

V-645

PROPANE ECONOMIZER

Quality Control Documentation

AUTHORIZED INSPECTOR TO BE GIVEN TRAVEL SHEET PRIOR TO CONSTRUCTION
SO THAT HE CAN INDICATE HOLD POINTS. HOLD POINTS ESTABLISHED 1/19/92

(A) NUMBER	(B) NAME	(C) ADDRESS	(D) CITY	(E) STATE	(F) ZIP
1	JOHN DOE	123 MAIN ST	ANYTOWN	CA	90210
2	JANE SMITH	456 ELM ST	ANYTOWN	CA	90210
3	BOB JONES	789 PINE ST	ANYTOWN	CA	90210
4	ALICE BROWN	101 OAK ST	ANYTOWN	CA	90210
5	CHARLIE WHITE	202 BIRCH ST	ANYTOWN	CA	90210
6	DAVID GREEN	303 SAGE ST	ANYTOWN	CA	90210
7	EVE BLACK	404 MAPLE ST	ANYTOWN	CA	90210
8	FRANK GRAY	505 CYPRESS ST	ANYTOWN	CA	90210
9	GRACE HARRIS	606 REDWOOD ST	ANYTOWN	CA	90210
10	HELEN KIM	707 CEDAR ST	ANYTOWN	CA	90210
11	IRVING LEE	808 SPRUCE ST	ANYTOWN	CA	90210
12	JACK MORGAN	909 WALNUT ST	ANYTOWN	CA	90210
13	JILL NELSON	1010 PINE ST	ANYTOWN	CA	90210
14	JOHN O'BRIEN	1011 OAK ST	ANYTOWN	CA	90210
15	JANE PETERSON	1012 BIRCH ST	ANYTOWN	CA	90210
16	JOHN QUINN	1013 MAPLE ST	ANYTOWN	CA	90210
17	JANE ROSS	1014 CYPRESS ST	ANYTOWN	CA	90210
18	JOHN TAYLOR	1015 REDWOOD ST	ANYTOWN	CA	90210
19	JANE WALKER	1016 CEDAR ST	ANYTOWN	CA	90210
20	JOHN YOUNG	1017 SPRUCE ST	ANYTOWN	CA	90210
21	JANE ZIMMERMAN	1018 WALNUT ST	ANYTOWN	CA	90210
22	JOHN ADAMS	1019 PINE ST	ANYTOWN	CA	90210
23	JANE BAKER	1020 OAK ST	ANYTOWN	CA	90210
24	JOHN CAMPBELL	1021 BIRCH ST	ANYTOWN	CA	90210
25	JANE COOPER	1022 MAPLE ST	ANYTOWN	CA	90210
26	JOHN EVANS	1023 CYPRESS ST	ANYTOWN	CA	90210
27	JANE FOSTER	1024 REDWOOD ST	ANYTOWN	CA	90210
28	JOHN GARCIA	1025 CEDAR ST	ANYTOWN	CA	90210
29	JANE HILL	1026 SPRUCE ST	ANYTOWN	CA	90210
30	JOHN JAMES	1027 WALNUT ST	ANYTOWN	CA	90210
31	JANE KELLY	1028 PINE ST	ANYTOWN	CA	90210
32	JOHN LAMBERT	1029 OAK ST	ANYTOWN	CA	90210
33	JANE LEWIS	1030 BIRCH ST	ANYTOWN	CA	90210
34	JOHN MILLER	1031 MAPLE ST	ANYTOWN	CA	90210
35	JANE MORRIS	1032 CYPRESS ST	ANYTOWN	CA	90210
36	JOHN NICHOLS	1033 REDWOOD ST	ANYTOWN	CA	90210
37	JANE OLSON	1034 CEDAR ST	ANYTOWN	CA	90210
38	JOHN PERKINS	1035 SPRUCE ST	ANYTOWN	CA	90210
39	JANE REED	1036 WALNUT ST	ANYTOWN	CA	90210
40	JOHN ROBERTS	1037 PINE ST	ANYTOWN	CA	90210
41	JANE SIMMONS	1038 OAK ST	ANYTOWN	CA	90210
42	JOHN STEVENSON	1039 BIRCH ST	ANYTOWN	CA	90210
43	JANE THOMPSON	1040 MAPLE ST	ANYTOWN	CA	90210
44	JOHN TUCKER	1041 CYPRESS ST	ANYTOWN	CA	90210
45	JANE VAUGHAN	1042 REDWOOD ST	ANYTOWN	CA	90210
46	JOHN WATSON	1043 CEDAR ST	ANYTOWN	CA	90210
47	JANE WELLS	1044 SPRUCE ST	ANYTOWN	CA	90210
48	JOHN WILSON	1045 WALNUT ST	ANYTOWN	CA	90210
49	JANE WOOD	1046 PINE ST	ANYTOWN	CA	90210
50	JOHN WYATT	1047 OAK ST	ANYTOWN	CA	90210
51	JANE YOUNG	1048 BIRCH ST	ANYTOWN	CA	90210
52	JOHN ZIMMERMAN	1049 MAPLE ST	ANYTOWN	CA	90210
53	JANE ADAMS	1050 CYPRESS ST	ANYTOWN	CA	90210
54	JOHN BAKER	1051 REDWOOD ST	ANYTOWN	CA	90210
55	JANE CAMPBELL	1052 CEDAR ST	ANYTOWN	CA	90210
56	JOHN COOPER	1053 SPRUCE ST	ANYTOWN	CA	90210
57	JANE EVANS	1054 WALNUT ST	ANYTOWN	CA	90210
58	JOHN FOSTER	1055 PINE ST	ANYTOWN	CA	90210
59	JANE GARCIA	1056 OAK ST	ANYTOWN	CA	90210
60	JOHN HILL	1057 BIRCH ST	ANYTOWN	CA	90210
61	JANE JAMES	1058 MAPLE ST	ANYTOWN	CA	90210
62	JOHN KELLY	1059 CYPRESS ST	ANYTOWN	CA	

VESSEL TITLE
30"OD X 8'-0" S/S.
PROPANE
ECONOMIZER

SERIAL NUMBER

TAG NO.

#1619

V-645

A.I.
HOLD
POINTS

C.R. NUMBER

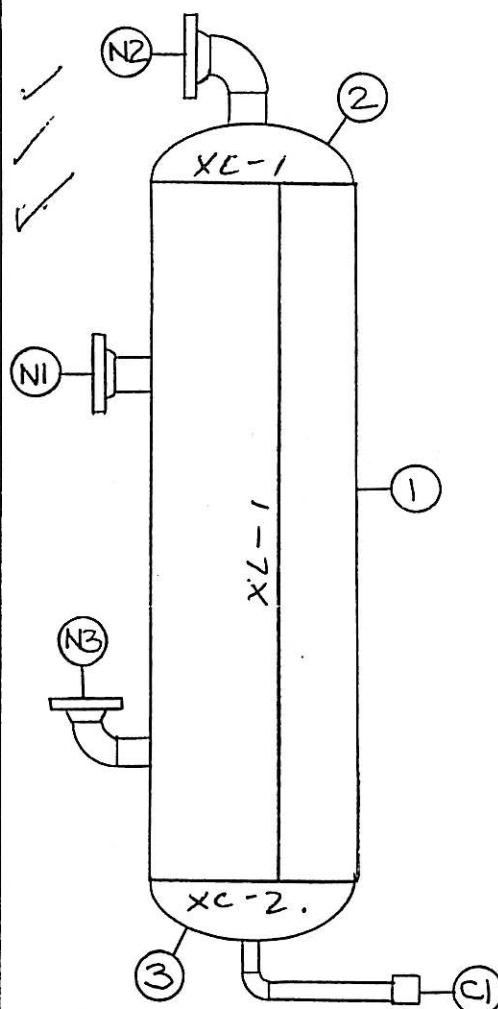
JOB CODE
CTC

DATE, FUNCTION COMPLETED
AND INSPECTORS INITIALS

NO.	FUNCTION	COMMENTS	T. D. E.	AUTHORIZED INSPECTOR
1	APPROVED DRAWINGS		97.12.19 Tom	LH98.3-23
2	MAT. CHECKED AGAINST DWG.		97.12.19 Tom	LH98-1-23
3	MILL TEST CHECKED		97.12.19 Tom	LH98-3-23
4	IMPACT TESTS			
5	VESSEL LAYOUT		98.01.05 @	
6	FIT UP	SHELL & HEADS	98.01.22 @	
7		NOZZL'S & FITTINGS	98.01.16 @	
8	INTERNAL INSPECTION		* 98.01.16 @	RH98-1-16
9	WELD SIZE		98.01.23 @	
10	WELDERS I.D.		98.01.23 @	RH98-1-23
11	RADIOGRAPHS	FULL	98.01.23 @	RH98-1-22
12	OTHER N.D.E.		—	
13	RELEASE FOR P.W.H.T.	NONE	—	
14	P.W.H.T. CHART CHECKED		—	
15	EXTERNAL INSPECTION		98.01.23 @	LH98-1-23
16	HYDROSTATIC TEST	330 PSIG.	98.01.23 @	LH98-1-23
17	HYDRO GAUGES	TH-122, TH-123.	98.01.23 @	
18	DATA REPORT			LH98.3-23
19	NAME PLATES			RH98.3-23

RT-PROGRESS

XL-1 XC-2 .
XC-1

[illegible]



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

EDMONTON

ALBERTA

CANADA

UNIT NAME

TAG NUMBER

PROPANE ECONOMIZER V-645

CR. NUMBER

SERIAL NUMBER

Ⓐ NUMBER

N-9966-21 1619

M.A.W.P.

AT TEMP.

M.D.M.T.

AT PRESSURE

260PSIG 150 200 260PSIG

YEAR BUILT

CORR. ALL.

DRAWING NUMBER

1998 0-0625IN 3097-0850-206

DIAMETER

LENGTH

CAPACITY

WEIGHT

36IN OD 8-0 5/8 44.00GAL 1750LBS

SHELL MATL.

HEAD MATL.

TBSHT. MATL.

COIL MATL.

SA-516-70N 516-70N

SHELL THK.

HEAD MIN. THK.

TBSHT. THK.

COIL THK.

0.375IN 0.375IN

CTC

W
RT-1

MANUFACTURED AND CERTIFIED BY
 THERMO DESIGN
 ENGINEERING LTD.

EDMONTON

ALBERTA

CANADA

UNIT NAME

TAG NUMBER

PROPANE ECONOMIZER

V-645

CR. NUMBER

SERIAL NUMBER

① NUMBER

N-9966-21

#1619

M.A.W.P.

AT TEMP.

M.D.M.T.

AT PRESSURE

260 PSIG

150°F

-20°F

260 PSIG

YEAR BUILT

CORR. ALL

DRAWING NUMBER

1988

0.0625 IN

9087-0850-206

DIAMETER

LENGTH

CAPACITY

WEIGHT

30 IN OD

8-0 S/S

43.0 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.

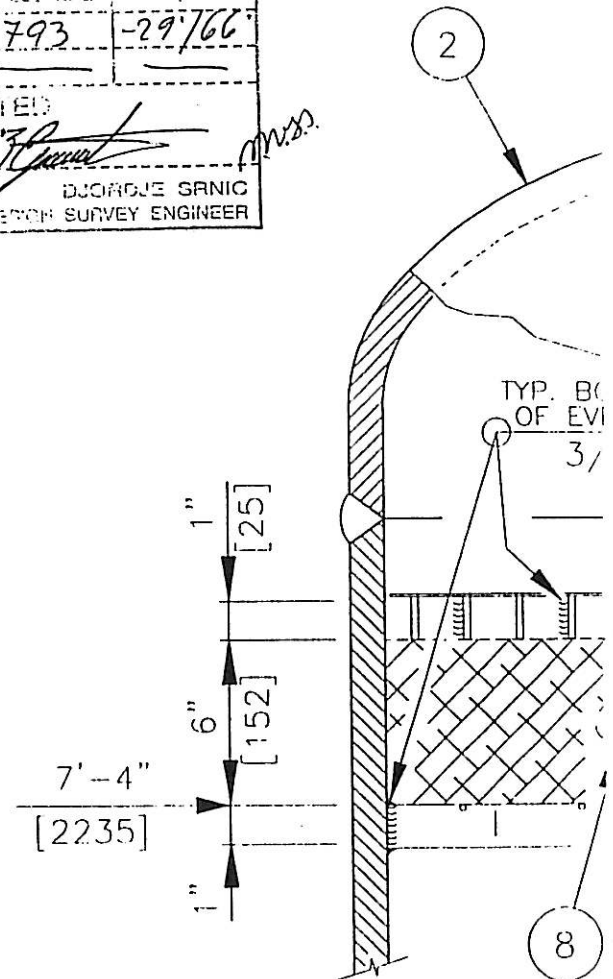
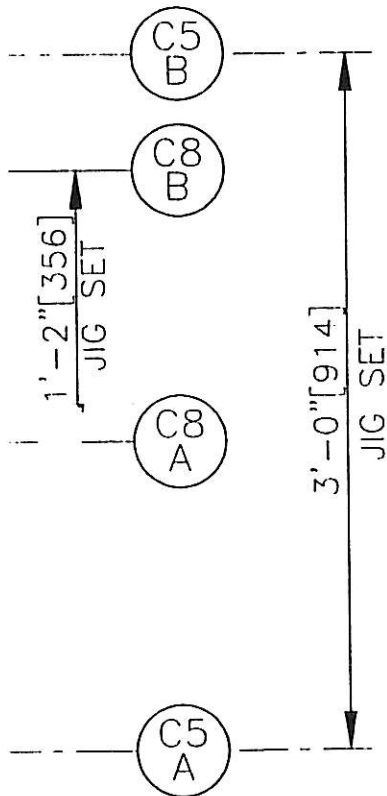
0.375 IN

0.345 IN
0.345 IN

based on TDE calculations,
radiography shall be RT-2
according to UW-11(a)(5)(b).
Feb. 09/1998.

[Signature]

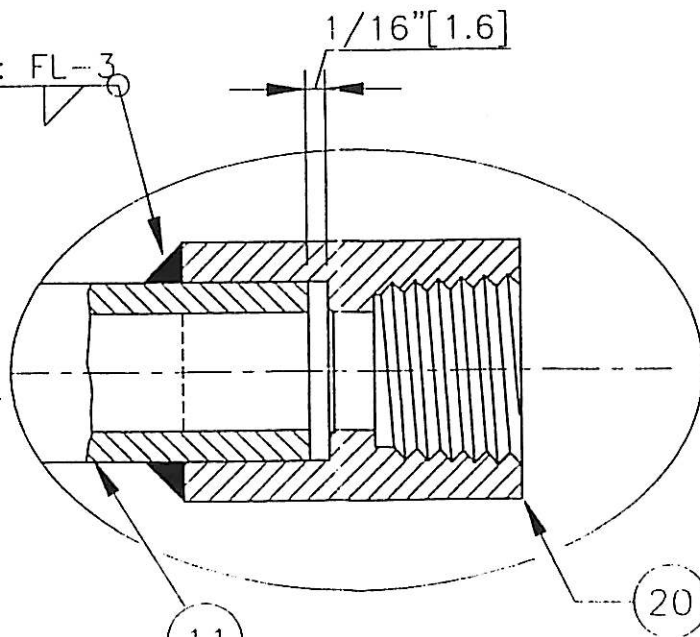
ALBERTA BOILERS SAFETY ASSOCIATION PROVINCE OF ALBERTA SAFETY CODES ACT		
REG. No.	N-9966-2	
DWG. No.	9097-0850-206 Rev. 0 AS NOTED	
	Design Press. kPa	Design Temp. °C
	1793	-29/66
ACCEPTED		
FEB 09 1998	Signed <i>[Signature]</i> MRS.	
Date	DUJONGUE SRNIC DESIGN SURVEY ENGINEER	



MIST EX

TYPE: FL-3
FULL

HOLES



TYP. TYPE: FL-2
1/4 [6]



TAQA NORTH DATA									
EQUIP NO.: 603VS012			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 : PROPANE ECONOMIZER					CLASS : VS			TYPE: ECONOMIZER	
SERVICE: <input checked="" type="checkbox"/> Sweet <input type="checkbox"/> Sour		H2S: N/A PPM		FLUID: PROPANE		S/D REQT.: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial			
OPERATING PRESSURE: 310		<input checked="" type="checkbox"/> kPa <input type="checkbox"/> PSI		OPERATING TEMPERATURE: -11		<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: 4"			

MANUFACTURING DATA									
MFG.: THERMO DESIGN		DWG. NO.: 9097-0850-206		SERIAL NO.: 1619		YR. BUILT: 1998		STAMP: W	
CRN: N9966.21		CODE/DIV.: ASME VIII DIV 1		PARA.: N/A		SUPPORT: <input checked="" type="checkbox"/> Skirt <input type="checkbox"/> Saddles <input type="checkbox"/> Nozzles <input type="checkbox"/> N/A			
MAWP: 1793		<input checked="" type="checkbox"/> kPa <input type="checkbox"/> PSI		@ TEMP: 66		<input checked="" type="checkbox"/> °C <input type="checkbox"/> °F		MDMT: -29 <input checked="" type="checkbox"/> °C <input type="checkbox"/> °F	
VOLUME: 43		<input type="checkbox"/> M ³ <input checked="" type="checkbox"/> FT ³		FLANGE RATING: N/A		PWHT: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		RADIOGRAPHY: <input checked="" type="checkbox"/> RT1 <input 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 : 762		<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: 2438 <input checked="" type="checkbox"/> mm. <input type="checkbox"/> inch.	
INSULATION TYPE: <input type="checkbox"/> Fiberglass <input type="checkbox"/> Wool <input checked="" type="checkbox"/> Low Temp <input type="checkbox"/> Asbestos Other:						INSULATION THK: 25 <input checked="" type="checkbox"/> mm. <input type="checkbox"/> inch.			
SECTION		MATERIAL		NOMINAL mm		C.A. mm			
SHELL		SA-516-70N		9.5 MM		1.6 MM			
HEAD		SA-516-70N		8.8 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			
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	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	
603SVVS012	N/A	1793 <input checked="" type="checkbox"/> kPa <input type="checkbox"/> PSI	14992	<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

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

Type Vertical # 1619 N-9966.21 9097-0850-206/Rev.0 1998
 (Horiz. or vert. tank) (Mfg's serial No.) (CRN) (Drawing no.) (Nat'l Bd. No.) (Year built)

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)

Shell: SA-516-70N 0.375" 0.0625" 29.25"ID 8'-0" S/S
 Mat'l. (Spec. No., Grade) Nom. Thk. (in.) Corr. Allow. (in.) Diam. I.D. (ft. & in.) Length (overall) (ft. & in.)

Seams: Dbt"V" Full 100 N/A N/A Sgl"V" Full 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

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.)

M.A.W.P. 260 psi at max. temp. 150 ° F

Min. design metal temp. -20 ° F at 260 psi. Hydro., pneu., or comb. test pressure 390 psi.

0. 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	4"	RFWN	SA-106-B	150#Sch.80	N/A	UW-16.1(c)	Shell
N2	1	4"	RFWN	SA-106-B	150#Sch.80	N/A	UW-16.1(c)	Head
N3	1	2"	RFWN	SA-333-6	150#Sch.160	N/A	UW-16.1(c)	Shell
C1	1	1 1/2"	CPLG	SA-333-6	6000#Sch160	N/A	UW-16.1(c)	Head

11. Supports: Skirt Yes Lugs Legs Other Attached Welded
 (Yes or no) (No.) (No.) (Describe) (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)

30"OD x 8'-0" S/S, Propane Economizer "V-645"

Capacity: 43 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 98-03-23 Co. Name THERMO DESIGN ENGINEERING LTD. Signed B. B. B.
 (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 23, 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.

D. 98-3-23 Signed L. Hajat 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)

9097-0850-206/Rev.0

(Tank separator, heat exch., etc)

#1619

(Mfg's serial No.)

N-9966.21

(CRN)

9097-0850-206/Rev.0

(Drawing No.)

(Nat'l. Bd. No.)

1998

(Year built)

Data Report Item Number	Remarks								
0 - Nozzles	C2	1	3/4"	LG CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
	C3A/B	2	1"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
	C4A/B	2	1 1/2"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
	C5A/B	2	3/4"	LG CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
	C6	1	3/4"	LG CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
	C7A/B	2	2"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell
	C8A/B	2	1 1/2"	CPLG	SA-105	6000#	N/A	UW-16.1(c)	Shell

2 - Remarks Registered Drawing No.: 9097-0850-206/Rev.0 (Alberta & British Columbia)

PSV: On Piping

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

Date 98.03.23 Name THERMO DESIGN ENGINEERING LTD.

(Manufacturer)

Signed CBilmarie

(Representative)

Date 8-3-23

Name R. Hapax

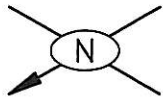
(Authorized Inspector)

Commission 3PR

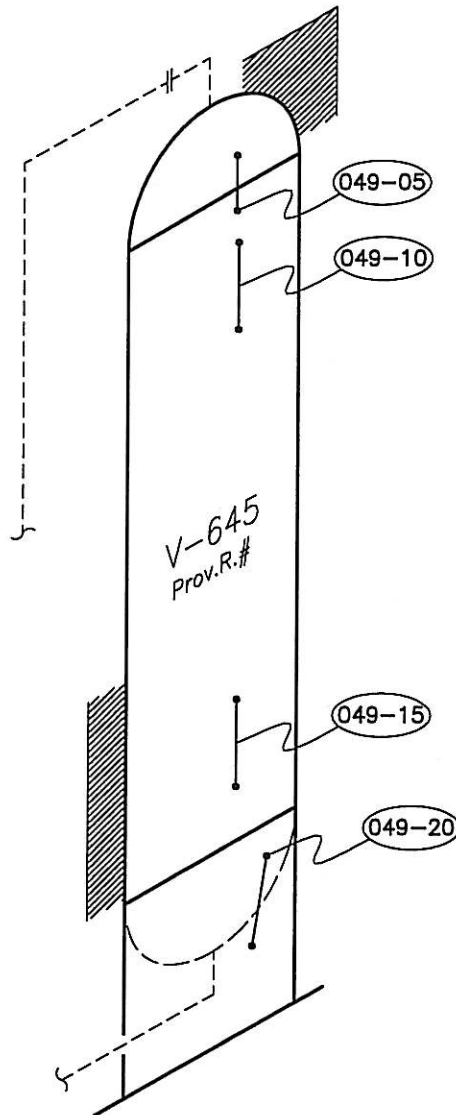
(Nat'l Board (incl. endorsements) State, Province and No.)



TESTING INC.



P&ID. # _____
REF. # _____



VESSEL DATA

P.E. No. V-645 Serial No. 1619 Prov. Reg. No. A C.R.N. N9966.21
MFR. THERMO DESIGN Code/Div. _____ Para _____ Code Stamp U
Yr. Bld. 1998 Yr. Inst. _____ Size 30"Ø x 8' Service _____ PWHT _____
RT RT-1 Insulated NO

Nominal Thickness & Material

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

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

MAWP Shell Side 260PSI @ Temp. -20/150°F

MAWP Tube Side _____ @ Temp. _____

COMMENTS: _____

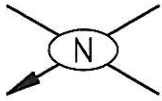
PIONEER NATURAL RESOURCES CANADA INC.
CHINCHAGA GAS PLANT
LSD C-32-H / 94-H-8

PROPANE ECONOMIZER

TECH.: J.O.	REV. DATE: _____	DWG DATE: 99/08
CAD: WO	REVISION: _____	DRAWING: 049

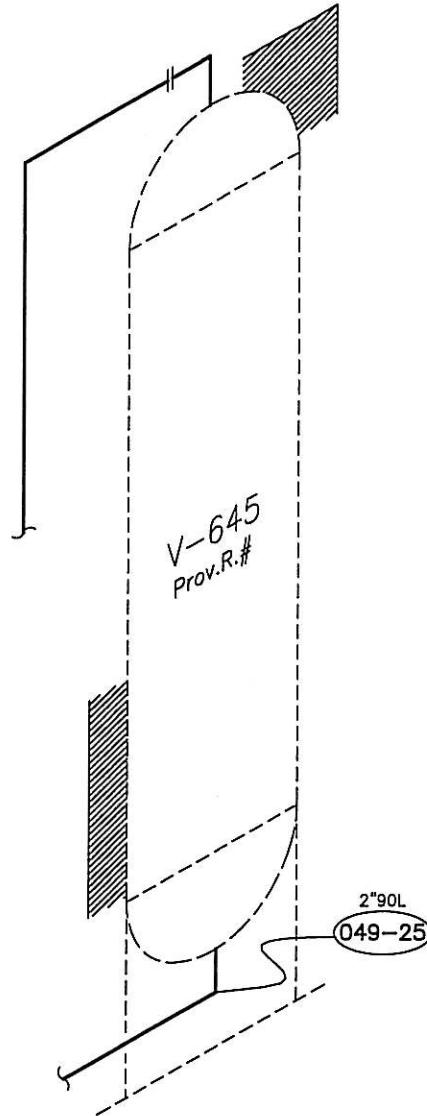


TESTING INC.



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.			
049-25	2"				160	8.7mm	* 1.6mm	6.0mm		

COMMENTS: _____

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

PROPANE ECONOMIZER PIPING

TECH.: JO

REV.DATE:

DWG.DATE: 99/12

CAD: WO

REVISION:

DRAWING: 049A

PIONEER NATURAL RESOURCES CANADA INC.
CHINCHAGA GAS PLANT

RIVEST TESTING INC.

Item Desc.: C-32-H/94-H-8 / PROPANE ECONOMIZER

Equip. No.: V-645

Ser. No.: 1619

Prov. Reg.: N/A

Pt.Desc.: TOP HEAD

Point No.: **049-05**

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	9.900	____.____
	2	9.900	____.____
	3	10.000	____.____
	4	9.900	____.____
	5	10.300	____.____

Data Evaluation

Lowest Reading : 9.900

Average - Low 3 : 9.900

Thk.Remaining Above Min. : 2.700

Indv. Short Term Rate (mm/yr) :

Short Term Rate (mm/yr) :

LongTerm Rate (mm/yr) :

Pt.Desc.: TOP SHELL

Point No.: **049-10**

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

Data Evaluation

Lowest Reading : 9.500

Average - Low 3 : 9.500

Thk.Remaining Above Min. : 1.600

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 / PROPANE ECONOMIZER

Equip. No.: V-645

Ser. No.: 1619

Prov. Reg.: N/A

Pt.Desc.: BTM.SHELL

Point No.: **049-15**

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	10.000	____.____
	2	9.900	____.____
	3	9.800	____.____
	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.HEAD

Point No.: **049-20**

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	9.600	____.____
	2	9.700	____.____
	3	9.600	____.____
	4	9.500	____.____
	5	9.500	____.____
	6	9.500	____.____

Data Evaluation

Lowest Reading : 9.500

Average - Low 3 : 9.500

Thk.Remaining Above Min. : 2.300

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 / PROPANE ECONOMIZER

Equip. No.: V-645

Ser. No.: 1619

Prov. Reg.: N/A

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

Point No.: 049-25

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

Survey Dates:

1999-12

Data Readings	1	8.200	____.____
	2	7.600	____.____
	3	7.600	____.____
	4	7.500	____.____
	5	8.000	____.____

Data Evaluation

Lowest Reading : 7.500

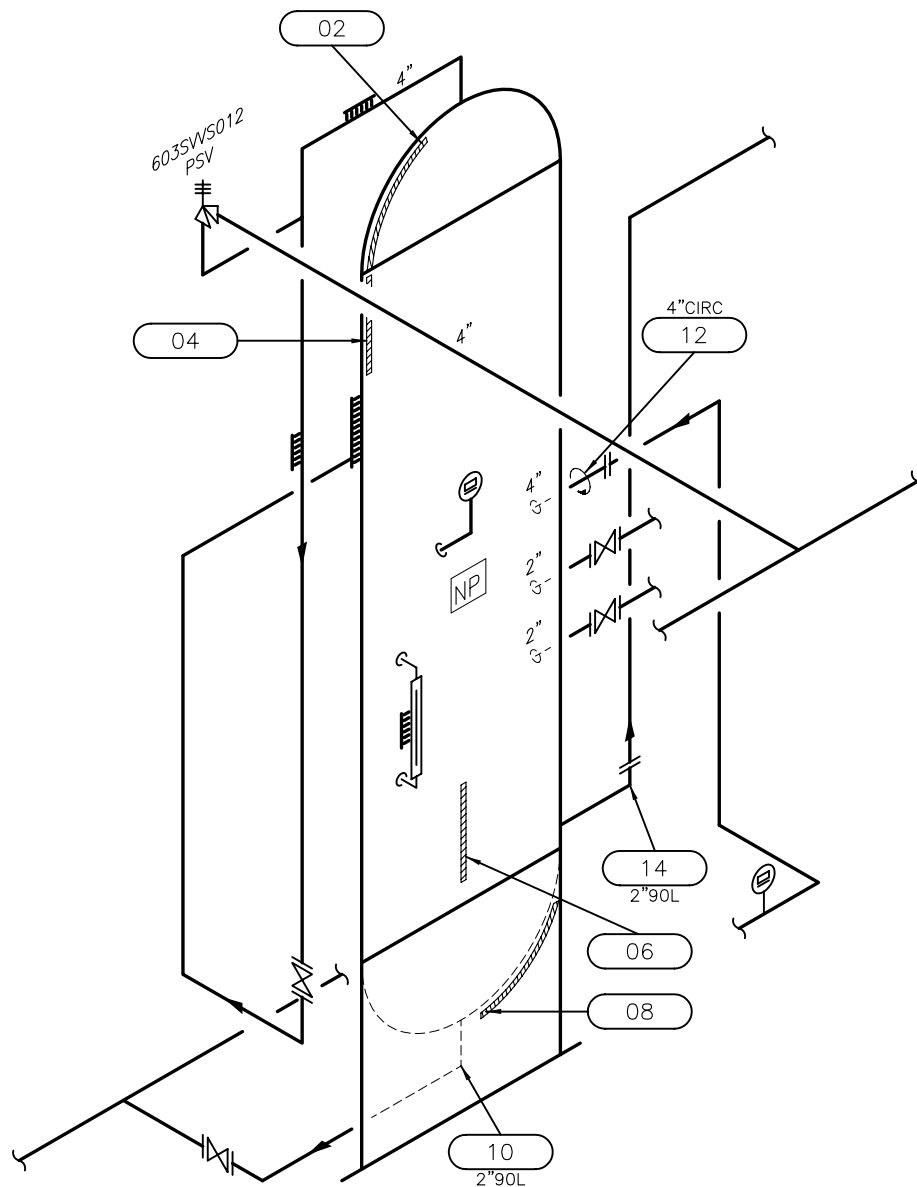
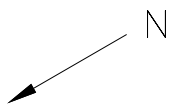
Average - Low 3 : 7.567

Thk.Remaining Above Min. : 1.500

Indv. Short Term Rate (mm/yr) :

Short Term Rate (mm/yr) :

LongTerm Rate (mm/yr) :



Integrity Testing
SERVICES

P.E. No.: N/S Yr. Blt.: 1998
OIP# 603VS012 Manway: NO
Serial No.: 1619 Size: 762mm x 2438mm
P.R.N. ④ N/S Service: SWEET
C.R.N.: N9966.21 PWHT: NO
Code/Div.: ASME VIII DIV. 1 RT: 1
Para: N/S Insulated: LOW TEMP
C. Stamp: W N.B. No: N/S
Manufacturer: THERMO DESIGN

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>1793 KPA</u>	④ Temp.: <u>66°C</u>
MAWP Tube Side: _____	④ Temp.: _____

CLIENT

TAQA NORTH

FACILITY

CHINCHAGA GAS PLANT

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

ITEM

PROPANE ECONOMIZER

Comments: _____

BY: M.T.

DATE: 2008/05

DWG.# 022

TAQA North

Unit: N-603

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08	DESIGN PRESSURE:	1793 kPa / 260 psi
ITEM DESC.:	PROPANE ECONOMIZER	DESIGN TEMP.:	66 C / 151 F
EQUIP / OIP#:	603VS012	RECOMMENDED NEXT INSP. DATE:	04/2013
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	12/2217
SERIAL #:	1619	REM. LIFE (from last survey 04/2008):	209.70 yrs.
CRN.:	N9966.21	TOTAL CAUTION / ACTION TML:	0

Item # (022)

TML No.: 2 TOP HD T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.93 mm.

MATERIAL: SA516-70

MINIMUM THICKNESS MEASURED: 9.70 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
2.01	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
2.02	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
2.03	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	9.70	0.000	0.000	04/2013	08/2841	NO
2.04	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
2.05	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	10.40	0.000	0.000	04/2013	12/3074	NO
2.06	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

TML No.: 4 TOP SH T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.63 mm.

MATERIAL: SA516-70

MINIMUM THICKNESS MEASURED: 9.30 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
4.01	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
4.02	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
4.03	9.50	1.60	7.90	01/1998	9.50	N/A	N/A	04/2008	9.30	0.000	0.020	04/2013	03/2077	NO *
4.04	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 *
4.05	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 *
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:	1793 kPa / 260 psi
ITEM DESC.:	PROPANE ECONOMIZER	DESIGN TEMP.:	66 C / 151 F
EQUIP / OIP#:	603VS012	RECOMMENDED NEXT INSP. DATE:	04/2013
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	12/2217
SERIAL #:	1619	REM. LIFE (from last survey 04/2008):	209.70 yrs.
CRN.:	N9966.21	TOTAL CAUTION / ACTION TML:	0

Item # (022)

TML No.: 6 BTM SH T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.67 mm.

MATERIAL: SA516-70

MINIMUM THICKNESS MEASURED: 9.50 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	9.50	0.000	0.000	04/2013	08/2541	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	9.70	0.000	0.000	04/2013	04/2608	NO
6.05	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
6.06	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: 10.33 mm.

MATERIAL: SA516-70

MINIMUM THICKNESS MEASURED: 10.00 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
8.01	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	10.30	0.000	0.000	04/2013	08/3041	NO
8.02	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	10.40	0.000	0.000	04/2013	12/3074	NO
8.03	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	10.50	0.000	0.000	04/2013	04/3108	NO
8.04	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	10.40	0.000	0.000	04/2013	12/3074	NO
8.05	8.80	1.60	7.20	01/1998	8.80	N/A	N/A	04/2008	10.40	0.000	0.000	04/2013	12/3074	NO
8.06	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

(*) 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:	1793 kPa / 260 psi
ITEM DESC.:	PROPANE ECONOMIZER	DESIGN TEMP.:	66 C / 151 F
EQUIP / OIP#:	603VS012	RECOMMENDED NEXT INSP. DATE:	04/2013
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	12/2217
SERIAL #:	1619	REM. LIFE (from last survey 04/2008):	209.70 yrs.
CRN.:	N9966.21	TOTAL CAUTION / ACTION TML:	0

Item # (022)

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

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 6.50 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 5.50 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	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	5.50	0.000	0.000	04/2013	08/2241	NO *
10.02	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
10.03	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	6.90	0.000	0.000	04/2013	04/2708	NO
10.04	5.50	0.70	4.80	01/1998	5.50	N/A	N/A	04/2008	6.60	0.000	0.000	04/2013	04/2608	NO
10.05	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

TML No.: 12 NOZ 4" I/L 150#

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.28 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 9.10 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
12.01	8.60	1.60	7.00	01/1998	8.60	N/A	N/A	04/2008	9.80	0.000	0.000	04/2013	08/2941	NO
12.02	8.60	1.60	7.00	01/1998	8.60	N/A	N/A	04/2008	9.10	0.000	0.000	04/2013	04/2708	NO
12.03	8.60	1.60	7.00	01/1998	8.60	N/A	N/A	04/2008	9.10	0.000	0.000	04/2013	04/2708	NO
12.04	8.60	1.60	7.00	01/1998	8.60	N/A	N/A	04/2008	9.40	0.000	0.000	04/2013	04/2808	NO
12.05	8.60	1.60	7.00	01/1998	8.60	N/A	N/A	04/2008	9.10	0.000	0.000	04/2013	04/2708	NO
12.06	8.60	1.60	7.00	01/1998	8.60	N/A	N/A	04/2008	9.20	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:	1793 kPa / 260 psi
ITEM DESC.:	PROPANE ECONOMIZER	DESIGN TEMP.:	66 C / 151 F
EQUIP / OIP#:	603VS012	RECOMMENDED NEXT INSP. DATE:	04/2013
PROV. REG. #:	N/S	RECOMMENDED RETIREMENT DATE:	12/2217
SERIAL #:	1619	REM. LIFE (from last survey 04/2008):	209.70 yrs.
CRN.:	N9966.21	TOTAL CAUTION / ACTION TML:	0

Item # (022)

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

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 8.56 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 8.50 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	
14.01	8.70	1.60	7.10	01/1998	8.70	N/A	N/A	04/2008	8.50	0.000	0.020	04/2013	03/2077	NO	*
14.02	8.70	1.60	7.10	01/1998	8.70	N/A	N/A	04/2008	8.60	0.000	0.010	04/2013	11/2155	NO	*
14.03	8.70	1.60	7.10	01/1998	8.70	N/A	N/A	04/2008	8.50	0.000	0.020	04/2013	03/2077	NO	*
14.04	8.70	1.60	7.10	01/1998	8.70	N/A	N/A	04/2008	8.60	0.000	0.010	04/2013	11/2155	NO	*
14.05	8.70	1.60	7.10	01/1998	8.70	N/A	N/A	04/2008	8.60	0.000	0.010	04/2013	11/2155	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:	Propane Economizer	A No:	BC	MTL No: VSL190
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-645	Serial Number:	1619	
Separator Type:		Business Unit:		
Direct Fired Vessel:	N/A	Fired Tube:		Cost Centre:
Current Status:	In Service	Flame Arrester Date Required:		Date
Thermal Insulation:	No	Asbestos:	No	

PRESSURE VESSEL NAMEPLATE INFORMATION

MTL Number:	VSL190	Volume:	43.000 F3	CRN Number:	N-9966-21	Registered:	Yes
Serial Number:	1619	Size:	30.000 in O.D.	x	8 ft	0 in	Seam to Seam
Drawing Number:	9097-0850-206	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):	RT1	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:	Propane Economizer	A No:	BC	MTL No: VSL190

VESSEL SHELL / HEADS / PIPING

External / Instrumentation Condition

This external surface of this vessel was noted in good condition. The vessel was insulated and cladded. Some cladding penetration requires sealing. The vessel paint was in good condition with some minor chips but no evidence of corrosion or degradation.

Internal Condition

No internal access

Nozzle Condition

The nozzle assembly was painted with minor chipping. No evidence of external corrosion was noted during this inspection.

Flange Condition

The flanges are bolted properly and there was no visible evidence of leakage. The associated gaskets were in place and appeared to be tight.

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

All associated flange and bolting were intact and showed no evidence of deterioration, visible cracking or process leaks.

Firetube Condition

Not Applicable

Demister Pad Condition

Not Applicable

Anode Condition

Not Applicable

Vessel Support

The skid base, skirt assembly and 8 bolts all appeared to be 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:	Propane Economizer	A No:	BC	MTL No: VSL190

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

Next internal inspection in 3 years
Next PSV servicing in 3 years
Repeat UT Survey 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:	Propane Economizer	A No:	BC	MTL No: VSL190

PSV DATA

Side	Set Pressure psi	CRN Number	Manufacturer PSV Number	Model Serial Number	Capacity	Size Inches	Set Date
Shellside	260		Farris PNR6451	26-LA-10-120 43975-5-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: 603VS012

Page of

FACILITY: Chinchaga Gas Plant

PROV. REG. NO:

EQUIPMENT NAME: Propane Economizer

TAG NO:

SIZE: 762mm OD x L/H 2438mm MAWP: 1793 kPa @ 66/-29 °C

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

MANWAY ☐ YES ☒ NO

SERVICE:

FLUID: Propane

☐ 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 ☐ 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

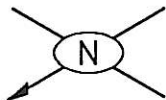
DATE OF INSPECTION 04 04 2008
(DD MONTH YYYY)

FOLLOW-UP INSPECTION REQ'D:

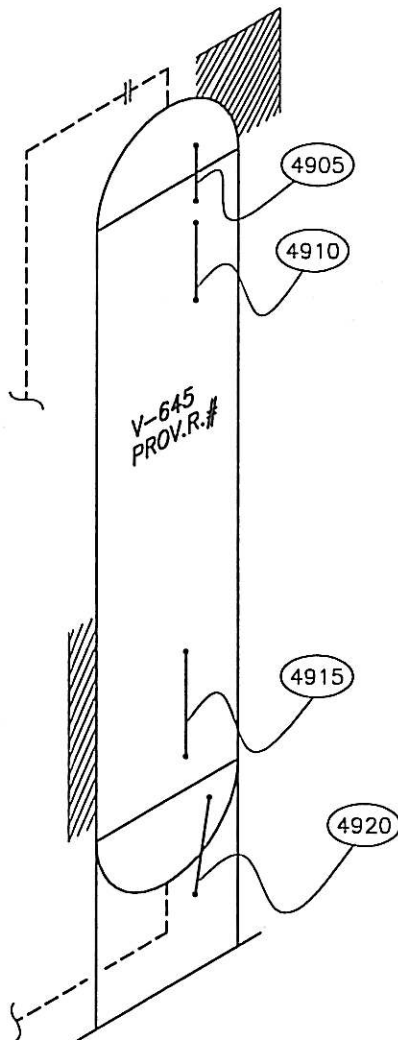
☐ YES ☒ NO

BY DATE:

(DD MONTH YYYY)



P&ID. # _____
REF. # _____



VESSEL DATA

Prov. Reg. No. _____ C.R.N. N 9966.21 P.E. No. V-645 Serial No. 1619
MFR. THERMO DESIGN Code/Div. _____ Para _____ Code Stamp U
Yr. Bld. 1998 Yr. Inst. _____ Size 30"ØX8' Vol.: _____ Service _____ PWHT _____

Nominal Thickness & Material

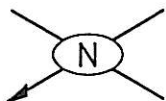
Head: 8.8mm Mat'l: SA 516-70N C.A.: 1.6mm Insulated NO R.T. 1
Head: _____ Repairs _____
Shell: 9.5mm SA 516-70N C.A.: _____ COMMENTS _____
Shell: _____
Chan Hd: _____ C.A.: _____
Chan Sh: _____
Gas Boot Hd: _____ C.A.: _____
Gas Boot Sh.: _____
Liq. Boot Hd.: _____ C.A.: _____
Liq Boot Sh.: _____

MAWP Shell Side 260psi @ Temp. -20/150°F
MAWP Tube Side _____ @ Temp. _____

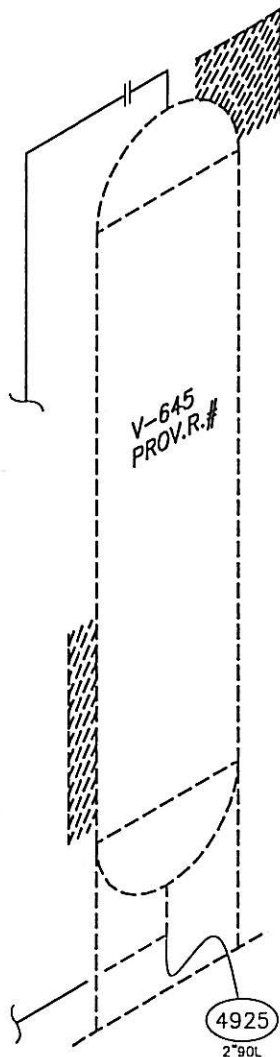
PIONEER NATURAL RESOURCES CANADA INC.
CHINCHAGA GAS PLANT
LSD C-32-H \ 94-H-8

PROPANE ECONOMIZER

TECH.: J.OLIVER	REV.DATE:	DWG DATE: 02/2002
CAD: MKM	REVISION:	DRAWING: 049



P&ID. # _____
REF. # _____



PIPING DATA

T.M.L.	SIZE	MAT'L	FLG. RATING	PROC.	LINE #	SPEC.	SCH.	CORR.ALL			MIN. THK.	CAL. THK.	CODE
								NOM. THK.	* ASTM DESIGN *** CALC.				
4925	2"						160	8.7mm	* 1.6mm		6.0mm		

COMMENTS: _____

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

PROPANE ECONOMIZER PIPING

TECH.: J.OLIVER	REV.DATE:	DWG DATE: 02/2002
CAD: MKM	REVISION:	DRAWING: 049A

Equip No V-645

Serial No 1619

Prov Reg No N/A

Description PROPANE ECONOMIZER

049 - 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: 676
 Min Calc'd Wall Thickness: N/A
 Thick Remain Above T Min: 2.6
 Short Term Corr Rate: N/A
 Long Term Corr Rate: N/A
 Months Remain to LFL: 260
 Lowest Value - Last Reading: 9.8

Comment:

	Dec-99	Feb-02
Point 1	9.9	10.0
Point 2	9.9	9.9
Point 3	10.0	10.0
Point 4	9.9	9.9
Point 5	10.3	9.8
Point 6		
Point 7		
Point 8		
Point 9		
Point 10		
Point 11		
Point 12		
Average	10.0	9.9
Avg Low 3	9.9	9.9
Lowest	9.9	9.8

049 - 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: 182
 Min Calc'd Wall Thickness: N/A
 Thick Remain Above T Min: 1.4
 Short Term Corr Rate: N/A
 Long Term Corr Rate: N/A
 Months Remain to LFL: N/A
 Lowest Value - Last Reading: 9.3

Comment:

	Dec-99	Feb-02
Point 1	9.6	9.9
Point 2	9.6	9.5
Point 3	9.5	9.4
Point 4	9.5	9.4
Point 5	9.6	9.3
Point 6	9.5	9.5
Point 7		
Point 8		
Point 9		
Point 10		
Point 11		
Point 12		
Average	9.6	9.5
Avg Low 3	9.5	9.4
Lowest	9.5	9.3

049 - 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	10.0
Min Calc'd Wall Thickness:	N/A	Point 2	9.9
Thick Remain Above T Min:	1.8	Point 3	9.8
Short Term Corr Rate:	N/A	Point 4	9.7
Long Term Corr Rate:	N/A	Point 5	9.7
Months Remain to LFL:	N/A	Point 6	9.8
Lowest Value - Last Reading:	9.7	Point 7	
Comment:		Point 8	
		Point 9	
		Point 10	
		Point 11	
		Point 12	
		Average	9.8
		Avg Low 3	9.7
		Lowest	9.7

049 - 020

TML Description: BTM. HEAD			
T Nominal: 8.8			
Min Nominal: 7.2			
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
Min Calc'd Wall Thickness:	N/A	Point 2	9.9
Thick Remain Above T Min:	2.5	Point 3	9.6
Short Term Corr Rate:	N/A	Point 4	10.0
Long Term Corr Rate:	N/A	Point 5	10.0
Months Remain to LFL:	117	Point 6	10.0
Lowest Value - Last Reading:	9.7	Point 7	9.7
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*

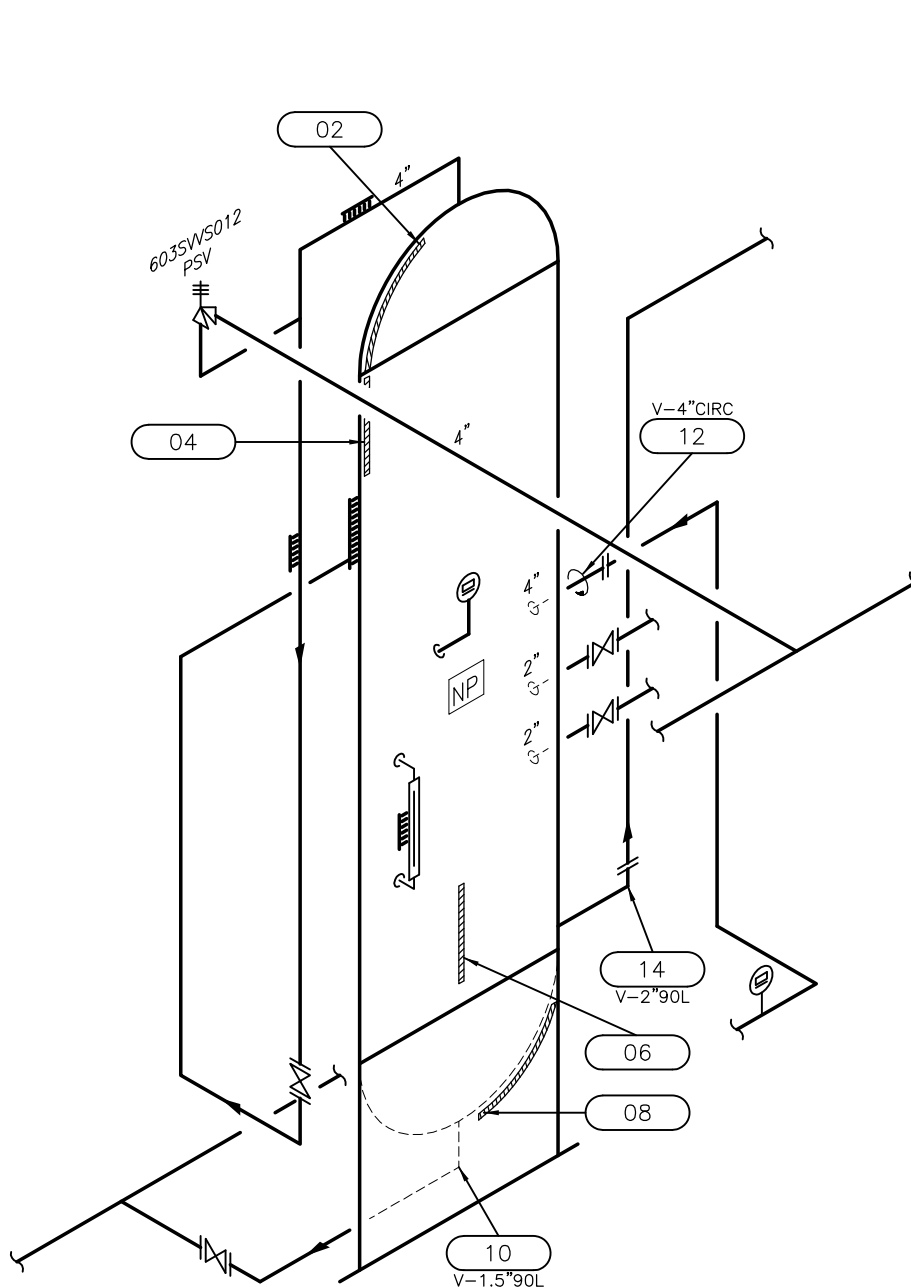
Months Remaining to T Min: 999
 Min Calc'd Wall Thickness: N/A
 Thick Remain Above T Min: 0.5
 Short Term Corr Rate: N/A
 Long Term Corr Rate: N/A
 Months Remain to LFL: N/A
 Lowest Value - Last Reading: 7.6

Comment:

	Dec-99	Feb-02
Point 1	8.2	8.2
Point 2	7.6	7.7
Point 3	7.6	7.6
Point 4	7.5	7.6
Point 5	8.0	7.8
Point 6		
Point 7		
Point 8		
Point 9		
Point 10		
Point 11		
Point 12		
Average	7.8	7.8
Avg Low 3	7.6	7.6
Lowest	7.5	7.6

RAM#		434017		EQUIP STATIC RECORD				JOB#		2636	
Unique OUP #:		603VS012		Old OUP #:				LSD:		C-032-H/094-H-08	
PLANT / FIELD:		Chinchaga Gas Plant		Down Hole Location:				RENTAL:			
EQUIPMENT NAME:		Propane Economizer		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		H ₂ S		PROCESS FLUID:		LPG		CYCLIC:	
MANUFACTURER:		Thermo Design Engineering Ltd.		DWG.#		9097-0850-206		S N:		1619	
PRN		for VESSEL or SHELL		CRN		N9966.21		YR. BUILT		1998	
NB:		CODE/DIV.		ASME VIII DIV.1		PARA.		STAMP		U	
SHELL-TANK				RADIOGRAPHY:		RT1		JOINT EFF.		PWHT:	
MAWP		1793 kPa		AT		66 °C		MDMT		-29 °C	
DIA. OD		762.0 mm		LENGTH:		mm		HEIGHT:		2438.0 mm	
VOLUME:		m ³									
SECTION		MATERIAL		NOMINAL THICKNESS		C.A.					
Shell		SA-516-70N		9.528		mm		1.588		mm	
Head		SA-516-70N		8.763		mm		1.588		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# 434017		EQUIP STATIC RECORD		JOB# 2636	
Unique OUP #: 603VS012		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: 350 kPa OPERATING TEMP. -3 °C YEAR PUT IN SERVICE:					
VESSEL CONNECTIONS: NPT FLANGE LARGEST CONNECTION mm INSPECTION PORT: None					
FLANGE ANSI: 150 FLG. FACE: SIZE of INSPECTION PORT: 114.3 mm					
VESSEL ORIENTATION: 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: 25.0 mm CUI Susceptible:					
EXT. COATING: Enamel Paint 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	
603SVVS012		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	



<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							Client:, District:, LSD:, Etc.:			
Description:		PROPANE ECONOMIZER					TAQA NORTH CHINCHAGA GAS PLANT C-032-H/094-H-08 PROCESS BUILDING			
P.R.N. No.:		N/S	Size:	762mm x 2438mm						
Equipment No. (OIP)		603VS012	N.B. No.:	N/S						
Serial No.:		1619	TAG No.:	V-645						
HEAD Material		SA-516-70N	Nominal:	8.76mm	C.A.:	1.59mm				
HEAD Material			Nominal:							
SHELL Material		SA-516-70N	Nominal:	9.53mm	C.A.:	1.59mm				
SHELL Material			Nominal:							
MAWP S.Side @TEMP:		1793 KPA @66°C	MAWP T.Side @TEMP:							
Comments: _____							Tech.: E.D.P.		Date: 03/2014	
_____							ITS Job No.: 2636		DWG No.: 022	

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08-PROCESSING BUILDING	DESIGN PRESSURE:	1793 kPa / 260 psi
ITEM DESC.:	PROPANE ECONOMIZER	DESIGN TEMP.:	66 C / 151 F
EQUIP / OIP#:	603VS012		
PROV. REG. #:	N/S	VESSEL CORROSION ALLOWANCE:	1.59 mm
SERIAL #:	1619		
CRN.:	N9966.21	TOTAL CAUTION / ACTION TML:	11

Item # (022)
TML No.: 2 TOP HD T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.83 mm.

MATERIAL: SA51670N

MINIMUM THICKNESS MEASURED: 9.70 mm.

Pts.	Nom. Thick. mm	CA + Steel Mfg.Tol. mm	Nom. -CA -Toll. mm	B/L Survey Thick. mm	Prev. Survey Thick. mm	Last Survey Thick. mm	Short Term CR mm/yr	Long Term CR mm/yr	Rem. Half Life yr	Future UT Reading mm/yy	Action/Caution Required Item
				01/1998	04/2008	03/2014					
2.01	8.76	1.84	6.92	8.76	9.80	9.90	0.0000	0.0000	100.00	.	NO
2.02	8.76	1.84	6.92	8.76	9.80	9.80	0.0000	0.0000	100.00	.	NO
2.03	8.76	1.84	6.92	8.76	9.70	9.70	0.0000	0.0000	100.00	.	NO
2.04	8.76	1.84	6.92	8.76	9.90	9.70	0.0330	0.0000	42.10	.	NO
2.05	8.76	1.84	6.92	8.76	10.40	9.90	0.0838	0.0000	17.78	.	NO
2.06	8.76	1.84	6.92	8.76	10.00	10.00	0.0000	0.0000	100.00	.	NO

TML No.: 4 TOP SH T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.43 mm.

MATERIAL: SA51670N

MINIMUM THICKNESS MEASURED: 9.40 mm.

Pts.	Nom. Thick. mm	CA + Steel Mfg.Tol. mm	Nom. -CA -Toll. mm	B/L Survey Thick. mm	Prev. Survey Thick. mm	Last Survey Thick. mm	Short Term CR mm/yr	Long Term CR mm/yr	Rem. Half Life yr	Future UT Reading mm/yy	Action/Caution Required Item
				01/1998	04/2008	03/2014					
4.01	9.53	1.84	7.69	9.53	10.00	9.40	0.1016	0.0076	8.42	.	CAUTION *
4.02	9.53	1.84	7.69	9.53	9.80	9.40	0.0660	0.0076	12.95	.	CAUTION *
4.03	9.53	1.84	7.69	9.53	9.30	9.50	0.0000	0.0025	100.00	.	NO
4.04	9.53	1.84	7.69	9.53	9.50	9.40	0.0178	0.0076	48.09	.	NO
4.05	9.53	1.84	7.69	9.53	9.40	9.50	0.0000	0.0025	100.00	.	NO
4.06	9.53	1.84	7.69	9.53	9.80	9.40	0.0660	0.0076	12.95	.	CAUTION *

If Baseline (B/L) Survey Thickness Measurement was not taken at the time of Manufacture, then Nominal Thickness is used as Baseline Thickness.
Minimum Thickness is calculated

Design Minimum Thickness = Nom. Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or -12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

(*) and GREEN Represent 25% of the last thickness readings, which have the shortest remaining half life.

BLUE (Caution TML Point) - If Corrosion Rate exceed a 0.250mm / 0.009 in. per yr. or Half Life is less than 15 years.

RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

CA - Corrosion Allowance, CR - Corrosion Rate (Brown if CR >= 0.500mm/yr.).

Calculated T-Min. Thickness - Using UPIE Mathematics.

TAQA North

Unit: N-603

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08-PROCESSING BUILDING	DESIGN PRESSURE:	1793 kPa / 260 psi
ITEM DESC.:	PROPANE ECONOMIZER	DESIGN TEMP.:	66 C / 151 F
EQUIP / OIP#:	603VS012		
PROV. REG. #:	N/S	VESSEL CORROSION ALLOWANCE:	1.59 mm
SERIAL #:	1619		
CRN.:	N9966.21	TOTAL CAUTION / ACTION TML:	11

Item # (022)

TML No.: 6 BTM SH T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.60 mm.

MATERIAL: SA51670N

MINIMUM THICKNESS MEASURED: 9.50 mm.

Pts.	Nom. Thick. mm	CA + Steel Mfg.Tol. mm	Nom. -CA -Toll. mm	B/L Survey Thick. mm	Prev. Survey Thick. mm	Last Survey Thick. mm	Short Term CR mm/yr	Long Term CR mm/yr	Rem. Half Life yr	Future UT Reading mm/yy	Action/Caution Required Item
				01/1998	04/2008	03/2014					
6.01	9.53	1.84	7.69	9.53	9.80	9.70	0.0178	0.0000	56.53	.	NO
6.02	9.53	1.84	7.69	9.53	9.50	9.60	0.0000	0.0000	100.00	.	NO
6.03	9.53	1.84	7.69	9.53	9.70	9.60	0.0178	0.0000	53.71	.	NO
6.04	9.53	1.84	7.69	9.53	9.70	9.50	0.0330	0.0025	27.41	.	NO
6.05	9.53	1.84	7.69	9.53	9.60	9.60	0.0000	0.0000	100.00	.	NO
6.06	9.53	1.84	7.69	9.53	9.70	9.60	0.0178	0.0000	53.71	.	NO

TML No.: 8 BTM HD T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 9.48 mm.

MATERIAL: SA51670N

MINIMUM THICKNESS MEASURED: 9.20 mm.

Pts.	Nom. Thick. mm	CA + Steel Mfg.Tol. mm	Nom. -CA -Toll. mm	B/L Survey Thick. mm	Prev. Survey Thick. mm	Last Survey Thick. mm	Short Term CR mm/yr	Long Term CR mm/yr	Rem. Half Life yr	Future UT Reading mm/yy	Action/Caution Required Item
				01/1998	04/2008	03/2014					
8.01	8.76	1.84	6.92	8.76	10.30	9.50	0.1346	0.0000	9.59	.	CAUTION *
8.02	8.76	1.84	6.92	8.76	10.40	9.60	0.1346	0.0000	9.96	.	CAUTION *
8.03	8.76	1.84	6.92	8.76	10.50	9.60	0.1499	0.0000	8.94	.	CAUTION *
8.04	8.76	1.84	6.92	8.76	10.40	9.50	0.1499	0.0000	8.61	.	CAUTION *
8.05	8.76	1.84	6.92	8.76	10.40	9.50	0.1499	0.0000	8.61	.	CAUTION *
8.06	8.76	1.84	6.92	8.76	10.00	9.20	0.1346	0.0000	8.47	.	CAUTION *

If Baseline (B/L) Survey Thickness Measurement was not taken at the time of Manufacture, then Nominal Thickness is used as Baseline Thickness. Minimum Thickness is calculated

Design Minimum Thickness = Nom. Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or -12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

(*) and GREEN Represent 25% of the last thickness readings, which have the shortest remaining half life.

BLUE (Caution TML Point) - If Corrosion Rate exceed a 0.250mm / 0.009 in. per yr. or Half Life is less than 15 years.

RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

CA - Corrosion Allowance, CR - Corrosion Rate (Brown if CR >= 0.500mm/yr.).

Calculated T-Min. Thickness - Using UPIE Mathematics.

TAQA North

Unit: N-603

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08-PROCESSING BUILDING	DESIGN PRESSURE:	1793 kPa / 260 psi
ITEM DESC.:	PROPANE ECONOMIZER	DESIGN TEMP.:	66 C / 151 F
EQUIP / OIP#:	603VS012		
PROV. REG. #:	N/S	VESSEL CORROSION ALLOWANCE:	1.59 mm
SERIAL #:	1619		
CRN.:	N9966.21	TOTAL CAUTION / ACTION TML:	11

Item # (022)

TML No.: 10 1.5"90L NOZ T-B

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 7.34 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 7.00 mm.

Pts.	Nom. Thick. mm	CA + Steel Mfg.Tol. mm	Nom. -CA -Toll. mm	B/L Survey Thick. mm	Prev. Survey Thick. mm	Last Survey Thick. mm	Short Term CR mm/yr	Long Term CR mm/yr	Rem. Half Life yr	Future UT Reading mm/yy	Action/Caution Required Item
				01/1998	04/2008	03/2014					
10.01	7.14	2.48	4.66	7.14	5.50	7.60	0.0000	0.0000	100.00	.	NO
10.02	7.14	2.48	4.66	7.14	6.80	7.20	0.0000	0.0000	100.00	.	NO
10.03	7.14	2.48	4.66	7.14	6.90	7.00	0.0000	0.0076	100.00	.	NO
10.04	7.14	2.48	4.66	7.14	6.60	7.40	0.0000	0.0000	100.00	.	NO
10.05	7.14	2.48	4.66	7.14	6.70	7.50	0.0000	0.0000	100.00	.	NO

TML No.: 12 4"CIRC NOZ 150#

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 8.60 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 8.00 mm.

Pts.	Nom. Thick. mm	CA + Steel Mfg.Tol. mm	Nom. -CA -Toll. mm	B/L Survey Thick. mm	Prev. Survey Thick. mm	Last Survey Thick. mm	Short Term CR mm/yr	Long Term CR mm/yr	Rem. Half Life yr	Future UT Reading mm/yy	Action/Caution Required Item
				01/1998	04/2008	03/2014					
12.01	8.56	2.66	5.90	8.56	9.80	8.00	0.3023	0.0356	3.48	.	CAUTION *
12.02	8.56	2.66	5.90	8.56	9.10	8.80	0.0508	0.0000	28.55	.	NO
12.03	8.56	2.66	5.90	8.56	9.10	8.90	0.0330	0.0000	45.43	.	NO
12.04	8.56	2.66	5.90	8.56	9.40	8.70	0.1168	0.0000	11.98	.	CAUTION *

If Baseline (B/L) Survey Thickness Measurement was not taken at the time of Manufacture, then Nominal Thickness is used as Baseline Thickness.
Minimum Thickness is calculated

Design Minimum Thickness = Nom. Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or -12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

(*) and GREEN Represent 25% of the last thickness readings, which have the shortest remaining half life.

BLUE (Caution TML Point) - If Corrosion Rate exceed a 0.250mm / 0.009 in. per yr. or Half Life is less than 15 years.

RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

CA - Corrosion Allowance, CR - Corrosion Rate (Brown if CR >= 0.500mm/yr.).

Calculated T-Min. Thickness - Using UPipe Mathematics.

TAQA North

Unit: N-603

FACILITY:	CHINCHAGA GAS PLANT	MANUFACTURER:	THERMO DESIGN ENGINEER
LSD:	C-032-H/094-H-08-PROCESSING BUILDING	DESIGN PRESSURE:	1793 kPa / 260 psi
ITEM DESC.:	PROPANE ECONOMIZER	DESIGN TEMP.:	66 C / 151 F
EQUIP / OIP#:	603VS012		
PROV. REG. #:	N/S	VESSEL CORROSION ALLOWANCE:	1.59 mm
SERIAL #:	1619		
CRN.:	N9966.21	TOTAL CAUTION / ACTION TML:	11

Item # (022)

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

DATE BUILT: 01/1998

AVERAGE THICKNESS MEASURED: 8.64 mm.

MATERIAL:

MINIMUM THICKNESS MEASURED: 8.40 mm.

Pts.	Nom. Thick. mm	CA + Steel Mfg.Tol. mm	Nom. -CA -Toll. mm	B/L Survey Thick. mm	Prev. Survey Thick. mm	Last Survey Thick. mm	Short Term CR mm/yr	Long Term CR mm/yr	Rem. Half Life yr	Future UT Reading mm/yy	Action/Caution Required Item
				01/1998	04/2008	03/2014					
14.01	8.71	2.68	6.03	8.71	8.50	8.90	0.0000	0.0000	100.00	.	NO
14.02	8.71	2.68	6.03	8.71	8.60	8.70	0.0000	0.0000	100.00	.	NO
14.03	8.71	2.68	6.03	8.71	8.50	8.50	0.0000	0.0127	97.25	.	NO
14.04	8.71	2.68	6.03	8.71	8.60	8.40	0.0330	0.0203	35.89	.	NO
14.05	8.71	2.68	6.03	8.71	8.60	8.70	0.0000	0.0000	100.00	.	NO

If Baseline (B/L) Survey Thickness Measurement was not taken at the time of Manufacture, then Nominal Thickness is used as Baseline Thickness.
Minimum Thickness is calculated

Design Minimum Thickness = Nom. Thick. - CA - Manufacturing Steel Tolerance.

Manufacturing Tolerance of pipe and forged fittings is + or -12.5% (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

Manufacturing Tolerance of plate is + or - 0.25mm (0.010") (May or may not apply dependent upon the Client's Owner-User Integrity Management System).

(*) and GREEN Represent 25% of the last thickness readings, which have the shortest remaining half life.

BLUE (Caution TML Point) - if Corrosion Rate exceed a 0.250mm / 0.009 in. per yr. or Half Life is less than 15 years.

RED (Action TML Point) - If Remaining Half Life is 0 and Last Survey Thickness is below Nominal-CA-Tolerance Thickness.

CA - Corrosion Allowance, CR - Corrosion Rate (Brown if CR >= 0.500mm/yr.).

Calculated T-Min. Thickness - Using UPipe Mathematics.

EQUIPMENT EXTERNAL INSPECTION REPORT

Customer:	TAQA North	ITS Job No.:	2636
District:	North Area	Date:	23-Mar-2014
Facility:	Chinchaga Gas Plant	LSD:	C-032-H/094-H-08
Equip. Description:	Propane Economizer	Serial No.:	1619
Equip./OIP No.:	603VS012	PRN:	Not Stated

Equip. Type: ☐ Column ☐ Cooler ☐ Exchanger ☐ Furnace ☐ Heater ☐ Plate Exchanger ☐ Reboiler ☒ Vessel ☐ Other:

Remedial Action	Service	Associated Components	Shell
<input 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 type="checkbox"/> Top <input type="checkbox"/> Bottom
<input checked="" type="checkbox"/> Paint/Coating Repairs	Access and Coverage	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N: Name Plate Legible	<input type="checkbox"/> Good Condition
<input type="checkbox"/> Insulation Repairs	<input checked="" type="checkbox"/> External Inspection	External Grounding	<input type="checkbox"/> External Corrosion
<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"/> Pitting: (max depth)
<input type="checkbox"/> Further Assessment Required	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"/> Scale
<input type="checkbox"/> Condition Damage	<input type="checkbox"/> MT		<input type="checkbox"/> Blistered
<input type="checkbox"/> Does not comply with applicable code/safe operating requirement.	<input checked="" type="checkbox"/> UT		<input type="checkbox"/> Mechanical Damage
<input type="checkbox"/> Repairs Required	<input type="checkbox"/> RT	<input checked="" type="checkbox"/> See Attached Pictures	<input type="checkbox"/> Deformation/Distortion
<input type="checkbox"/> See Comments	<input type="checkbox"/> BH	<input type="checkbox"/> Excessive Vibration	<input type="checkbox"/> Condensation/Sweating
	<input type="checkbox"/> PT	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N <input type="checkbox"/> NA: Pressure Gauge within MAWP	<input checked="" type="checkbox"/> No Access Insulated
	<input type="checkbox"/> Other		<input type="checkbox"/> No Access Ice Build Up
Status	<input type="checkbox"/> See Comments	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N <input type="checkbox"/> NA: Temp. Gauge within MDMT	<input type="checkbox"/> Weld(s) in Good Condition
<input checked="" type="checkbox"/> Operational; <input type="checkbox"/> Idle;		<input checked="" type="checkbox"/> Y <input type="checkbox"/> N Attached Piping and Instrumentation in Good Condition	<input type="checkbox"/> Weld(s) Corroded
<input type="checkbox"/> Shut In;		<input type="checkbox"/> See Comments	<input type="checkbox"/> Weld(s) Poor Quality
<input type="checkbox"/> Surplus/Boneyard;			<input type="checkbox"/> Weld(s) Cracked
<input type="checkbox"/> Other:			<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 checked="" 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"/> Flat <input type="checkbox"/> FLG <input checked="" type="checkbox"/> ELL <input type="checkbox"/> ECC <input type="checkbox"/> HEMI	<input type="checkbox"/> Good Condition
<input type="checkbox"/> Good Condition	<input type="checkbox"/> Good Condition	<input type="checkbox"/> Fasteners Engaged
<input type="checkbox"/> External Corrosion	<input checked="" type="checkbox"/> External Corrosion	<input type="checkbox"/> Repad Weep Holes Clear
<input type="checkbox"/> Pitting: (max depth)	<input type="checkbox"/> Pitting: (max depth)	<input type="checkbox"/> Nozzles are Gusseted
<input type="checkbox"/> Scale	<input type="checkbox"/> Scale	<input checked="" type="checkbox"/> External Corrosion
<input type="checkbox"/> Blistered	<input type="checkbox"/> Blistered	<input type="checkbox"/> Leaking/Weeping
<input type="checkbox"/> Mechanical Damage	<input type="checkbox"/> Mechanical Damage	<input type="checkbox"/> Damaged/Cracked
<input type="checkbox"/> Deformation/Distortion	<input type="checkbox"/> Deformation/Distortion	<input type="checkbox"/> Bolts Missing/Loose
<input type="checkbox"/> Condensation/Sweating	<input type="checkbox"/> Condensation/Sweating	<input type="checkbox"/> Deflection/Distortion
<input type="checkbox"/> No Access	<input type="checkbox"/> No Access	<input type="checkbox"/> Partial Internal Inspection
<input checked="" type="checkbox"/> No Access Insulated	<input type="checkbox"/> No Access Insulated	<input checked="" type="checkbox"/> No Access Insulated
<input type="checkbox"/> No Access Ice Build Up	<input type="checkbox"/> No Access Ice Build Up	<input type="checkbox"/> Weld(s) in Good Condition
<input type="checkbox"/> External Protection Only	<input type="checkbox"/> External Protection Only	<input type="checkbox"/> Weld(s) Corroded
<input type="checkbox"/> See Comments	<input checked="" type="checkbox"/> See Comments	<input type="checkbox"/> Weld(s) Poor Quality
		<input type="checkbox"/> Weld(s) Cracked
		<input checked="" type="checkbox"/> See Comments

External Surface	Supports	Associated Piping	PRD 1	PRD 2
<input type="checkbox"/> Good Condition	<input checked="" type="checkbox"/> Good Condition	<input type="checkbox"/> Good Condition	Location: PIPING	Location: Not Applicable
<input checked="" type="checkbox"/> Painted <input type="checkbox"/> Full <input checked="" type="checkbox"/> Part.	<input checked="" type="checkbox"/> Anchor Bolts Secure	<input type="checkbox"/> Corrosion	PSV Tag No.: 603SVVS012	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 checked="" type="checkbox"/> Insulated <input checked="" 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 Threaded	<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 Threaded	<input checked="" type="checkbox"/> Piping and Valves Supported	<input type="checkbox"/> PSV inlet Gusseted	<input type="checkbox"/> PSV inlet Gusseted
<input checked="" 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 checked="" 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"/> See Comments	Locked Open <input type="checkbox"/> Y <input type="checkbox"/> N	Locked Open <input type="checkbox"/> Y <input type="checkbox"/> N
<input type="checkbox"/> See Comments	<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"/> See Comments	<input type="checkbox"/> See Comments

Observations:	
<input checked="" type="checkbox"/> Vessel in Good Condition	<input type="checkbox"/> Based on API 510 Visual External Inspection this vessel is fit for service

- Paint deterioration on bottom head and nozzles, surface corrosion.
- Pressure gauge not in range of mawp.
- Temperature gauge not in range of mdmt.

Recommendations:
<ul style="list-style-type: none"> - Paint. - Replace pressure and temperature gauge as per mawp/mdmt.

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:	40 Months
		PRD 2 Recommended Service Interval:	Not Applicable Months

Pictures:



Photo 1: BOTTOM HEAD



Photo 2: BOTTOM HEAD



Photo 3: PRESSURE GAUGE



Photo 4: TEMPERATURE GAUGE

External Inspection Performed By:

Print Name:

Erwin D. Pederson

Certification No.:

ABSA IPV PESL:
000406
API 510: 33075
API 570: 28183
PEI Class 2: 154

Signature:

Erwin Pederson

Report Reviewed:

[Signature]
Initial

Chief Inspector /
Client
Representative:

Name (Print)

Signature

Date: