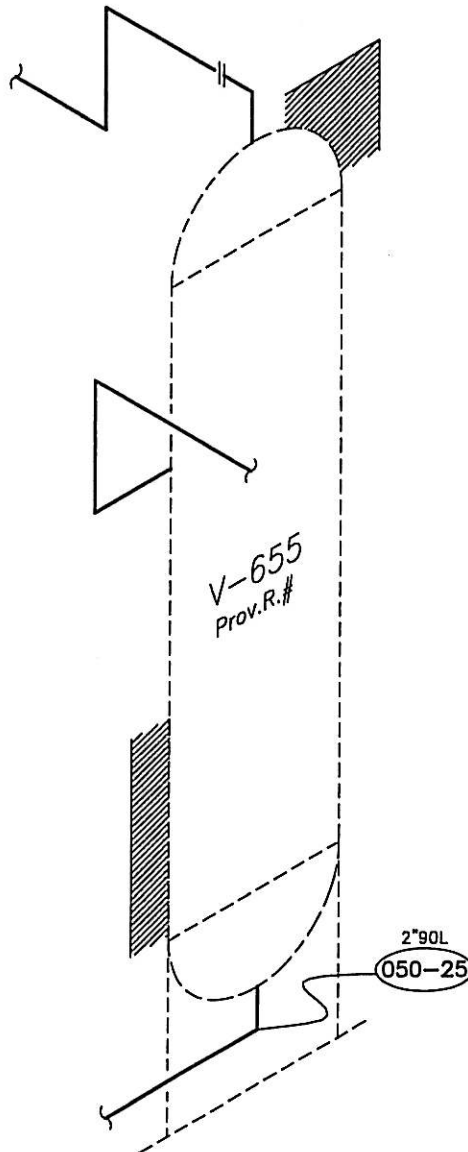
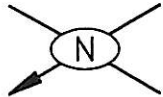
MAWP Tube Side _____ @ Temp. _____

COMMENTS: NO RDGS. FOR 20 & 25 ICED

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

PROPANE ECONOMIZER

TECH.: J.O.	REV. DATE:	DWG DATE: 99/08
CAD: WO	REVISION:	DRAWING: 050



P&ID # _____
REF. # _____

PIPING DATA

THICKNESS MEASUREMENT LOCATION:	SIZE	PROC.	LINE #	SPEC.	SCH.	NOM.THK.	API * CORR. ALLW. ** CALCULATED CORR.ALLW.	MIN.THK.	CAL.THK.	FLG. RATING
050-25	1-1/2"				160	7.1mm	* 1.6mm	4.6mm		

COMMENTS: _____

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

REFRIGERATION SUCTION SCRUBBER

TECH.: JO	REV.DATE:	DWG.DATE: 99/12
CAD: WO	REVISION:	DRAWING: 050A

PIONEER NATURAL RESOURCES CANADA INC.
CHINCHAGA GAS PLANT

RIVEST TESTING INC.

Item Desc.: C-32-H/94-H-8 / REFRIGERANT SUCTION SCRUBBER

Equip. No.: V-655

Ser. No.: 1620

Prov. Reg.: N/A

Pt.Desc.: TOP HEAD

Point No.: 050-05

Nominal: 8.800 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: 7.200

Suggested Max Insp. Interval In Mths.: 12

Survey Dates: 1999-12

Data Readings	1	9.700	_____
	2	9.600	_____
	3	9.600	_____
	4	9.600	_____
	5	9.900	_____

Data Evaluation

Lowest Reading : 9.600

Average - Low 3 : 9.600

Thk.Remaining Above Min. : 2.400

Indv. Short Term Rate (mm/yr) :

Short Term Rate (mm/yr) :

LongTerm Rate (mm/yr) :

Pt.Desc.: TOP SHELL

Point No.: 050-10

Nominal: 9.500 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: 7.900

Suggested Max Insp. Interval In Mths.: 12

Survey Dates: 1999-12

Data Readings	1	9.700	_____
	2	9.800	_____
	3	9.800	_____
	4	9.800	_____
	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) :

PIONEER NATURAL RESOURCES CANADA INC.
CHINCHAGA GAS PLANT

RIVEST TESTING INC.

Item Desc.: C-32-H/94-H-8 / REFRIGERANT SUCTION SCRUBBER

Equip. No.: V-655

Ser. No.: 1620

Prov. Reg.: N/A

Pt.Desc.: BTM.SHELL

Point No.: 050-15

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	9.600	____.____
	2	9.600	____.____
	3	9.500	____.____
	4	9.600	____.____
	5	9.600	____.____
	6	9.600	____.____

Data Evaluation

Lowest Reading : 9.500

Average - Low 3 : 9.567

Thk.Remaining Above Min. : 1.600

Indv. Short Term Rate (mm/yr) :

Short Term Rate (mm/yr) :

LongTerm Rate (mm/yr) :

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:	Refridgerant Suction Scrubber	A No:	BC	MTL No: VSL201
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-655	Serial Number:	1620	
Separator Type:		Business Unit:		
Direct Fired Vessel:	N/A	Fired Tube:		Cost Centre:
Current Status:	In Service	Flame Arrester Date Required:		Date
Thermal Insulation:	Yes	Asbestos:	No	

PRESSURE VESSEL NAMEPLATE INFORMATION

MTL Number:	VSL201	Volume:	39.500 F3	CRN Number:	N-9767-21	Registered:	No
Serial Number:	1620	Size:	30.000 in O.D.	x	7 ft	6 in	Seam to Seam
Drawing Number:	9097-0850-207	P & ID Number:					
Shell Material:	SA-516-70N	Bottom	Shell Thickness:	0.375	In		
		Top	Shell Thickness:	0.375	In		
Head Material:	SA-516-70N	Bottom	Head Thickness:	0.345	In		
		Top	Head Thickness:	0.345	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: 260 psi	Operating Pressure:	Shell: psi				
	Tube: psi		Tube: psi				
Design Temperature:	Shell: 150 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:	Refridgerant Suction Scrubber	A No:	BC	MTL No: VSL201

VESSEL SHELL / HEADS / PIPING

External / Instrumentation Condition

The external surface of this vessel was insulated and cladded. The cladding needs to be sealed. The vessel was partially painted with no evidence of corrosion. The associated instrumentation appeared to be in good working order.

Internal Condition

No internal access

Nozzle Condition

The accessible nozzle and coupling appeared to be in good condition. There was no evidence of degradation or corrosion.

Flange Condition

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

Internal Piping

Not Applicable

External Piping

The piping was painted with no evidence of corrosion. The associated pressure welds were intact and revealed no signs of deterioration or visible cracking.

Pipe Support Condition

The associated pipe supports were in good condition with no evidence of any mechanical damage or degradation.

Bolting Condition

The associated bolting and gaskets wer ein place and appeared to be tight.

Firetube Condition

Not Applicable

Demister Pad Condition

Not Applicable

Anode Condition

Not Applicable

Vessel Support

The skid base, skirt assembly and bolts were all 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:	Refrigerant Suction Scrubber	A No:	BC	MTL No: VSL201

VESSEL COATING INSPECTION

Type of Coating

Coating Manufactuer 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

Consider performing an internal inspection next turnaround or in 3 years
Service PSV in 3 years
Repeat UT Survey

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:	Refridgerant Suction Scrubber	A No:	BC	MTL No: VSL201

PSV DATA

Side	Set Pressure psi	CRN Number	Manufacturer PSV Number	Model Serial Number	Capacity	Size Inches	Set Date
	260		Farris PNR6551	26-LA10-120-L/SP 43871-1-A10	14970 SCFM	3 x	Dec/1999

CURRENT VESSEL PROCESS CONDITIONS

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

Name (Printed)	Signature	Date
Visual Inspector Paul Gorman API510		February 06, 2002
QA Supervisor: (Chief Inspector)		
QA Administrator:		
ABSA Inspector:		

EQUIPMENT NO: 603VS010

Page of

FACILITY: Chinchaga Gas Plant

PROV. REG. NO:

EQUIPMENT NAME: Refrigerant Suction Scrubber

TAG NO:

SIZE: 762mm OD x L/H 2286mm MAWP: 1763 kPa @ 66/-45 °C

LSD : C-032-H / 094-H-08

MANWAY ☐ YES ☒ NO

SERVICE:

FLUID: N.G.L.,Propane , L.P.G.

☐ SOUR ☒ SWEET ☐ CRYOGENIC

SCOPE OF INSPECTION

TYPE OF INSPECTION:

CLEANING:

ACCESS:

☐ PRECOMMISSIONING

☐ AE

☐ MT

☐ RT

☒ GOOD

☐ FULL

☒ INITIAL

☐ ET

☐ MFL

☒ UT

☐ FAIR

☐ PARTIAL

☐ REINSPECTION

☐ LT

☐ PT

☒ VT

☐ INADEQUATE

☒ EXTERNAL

☐ OTHER

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 & Insulation
6. EXTERNAL METAL SURFACES ☐ None
7. FANS AND OTHER ANCILLARY EQUIPMENT ☒ Pump motor
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

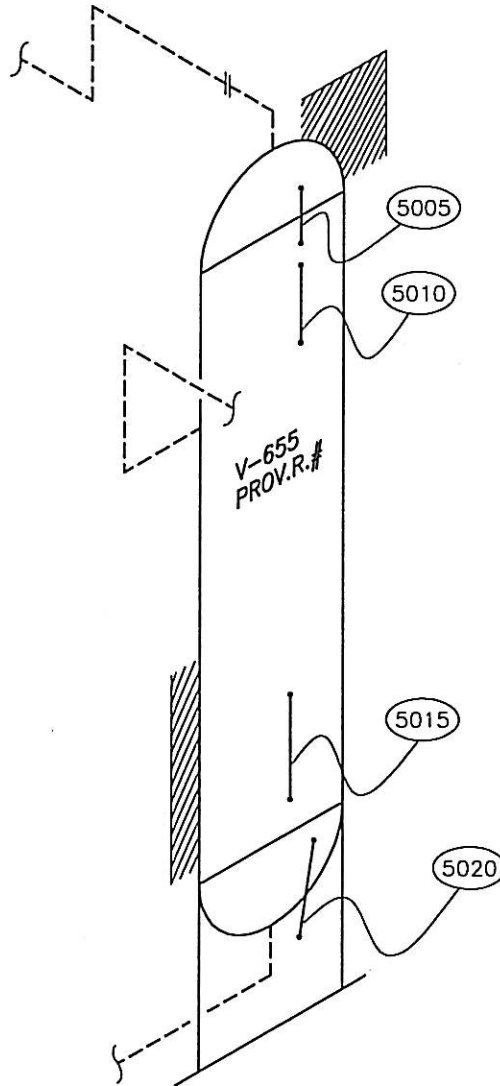
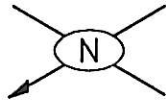
INSPECTION PERFORMED BY: Mark Tomko

DATE OF INSPECTION 07 04 2007
(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. N 9967.21 P.E. No. V-655 Serial No. 1620
MFR. THERMO DESIGN Code/Div. _____ Para _____ Code Stamp U
Yr. Bld. 1998 Yr. Inst. _____ Size 30"ØX7'6" Vol.: _____ Service _____ PWHT _____

Nominal Thickness & Material

Head: 8.8mm Mat'l: SA 516-70N C.A.: 1.6mm

Head: _____

Shell: 9.5mm SA 516-70N C.A.: 1.6mm

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 260psi @ Temp. -49/150°F

MAWP Tube Side _____ @ Temp. _____

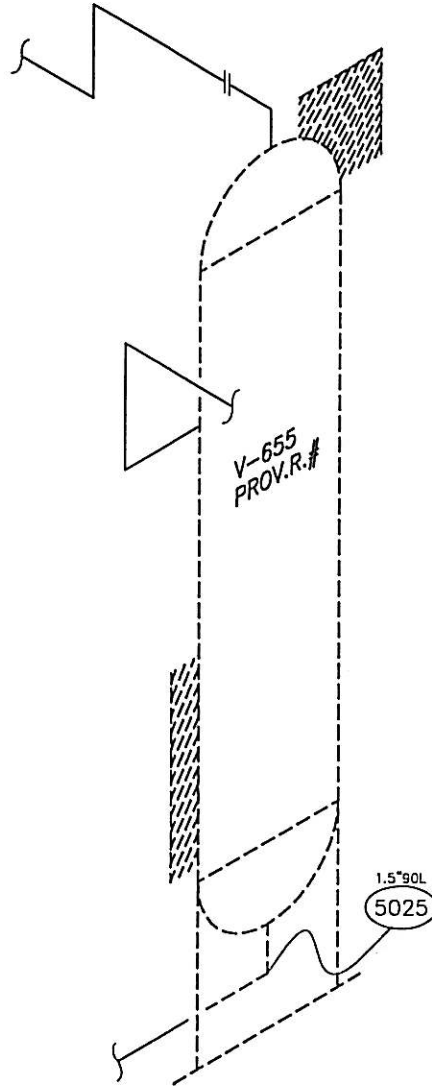
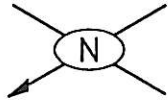
Insulated YES R.T. 2

Repairs _____
COMMENTS NO READINGS FOR 20 & 25, ICED

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

REFRIGERANT SUCTION SCRUBBER

TECH.: J.OLIVER	REV.DATE:	DWG DATE: 02/2002
CAD: MKM	REVISION:	DRAWING: 050



P&ID. # _____
REF. # _____

PIPING DATA

T.M.L.	SIZE	MAT'L	FLG. RATING	PROC.	LINE #	SPEC.	SCH.	NOM. THK.	CORR.ALL		MIN. THK.	CAL. THK.	CODE
									* ASTM	** DESIGN *** CALC.			
5025	1.5"						160	7.1mm	*	1.6mm	4.6mm		

COMMENTS: _____

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

REFRIGERANT SUCTION SCRUBBER PIPING

TECH.: J.OLIVER	REV.DATE:	DWG DATE: 02/2002
CAD: MKM	REVISION:	DRAWING: 050A

Equip No V-655

Serial No 1620

Prov Reg No N/A

Description PROPANE ECONOMIZER

050 - 005

TML Description: TOP HEAD

T Nominal: 8.8

Min Nominal: 7.2

Corr Allowance: 1.6

*Data Readings**Data Evaluations*

Months Remaining to T Min: 598
 Min Calc'd Wall Thickness: N/A
 Thick Remain Above T Min: 2.3
 Short Term Corr Rate: N/A
 Long Term Corr Rate: N/A
 Months Remain to LFL: 182
 Lowest Value - Last Reading: 9.5

Comment:

	Dec-99	Feb-02
Point 1	9.7	9.8
Point 2	9.6	9.7
Point 3	9.6	9.6
Point 4	9.6	9.5
Point 5	9.9	9.9
Point 6		
Point 7		
Point 8		
Point 9		
Point 10		
Point 11		
Point 12		
Average	9.7	9.7
Avg Low 3	9.6	9.6
Lowest	9.6	9.5

050 - 010

TML Description: TOP SHELL

T Nominal: 9.5

Min Nominal: 7.9

Corr Allowance: 1.6

*Data Readings**Data Evaluations*

Months Remaining to T Min: 999
 Min Calc'd Wall Thickness: N/A
 Thick Remain Above T Min: 1.8
 Short Term Corr Rate: N/A
 Long Term Corr Rate: N/A
 Months Remain to LFL: N/A
 Lowest Value - Last Reading: 9.7

Comment:

	Dec-99	Feb-02
Point 1	9.7	9.7
Point 2	9.8	9.8
Point 3	9.8	9.8
Point 4	9.8	9.9
Point 5	9.8	9.8
Point 6	9.8	9.9
Point 7		
Point 8		
Point 9		
Point 10		
Point 11		
Point 12		
Average	9.8	9.8
Avg Low 3	9.8	9.8
Lowest	9.7	9.7

050 - 015

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	9.6 9.7
Min Calc'd Wall Thickness:	N/A	Point 2	9.6 9.6
Thick Remain Above T Min:	1.7	Point 3	9.5 9.6
Short Term Corr Rate:	N/A	Point 4	9.6 9.6
Long Term Corr Rate:	N/A	Point 5	9.6 9.6
Months Remain to LFL:	26	Point 6	9.6 9.6
Lowest Value - Last Reading:	9.6	Point 7	
Comment:		Point 8	
		Point 9	
		Point 10	
		Point 11	
		Point 12	
		Average	9.6 9.6
		Avg Low 3	9.6 9.6
		Lowest	9.5 9.6

050 - 020

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

TML Description: 2" 90' L T-B

T Nominal: 8.7

Min Nominal: 7.1

Corr Allowance: 1.6

*Data Readings**Data Evaluations*

Months Remaining to T Min: 999
 Min Calc'd Wall Thickness: N/A
 Thick Remain Above T Min: 0.2
 Short Term Corr Rate: N/A
 Long Term Corr Rate: N/A
 Months Remain to LFL: N/A
 Lowest Value - Last Reading: 7.3

Comment:

Feb-02

Point 1	7.5
Point 2	7.3
Point 3	7.5
Point 4	7.7
Point 5	7.7
Point 6	
Point 7	
Point 8	
Point 9	
Point 10	
Point 11	
Point 12	
Average	7.5
Avg Low 3	7.4
Lowest	7.3

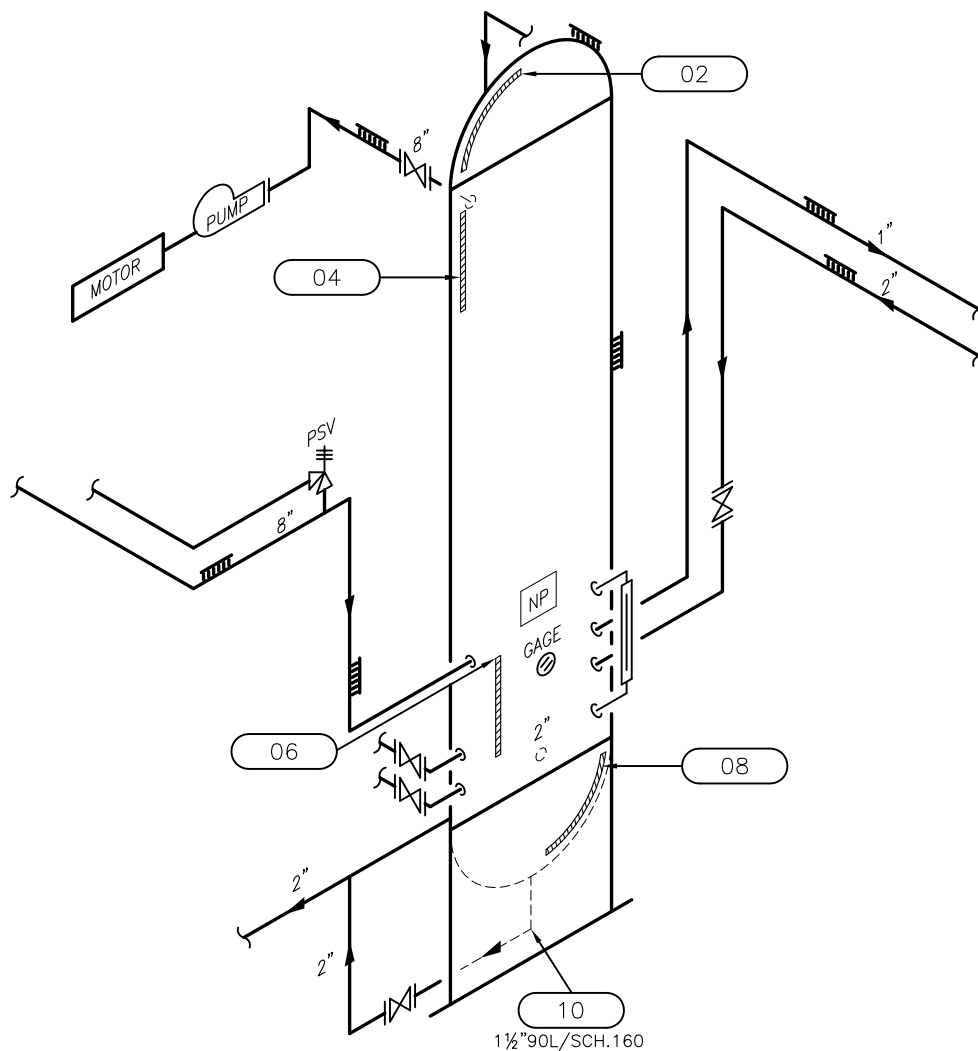
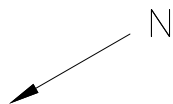
RAM#		434015		EQUIP STATIC RECORD				JOB#		2636	
Unique OUP #:		603VS010		Old OUP #:				LSD:		C-032-H/094-H-08	
PLANT / FIELD:		Chinchaga Gas Plant		Down Hole Location:				RENTAL:			
EQUIPMENT NAME:		Refrigerant Suction Scrubber		Unique # of Compressor this equipment is related to:							
VESSEL STATUS:		Active		PRIMARY LOCATION:		Gas Plant		Vessel Car-Sealed Out?			
PHYSICAL LOCATION:						YEAR INSTALLED:					
SERVICE:		Sweet		H2S		PROCESS FLUID:		LPG		CYCLIC:	
MANUFACTURER:		Thermo Design Engineering Ltd.		DWG.#		9097-0850-207		S N:		1620	
PRN		for VESSEL or SHELL		CRN		N9967.21		YR. BUILT		1998	
NB:		CODE/DIV.		ASME VIII DIV.1		PARA.		STAMP		U	
SHELL-TANK				RADIOGRAPHY:		RT2		JOINT EFF.		PWHT:	
MAWP		1763 kPa		AT		66 °C		MDMT		-45 °C	
DIA. OD		762.0 mm		LENGTH:		mm		HEIGHT:		2286.0 mm	
VOLUME:		m³									
SECTION		MATERIAL		NOMINAL THICKNESS		C.A.					
Shell		SA-516-70N		9.525		mm		1.600		mm	
Head		SA-516-70N		8.763		mm		1.600		mm	
						mm				mm	
						mm				mm	
						mm				mm	
						mm				mm	
						mm				mm	
Heat Exchangers, Tubing, Channel, Line Heater coil											
MAWP		kPa		AT		°C		MDMT		°C	
CODE/DIV.		PARA.		STAMP		TUBE/TUBE SHEET		TEMA CLASS		S N:	
DIA.		mm		LENGTH:		mm		TUBE SIZE		mm	
# of Tubes		MATERIAL		NOMINAL THICKNESS		C.A.					
						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.	
								mm		mm	
COIL: PRN CRN COIL NAME: HP, LP, FG, HS											
MAWP		kPa		AT		°C		TUBE SIZE		mm	
# of Tubes		MATERIAL		NOMINAL THICKNESS		C.A.					
						mm				mm	

RAM# 434015		EQUIP STATIC RECORD		JOB# 2636	
Unique OUP #: 603VS010		Old OUP #:		LSD: C-032-H/094-H-08	
TANK M/WAY OD FLANGE DIMENSIONS: X mm OR IF M/WAY IS ROUND, DIA. IS: mm					
TK. HEATED: TYPE OF HEAT: TK. SKIDDED or PORTABLE: GAS BLANKET: DOUBLE WALL:					
TK. CONSTRUCTION: TANK DYKED: DYKE MATERIAL: Leak Tag#:					
DYKE LINED: TYPE of LINER: Leak Test Co. Leak Test Date					
DYKE SHAPE: mm Width: mm Height: mm					
DYKE VOLUME: m³ TK. BASE SITTING ON: BETWEEN TK. AND BASE:					
TANKS INSIDE DYKE:					
P&ID #: SHUT DOWN: Partial					
OPERATING PRESSURE: 83 kPa OPERATING TEMP. 3 °C YEAR PUT IN SERVICE:					
VESSEL CONNECTIONS: NPT FLANGE LARGEST CONNECTION mm INSPECTION PORT: None					
FLANGE ANSI: FLG. FACE: SIZE of INSPECTION PORT: mm					
VESSEL ORIENTATION: Vertical TYPE OF VESSEL SUPPORT: Skirt IS BOTTLE (VB) BLOCKED:					
TRAY(VT): # of TRAYS MAT'L MFG.					
PACKING(VK): EXT. INSULATED: Full or Partially covered?					
INSULATION TYPE: CLADDING:					
TYPE of EXT. INSULATION: EXT. INSULATION THICKNESS: 40.0 mm CUI Susceptible:					
EXT. COATING: INTERNAL COATING: INTER. LINING:					
PRESSURE RELIEF DATA					
PSV OUP#		SET PRESSURE	units	CODE: SV, SR, ST, SL or ESD PROTECTS - TANK, SHELL, TUBE (HA or HT), HP coil, LP coil, FG coil, HS coil (heat string coil in line heater), PL, PP, Channel A or B in HP	
603SVVS010		1793	kPa	Shell	
			kPa		
			kPa		
			kPa		
			kPa		
			kPa		
			kPa		
			kPa		
			kPa		
			kPa		
			kPa		
			kPa		
			kPa		
			kPa		
			kPa		
ITS PRINT NAME:		Erwin D. Pederson		ITS SIGNATURE: Erwin Pederson	
				DATE: data collected - yyyy-mm-dd 2014-May-05	

RAM#	434015	EQUIP STATIC RECORD	JOB#	1-4012
Unique OUP #:	603VS010	Old OUP #:	LSD: C-032-H/094-H-08	
PLANT / FIELD:	Chinchaga Gas Plant	Down Hole Location:	RENTAL:	
EQUIPMENT NAME:	Refrigerant 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	H ₂ S	PROCESS FLUID:	LPG
			CYCLIC:	
MANUFACTURER:	Thermo Design Engineering Ltd.	DWG.#	9097-0850-207	S N:
PRN	for VESSEL or SHELL	CRN	N9967.21	YR. BUILT
NB:	CODE/DIV. ASME VIII DIV.1	PARA.		STAMP
				U
SHELL-TANK				
RADIOGRAPHY:		RT2		JOINT EFF.
PWHT:				
MAWP	1793 kPa	AT	66 °C	MDMT
				-45 °C
AT	1793 kPa			
DIA. ID	743.0 mm	LENGTH:		HEIGHT:
				2286.0 mm
VOLUME:				
	m ³			
Shell Longitudinal Seam Present				
Pipe				
<u>SECTION</u>	<u>MATERIAL</u>	<u>NOMINAL THICKNESS</u>	<u>C.A.</u>	
Head	SA-516-70N	8.76 mm	1.59 mm	
Shell	SA-516-70N	9.53 mm	1.59 mm	
		mm	mm	
		mm	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	
		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	<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	<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#: 603VS010
PROV. REG. NO.: N/S C.R.N.: N9967.21
SERIAL NO.: 1620 N.B. NO.: N/S

Code/Div.: ASME VIII DIV.1 Size: 743mm ID X 2286mm S/S
Radiography: RT-2 Service: SWEET
Insulated: YES PWHT: N/S
Year Built: 1998 Manway: NO Size: N/A
Manufacturer: THERMO DESIGN ENGINEERING LTD.

Design & Materials Data

HEAD
Mat'l: SA-516-70N Nom.: 8.76mm C.A.: 1.59mm
Mat'l: Nom.: C.A.:
SHELL
Mat'l: SA-516-70N 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: 1793 KPA @ Temp.: 66°C/-45°C
MAWP Tube Side: @ Temp.:

CLIENT	TAQA NORTH	
FACILITY	CHINCHAGA GAS PLANT	
	LSD C-032-H/ 094-H-08	
ITEM	REFRIGERANT SUCTION SCRUBBER	
TECH/CAD: C.R.E./F.Y.C.	DATE: 07/2018	DWG. No.: 020

CLIENT: **TAQA North**
FACILITY: Chinchaga Gas Plant
UNIT/AREA:
LSD: C-032-H/094-H-08
DESCRIPTION: Refrigerant Suction Scrubber

PROV. REG. #: Not Stated
SERIAL #: 1620
OIP NO.: 603VS010

Description: TOP HEAD T-B
CML: 020-02

NOM. THICK.: 9.53 mm
MILL. TOL.: 0.254 mm
CA: 1.59 mm
MIN. NOM.: 7.69 mm

MATERIAL: SA-516-70N
MINIMUM THICKNESS MEASURED: **9.30 mm**
AVERAGE THICKNESS MEASURED: 9.40 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	04/07/08	07/09/18			
1	9.40	9.50	0.0000	0.0000	100.00
2	9.40	9.40	0.0000	0.0000	100.00
3	9.40	9.40	0.0000	0.0000	100.00
4	9.20	9.30	0.0000	0.0000	100.00
5	9.30	9.40	0.0000	0.0000	100.00
6	9.30	9.40	0.0000	0.0000	100.00

Description: TOP SHELL T-B
CML: 020-04

NOM. THICK.: 8.76 mm
MILL. TOL.: 0.254 mm
CA: 1.59 mm
MIN. NOM.: 6.92 mm

MATERIAL: SA-516-70N
MINIMUM THICKNESS MEASURED: **9.20 mm**
AVERAGE THICKNESS MEASURED: 9.47 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	04/07/08	07/09/18			
1	9.60	9.50	0.0097	0.0000	100.00
2	10.20	9.50	0.0682	0.0000	18.91
3	10.00	9.50	0.0487	0.0000	26.49
4	9.80	9.50	0.0292	0.0000	44.18
5	10.00	9.20	0.0780	0.0000	14.62
6	10.10	9.60	0.0487	0.0000	27.52

CLIENT: **TAQA North**
 FACILITY: Chinchaga Gas Plant
 UNIT/AREA:
 LSD: C-032-H/094-H-08
 DESCRIPTION: Refrigerant Suction Scrubber

PROV. REG. #: Not Stated
 SERIAL #: 1620
 OIP NO.: 603VS010

Description: BTM SHELL T-B
CML: 020-06

NOM. THICK.: 8.76 mm
 MILL. TOL.: 0.254 mm
 CA: 1.59 mm
 MIN. NOM.: 6.92 mm

MATERIAL: SA-516-70N
 MINIMUM THICKNESS MEASURED: **9.40 mm**
 AVERAGE THICKNESS MEASURED: 9.47 mm
 CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	04/07/08	07/09/18			
1	9.50	9.50	0.0000	0.0000	100.00
2	9.40	9.50	0.0000	0.0000	100.00
3	9.50	9.40	0.0097	0.0000	100.00
4	9.40	9.40	0.0000	0.0000	100.00
5	9.50	9.50	0.0000	0.0000	100.00
6	9.50	9.50	0.0000	0.0000	100.00

Description: BTM HEAD T-B
CML: 020-08

NOM. THICK.: 9.53 mm
 MILL. TOL.: 0.254 mm
 CA: 1.59 mm
 MIN. NOM.: 7.69 mm

MATERIAL: SA-516-70N
 MINIMUM THICKNESS MEASURED: **9.50 mm**
 AVERAGE THICKNESS MEASURED: 9.63 mm
 CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	04/07/08	07/09/18			
1	10.20	9.70	0.0487	0.0000	20.64
2	10.20	9.50	0.0682	0.0000	13.27
3	10.00	9.70	0.0292	0.0000	34.42
4	9.80	9.60	0.0195	0.0000	48.97
5	9.80	9.60	0.0195	0.0000	48.97
6	9.90	9.70	0.0195	0.0000	51.54

CLIENT:	TAQA North	PROV. REG. #:	Not Stated
FACILITY:	Chinchaga Gas Plant	SERIAL #:	1620
UNIT/AREA:		OIP NO.:	603VS010
LSD:	C-032-H/094-H-08		
DESCRIPTION:	Refrigerant Suction Scrubber		

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

CML: 020-10

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: 7.15 mm
CALCULATED T-MIN: Not Stated

Rdg.	B/L Thick. MM/DD/YY		Short Term mm/yr	Long Term mm/yr	Rem. Half Life
	04/07/08	07/09/18			
1	7.30	7.10	0.0195	0.0000	62.56
2	7.10	7.30	0.0000	0.0000	100.00
3	7.10	7.00	0.0097	0.0000	100.00
4	8.10	7.20	0.0877	0.0000	14.48

COMMENTS:
2008/04 - DRAIN ELBOW WELDED TO VESSEL.

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:	Refrigerant Suction Scrubber	Serial No.:	1620
Equip./OIP No.:	603VS010	PRN:	Not Stated
Equip. Type: ☐ Column ☐ Cooler ☐ Exchanger ☐ Furnace ☐ Heater ☐ Plate Exchanger ☐ Reboiler ☒ Vessel ☐ Other:			

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

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

External Surface	Supports	Associated Piping	PRD 1	PRD 2
☒ Good Condition	☒ Good Condition	☒ Good Condition	Location: Shell	Location:
☐ Painted ☐ Full ☐ Part.	☒ Anchor Bolts Secure	☐ Corrosion	PSV Tag No.: 603SVVS010	PSV Tag No.:
☐ Coated ☐ Full ☐ Part.	☐ Welded to Skid	☐ Pitting: (max depth)	☒ Service Date within Interval	☐ Service Date within Interval
☒ Insulated ☒ Full ☐ Part.	☐ Supported by Nozzle(s)	☐ Bolts Missing/ Loose/ Damaged	☒ Set Pressure within MAWP	☐ Set Pressure within MAWP
☐ Insulation Damaged	☐ Piping Supported	☐ Short Bolting	☒ Safety Seal Intact	☐ Safety Seal Intact
☐ Penetration Seals Broken	☐ Expansion Slots	☐ Valves leaking	☒ Service Seal Intact	☐ Service Seal Intact
☐ Corrosion Under Insulation (CUI)	☐ Bolts Missing/ Loose/ Damaged	☐ Connections Leaking	☒ Current Service Tag Attached	☐ Current Service Tag Attached
☐ Visible Moisture Contamination	☐ Short Bolting	☒ Piping and Valves Supported	☐ PSV inlet Gusseted	☐ PSV inlet Gusseted
☐ Paint Deterioration	☐ Deflected/Distorted	☐ Piping Deflected/ Distorted	☐ Inlet Block Valve	☐ Inlet Block Valve
☐ Coating Deterioration	☐ Poor Insulation	☐ No Access Insulated	Locked Open ☐ Y ☐ N	Locked Open ☐ Y ☐ N
☐ Fireproofing Cracked	☐ Fire Proofing Cracked	☐ See Comments	Sealed Open ☐ Y ☐ N	Sealed Open ☐ Y ☐ N
☐ External Protection Only	☒ Vessel is level		☐ Outlet Block Valve	☐ Outlet Block Valve
☐ See Comments	☐ See Comments		Locked Open ☐ Y ☐ N	Locked Open ☐ Y ☐ N
			Sealed Open ☐ Y ☐ N	Sealed Open ☐ Y ☐ N
			☐ See Comments	☐ 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.)

- Limited inspection due to external insulation.
- Insulation 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 Service Interval:	Months
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External Inspection Performed By:

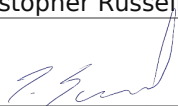
Print Name: Christopher Russell Earl

Certification No.:

ABSA IPV PESL: 000782

API 510: 45377

Signature:



Report Reviewed:



Initial

Chief Inspector /
Client
Representative:

Name (Print)

Signature

Date: