

Alberta Boilers Safety Association

#200, 4208 - 97 Street
Edmonton, Alberta, Canada T6E 5Z9
Tel: (780) 437-9100 / Fax: (780) 437-7787

November 16, 2000

Garry Watt
CRESTAR ENERGY INC.
BOX 888
333 - 7 AVENUE SW

CALGARY, AB T2P 4M8

Dear Garry Watt,

The repair or alteration procedure received on October 04, 2000 is accepted for registration as follows:

CRN :	C5574.2	A Number :	138461
Fee :	\$ 225.00	Accepted on :	November 16, 2000
Add. Prints:	\$ 0	Track No. :	2000-06621
Reg Type :	Alteration		

Description	Design Pressure	Design Temperature
Internal Pressure	1551 kPa	38 ⁰ C

Registered under owner / manufacturer name LARSEN & D'AMICO MFG. LTD.

Since only one set of drawings were sent, we have kept it for our file. If you require a stamped set of drawings please forward an additional set of drawings to my attention marked "for stamping only."

An invoice covering survey and registration fees will be forwarded from our Revenue Accounts.

Sincerely,

B.C. DESAI

Design Survey Engineer

cc : Grande Prairie Regional Office



CRESTAR ENERGY

September 29, 2000

Design Survey
Alberta Boiler Safety Association
#200 4208- 97 Street
Edmonton, AB
T6E 5Z9

Re: Re-Rating of Pressure Vessel A#138461

Crestar Energy wishes to re-rate the referenced vessel to allow a MAWP of 1551 kpa (225 psi) instead of its current MAWP, which is 862 kpa (125 psi)

Enclosed you will find:

- 1) Request to re-rate
- 2) Copy of the U-1A form
- 3) External inspection report
- 4) Ultrasonic report with diagram and readings for all components of the vessel
- 5) Calculations to support re-rate to higher pressure

The manufacturer was unable to supply a copy of the drawings as the sepia has been revised several times since original manufacture, however they did advise of the inside projection and weld detail for the NPS8 nozzle so that reinforcement calculations could be made.

If this request to rerate the vessel to a higher working is approved Crestar Energy will contact the local ABSA inspector so that he may witness the hydro testing of the vessel and the installation of a nameplate with the new MAWP.

Please process this request on a rush basis. If you have any questions please contact me at 403-231-8454

Regards,

Garry Watt, C.E.T.
Quality Assurance Coordinator



CRESTAR ENERGY INC.

Page 1 of 2
Revision 1
January 1, 1998
Exhibit 100

Quality Assurance Forms

P.O. Box 888 #333 - 7 th Ave. SW CALGARY, Alberta T2P 4M8 Phone: (403) 231-6700 Fax: (403) 231-6945	Report No.: Date: <u>Sept 28, 2000</u> File No.: Page: <u>1</u> of <u>2</u>
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☒ RERATING	☐ INSPECTION EXTENSION	☐ NONCONFORMANCE / CORRECTIVE ACTION	☐ DOCUMENT TRANSMITTAL	☐ HYDROTEST
--	--	--	---	------------------------------------

Equipment Location: <u>14-9-75-9 Wb.</u>	Equipment Description: <u>Vertical Separator</u>	Business Unit:
Pressure Vessel A#: <u>138461</u>	Old Design Pressure: <u>125 PSI</u>	New Design Pressure: <u>225 PSI</u>
Process / Service: <u>Sweet</u>	Old Design Temperature:	New Design Temperature:
Test Pressure: <u>338 PSI</u>	Gauge #:	Minimum Time of Test: <u>30 minutes</u>

Document #:	To:	From:	Date Sent:
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Failure Date:	Notification Date:
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Failure / Nonconformance / <u>Hydrotest</u> / <u>Rerating</u> / Extension Description: <u>- We wish to rerate this vessel to 225psi - no change to temperature.</u>
--

Recommendations (must be filled in for Nonconformance / Failure / Extension):

Inspection and Repair History (must be filled in for Extension or Rerating):
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CRESTAR ENERGY INC.

Page 2 of 2
Revision 1
January 1, 1998
Exhibit 100

Quality Assurance Forms

Comments (any additional inspection or repair findings):

- External inspection found no anomalies - (report attached)
- Ultrasonic inspection confirmed no corrosion was present and all components have sufficient thickness for new pressure - (report attached.)
- Calculations confirm vessel is suitable for MAWP of 225 psi (report attached)
- IF rerating is accepted Crestar will contact the local ABSA inspector and have him witness the hydro test and installation of nameplate with new MAWP.

<u>Name</u> (type or print name)	<u>Signature</u>	<u>Date</u>
Visual Inspector		
QA Administrator		
QA Coordinator	G. West	Sept 29, 2000
ABSA Safety Codes Officer		

A138461

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

A138461

1. Manufactured by LARSEN & D'AMICO MFG LTD 9805 - 51 Ave. Edmonton, Alta.
 2. Manufactured for SHEAMAR SUPPLY LTD 5705-99 St. Edmonton, Alberta
 3. Location of Installation Grande Prairie Area, Alberta
 4. Type Vertical VS-060016-147 C-5574,2 LD-121-A (Year Built) 79
 (Horiz. or vert. tank) (Mfr's Serial No.) (CRN) (Drawing No.) (Nat'l. Div. No.)
 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 7.7 and Addenda to Jun 79 and Code Case Nos. _____
 (Year) (Date)
 Special Service per UG-120(d) _____
 Manufacturers' Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: _____
 6. Shell; Matl. SA-53-B Nom. (7.9mm) Corr. (609mm) (1524 mm)
 (Spec. No., Grade) Thk. 0.312 in. Allow. Nil in. Diam. 24 in. Lgth. 5 ft 0 in.
 7. Seams: Long. SMLS R.T. NONE Efficiency 70 % H.T. Temp. _____ F Time _____ hr
 (Welded, Dbl. Sngl. Lap, Buttl) (Spot or Full)
 Girth Welded Buttl R.T. _____ (Spot, Partial, or Full) No. of Courses 1
 (Welded, Dbl. Sngl. Lap, Buttl)
 8. Heads: (a) Material SA-516-70 (b) Material SA-516-70
 (Spec. No., Grade) (Spec. No., Grade)

	Location (Top, Bottom, End)	Thk. (3mm)	Corr. Allow.	Crown Radius	Knuckle Radius	Ellipse Ratio	Conical Apex Angle	Membr. Radius	Flat Diam.	Side to Pressure (Convex or Concave)
(a)	<u>TOP</u>	<u>0.12</u>				<u>2:1</u>				<u>CONCAVE</u>
(b)	<u>BOTTOM</u>	<u>0.12</u>				<u>2:1</u>				<u>CONCAVE</u>

 If removable, bolts used (describe other fastenings) _____
 9. Constructed for max. allowable working pressure (862 kPa) (Material, Spec. No., Gr., Size, No.) 38 C
 less than -20 F) _____ F. Hydrostatic, pneumatic, or combination test pressure 100 psi at max. temp. 100 F. Min. temp. (when
 10. Safety Valve Outlets: Number 1 Size 2 Location Top Head _____ psi. (1293 kPa)
 11. Nozzles and Inspection Openings:

Purpose (Inlet, Outlet, Drain)	Diam. or Size	Type	Matl.	Nom. Thk.	Reinforcement Matl.	How Attached	Location
<u>SEE DRAWING # LD-121-A Rev. 2</u>							

 12. Supports: Skin YES Lugs _____ Legs _____ Other _____ Attached Bottom Head-weld
 (Yes or No) (No.) (No.) (Describe) (Where and how)
 13. Remarks:
TYPE: 2 phase Vertical Separator
CAPACITY: 16.2 Cu. Ft. (0.46 m³) WO# 775 VS-5
WEIGHT: 965 Lbs. (439 kg)
ULTIMATE OWNER: DOME PETROLEUM LTD 706-7 Ave. S.W. Calgary, Alta.

CERTIFICATE OF 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.
 Date Sept 10 1979 Signed LARSEN & D'AMICO MFG LTD W. Smith (Manufacturer) (Representative)
 "U" Certificate of Authorization No. 14254 expires October 28 1980

CERTIFICATE OF SHOP INSPECTION

Vessel made by LARSEN & D'AMICO MFG LTD at 9805 - 51 Ave. Edmonton
 I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of Alberta and employed by Boilers Branch have inspected the pressure vessel described in this Manufacturers' Data Report on Sept 10 1979 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 the Manufacturers' 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.
 Signed _____ Date 7-9-79 Commissions _____ (Inspector) (Nat'l. Board, State, Province and No.)

GENERAL PRESSURE VESSEL INFORMATION

Area: <u>Valhalla Field</u>	Location (LSD): <u>14-9-75-906</u>
Facility:	Date: <u>Sept. 21/00</u>
Vessel Name: <u>Separator</u>	
Internally coated: yes ☐ no ☒	
Orientation: horizontal ☐ vertical ☒	
Facility Vessel Identification #:	
Separator type (if applicable): 2-phase ☒ 3-phase ☐	
Direct fired vessel: yes ☐ no ☒	Last flame arrestor test date:
Status: operating ☒ shut in ☐ surplus ☐ junk ☐	
Thermal insulation: yes ☐ no ☒	Asbestos: yes ☐ no ☒

PRESSURE VESSEL NAMEPLATE DATA

"A" number:		CRN number:	
"S" Number (Sask): <u>A138461</u>		<u>C.5574.2</u>	
B.C. Registration #:			
Vessel serial number: <u>VS.060016.147</u>		Size (i.d. x length): <u>609mm X 1524mm</u>	
Drawing #:		Capacity (volume): <u>0.46m³</u>	
Shell thickness: <u>7.9mm</u>		Shell material: <u>SA-53-B</u>	
Head thickness: <u>3mm (min)</u>		Head material: <u>SA-516-70</u>	
Tube wall thickness:		Tube material:	
Tube size (i.d.):			
Channel thickness:		Channel material:	
Design pressure <u>862 kPa</u>	Shell:	Operating pressure	Shell:
	Tubes:		Tubes:
Design temperature <u>38°C</u>	Shell:	Operating temperature	Shell:
	Tubes:		Tubes:
X-ray: <u>no</u>	Heat treatment: <u>no</u>		
Code parameters:	Joint efficiency (j.e.): <u>70%</u>		
Manufacturer:	Year built: <u>Aug/79</u>		
Corrosion allowance: <u>Nil</u>	Manway? yes ☐ no ☒		

PSV Data

LOCATION (Reference Pressure Vessel A# that the valve is attached to or protecting. Where the valve is not protecting a vessel describe the piping system location. i.e. Inlet Header or Compressor Discharge):

	Set Pressure	CRN #	Manufacturer / Model / Tag # /Serial #	Capacity (Scfm)	Size	Set Date
Shell Side	<u>125 psi</u>					<u>08/00</u>
Tube Side (Exchangers Only)						

Service Conditions - check all that apply

Steam	Air	Sweet Oil ☒	Lean Amine	Sour Oil
Sour Condensate	LPG	Sweet Gas ☒	Rich Amine	Sour Gas
Sweet Condensate	Nitrogen	Sweet Glycol	Sulphur	Salt Water
Chlorine	Ammonia	Sour Glycol	Other	

External Condition (check skirt, saddle, foundation, , gauges, site glasses, ensure external piping is secure and there no excessive loading. Look for leaks, corrosion, etc. Confirm PSV set pressure is below MAWP. Record general condition and all anomalies.

looks OK.

Internal Condition: (Check attachments welds, all pressure retaining welds, look for corrosion, erosion, or other service related damage. Inspect all nozzles & coupling for damage. Ensure demister pads are clean., internal anodes are acceptable Record condition such as cleanliness, condition of coating, size, depth and location of all service related damage, or any information that may be useful for TAR and Inspection planning. If problems are noted do not close vessel until discussed with QA Coordinator)

n/a

Suitable for continued Service: ☒ YES ☐ NO

Next Recommended Inspection:

Inspected by:

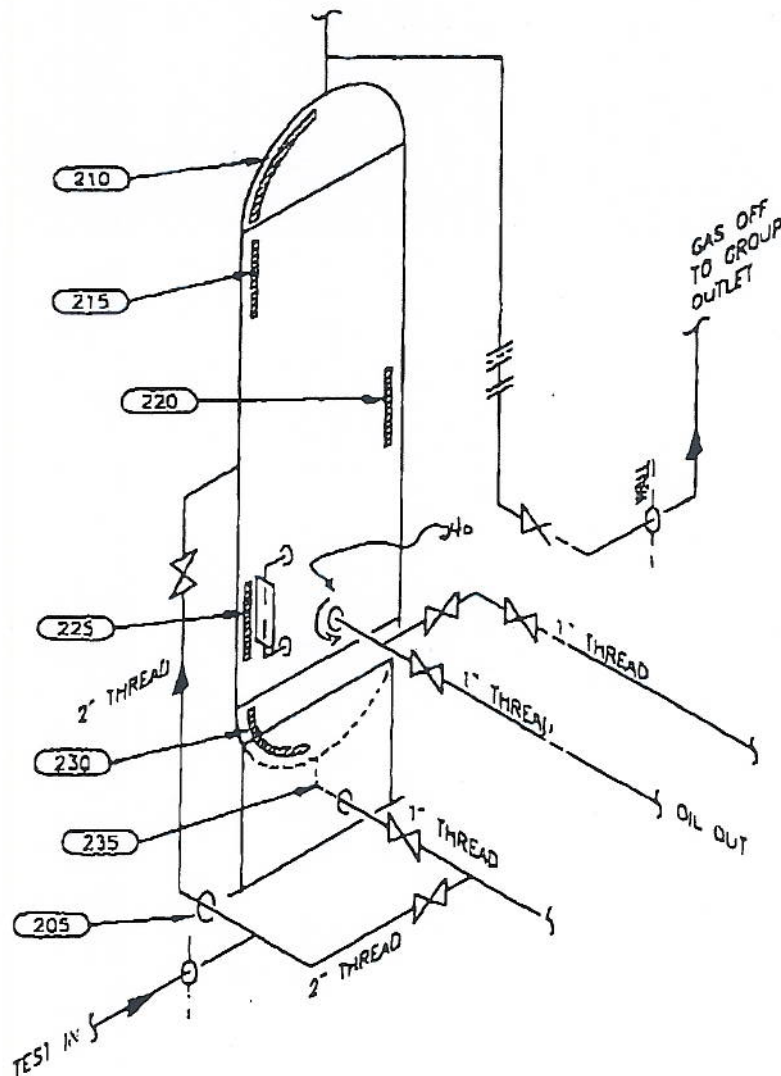
BT

Dated:

09/21/00

Sep-21-00 02:02pm From-RTD QUALITY SERVICES

T-544 P.01/03 F-970



Equip. No. _____	Prov. Reg. No. <u>138461</u>	C.R.N. <u>1-55242</u>	Serial No. <u>VS 060016-147</u>	Yr. Inst. _____																				
Code/Div. <u>ASME Div 1</u>	Size: <u>24"x5'</u>	Manufacturer: <u>LARSEN & LAMICO</u>		Yr. Bld. <u>1975</u>																				
C Stamp: <u>YES</u>	Service: <u>SWFT</u>	PWHT: <u>NO</u>	Radiography: <u>NO</u>	Insulated: <u>NO</u>																				
Design & Materials Data																								
HEAD:																								
Mat'l. <u>SA-516-70</u>	Thick. <u>3.0mm/min</u>	CA. <u>NIL</u>																						
Mat'l. _____	Thick. _____	CA. _____																						
CHANNEL:																								
Material: _____	Nominal: _____	CA. _____																						
BOOT:																								
Head Mat'l. _____	Head Nom. _____	Head CA. _____																						
Shell Mat'l. _____	Shell Nom. _____	Shell CA. _____																						
SHELL:																								
Material: <u>SA-53-B</u>	Nominal: <u>2.9mm</u>	CA. _____																						
MWP Shell Side: <u>862 kPa</u>	Ø Temp. <u>35°C</u>																							
MWP Tube Side: _____	Ø Temp. _____																							
<table border="1" style="width:100%"> <tr> <td colspan="2">CLIENT</td> <td colspan="2">CRESTAR ENERGY</td> </tr> <tr> <td colspan="2">FACILITY</td> <td colspan="2">VALHALLA OIL & GAS GATHERING</td> </tr> <tr> <td colspan="2"></td> <td colspan="2">LSD 14-09-75-09 W6M</td> </tr> <tr> <td colspan="2">ITEM</td> <td colspan="2">2 PHASE VERTICAL SEPARATOR</td> </tr> <tr> <td>By: EG</td> <td>DATE: 00/09</td> <td colspan="2">DWG # 12</td> </tr> </table>					CLIENT		CRESTAR ENERGY		FACILITY		VALHALLA OIL & GAS GATHERING				LSD 14-09-75-09 W6M		ITEM		2 PHASE VERTICAL SEPARATOR		By: EG	DATE: 00/09	DWG # 12	
CLIENT		CRESTAR ENERGY																						
FACILITY		VALHALLA OIL & GAS GATHERING																						
		LSD 14-09-75-09 W6M																						
ITEM		2 PHASE VERTICAL SEPARATOR																						
By: EG	DATE: 00/09	DWG # 12																						

Sep-21-00 02:02pm From-RTD QUALITY SERVICES

Y-644 P.02/03 F-970

UTS DATA

CLIENT: CRESTAR ENERGY
EQUIPMENT: 2 PHASE VERTICAL SEPARATOR
EQUIPMENT ID#:
PROV REG: A 138461
TESTED ON STREAM

FACILITY: VALHALLA OIL & GAS GATHERING
SERVICE: SWEET
LOCATION: 14 03-75-08 W6M
RTD JOB # G99-0215
REFER TO DRAWING: 12

Test Point	THICKNESS DATA				Flag	Cm	CA	Nom	Short Term	Long Term	Ass mmpy	Flag Data
210												
Description:	TOP HEAD											
	2000 7											
Min Thick	7.8		3.00		0		3.00					L
Average	8								0	0		L
Analysis	2000/07 NOTE: NAME PLATE STAMPED WITH HEAD NOMINAL = 3.0 mm. PROBABLE MIS-PRINT; SUGGEST CONFIRMATION VIA UT-A FORM											
215												
Description:	TOP SHELL											
	2000 7											
Min Thick	7.8		7.90		0		7.90					L 2000
Average	8								0	0		L
Analysis	2000/07 LAMINATION DEFECT NOTED @ 5.4mm											
220												
Description:	SHELL OPPOSITE INLET											
	2000 7											
Min Thick	7		7.90		0		7.90					L 2000
Average	7.8								0	0		L 2000
Analysis	2000/07 LAMINATION DEFECT NOTED @ 5mm											
225												
Description:	SHELL @ UL											
	2000 7											
Min Thick	7.8		7.90		0		7.90					L 2000
Average	8								0	0		L
Analysis												
230												
Description:	BOTTOM HEAD											
	2000 7											
Min Thick	9.3		3.00		0		3.00					L
Average	9.7								0	0		L
Analysis	2000/07 MIN SCAN @ MID BAND											
235												
Description:	1" 90° NOZZLE											
	2000 7											
Min Thick	3.9		4.60		0		4.60					L 2000
Average	4.3								0	0		L 2000
Analysis												

Sep-21-00 02:02pm From-RTD QUALITY SERVICES

T-644 P.03/03 F-970

UTS DATA

CLIENT: CRESTAR ENERGY
EQUIPMENT: 2 PHASE SEPARATOR PIPING
EQUIPMENT ID#:
PROV REG:
TESTED ON STREAM

FACILITY: VALHALLA OIL & GAS GATHERING
SERVICE: SWEET
LOCATION: 14-03-75-09 WSM
RTD JOB #: G69-0215
REFER TO DRAWING: 12

Test Point	THICKNESS DATA	Flag	CN	C.A.	Nom.	Short Term	Long Term	Avg mm/yr	Flag Date
205									
Description:	2" CIRC BAND								
	2000 7								
Min Thick	3.3	4.81		.7	5.50				L
Average	5.7					0	0		L
Analysis	2000/07 MIN SCAN @ 3:00 POSITION.								

240

8" circ band (nozzle)

min 8.2

avg 8.7

analysis min scan @ 12:00 pos

8.18

0

8.18

[Handwritten signature]

Summary: This nozzle is 8 inch S.O.



Subject

Re-rate of Separator A# 138461Original Design

- MAWP of 125 psi @ 100F
- R.T. None - Joint EFF = 70%
- Corr. All = Nil

Re-rate to Higher MAWP of 225 psi

- use same materials, Joint EFF & Corr All
- verify wall thickness of components by ultrasonics
- provide calculations for higher pressure
- hydro test @ 225 x 1.5 = 338 psi
- add additional name plate with new MAWP

Shell Calculation

$$t = \frac{PR}{SE + 4P}$$

where

$$P = 225 \text{ psi}$$

$$R = 12'$$

$$S = 15,000 \text{ for SA53-B}$$

$$E = 70\%$$

$$t = \frac{(225)(12)}{(15,000)(.70) + (4)(225)}$$

$$t = \frac{2700}{10,590}$$

$$t = .255' \text{ required for shell}$$

minimum from
u.t. report is .275"



CRESTAR ENERGY

Engineering Chart

Sheet No. 2 of 6

File _____

Appn. _____

Date Sept 28, 2000

By G. Hart

Subject _____

Head Calculation

$$t = \frac{PD}{2SE + 1.8P}$$

Where

$$P = 225 \text{ psi}$$

$$D = 24"$$

$$S = 17,500 \text{ for SA516-70}$$

$$E = 1$$

$$t = \frac{(225)(24)}{(2)(17,500)(1) + (1.8)(225)}$$

$$t = \frac{5400}{35,405}$$

$$t = .153" \text{ required for head}$$

Minimum Thickness

measured by U.T. is .307"



Subject _____

Reinforcement of NPSB

$$A = d \times t_r$$

$$A = 7.981 \times .179$$

$$A = 1.43 \text{ in}^2 \text{ required}$$

where

$$d = 7.981$$

$$t_r = \frac{PR}{SE + AP}$$

$$P = 225 \text{ psi}$$

$$R = 12"$$

$$S = 15,000$$

$$E = 1$$

$$t_r = \frac{(225)(12)}{(15,000)(1) + (4)(225)}$$

$$t_r = \frac{2700}{15,090}$$

$$t_r = .179$$

Available reinforcement

$$A_1 = (t - t_r) d$$

$$A_1 = (.275 - .179) 7.981$$

$$A_1 = .766 \text{ in}^2$$

where

$$t = .275" \text{ (from U.T. report)}$$

$$t_r = .179$$

$$d = 7.981$$



CRESTAR ENERGY

Engineering Chart

Sheet No.

4 of 6

File

Appn.

Date Sept 28, 2000By G. Watt

Subject

 A_2 is smaller of

$$(t_n - t_{rn}) S t$$

or

$$(t_n - t_{rn}) S t_n$$

$$(t_n - t_{rn}) S t$$

$$(.322 - .064) (5) (.275) =$$

$$A_2 = .355 \text{ in}^2$$

or

$$(t_n - t_{rn}) (5) (t_n)$$

$$(.322 - .064) (5) (.322)$$

$$A_2 = .415 \text{ in}^2$$

where

$$t_n = .322"$$

$$t_{rn} = \frac{PR}{SE + AP}$$

$$P = 225 \text{ psi}$$

$$R = 4.3125$$

$$S = 15,000$$

$$E = 1$$

$$t_{rn} = \frac{(225)(4.3125)}{(15,000)(1) + 4(225)}$$

$$t_{rn} = \frac{970}{15,090}$$

$$t_{rn} = .064$$

$$t = .275$$

from U.T. report



CRESTAR ENERGY

Engineering Chart

Sheet No.

5 of 6

File

Appn.

Date Sep 28, 2001

By G. L. H. T.

Subject

$$A_3 = (t_w - c) 2h$$

$$A_3 = (.322 - c) (2) (.688)$$

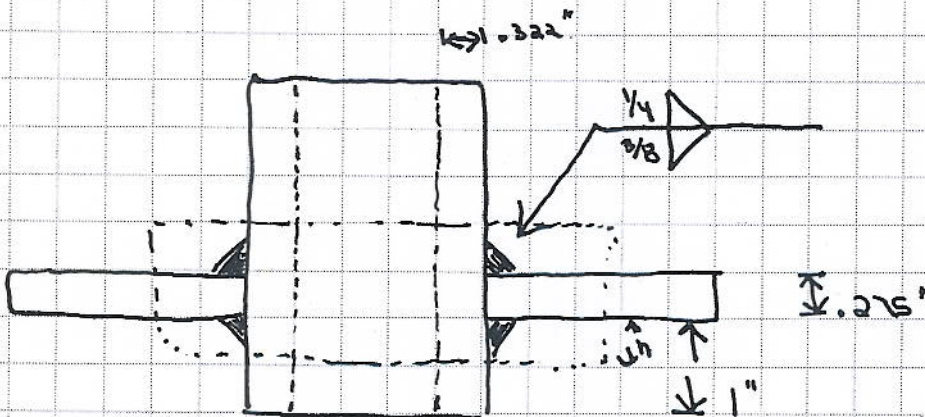
$$A_3 = .221 \text{ in}^2$$

where

$$t_w = .322$$

$$c = 0$$

$$h = .688$$



$$h = (2.5) (.275) = .688$$

A_4 : area of outside weld.

$$A_4 = .375^2$$

$$A_4 = .140 \text{ in}^2$$

A_5 : area of inside weld.

$$A_5 = .250^2$$

$$A_5 = .063 \text{ in}^2$$



CRESTAR ENERGY

Engineering Chart

Sheet No.

6 of 6

File

Appn.

Date Sept 28, 2000

By G. Watt

Subject

Area of reinforcement available:

$$A_1 = .766 \text{ in}^2$$

$$A_2 = .355 \text{ in}^2$$

$$A_3 = .221 \text{ in}^2$$

$$A_4 = .140 \text{ in}^2$$

$$A_5 = .063 \text{ in}^2$$

$$\text{Total } \underline{1.54 \text{ in}^2}$$

This exceeds the requirement of 1.43 in^2 , therefore additional reinforcement is not required.

G. Watt.
Sept 28, 2000



**RTD Quality Service Inc.**

1431 - 70 Avenue
Edmonton, Alberta T6P 1N5
Tel: (780) 440-6600
Fax: (780) 440-2538

**CRESTAR ENERGY
VALHALLA OIL AND GAS GATHERING**

To: Gary Watt - Crestar Chief Inspector

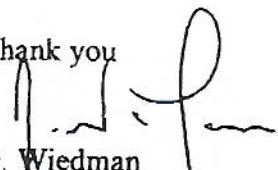
REF: ABSA data request - LSD - 14 - 09 - 75 - 09 - W6M / 2 PHASE SEPARATOR / A - 138461

Gary,

The following is an explanation for the data discrepancy on the July 2000 UTS survey on the Valhalla Oil and gas gathering system. Data point 210 was verified to originals and confirmed to have been entered in error. The correct thickness is 9.5mm min / 9.7mm avg. The data point directly below point # 210 had Exactly the same measurements as point # 210 originally had and was a simple mistake - We regret any inconvenience this may have caused.

The difference in data measurements between the July 2000 data and the Nov 2000 data is due to the area difference in a survey conducted by using a scanning technique in July and a point survey used in November. The area covered with a scanning survey is a lot greater and covers more area in a concentrated zone, unlike A point survey that is directed to trending metal thickness based on the assumption that all surfaces regardless Of service deteriorate in the same manor. The point method does not lend itself to pit detection as this method Is hit or miss, due to the small area of contact. The original survey was conducted with the scanning method And , in Nov 2000, at the direction from ABSA, a point survey was conducted on the shell. Should you require any more clarification on this inspection service we will be at your direction.

Thank you


D. Wiedman
RTD Quality Services
Grande Prairie Alberta



RTD Quality Services Inc.
1431 - 70 Avenue
Edmonton, Alberta T6P 1N5
Phone: (780) 440-6600 Fax: (780) 440-2538

UT Inspection Report

Cres Val - 002

Date: 6 Nov 2000

Page 1 of 2

RTD Job # G99-0271

RTD Dept # 1121

Client: Crestar Energy

Address: Valhalla Oil Gathering

Client PO Number:

Client Representative: Mr. B Throncous

Parts Examined: 2 Phase Separator A-138461

Project: Corrosion Detection

Location: LSD - 14 - 09 - 75 - 09 - W6M

Procedure: RTD - SPM - NDE UT - 001

Code: ASME VIII

Calibration
Standard: ASME Cal std 1179

Thickness mm 3.0 / 7.9 Heat treatment: Yes No

Couplant: UTX Material Type: C/S

Surface Condition: Painted

Surface Temp(°C): ☐ < 5 ☒ > 5 ☒ < 60 ☐ > 60

Method X Pulse Echo
Technique X Other

UT Flaw Detector type: Krautkramer USN 52L No: 7091

Straight Beam Probe

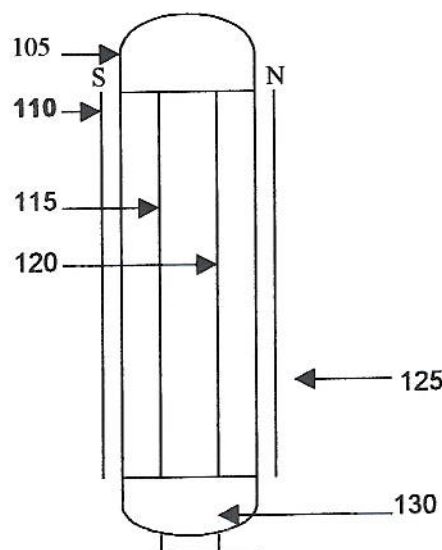
Angle Beam Probe

Type	0 deg						
MHz	5 mhz						
Sound Path	20mm						
Sen. Setting	54 db						
Transfer	----						
Scan Sensit.	----						
Total dB	54 db						

Scope: Ultrasonic Inspection of 2 phase separator

Ref: E - Mail G. Watt, Nov 3 2000 - ABSA Requirements for inspection of separator for re-rating pressure.

Results: The top and bottom head were completely scanned using ultrasonic inspection method. The shell was inspected At 4 quadrants top to bottom 1 foot intervals using ultrasonic inspection method.
No pitting was detected. The minimum thicknesses were recorded, see drawing and data attached.



Technician Name	D. Wiedman	ASNT/CGSB Level: 2	(AM) Start Time:	Stop Time:	St. Hrs. 7
Signature:			(PM) Start Time:	Stop Time:	OT. Hrs. 4
Assistant:		ASNT/CGSB Level:	Unit # 132	Km 586	Travel Time 7
Client Representatives' Signature:			Subsistence Required ☐	OT Meal ☐	Consumables

* Results are an interpretation of the inspection method, not a guarantee. Client Representative signature indicates acceptance of report, results and applicable charges.

CONT:

Page 2

Scope: Ultrasonic Inspection of 2 phase separator.

Ref: E – Mail G. Watt, Nov 3 2000 – ABSA Requirements for inspection of separator for re-rating pressure.

**Results: The top and bottom head were completely scanned using ultrasonic inspection method. The shell was inspected At 4 quadrants top to bottom 1 foot intervals using ultrasonic inspection method.
No pitting was detected. The minimum thicknesses were recorded, see drawing and data attached.**

Point #	Description	Min thickness
105	Top head	9.5mm
110-01	South upper shell	7.9mm
110-02	South upper shell	8.0mm
110-03	South upper shell	7.9mm
110-04	South mid shell	7.9mm
110-05	South lower shell	7.9mm
110-06	South lower shell	7.9mm
115-01	West upper shell	8.0mm
115-02	West upper shell	8.0mm
115-03	West upper shell	8.0mm
115-04	West mid shell	8.0mm
115-05	West lower shell	8.0mm
115-06	West lower shell	8.1mm

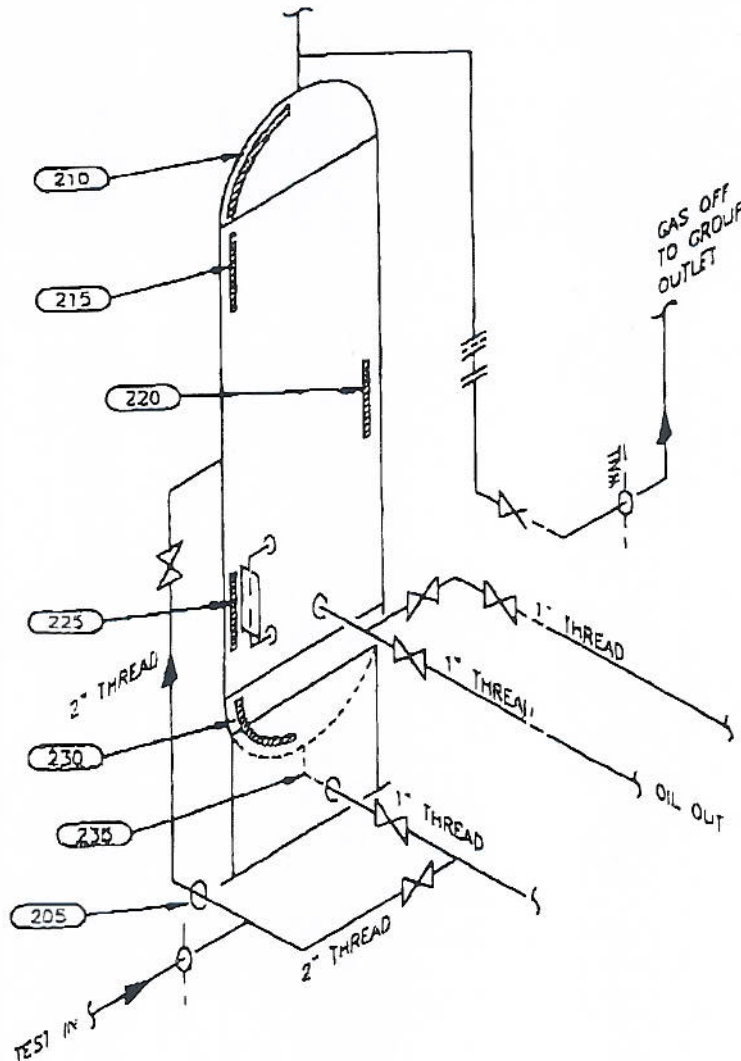
Point #	Description	Min thickness
120-01	East upper shell	8.0mm
120-02	East upper shell	8.0mm
120-03	East upper shell	7.9mm
120-04	East mid shell	8.0mm
120-05	East lower shell	7.9mm
120-06	East lower shell	8.0mm
125-01	North upper shell	8.1mm
125-02	North upper shell	7.9mm
125-03	North upper shell	7.9mm
125-04	North mid shell	7.9mm
125-05	North lower shell	7.9mm
125-06	North lower shell	8.1mm
130	Bottom head	9.4mm

SEP-21-00 02:02pm From-RTD QUALITY SERVICES

T-644 P.01/03 F-970



N
↙



Equip. No. _____	Prov. Reg. No. <u>Q 138461</u>	C.R.N. <u>1-55742</u>	Serial No. <u>VS 060016-147</u>	Yr. Inst. _____
Code/Div. <u>ASME Div 1</u>	Size: <u>24"x5"</u>	Manufacturer: <u>JARSEN & D'AMICO</u>		Yr. Bld. <u>1979</u>
C Stamp: <u>YES</u>	Service: <u>SNFET</u>	PWMT: <u>NO</u>	Radiography: <u>NO</u>	Insulated: <u>NO</u>
Design & Materials Data				
HEAD:				
Mat'l: <u>SA-516-70</u>	nom: <u>3.0mm/mid</u>	CA: <u>NIL</u>		
Mat'l: _____	nom: _____	CA: _____		
CHANNEL:				
Material: _____	Nominal: _____	CA: _____		
BOOT:				
Head Mat'l: _____	Head Nom: _____	Head CA: _____		
Shell Mat'l: _____	Shell Nom: _____	Shell CA: _____		
SHELL:				
Material: <u>SA-53-B</u>	Nominal: <u>7.9mm</u>	CA: _____		
MAWP Shell Side: <u>862 kPa</u>	Temp: <u>39°C</u>			
MAWP Tube Side: _____	Temp: _____			
CLIENT <u>CRESTAR ENERGY</u>				
FACILITY <u>VALHALLA OIL & GAS GATHERING</u>				
<u>LSO 14-09-75-09 W6M</u>				
ITEM <u>2 PHASE VERTICAL SEPARATOR</u>				
By: <u>EG</u>		DATE: <u>00/09</u>	DWG # <u>12</u>	

Sep-21-00 02:02pm From:RTD QUALITY SERVICES

T-644 P.02/03 F-970

UTS DATA

CLIENT: CRESTAR ENERGY
EQUIPMENT: 2 PHASE VERTICAL SEPARATOR
EQUIPMENT ID#:
PROV REG: A 138461
TESTED ON STREAM

FACILITY: VALHALLA OIL & GAS GATHERING
SERVICE: SWEET
LOCATION: 14 03-75-08 W6M
RTD JOB #: G99-0215
REFER TO DRAWING: 12

THICKNESS DATA		Flag	Cri	CA	mm	Short Term	Long Term	Avg mm/y	Flag	Date
Test Point										
210										
Description	TOP HEAD									
	2000 7				3.00	0	3.00	0	0	L
Min Thick	7.8							0	0	L
Average	8									
Analysis	2000/07 NOTE: NAME PLATE STAMPED WITH HEAD NOMINAL = 3.0 mm. PROBABLE MIS-PRINT; SUGGEST CONFIRMATION VIA U1-A FORM									
215										
Description	TOP SHELL									
	2000 7				7.90	0	7.90	0	0	L 2000
Min Thick	7.8							0	0	L
Average	8									
Analysis	2000/07 LAMINATION DEFECT NOTED @ 6 mm									
220										
Description	SHELL OPPOSITE INLET									
	2000 7				7.90	0	7.90	0	0	L 2000
Min Thick	7							0	0	L 2000
Average	7.8									
Analysis	2000/07 LAMINATION DEFECT NOTED @ 5mm									
225										
Description	SHELL @ UL									
	2000 7				7.90	0	7.90	0	0	L 2000
Min Thick	7.8							0	0	L
Average	8									
Analysis										
230										
Description	BOTTOM HEAD									
	2000 7				3.00	0	3.00	0	0	L
Min Thick	9.3							0	0	L
Average	9.7									
Analysis	2000/07 MIN SCAN @ MID BAND									
235										
Description	1" 90° NOZZLE									
	2000 7				4.60	0	4.60	0	0	L 2000
Min Thick	3.9							0	0	L 2000
Average	4.3									
Analysis										

Sep-21-00 02:02pm From-RTD QUALITY SERVICES

T-644 P 03/03 F-970

UTS DATA

CLIENT: CRESTAR ENERGY
 EQUIPMENT: 2 PHASE SEPARATOR PIPING
 EQUIPMENT ID#:
 PROV REG:
 TESTED ON STREAM

FACILITY: VALHALLA OIL & GAS GATHERING
 SERVICE: SV'ET
 LOCATION: 14-03-75-09 W6M
 RTD JOB #: G69-0215
 REFER TO DRAWING: 12

Test Point	THICKNESS DATA	Flag	Cn	CA	Nom	Short Term	Long Term	Avg. mm/yr	Flag Date
205									
Description:	2" CIRC BAND								
	2000 7	4.81		.7	5.50	0	0		L
Min Thick	5.3								L
Average	5.7								
Analysis	2000/07 MIN SCAN @ 3:00 POSITION.								

Certifications – Wiedman, Dellas

Natural Resources Canada / Ressources naturelles Canada

Your certification card is only valid when presented with this identity card.
Votre certificat de poche est valide seulement s'il est présenté avec cette carte d'identité.

Name / Nom: Wiedman, Dellas G.

Reg. No. / No. matricule: 3267

Issue Date / Date d'émission: 96.01.26

Expiry Date / Expiration: 2001.12.31

Natural Resources Canada / Ressources naturelles Canada

This certifies that **Dellias G. Wiedman**
Le présent atteste que **Dellias G. Wiedman**
has qualified according to the C.G.S.B. Standard 48.9712 as follows:
est qualifié selon la norme C.N.G.C. 48.9712 comme suit:

METHOD / MÉTHODE	LEVEL / NIVEAU	OPTION	SECTOR / SECTEUR	TEST DATE / DATE D'ÉVALUATION	RECEIPT DATE / DATE DE RÉCEPTION	EXPIRATION / EXPIRATION
UT	2	B	ENC	1987/04/01		2001/12/31
RT	2	B	ENC	1988/10/15		2001/12/31
PT	2	B	ENC	1984/08/01		2001/12/31
NT	2	B	ENC	1984/08/01		2001/12/31
ET	2	B	ENC	1986/09/01		2001/12/31

REG NO / NO MATRICULE: 3267 **ISSUE DATE / DATE D'ÉMISSION: 1999/01/22**

Richard V. Murphy
MANAGER, CERTIFYING AGENCY / GESTIONNAIRE, ORGANISME DE CERTIFICATION

Atomic Energy Control Board / Commission de contrôle de l'énergie atomique

Qualified Operator / Opérateur qualifié

D. Wiedman

1984.10.24

Canada

[Signature]

THIS IS NOT A VALID CERTIFICATE UNLESS ACCOMPANIED BY THE CARDHOLDER'S PHOTO CARD BEARING THE SAME REGISTRATION NUMBER / CE CERTIFICAT EST VALIDE SEULEMENT SI ACCOMPAGNÉ DE LA CARTE D'IDENTITÉ DU TITULAIRE AYANT LE MÊME NUMÉRO MATRICULE

METHOD / MÉTHODE	LEVEL / NIVEAU	OPTION	SECTOR / SECTEUR	TEST DATE / DATE D'ÉVALUATION	RECEIPT DATE / DATE DE RÉCEPTION	EXPIRATION / EXPIRATION
RT	2	B	A/S	1990/10/15		2001/12/31

CARDHOLDER'S SIGNATURE / SIGNATURE DU TITULAIRE

REG NO / NO MATRICULE: 3267

Qualified Operator / Opérateur qualifié

pursuant to Section 18 of the Atomic Energy Control Regulations, for the purpose of operating an exposure device containing a prescribed substance.
en vertu de l'article 18 du Règlement sur le contrôle de l'énergie atomique afin d'utiliser un dispositif d'exposition contenant une substance prescrite.

Card Number / Numéro de carte: 000433

Issuing Officer's Signature / Signature de l'agent responsable: G.B. Knight

American Petroleum Institute



7/31/2002

Expiration Date

This is to certify that **Dellias George Wiedman**

has successfully met the requirements to be certified as an API Pressure Vessel Inspector under ANSI/API 510's Pressure Vessel Inspector Certification Program.

Signature of Inspector: Edward R. Kiff
Authorized Signature

Certification No. **25581**

WAYDEX

SERVICES INC

QUALITY CONTROL

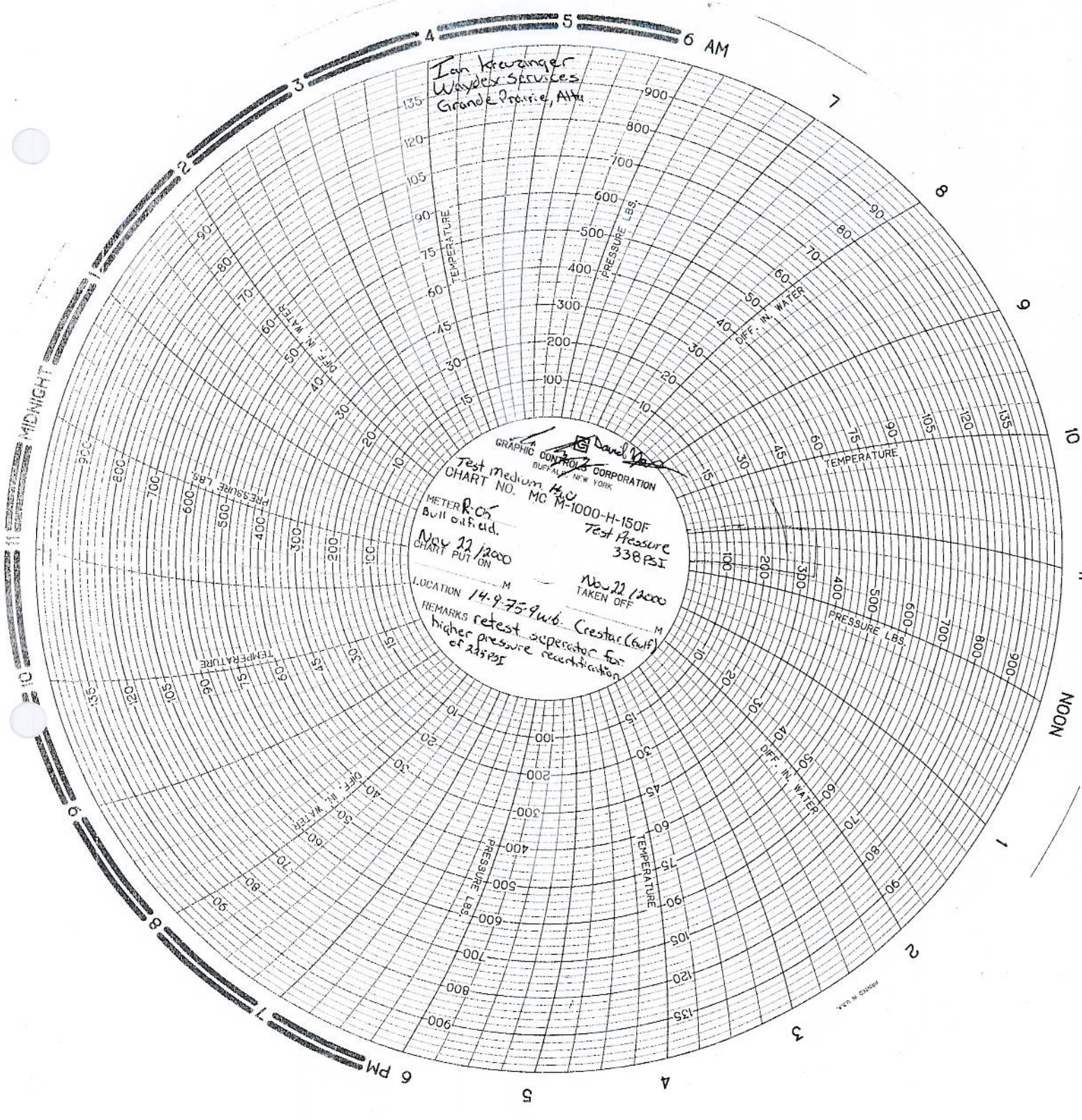
JOB # 27

CRESTAR ENERGY

RE-RATE VERTICAL SEPARATOR

14-9-75-W6M

BARRY THRONES



Jan Kreuzinger
Waydex Services
Grande Prairie, Alta

GRAPHIC CONTROLS CORPORATION
BUFFALO, NEW YORK
Test medium H₂O
CHART NO. MC M-1000-H-150F
METER RCH
Bull out field.
Nov 22/2000
CHART PUT ON
LOCATION M
REMARKS 14.9-75.9 w.b. Crestar (wbf)
higher pressure recertification
Test Pressure 338 PSI
Nov 22/2000
TAKEN OFF

11/9/00 3:47 PM

BULL OILFIELD Instrument Rentals

742698 Alberta Ltd

10110 82 Ave Grande Prairie Alta. T8W 1Z7

CERTIFICATE OF CALIBRATION

PRESSURE TEMPERATURE RECORDER		
UNIT #	Pressure Range	Temp Range
R-05	0-1000 psig	0-150 * F

DEADWEIGHT PRESSURE	RECORDER READING	error	TEMP BATH	RECORDER READING
200	200	0	33	33
400	400		61	61
600	600		145	145
800	800			
1000	1000	0		
900	900			
700	700			
500	500	0		
300	300			
100	100			
0	0			

clock & battery checked	1.519 volts	Deadweight Ser.#	HL-5589
hose	yes	Calabrated at	Technician
swivels	yes	65* F	Jason Owen
pens	new		Les Owen

DATE CALIBRATED November 9, 2000 Cer#11/9/00R05

Tech. Signature



Waydex Services Inc.
QUALITY CONTROL MANUAL

REVISION: 1.0

DATE: 99/07

SECTION 8 Page 12 OF 13

EXHIBIT 8.6 PRESSURE TEST EXAMINATION GUIDE

PRESSURE TEST EXAMINATION GUIDE	Q.C. INSP. ✓
PRESSURE TEST PREPARATION	
1. All punch list items corrected.	/
2. Test blinds correct thickness.	/
3. All items which could be damaged by test isolated or removed (control valves, safety valves, instruments, expansion joints, etc.)	/
4. Equipment with internals (ie. filters) that could be damaged, isolated as required.	✓
5. Vents and drains correctly installed.	—
6. Open and Closed position of all valves verified.	/
7. Shipping bars in place - bellows.	—
8. Hanger stops in place.	—
PRESSURE TEST COMPLETION	
1. All temporary blinds (blanks) removed.	/
2. Temporary gaskets changed for correct gaskets.	/
3. Temporary supports removed.	—
4. Shipping bars removed from bellows.	—
5. Spring hanger stops removed - cold setting checked.	—
6. Safety valves - □UV□ or □V□ symbol and correct set pressure and capacity installed.	—
7. Safety valve vents are correct size - adequately supported - drain holes and or weather hoods installed.	—
8. Screens for pumps and compressors installed (initial start-up and permanent screens).	—

Q. C. Inspector Signature:

[Signature]

Date:

Nov 22 01

Attn: Wayne



Manufactured in Canada by
Larsen & D'Amico
Mfg Ltd.
Edmonton

Unit Name 2 PH. VERT. SEPARATOR

CRN C.5574.2 A138461

Serial No. VS.060016.147

Item No. VS.5

Design Pr. 862 kPa

Desing Temp. 38°C

MAWP 862 kPa

Hyd. Test Pr. 1293 kPa

Heat Treatment No

Radiography No

Shell Material SA-53.3

Shell Min. Thk. required 0.255 in.

Joint Eff. 70%

Head Material SA-516-70

Head Min. Thk. required 0.153 in.

Type S.E

Size 609 mm x 1524 mm

Volume 0.46 m³

Weight 439 kg

Corr. Allow Nil

Date Built Aug. 79

W.O. No 775

Date Rerated Nov, 2000