

SECTION A)

SALES INFORMATION

SECTION B)

BOILER BRANCH INFORMATION

SECTION C)

PICTURES

MW UNIT #4
MARBARTON
Missouri

SECTION A)

SALES INFORMATION

STEAM GENERATION EQUIPMENT SALES INFORMATION

Tobago Management Reference Number: Unit #4

Equipment Location: Lloydminster, Sask.; WSS yardsite location B, D

Equipment History:

The following equipment was purchased from Koch exploration in 1997 and relocated to Lloydminster, Sask. The steam generator has undergone an extensive rebuild program which was completed in 1999. The rebuild program included new boiler feed water pump, instrument air compressor, electrical and instrumentation. It is our understanding that the unit was in use for approximately two years before being moth balled in the late 1980's.

Description:

Unit #4 - consists of one skid mounted 50 MMBTU / Hr. Thermotics steam generator, blower assembly and Gardner Denver boiler feed water pump. Unit also includes a Gardner Denver instrument air compressor.

Details:

Steam Generation Skid

Steam Generator:

Manufacturer:	Thermotics
Serial Number:	78208
Alberta "A" Number:	115763
National Board Number:	235
Year Built:	1978
Capacity:	50 million BTU
MAWP:	14822 Kpa
Heating Surface:	7710 sq. ft.

Economizer:

Manufacturer:
Serial Number:
Alberta "A" Number:
National Board Number:
Year Built:

Burner:

Manufacturer: North American
Model Number: 4131.G-62.5
Serial Number: BD6942-1

Blower / Feed Water Skid:

Blower Motor:

Manufacturer: Toshiba
Horsepower: 50
Voltage: 460 / 3 / 60

Relief Valves:

Manufacturer: Crosby
Model Number: H555
Serial Number: HR673, HR674
Set Pressure: 13788 Kpa

Fuel System:

Regulator: Fisher 4", Type 298T-EK
Gas Valves: Maxon 808CP

Feed Water Pump:

Manufacturer: Gardner Denver
Model Number: QBXB
Serial Number: 917664
Pulsation Dampener Performance Pulsation Dampener / Serial # 1333-D-1

Feed Water Pump Motor:

Manufacturer: Lincoln
Serial Number: 1916446
Horsepower: 150
Voltage: 460 / 3 / 60

Instrument Air Compressor:

Manufacturer: Gardner Denver
Model Number: ASDRMD-AFAAGA
Horsepower: 5
Voltage: 480 / 3 / 60

Instrument Air Dryer:

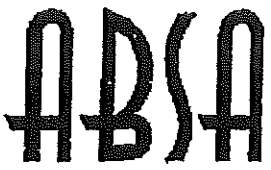
Manufacturer: Pall
Model Number: 10-HA7

Burner Circuit Control:

Manufacturer: Honeywell
Model Number:

SECTION B)

BOILER BRANCH INFORMATION



Unit # 4

BOILER AND PRESSURE VESSEL STATUS REPORT

This status report form has been provided for you to report any changes to your boilers and/or pressure vessels. If you complete the form below, we would be pleased to make the required changes to our records and credit your account if credits are due.

RE: Vessel (A)	<u>1) 0115763</u>	2) 0115920	3) 204196
Serial No.	<u>78-208</u>	79-1101	LM 1858
CRN	<u>C 6749.2</u>	C 6749.2	D 9487.2

The above vessel(s) was (were) sold. Please transfer the registration of the vessel(s) to:

Name of New Owner: _____

Mailing Address: _____

Location of Vessel: _____

Contact Person: _____ Tel: _____

Date of Sale: _____ P.O. No: _____

The above vessel(s) was (were) removed from service on DEC. 197
I will advise Alberta Boilers Safety Association when it is returned to service.

The above vessel(s) was (were) destroyed and disposed of as scrap material on _____ (Date). The Alberta Identification (A) Number has been obliterated.

The above vessel(s) has (have) been relocated to _____

The above vessel(s) has (have) been operating outside of the Province of Alberta since _____ (Date). Please remove from annual registration.

Company Name: TRINITY ENERGY LTD Tel: (403) 875-1350

Position Title: CHIEF ENGINEER

(Please print name) FLOYD PATTERSON

Signature: Floyd Patterson Date: Dec 10/98

Note: The owner of the boiler or pressure vessel is responsible for ensuring that the above equipment is inspected by Alberta Boilers Safety Association prior to its being returned to service in the Province of Alberta.

Please Return This Report To: ALBERTA BOILERS SAFETY ASSOCIATION
#200, 4208 - 97 Street, Edmonton, AB T6E 5Z9
(403) 437-9100 Fax (403) 437-7787

FORM P-3 MANUFACTURER'S DATA REPORT FOR WATERTUBE BOILERS, SUPERHEATERS, WATERWALLS, AND ECONOMIZERS As Required by the Provisions of the ASME Code Rules

7/15763

115763
Sept 6-78
V.G.S

1. Manufactured by Thermotics, Inc. P.O. Box 13030 Houston, Texas 77019
(Name and address of manufacturer)

2. Manufactured for Worldwide Energy Company Ltd. P.O. Box 1770 Bonnyville, Alberta, Canada
(Name and address of purchaser)

3. Location of Installation Bonnyville, Alberta, Canada
(Name and address)

Received AUG 25 1978
District Edm
For Chief Inspector of Boilers 1978

4. Unit Identification once-through water tube Identifying Nos. 78-208
(Complete boiler, superheater, water wall, economizer, etc.) (Mfr. Serial No.)
C-6749-2 45714 235 1978
(CRN) (Drawing No.) (Nat'l. Brd. No.) (Year Built)

5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction, and workmanship conform to the ASME Rules, Section I, 1977 and Addenda to Winter 1977
(Year) (Date)

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

6(a) ~~XXXXXX~~ Feedwater Preheater - Water to Water (Name of unit, item number, mfr's name, and identifying stamp)

No.	XXXXX diameter, in.	XXXXXXXXXX Ft. In.	XXXXXXXXXX		XXXXXXXXXX		XXXXXXXXXX	
			Mat'l. Spec. No., Grade	Thickness in.	Inside radius in.	Thickness in.	Inside radius in.	Longitudinal
1	Outer Pipe	SMLS	SA-53-B, Sch. 160	160	4" (0.531" thk.)			
2	Inner Pipe	SMLS	SA-53-B, Sch. 80	80	7 1/2" (0.276" thk.)			
3	Header Pipe	SMLS	SA-53-B, Sch. 160	160	6" (0.718" thk.)			
4	Weld Cap	SMLS	SA-234-WPB, Sch. 160	160	6" (0.718" thk.)			

No.	Longitudinal joints		Circum. joints		Heads					Hydrostatic test, psi
	No. & type*	Efficiency	No. & type	Efficiency	Mat'l. Spec. No., Grade	Thickness, in.	Type**	Radius of dish	Manholes No. Size	
1										
2										
3										

*Indicate if (1) Seamless; (2) Fusion welded. **Indicate if (1) Flat; (2) Dished; (3) Ellipsoidal; (4) Hemispherical.

6(b) ~~XXXXXX~~ Radiant Tubes

Diameter	Thickness	Mat'l. Spec. No., Grade
3.5	0.300"	SMLS, SA-53-B

6(c) Headers No. _____ (Box or sinuous or round; Mat. spec. no.; Thickness)

Heads or Ends _____ Hydro. Test, psi _____ (Shape; Mat. spec. no.; Thickness)

6(d) Staybolts _____ (Mat. spec. no.; Diameter; Size telltale; Net area)

Pitch _____ in. Net Area _____ in.² Max. A.W.P. _____ psi (Supported by one bolt)

6(e) Mud Drum _____ Heads or Ends _____ Hydro. Test, psi _____ (For sect. header boilers. State Size; Shape; Mat. spec. no.; Thickness) (Shape; Mat. spec. no.; Thickness)

7(a) ~~XXXXXXXXXX~~ Outlet Piping & Valves

No.	Size and shape	Material spec. no.	Thickness in.	XXXXXXXXXX		Hydro. test, psi.	Diameter in.	Thickness in.	Material spec. no.
				XXXXX	XXXXX				
	3" Sch. 80,	SMLS SA-53-B	0.300"	XXXXX	XXXXX				
	Edwards Check Valve								
	3", Fig. #3674								

7(b) ~~XXXXXXXXXX~~ Water Walls

8(a) ~~XXXXXXXXXX~~ Return Bends

8(a) Return Bends		8(b) Economizer Tubes	
3" Sch. 80,	180°S.R., SA-234-WPB,	3 5 x 0.300"	SA-53-B SMLS
3" Sch. 80,	180°S.R. SA-234-WPB,		
	0.300" wall		

Form P-3 (Back)

A115763
Inlet Valves

9(a) Feedwater Piping

3" Sch. 80, SA-53 SMLS 0.300" thk.	2" Jack Valve, Edwards #1038Y
2" Sch. 80, SA-53-E SMLS 0.218" thk.	2" stop valve, Edwards #1048Y

10(a) Other Parts (1) Steam Separator

10(b) Tubes for Other Parts

1	6" Sch. 160, SMLS Pipe SA-53-B 0.718" thk.			
2	6" Sch. 160 Weld Caps, SA-234-WPB, 0.718" thk.			
3				

11 Openings (1) Inlet - 3" Sch. 80 (No., size, and type of nozzles or outlets)

(2) Safety Valve (2) 1 1/2", 1500# RFWN Flange (No., size, and type of nozzles or outlets)

(3) Outlet - 3" Sch. 80 (No., size, and type of nozzles or outlets)

(4) Feed (7) 1/2", 3000# (2) 3/4", 3000#, (2) 1/2" 6000# (3) 3/4" 600# (5) 1" 6000# (No., size, type, and location of connections)

12	Maximum Allowable Working Pressure	Code Par. and/or Formula on which AWP is Based	Shop hydro. test psi	Heating Surface sq. ft.	Heating surface to be stamped in drum heads. Heating surface not to be used for determining minimum safety valve capacity.	13 Field hydro. test psi
a Drum Rad.	2150	27.2.1	3225	1990		
b Econ.	2150	27.2.1	3225	5720		
c Exch.	2250	27.2.1 & 2	3375			
d Superheater						
e Final Assy.			3225	7710		

CERTIFICATE OF COMPLIANCE

We certify the statement in this data report to be correct.

Date July 7, 1978 Signed Thermotics, Inc. by [Signature] (Manufacturer) (Authorized Representative)

Our Certificate of Authorization No. 8795 to use the (M) or (S) Symbol expires Jan. 31, 1979

CERTIFICATE OF SHOP INSPECTION

BOILER MADE BY Thermotics, Inc. at Houston, Texas

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 Texas and employed by H.S.B. Insp. & Ins. Co. of Hartford, Conn. have inspected parts of this boiler referred to as data items 6(a), (b), 7(a), 8(a), (b), 9(a), (b) and have examined Manufacturer's Partial Data Reports for items 10, 11, 12

and state that, to the best of my knowledge and belief, the manufacturer has constructed this boiler in accordance with the applicable sections of the ASME BOILER AND PRESSURE VESSEL CODE.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the boiler described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date July 27, 1978 [Signature] Inspector Commissions 8430 Nat'l Board, State, Province and No.

CERTIFICATE OF COMPLIANCE

We certify that the field assembly of all parts of this boiler conforms with the requirements of SECTION I of the ASME BOILER AND PRESSURE VESSEL CODE.

Date Signed By (Assembler) (Representative)

Our Certificate of Authorization No. to use the (A) or (S) Symbol expires 19

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

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 and employed by of

have compared the statements in this Manufacturer's Data Report with the described boiler and state that the parts referred to as data items, not included in the certificate of shop inspection, have been inspected by me and that to the best of my knowledge and belief the manufacturer and/or the assembler has constructed and assembled this boiler in accordance with the applicable sections of the ASME BOILER AND PRESSURE VESSEL CODE. The described boiler was inspected and subjected to a hydrostatic test of psi.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the boiler described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date Inspector Commissions Nat'l Board, State, Province and No.

The following is all the paperwork showing the pulsation dampeners are "re-rated". They have to be hydro-tested to 3031 psi and witnessed by the boiler branch inspector and then a repair/alteration nameplate must be attached.



Municipal Affairs,
Culture and Housing

Municipal Services Division

Protection Services Branch
Boiler & Pressure Vessel Safety
330 - 1855 Victoria Avenue
Regina, Saskatchewan
S4P 3V7

PLEASE DO NOT SEND REMITTANCE
WITHOUT A COPY OF THIS INVOICE
WHICH IS DUE WITHIN 30 DAYS.

TEL : (306)787-4522
FAX : (306)787-9273

APPROVAL AND INVOICE

Tuesday, April 03, 2001
Waterflood Service & Sales Ltd.
Box 1490
Estevan, Saskatchewan S4A 2L7

Our File 29239 [0 V]

ATTENTION : Brent Blackburn

With reference to your submission respecting the registration of the item below, for legal use in the province, please note we have surveyed, approved and registered this design as noted.

MANUFACTURER :	Performance Pulsation Control	
ITEM :	DRAWING NUMBER :	CRN :
Pulsation Dampener	DR18008-A0 Rev 1	A4321.3
REGISTRATION FEE: \$180.00 (CANADIAN FUNDS ONLY)		

We wish to point out that every vessel must be constructed strictly in accordance with the registered design.

In addition to stamping every vessel with the registration number given above and as required in CSA Code B51, a Manufacturer's Data Report must be forwarded to this office immediately at the time a vessel is shipped. Such forms may be obtained upon request.

Sincerely,

Brian Krasiun, P. Eng.
Design and Registration

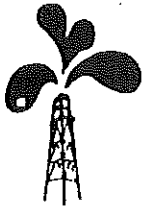
#327 Reg. of Design

REMARKS: Approval for the rerate of vessels with serial numbers 1333-D1 thru 1333-D3 from 1600 psi to 2021 psi. Vessels require hydro and Alteration nameplate.

e-mail greg M. March 19 01 for prints.

April 3/01 - talked to Brian at Santa Branch
and he advised we would opt a
CRW for repair/alteration. But hydro
test pressure must be 1.5 to 3031 psi.
revised hydro test pressure and for
copies to Brian for his records.

Brent Blackburn



WATERFLOOD
SERVICE &
SALES
LTD.

BOX 1490
ESTEVAN, SASKATCHEWAN — S4A 2L7
Phone (306) 634-7212 - Fax (306) 634-7887
.....
PUMPS, COMPRESSORS, ENGINES AND MACHINING

Protection Services Branch
Boiler & Pressure Vessel Safety
3rd Floor - 1855 Victoria Ave.
Regina, Sask.
S4P 3V7

March 21, 2001

Attention: Mr. Brian Krasium

Reference: Quality Control Manual Review

*Mailed to Brent
Branch March. 21/01
Brent.*

Dear Mr. Krasium;

Brian, as per our discussion a couple of weeks ago, in regards to the repair/alteration of three existing pulsation dampener. I have three dampeners that are new and have never been used. We wish to do a repair/alteration to re-rate them to 2021 MAWP. As per your request please find attached all paperwork required, I have included the following:

- Manufactures Data Report
- Calculations (based on old Code Numbers)
- Original design drawings
- Repair/Alteration Report (Exhibit #7) for each vessel

Please review and give me a call if you have any questions. Thank You.

Sincerely,

Waterflood Service & Sales

Brent Blackburn, P. Eng.
Project Engineer

Saskatchewan
Environment and
Public Safety

Job No. _____
Provincial No. _____
Manufacturer Performance Pulsation Control
CRN L-3261.2
Serial No. 1333-D-1

Boiler and Pressure
Vessel Safety Branch

- 1 Name of Company Performing Repair Alteration WATERFLOOD Service & Sales.
Address Box 1490, ESTEVAN, SASK. S4A 2L7
- 2 Name of Owner Tobago MANAGEMENT Ltd.
Address Box 1859, LLOYDMINSTER, SK, S9V 1N4
Location of Installation LLOYDMINSTER, SK. Co. Code _____
- 3 Type of Vessel PULSATION DAMPNER. Dia. 18" O.D. Length N/A
- 4 Design Pressure Shell 2021 PSI At 250°F Temperature _____
Jacket/Tubeside N/A At N/A Temperature _____

When repairs involve any of the items 5 thru 10, complete as applicable:

- 5 Head Material Specification SA 516 Gr 70 Thickness .6250 in. nominal
- 6 Tubesheet Material Specification N/A Thickness N/A
- 7 Shell Material Specification N/A Thickness N/A
- 8 Tube Material Specification N/A Tube Diameter N/A Th. _____
- 9 Flange Rating Standard N/A Fitting Rating N/A

- 10 Nozzle Material Specification and Schedule SA-106 GR B., 2" schedule, XXH
- 11 Details of Repair/Alteration (Attach repair procedure when approved)
No physical alteration, rerate of vessel from 1600 MAWP to 2021 MAWP. Vessel ~~is~~ new and ~~has~~ never been used or in service.

- 12 Partial Data Reports/Affidavits have been furnished for the following parts:
N/A

- 13 Radiography Not required
- 14 Other N.D.E. not required
- 15 Post Weld Heat Treatment not required.
- 16 Hydrostatic Test Pressure Shell ~~2627~~ PSI Tubes N/A
- 17 Alternative or Additional Tests 3031
- 18 Weld Procedure Specifications N/A

(STATEMENT TO BE MADE ON COMPLETION OF WORK)

I certify that the statements made in this report are correct and that the repair/alteration conforms to the requirements of the Design, Construction and Installation of Boilers and Pressure Vessels Regulations.

Signed _____ Date 11/24/99
For _____
(Repair / Alteration Company)

I have inspected the repair/alteration described above and state that to the best of my knowledge and belief the repair/alteration has been completed in accordance with requirements of the Design, Construction and Installation of Boilers and Pressure Vessels Regulations.

Signed _____ Date _____
Saskatchewan Inspector

When not inspected by a Saskatchewan Inspector

Report received by _____ Date _____

Saskatchewan
Environment and
Public Safety

Job No. _____
Provincial No. _____
Manufacturer Performance Pulsation Control
CRN L-3261.2
Serial No. 1333-D-2

Boiler and Pressure
Vessel Safety Branch

- 1 Name of Company Performing Repair Alteration WATERFLOOD SERVICE & SALES LTD.
Address Box 1490, ESTEVAN, SASK., S4A 2L7
- 2 Name of Owner Tobago MANAGEMENT Ltd.
Address Box 1859, LLOYDMINSTER, SK. S9V 1N4
Location of Installation LLOYDMINSTER SK. Co. Code _____
- 3 Type of Vessel PULSATION DAMPNER Dia. 18" O.D Length N/A
- 4 Design Pressure Shell 2021 PSI At 250 °F Temperature _____
Jacket/Tubeside N/A At N/A Temperature _____

When repairs involve any of the items 5 thru 10, complete as applicable:

- 5 Head Material Specification SA 516 GR 70 Thickness .6250 in. Nominal
- 6 Tubesheet Material Specification N/A Thickness N/A
- 7 Shell Material Specification NA Thickness N/A
- 8 Tube Material Specification N/A Tube Diameter N/A Th. _____
- 9 Flange Rating Standard N/A Fitting Rating N/A
- 10 Nozzle Material Specification and Schedule SA-106 GR-B, 2" SCHEDULE XXH
- 11 Details of Repair/Alteration (Attach repair procedure when approved)

No physical alteration, rerate vessel from 1600 MAWP to 2021 MAWP. VESSEL IS NEW AND HAS NEVER BEEN USED or put in service

- 12 Partial Data Reports/Affidavits have been furnished for the following parts:
N/A

- 13 Radiography ~~N/A~~ not required
- 14 Other N.D.E. not required
- 15 Post Weld Heat Treatment not required.
- 16 Hydrostatic Test Pressure Shell ~~2021~~ Tubes N/A
- 17 Alternative or Additional Tests 3031

- 18 Weld Procedure Specifications N/A

(STATEMENT TO BE MADE ON COMPLETION OF WORK)

I certify that the statements made in this report are correct and that the repair/alteration conforms to the requirements of the Design, Construction and Installation of Boilers and Pressure Vessels Regulations.

Signed _____ Date 11/24/99
For _____
(Repair / Alteration Company)

I have inspected the repair/alteration described above and state that to the best of my knowledge and belief the repair/alteration has been completed in accordance with requirements of the Design, Construction and Installation of Boilers and Pressure Vessels Regulations.

Signed _____ Date _____
Saskatchewan Inspector

When not inspected by a Saskatchewan Inspector

Report received by _____ Date _____

Saskatchewan
Environment and
Public Safety

Job No. _____
Provincial No. _____
Manufacturer Performance Pulsation Control
CRN L-3261.2
Serial No. 1333-D-3

Boiler and Pressure
Vessel Safety Branch

- 1 Name of Company Performing Repair Alteration WATERFLOOD Service & SALES Ltd
Address Box 1490, ESTEVAN, SASK., S4A 2L7
- 2 Name of Owner Tobago Management Ltd.
Address Box 1859, LLOYDMINSTER, SASK., S9V 1N4
Location of Installation LLOYDMINSTER, SK. Co. Code _____
- 3 Type of Vessel PULSATION DAMPNER Dia. 18" O.D. Length N/A
- 4 Design Pressure Shell 2021 PSI At 250°F Temperature _____
Jacket/Tubeside N/A At N/A Temperature _____

When repairs involve any of the items 5 thru 10, complete as applicable:

- 5 Head Material Specification SA 516 Gr 70 Thickness .6250 in. Nominal
- 6 Tubesheet Material Specification N/A Thickness N/A
- 7 Shell Material Specification N/A Thickness N/A
- 8 Tube Material Specification N/A Tube Diameter N/A Th. _____
- 9 Flange Rating Standard N/A Fitting Rating N/A
- 10 Nozzle Material Specification and Schedule SA-106 B GR. B, 2" - schedule XXH
- 11 Details of Repair/Alteration (Attach repair procedure when approved)
No physical alteration, rerate vessel from 1600 MAWP To 2021 MAWP. Vessel is new and has never been used or put in service

12 Partial Data Reports/Affidavits have been furnished for the following parts:
N/A

- 13 Radiography not required
- 14 Other N.D.E. not required.
- 15 Post Weld Heat Treatment not required
- 16 Hydrostatic Test Pressure Shell ~~2622~~ Tubes N/A
- 17 Alternative or Additional Tests 3031

18 Weld Procedure Specifications N/A.

(STATEMENT TO BE MADE ON COMPLETION OF WORK)

I certify that the statements made in this report are correct and that the repair/alteration conforms to the requirements of the Design, Construction and Installation of Boilers and Pressure Vessels Regulations.

Signed _____ Date 11/19
For _____
(Repair / Alteration Company)

I have inspected the repair/alteration described above and state that to the best of my knowledge and belief the repair/alteration has been completed in accordance with requirements of the Design, Construction and Installation of Boilers and Pressure Vessels Regulations.

Signed _____ Date _____
Saskatchewan Inspector

When not inspected by a Saskatchewan Inspector

Report received by _____ Date _____

SCOPE INDEXED

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

1

1. Manufactured and certified by Performance Pulsation Control, Inc., 390 Clay Road, Sunnyvale, TX 75182
2. Manufactured for Waterloo Sales, Canada 4810 - 62nd Ave. Lloydminster, AB
3. Location of installation Unknown 1333-D-3
4. Type Sphere 1333-D-1 thru 1333-D-3 L-3281.2 DR18008-AO Rev 1
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

6. Shell: None 0.825" 0.0" 18.75" ID N/A
7. Seams: None 85 N/A N/A 1 Spot None
8. Heads: (a) Matl. SA-516 Gr 70 (b) Matl. SA-516 Gr 70

Table with 10 columns: 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). Rows (a) and (b) show End locations with 0.47" thickness and 0.0" allowance.

9. MAWP 1800 psi at max. temp. 32 °F at 1600 psi. Hydro., stress, or design test pressure 2400 psi.

Table for 10. Nozzles, Inspection and safety valve openings. Columns: Purpose (Inlet, Outlet, Drain), No., Diam. or Size, Type, Matl., Nom. Thk., Reinforcement Matl., How Attached, Location. Row 1: Inlet/Outlet, 2, 2", PIPE, SA-108 Gr B SMLS, 0.436", None, Welded, Head.

11. Supports: Skirt No Lugs 0 Legs 0 Other Footpad Attached Head-Welded

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report: None

CERTIFICATE OF SHOP COMPLIANCE and CERTIFICATE OF SHOP INSPECTION. Includes fields for Date (8/12/98), Co. Name (Performance Pulsation Control, Inc.), Vessel location (Sunnyvale, TX 75182), and Inspector (Alberta Inspector).

BRENT; THIS ONE IS OKAY. ALBERTA INSPECTOR HAS SEEN + APPROVED THIS DIS. DESURGER.

SCOPE INDEXED

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

3

1. Manufactured and certified by Performance Pulsation Control, Inc., 390 Clay Road, Sunnyvale, TX 75182

2. Manufactured for Waterloo Sales, Canada 4810 - 62nd Ave. Lloydminster, AB (Name and address of manufacturer)

3. Location of installation Unknown (Name and address of purchaser)

4. Type Sphere 1333-D-1 thru 1333-D-3 L-3261.2 DR18008-AO Rev 1 6,7,8 1998 (Name and address) (Mfg's serial No.) (CRN) (Drawing no.) (Nat'l Bd. No.) (Year: ECR)

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

6. Shell: None 0.825" 0.0" 16.75" ID N/A (Addenda (Data)) Code Case No. Special Service per UG-120(a) (Mat'l. (Spec. No., Grade)) Nom. Thk. (in.) Cor. Allow. (in.) Diam. ID. (ft. & in.) Cert'n (circ'd) (ft & in.)

7. Seams: None 85 N/A N/A 1 Spot (Long. (Welded, DB., Singl., Lap, Bvt)) R.T. (Spot or Full) Eff. (X) H.T. Temp (F) Time (hr) Grn (welded, DB., Singl., Lap, Bvt) R.T. (Spot, Partial, or Full) No. of Courses

8. Heads: (a) Mat'l. SA-516 Gr 70 (Spec No., Grade) (b) Mat'l. SA-516 Gr 70 (Spec No., Grade)

Table with 10 columns: 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). Rows (a) and (b) show End locations with 0.47" thickness and 0.0" corrosion allowance.

If removable, bolts used (describe other fastenings)

9. MAWP 1800 psi at max. temp. 250 °F (Mat'l. Spec. No., Gr., Size, No.) Min. design metal temp. 32 °F at 1600 psi. Hydro., pneum., or other test pressure 2400 psi

10. Nozzles, inspection and safety valve openings: Table with 9 columns: Purpose (Inlet, Outlet, Drain), No., Diam. or Size, Type, Mat'l., Nom. Thk., Reinforcement Mat'l., How Attached, Location. Row 1: Inlet/Outlet, 2, 2", PIPE, SA-106 Gr B SMLS, 0.436", None, Welded, Head.

11. Supports: Skirt No Lugs 0 Legs 0 Other Footpad Attached Head-Welded (Yes or no) (No.) (No.) (Describe)

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report: None (Name of part, item number, Mfg's name and identifying stamp)

Pressure Relief valve exemption per UG-125(a) Designed per UG-22(a) Impact test exemption per UG-20(f)

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. 29,537 expires April 11, 2000. Date 6/12/98 Co. Name Performance Pulsation Control, Inc. Signed J. Board. CERTIFICATE OF SHOP INSPECTION: I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of Texas and employed by Old Republic Insurance Company, Arlington, TX have inspected the component described in this Manufacturer's Data Report on June 12, 1998 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. Date 6/12/98 Signed [Signature] Commissions NB-8934-A

SCOPE INDEXED

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

10

- 1. Manufactured and certified by Performance Pulsation Control, Inc., 390 Clay Road, Sunnyvale, TX 75182
- 2. Manufactured for Waterford Sales, Canada 4810 - 62nd Ave. Lloyminster, AB
- 3. Location of installation Unknown
- 4. Type Sphere 1333-D-1 thru 1333-D-3 L-3261.2 DR18008-AQ Rev 1 6.7.8 1938
- 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

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) End	0.47"	0.0"	---	---	---	---	8.375"	---	Concave
(b) End	0.47"	0.0"	---	---	---	---	8.375"	---	Concave

If removable, bolts used (describe other fastenings)

9. MAWP 1800 psi at max. temp. 250 ° F

Min. design metal temp. 32 ° F at 1600 psi. Hydro., ~~stress~~, or ~~burst~~ test pressure 2400 psi

10. Nozzles, inspection and safety valve openings:

Purpose (Inlet, Outlet, Drain)	No.	Diam. or Size	Type	Matl.	Nom. Thk.	Reinforcement Matl.	How Attached	Location
Inlet/Outlet	2	2"	PIPE	SA-106 Gr B SMLS	0.436"	None	Welded	Head

11. Supports: Skirt No Lugs 0 Legs 0 Other Footpad Attached Head-Welded

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report: None

Pressure Relief valve exemption per UG-125(a)

Designed per UG-22(b)

Impact test exemption per UG-20(f)

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. 29,537 expires April 11, 2000.

Date 6/12/98 Co. Name Performance Pulsation Control, Inc. Signed J. J. Board

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of Texas and employed by Old Republic Insurance Company at Sunnyvale, TX 75102 have inspected the component described in this Manufacturer's Data Report on June 12, 1998 and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 6/12/98 Signed [Signature] Commissions NO-8934 "A"

Performance Pulsation Control, Inc.
1325 19th Street Plano, TX 75074

Date Printed: 2/2/01

CUSTOMER

WATERFLOOD SERVICE & SALES LTD
BOX 1490
ESTEVAN, SASKATCHEWAN, CANADA S4A 2L7

VESSEL LOCATION

UNKNOWN

VESSEL DESCRIPTION

DR-18-2220CS

Vessel designed per the ASME Boiler & Pressure Vessel Code,
Section VIII Division 1, 1998 Edition 1999 Addenda
with Advanced Pressure Vessel for Windows, Version: 7.1.4
Vessel is ASME Code Stamped

Seismic Analysis is Not Required

1333-D OLD DESIGN

Vessel Number:

1

NAMEPLATE INFORMATION

MAWP: 2021.00 PSI at 250 °F

MDMT: -20 °F at 2021.00 PSI

Serial Number(s): 1333-D-1 THRU 1333-D-3

National Board Number(s): _____

Year Built: 1999

Radiography: RT 3

Postweld Heat Treated: NONE

Construction Types : W

Signatures

Design Engineer:

Greg Mathias

Date: 2/2/01

Supervisor:

Date: / /

Authorized Inspector:

Date: / /

Performance Pulsation Control, Inc.
1325 19th Street Plano, TX 75074

Date Printed: 2/2/01

Project Description

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Performance Pulsation Control, Inc.
18" OD HEMI HEAD

Customer: WATERFLOOD SERVICE & SALES LTD
1333-D OLD DESIGN

Vessel Number: 1
Mark Number: H1

Head Number: 1

Date Printed: 2/2/01

Hemispherical Head Design Information

Design Pressure:	2021.00 PSI	Design Temperature:	250 °F
Static Head:	0.00 PSI	Joint Efficiency:	85 %
Head Material:	SA-516 Gr 70 OLD	Factor B Chart:	CS-2
Material Condition:	Normalized	Material Stress (hot):	17500 PSI
Corrosion Allowance:	0.0000 in.	Material Stress (cold):	17500 PSI
Head Location:	Bottom	Actual Head Stress:	17496 PSI
Outside Diameter :	18.0000 in.	Straight Flange :	0.0000 in.
Crown Radius (Lo) :	9.0000 in.	Thin Out :	0.0450 in.
Head Surface Area:	3.53 Sq. Ft.	Extreme Fiber Elongation:	5.40 %
Head Estimated Volume:	5.33 Gal.	Specific Gravity:	1.00
Head Weight:	90.02 lb.	Weight of Fluid:	44.42 lb.
		Total Flooded Head Weight:	134.44 lb.

Minimum Design Metal Temperature Data

Min. Temperature Curve:	D	Pressure at MDMT:	2021.00 PSI
UCS-66(b) reduction:	Yes	Minimum Design Metal Temperature:	-20 °F
UCS-68(c) reduction:	No	Computed Minimum Temperature:	-55 °F

Design Thickness Calculations

Design Thickness Calculations per Appendix 1-1

$$PL_0 = \frac{2021.00 * 9.0000}{2SE + 0.8P} = \frac{2021.00 * 9.0000}{2 * 17500 * 0.85 + 0.8 * 2021.00} = 0.5799 + 0.0000 \text{ (corrosion)} + 0.0450 \text{ (thin out)} = \text{minimum of } 0.6249 \text{ in.}$$

Nominal Head Thickness Selected = 0.6250 in.
Minimum Thickness after forming = 0.5800 in.

Performance Pulsation Control, Inc.
2" SCH XXH BFW CONNECTIONS

Customer: WATERFLOOD SERVICE & SALES LTD
1333-D OLD DESIGN

Vessel Number: 1
Mark Number: N1

Number: 1

ID Number: 1

Nozzle passes through the vessel, attached by a groove weld.

Nozzle does not pass through a Category A joint.

Date Printed: 2/2/01

Nozzle Design Information

Nozzle Material:	SA-106 Gr B OLD	Nozzle Efficiency E:	100 %
		Joint Efficiency E1:	1.00
		Factor B Chart:	CS-2
External Projection:	4.0000 in.	Allowable Stress at Design Temperature (S _n):	15000 PSI
Internal Projection:	1.0900 in.	Allowable Stress at Ambient Temperature:	15000 PSI
Nozzle Corrosion Allowance:	0.0000 in.	Correction Factor F:	1.00
Nozzle Pipe Size:	2	Nozzle Pipe Schedule:	XXH
Nozzle ID (new):	1.5030 in.	Nozzle Wall Thickness(new):	0.4360 in.
Nozzle ID (corroded):	1.5030 in.	Nozzle Wall Thickness(corroded):	0.4360 in.
Outer "h" Limit:	1.0900 in.	Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal "h" Limit:	1.0900 in.	Internal Weld Leg Size(Weld 43):	0.0000 in.
OD, Limit of Reinforcement:	3.5350 in.	Outside Groove Weld Depth:	0.6250 in.

Minimum Design Metal Temperature

Min. Temp. Curve:	B	Pressure at MDMT:	2021.00 PSI
UCS-66(b) reduction:	Yes	Minimum Design Metal Temperature:	-20 °F
UCS-66(c) reduction:	No	Computed Minimum Temperature:	-155 °F

Head Information

Material:	SA-516 Gr 70 OLD	Head wall thickness(new):	0.6250 in.
Material Stress(S _v):	17500 PSI	Head wall thickness - thin out (corroded):	0.5800 in.

Pipe Size: 2 Schedule: XXH

Nozzle is adequate for UG-45 requirements.

Opening is adequately reinforced for Internal Pressure.

Reinforcement calculations are not required per UG-36(c)(3)(a)

Weld Strength Paths are adequate.

Performance Pulsation Control, Inc.
2" SCH XXH BFW CONNECTIONS

1333-D OLD DESIGN

Number: 1
Turnover: 1

Vessel Number: 1
Mark Number: N1

Date Printed: 2/2/01

Required Head Thickness per Paragraph UG-37(a)

$$t = \frac{P L_o}{(2SE + 0.8P)} = \frac{2021.00 * 9.0000}{(2 * 17500 * 1 + 0.8 * 2021.00)} = 0.4967 \text{ in.}$$

Nozzle Required Thickness Calculations

Required Nozzle Thickness for Internal Pressure per Paragraph UG-37(a)

$$t_n = \frac{P R_n}{SE - 0.6P} = \frac{2021.00 * 0.7515}{15000 * 1 - 0.6 * 2021.00} = 0.1102 \text{ in.}$$

Strength Reduction Factors

$$fr1 = \frac{S_n}{S_v} = \frac{15000}{17500} = 0.8571$$

$$fr2 = \frac{S_n}{S_v} = \frac{15000}{17500} = 0.8571$$

$$fr3 = \frac{S_n}{S_v} = \frac{15000}{17500} = 0.8571$$

UG-45 Thickness Calculations

Nozzle Thickness for Pressure Loading (plus corrosion) per Paragraph UG-45(a)

$$t = \frac{P R_n}{SE - 0.6P} + C_a = \frac{2021.00 * 0.7515}{15000 * 1.00 - 0.6 * 2021.00} + 0.0000 = 0.1102 \text{ in.}$$

Nozzle Thickness for Internal Pressure (plus corrosion) per Paragraph UG-45(b)(1)

$$t = \frac{P L_o}{(2SE + 0.8P)} + C_a = \frac{2021.00 * 9.0000}{(2 * 17500 * 1 + 0.8 * 2021.00)} + 0.0000 = 0.4967 \text{ in.}$$

Minimum Thickness of Standard Wall Pipe (plus corrosion) per Paragraph UG-45(b)(4)

$$t = \text{minimum thickness of standard wall pipe} + C_a = 0.1347 \text{ in.}$$

Nozzle Minimum Thickness per Paragraph UG-45(b)

$$t = \text{Smallest of UG-45(b)(1) or UG-45(b)(4)} = 0.1347 \text{ in.}$$

Minimum Nozzle Wall Thickness = $t_n - 12 \frac{1}{2} \%$ (for pipe) = 0.3815 in.
 Minimum Nozzle Wall Thickness of 0.3815 in. is greater than UG-45(a) value of 0.1102 in.
 Minimum Nozzle Wall Thickness of 0.3815 in. is greater than UG-45(b) value of 0.1347 in.

Performance Pulsation Control, Inc.
DR-18-2220CS

Customer: WATERFLOOD SERVICE & SALES LTD
1333-D OLD DESIGN

Vessel Number: 1

Date Printed: 2/2/01

MDMT Report by Components
Design MDMT is -20 °F

<u>Component</u>	<u>Material</u>	<u>Curve Pressure</u>	<u>MDMT</u>
18" OD HEMI HEAD	SA-516 Gr 70 OLD	D 2021.00 PSI	-55 °F
2" SCH XXH BFW CONNECTIONS	SA-106 Gr B OLD	B 2021.00 PSI	-155 °F

Component with highest MDMT: 18" OD HEMI HEAD.

Computed MDMT = -55 °F

The required design MDMT of -20 °F has been met or exceeded.

ANSI Flanges Are Not Included in MDMT Calculations.

Performance Pulsation Control, Inc.
DR-18-2220CS

Customer: WATERFLOOD SERVICE & SALES LTD
1333-D OLD DESIGN

Vessel Number: 1

Date Printed: 2/2/01

MAWP Report by Components

Component	Design Pressure	Static Head	Vessel MAWP	Component MAWP	Vessel MAWP
			New & Cold UG-98(a)	Hot & Corroded UG-98(b)	Hot & Corroded UG-98(a)
18" OD HEMI HEAD	2021.00 PSI	0.00 PSI	2021.44 PSI	2021.44 PSI	2021.44 PSI
2" SCH XXH BFW CONNECTIONS	021.00 PSI	0.00 PSI	2378.37 PSI	2378.37 PSI	2378.37 PSI

NC = Not Calculated Inc = Incomplete

Summary

Component with the lowest vessel MAWP(New & Cold): **18" OD HEMI HEAD** 2021.44 PSI
 The lowest vessel MAWP(New & Cold):

Component with the lowest vessel MAWP(Hot & Corroded): **18" OD HEMI HEAD** 2021.44 PSI
 The lowest vessel MAWP(Hot & Corroded):

Pressures are exclusive of any external loads.

Performance Pulsation Control, Inc.
DR-18-2220CS

Customer: WATERFLOOD SERVICE & SALES LTD
1333-D OLD DESIGN

Vessel Number: 1

Date Printed: 2/2/01

Summary Information

	<u>Dry Weight</u>	<u>Flooded Weight</u>
Head	90.02 lb.	134.44 lb.
Nozzle	4.40 lb.	4.40 lb.
Totals	94.42 lb.	138.85 lb.
	<u>Volume</u>	
Head	5.33 Gal.	
Nozzle	0.08 Gal.	
Totals	5.40 Gal.	
	<u>Area</u>	
Head	3.53 Sq. Ft.	
Nozzle	0.27 Sq. Ft.	
Totals	3.80 Sq. Ft.	

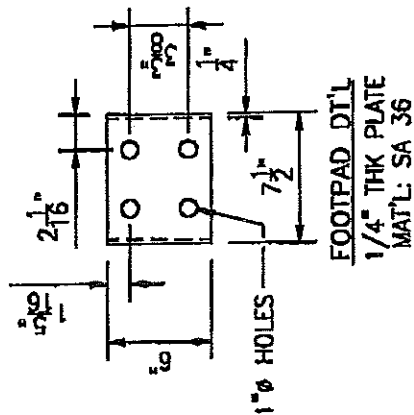
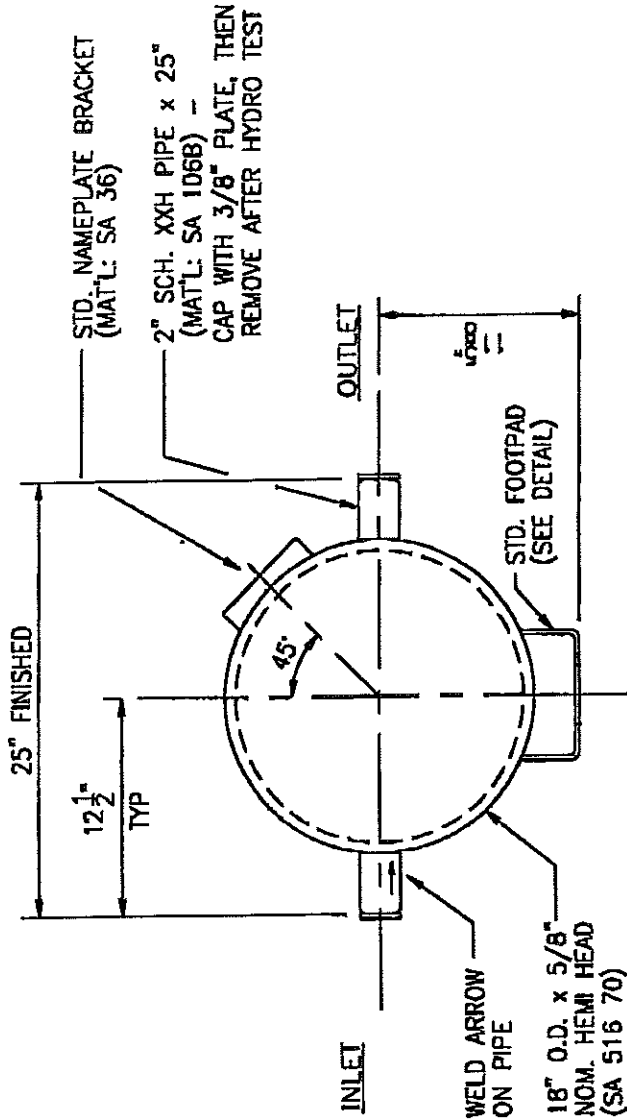
Hydrostatic Test Information (UG-99)
Gauge at Top

Component with controlling ratio is : 18" OD HEMI HEAD
Component with controlling pressure is : 18" OD HEMI HEAD

$$\text{Calculated Test Pressure} = P * 1.3 * \frac{\text{Cold Stress}}{\text{Hot Stress}} = 2021.00 * 1.3 * \frac{17500}{17500} = 2627.30 \text{ PSI}$$

Specified Test Pressure : 2627.30 PSI

REV	DESCRIPTION	SIGN
1	ADDED S/N & HYDRO TEST NOTE	JV



FABRICATED IN ACCORDANCE WITH ASME SECTION VIII, DIV. 1 - 1995 EDITION; 1996 ADDENDA
 MAMP: 1600 PSIG @ 250° F
 MDMT: 32° @ 1600 PSIG
 RT-3 C.A.=0.0 PWHT: NONE
 HYDRO TEST @ 2400 PSIG

PHONE: 972-633-8600
 FAX: 972-633-8700

MODEL DR-18-2220CS MAINTENANCE FREE DISCHARGE DAMPENER WITH 2" BFW ENDS

DWG. # DR18008-AO
 REV 1

WEIGHT: 200 LBS
 DATE: 6/2/98
 CK: GM
 BY: JV

PPC S/N
 1333-D-1
 1333-D-2
 1333-D-3

PERFORMANCE PULSATION CONTROL	
PHONE 972-633-8600	FAX 972-633-8700
DR18008-AO	PPC MODEL # DR-18-2220CS
SEE LIST	CUST. PART #
MAT'L BD. NO.	
PERFORMANCE PULSATION CONTROL, INC.	
MAMP: 1600 P.S.I.G. AT 250 °F	
M.D.M.T.: 32 °F AT 1600 P.S.I.G.	
MANUFACTURER'S SERIAL NUMBER	SEE LIST
YEAR BUILT	1998

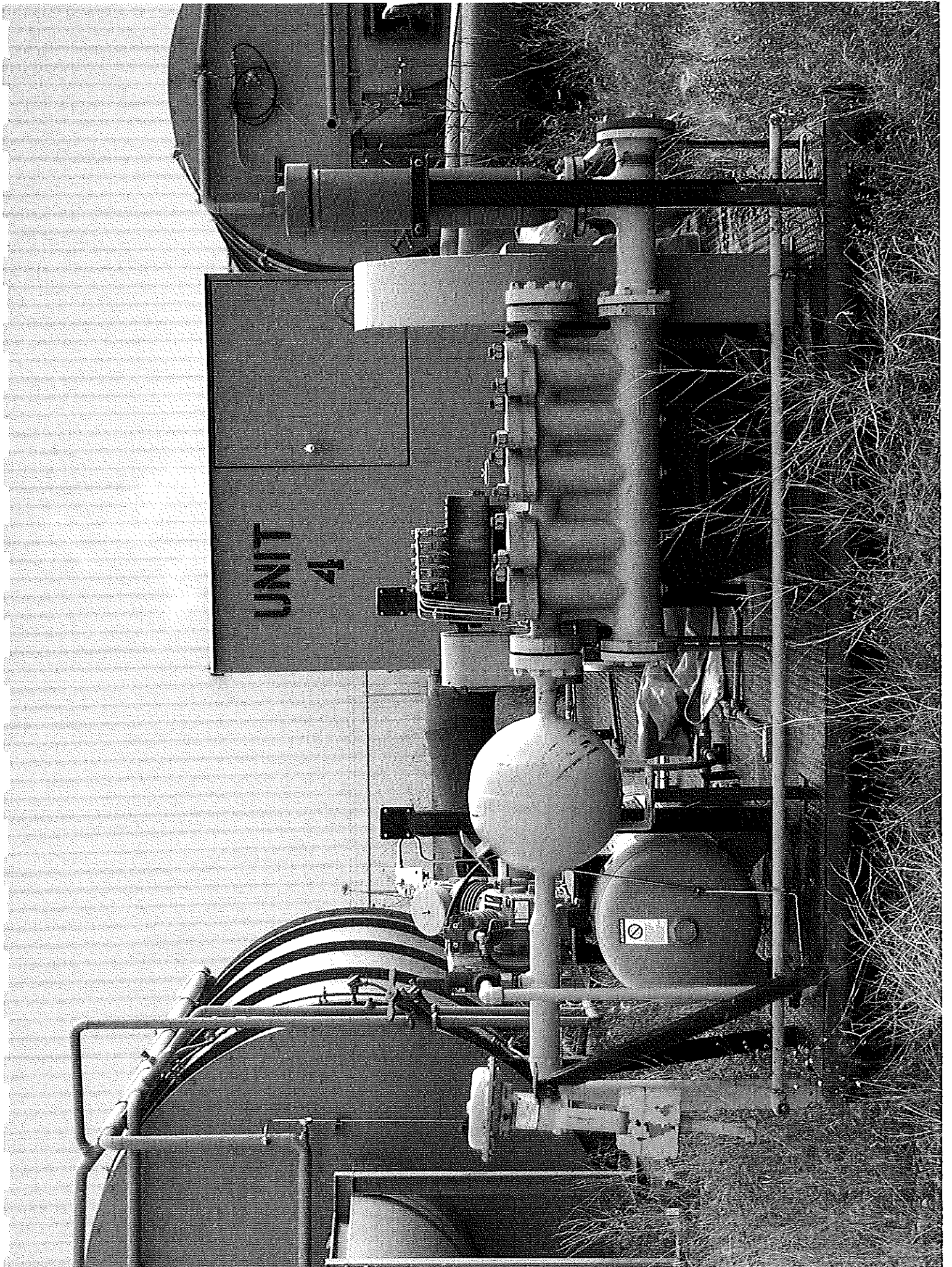
DESCRIPTION:

DIMENSION TOLERANCES ±1/8"
PERFORMANCE PULSATION CONTROL



UNIT #4

UNIT #5



UNIT
4

