Canadian Natural

PRESSURE VESSEL VISUAL INSPECTION REPORT

Report #:	156816-KK-22
Inspect Date:	05/09/2012
Page:	1 of 12
Insp. Co. Job #:	156816

Criticality Designation: Green

Insp. Comp:	Matrix_Inspection	District:	St Albert - South	Field:	Hobbema-1775
Location:	Hobbema Field	Unit / Skid #:	N/A	LSD:	04-16-044-24W4M
Jurisdiction #:	A0443655	Equip Tag #:	N/A	Serial #:	PE 5252
CRN #:	N0684.21	Nat'l Bd #:	N/A	Year Built:	1998
Manufacturer:	Penfabco	Equipment Description:	Other: Separator		
Status:	In Service -	Equip. Type:	Vessel: Separator	Service:	Sweet
MAWP Shell:	1440 Psi @ 100 °F	Volume:	N/A	Code Stamp:	☒ Y ☐ N
MAWP Tube:	N/A @ N/A	Height/Length:	N/A	Insulated:	☐ Y ☒ N
MDMT:	-20 °F	RT: RT-2	Size/Diameter.: 24 in. O.D.	PWHT:	☐ Y ☒ N
Support	Skirt	Vessel on Original CNRL Inventory List:	☒ Y ☐ N	Manway:	☐ Y ☒ N
C.A.:	0.125 in.	Coated: No	Clad: No	J.E.: N/A	Remote Access: ☐ -

	Component	Material	Nominal Thk	Diameter	OD/ID	Tube Side	Shell Side
1	Main - Shell	N/A		24.000 in.	OD	☐	☒
2	Top - Head	N/A		24.000 in.	OD	☐	☒
3	Bottom - Head	N/A		24.000 in.	OD	☐	☒
4	-					☐	☐
5	-					☐	☐

Static Data: Confirmed ☐ Changed (See Comments) ☒

Comments:
Data not provided from MaxiTrack prior to inspections.
Confirm data before overwriting database.
Limited data available from data plate.

PSV Static Data

PSV –1 Tag #:	P32379	Serial #:	B103983-1-2	CRN:	OG0449.2
Model #:	1990C-LCC	Capacity:	2662 SCFM	Set Pressure:	1440 psi
Manufacturer:	Consolidated			Service Company:	POWELL
Inlet Size & Type:	1.00 in. - Threaded			Last Service Date:	05-08-2012
Outlet Size & Type:	1.00 in. - Threaded			Block Valve:	N/A - -
Carseal Intact:	Yes			Code Stamp:	Yes
Shell Side / Tube Side:	Shell Side	Out for Service During Insp.:	Y	Location of PSV:	On Vessel

PSV –2 Tag #:	N/A	Serial #:	N/A	CRN:	N/A
Model #:	N/A	Capacity:	N/A	Set Pressure:	
Manufacturer:	N/A			Service Company:	N/A
Inlet Size & Type:	-			Last Service Date:	N/A
Outlet Size & Type:	-			Block Valve:	- -
Carseal Intact:				Code Stamp:	
Shell Side / Tube Side:		Out for Service During Insp.:		Location of PSV:	

PSV Comments

PSV was removed during the external visual inspection and UT corrosion survey.
PSV data was provided at a later date for updating reports with current service data.

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External Inspection Results – VE External Inspection Performed

Item	N/A	Condition	Comment (Check Status Bar or Press F1 for Help)	NCR	Action Item Integrity	Action Item Maintenance
Nameplate	☐	Accept	Limited data	☐	☐	☐
Foundation and Supports	☐	Accept	Secure and level	☐	☐	☐
Anchor Bolts	☐	Accept	secure and level	☐	☐	☐
Grounding	☐	Accept	grounded through building	☐	☐	☐
Insulation Condition	☒		not insulated	☐	☐	☐
PSV	☒		PSV removed for service at time of inspection	☐	☐	☐
Shell Heads & Nozzles	☐	Accept	good condition	☐	☐	☐
Metal Surfaces (Paint)	☐	Accept	isolated surface corrosion and scale	☐	☐	☐
Aux Equipment	☐	Accept	good condition	☐	☐	☐
Cathodic Protection	☒		not applicable	☐	☐	☐
Alignment	☐	Accept	good alignment	☐	☐	☐
Flange Connections	☐	Accept	proper bolt engagment	☐	☐	☐
Pressure Gauge	☐	Accept	clear and legible	☐	☐	☐
Temperature Gauge	☐	Accept	clear and legible	☐	☐	☐
Sight Glass	☐	Accept	clear and clean	☐	☐	☐
Ladder / Platform	☒		no ladders or platforms attached	☐	☐	☐
Leaks	☐	No	no leaks noted	☐	☐	☐
Piping from Vessel	☐	Accept	isolated surface corrosion and flaking paint			
Previous UT Survey	☐	Yes	evidence of previous survey	UT Company: unknown		

External Visual Observations

Nameplate is secure and easy to read, but contains little information.
The vessel is secure and level, with properly aligned piping and external attachments.
The paint is in fair condition, with scale and minor surface corrosion noted.
The paint is thick and rough in some locations.
The attached piping is in good condition with isolated areas of surface corrosion.
The vessel piping to wall and vessel to roof interface is in poor condition.
The building has product staining on the wall from the PSV discharge.
The PSV is removed for service at the time of the inspection.
The plumbing for the PSV appears to be in good condition, and of adequate size and proper rating.
The PSV service data has been supplied from the service company to update the static information in this report.

The overall condition of this vessel is good.

A UT corrosion survey was performed at the time of the inspection by IRISNDT using DMS2 SN 020448.
Typical locations on the vessel heads, shell, and attachments were selected for the UT survey.
No thickness values of concern were noted during the UT survey.
See attached UT values and drawing for complete details.

Recommendations:

Clean th eproduct from the building wall.
Reseal the vessel to roof interface and piping to wall interfaces.
Clean and maintain buildings and packages to prevent further surface corrosion and potential degradation.
Ensure PSV's are serviced, installed, and rated correctly before putting this equipment back into service post TAR.

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Internal Inspection Results – VI N/A (Not Applicable)

Item	N/A	Condition	Comment (Check Status Bar or Press F1 for Help)	NCR	Action Item Integrity	Action Item Maintenance
Shell	☒		No Internal Inspection Carried Out	☐	☐	☐
Heads	☒		No Internal Inspection Carried Out	☐	☐	☐
Manway	☒		No Internal Inspection Carried Out	☐	☐	☐
Gasket Surfaces	☒		No Internal Inspection Carried Out	☐	☐	☐
Welds	☒		No Internal Inspection Carried Out	☐	☐	☐
Refractory	☒		No Internal Inspection Carried Out	☐	☐	☐
Heating Coils	☒		No Internal Inspection Carried Out	☐	☐	☐
Demister Pad	☒		No Internal Inspection Carried Out	☐	☐	☐
Vane Pack	☒		No Internal Inspection Carried Out	☐	☐	☐
Baffles	☒		No Internal Inspection Carried Out	☐	☐	☐
Trays	☒		No Internal Inspection Carried Out	☐	☐	☐
Filter	☒		No Internal Inspection Carried Out	☐	☐	☐
Internal Coating	☒		No Internal Inspection Carried Out	☐	☐	☐
Tubesheet	☒		No Internal Inspection Carried Out	☐	☐	☐
Tube Bundle	☒		No Internal Inspection Carried Out	☐	☐	☐

Internal Visual Observations

No Internal Inspection Carried Out

Recommendations:

No Internal Inspection Carried Out

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Firetube Static Data Vessel Not Equiped with Firetube

Diameter: Not Applicable Nom Thickness: Not Applicable Bend: Not Applicable

Length: Not Applicable Firetube Description: Not Applicable

Firetube NDE Performed:

UT ☐	Report#: Not Applicable		ET ☐	Report#: Not Applicable	
MT ☐	Report#: Not Applicable		RT ☐	Report#: Not Applicable	
PT ☐	Report#: Not Applicable		Other ☐	Report#: Not Applicable	

Firetube Inspection Results

Item	N/A	Condition	Comment (Check Status Bar or Press F1 for Help)	NCR	Action Item Integrity	Action Item Maintenance
Burner	☒		No Firetube Inspection Carried Out	☐	☐	☐
Stack	☒		No Firetube Inspection Carried Out	☐	☐	☐
Flange (Throat)	☒		No Firetube Inspection Carried Out	☐	☐	☐
Tube Sheet	☒		No Firetube Inspection Carried Out	☐	☐	☐
Hot Side	☒		No Firetube Inspection Carried Out	☐	☐	☐
Miter	☒		No Firetube Inspection Carried Out	☐	☐	☐
Return Bend	☒		No Firetube Inspection Carried Out	☐	☐	☐
Supports	☒		No Firetube Inspection Carried Out	☐	☐	☐
Butt Welds	☒		No Firetube Inspection Carried Out	☐	☐	☐
Fillet Welds	☒		No Firetube Inspection Carried Out	☐	☐	☐

Firetube Visual Observations

No Firetube Inspection Carried Out

Recommendations:

No Firetube Inspection Carried Out

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Vessel NDE and Final Summary:

NDE Performed:					
UT ☒	Report#: Included	ET ☐	Report#:		
MT ☐	Report#:	RT ☐	Report#:		
PT ☐	Report#:	Other ☐	Report#:		

Maxi-Trak Observations Summary (Summarize inspection results Max 255 Characters):

Isolated minor surface corrosion noted on vessel and piping. Building wall has product staining from PSV discharge. Roof to vessel interface requires sealant.

Maxi-Trak Recommendations Summary (Summarize Recommendations Max 255 Characters):

Clean the product from building wall. Reseal the vessel to roof and piping to wall interfaces. Ensure PSV connected / rated correctly prior to post TAR startup.

Actions Corrected at Time of Inspection: (If actions were corrected at the time of Inspection – note the corrected actions here.)

None required.

Additional Visual Observations

Overall site conditions are very good.
It is clear that operations and maintenance staff take pride in the plant, and maintain a tidy and clean workplace.

Any other safety concerns or observations from associated equipment: (for example associated piping, buildings, pumps etc…)

None noted

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Thickness and Remaining Life Evaluation *" Must be Completed"*

MUST BE COMPLETED AND RESOLVED WITH CNRL IMMEDIATELY UPON DISCOVERY OF LOW WALL THICKNESS AREAS

Step 1: Was any thickness measurement location found to be less than (Nominal WT – Corrosion Allowance)?: ***No***

If YES, proceed to Step 2; if NO, proceed to "Crack Evaluation" and "CNRL Criticality Designation".

Step 2: Which component(s) were found below (Nominal WT – Corrosion Allowance)?

Components found below Nom - CA:

Components
N/A - N/A
N/A - N/A
N/A - N/A
N/A - N/A
N/A - N/A

Perform Steps 3 – 8 for each component with actual thickness less than (Nominal WT – Corrosion Allowance).

Step 3: Describe Location and Extent of Corrosion*:*

Components	Location and Extent of Corrosion
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection

Notes:
Not Applicable for this Inspection

Step 4:

- For shells and nozzles, calculate minimum required thickness (T-min) as per ASME Section VIII UG-27.
- For heads, calculate minimum required thickness (T-min) as per ASME Section VIII UG-32.

Components	T-Min
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A

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Thickness and Remaining Life Evaluation *(Continued)*

Step 5: Is any measured thickness less than calculated minimum required thickness (T-min)? ***N/A***

If YES, complete Step 6
If NO, proceed to Step 7..

Step 6: Is nature and extent of pitting acceptable as per API 510? ***N/A***

Step 7: Calculate Remaining Life as per API 510. How? (Find last reading; use nominal thickness if nothing available). Short Term Corrosion Rates and Long Term Corrosion Rates.

Components	Remaining Life (Yrs)
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A

Step 8: Contact CNRL Integrity Coordinator to discuss above results.

- Name of CNRL contact: Not Applicable for this Inspection
- Date and time of conversation: Not Applicable for this Inspection

Summary/results of conversation:
Not Applicable for this Inspection

Crack Evaluation by Magnetic Particle or Alternative Inspection *" Must be Completed"*

MUST BE COMPLETED AND RESOLVED WITH CNRL IMMEDIATELY UPON DISCOVERY OF CRACK-LIKE INDICATIONS

Were any indications found to suggest the vessel contained cracks? ***N/A***

If NO, proceed to "CNRL Criticality Designation".

If YES, Contact CNRL Integrity Coordinator to discuss results.

- Name of CNRL contact: Not Applicable for this Inspection
- Date and time of conversation: Not Applicable for this Inspection

Summary/results of conversation:
Not Applicable for this Inspection

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CNRL Criticality Evaluation – *"MUST BE COMPLETED"*

The CNRL In-Service Pressure Vessel Inspector MUST answer all the following questions

1. Is the vessel fit-for-service? : ***Yes***
2. Was the measured thickness less than the calculated minimum required thickness (T-min) for any component?: ***No***
3. Were MT indications found?: ***N/A***
4. Was the remaining life less than 6 years for sour service vessels or less than 10 years for sweet service vessels?: ***No***
5. Were NCR's or Action Items generated as a result of the inspection? : ***No***
6. Were UT readings below (Nominal WT – Corrosion Allowance) found? : ***No***

Information on CNRL Owner User Program - Criticality Designation and Required Review

RED – Vessel Inspection Results are deemed RED if one of the following occurred:

- The measured thickness was less than the calculated minimum required thickness (T-min) for any component.
- MT indications were found.
- The remaining life was calculated to be less than 6 years for sour-service vessels or less than 10 years for sweet-service vessels.

RED inspection reports must be signed off by the CNRL Chief Inspector.

YELLOW – Vessel Inspection Results are deemed YELLOW if one or more of the following occurred:

- The vessel was declared NOT fit-for-service by the 3rd Party In-Service PV Inspector.
- NCR's or Action Items were generated as a result of the inspection.
- UT readings below (Nominal WT – Corrosion Allowance) were found.

YELLOW inspection reports must be signed off by the CNRL Pressure Equipment Integrity Coordinator.

GREEN – Vessel Inspection Results are deemed GREEN if all of the following are true:

- The vessel was declared fit-for-service by the 3rd Party In-Service PV Inspector.
- UT readings below (Nominal WT – Corrosion Allowance) were NOT found.
- MT indications were NOT found.
- NCR's or Action Items were NOT generated as a result of the VE inspection.

GREEN inspection reports must be signed off by the 3rd Party In-Service Pressure Vessel Inspector.

Criticality Designation						Green

Vehicle #: Kms:

Time In: 00:00 Time Out: 00:00 Hrs

Time In: 00:00 Time Out: 00:00 Hrs

Personnel:

Billing Info: :

Inspector (Name): Kris Katryniuk PESL: N/A

Inspector (Signature): Kris Katryniuk Inspector Signature 2012.07.18 14:33:09 -06'00' 06/30/2010 08:43:20 am API: 510-35238

CNRL Coordinator (Name):

CNRL Coordinator (Signature): Coordinator Signature

CNRL Chief Inspector (Signature): 06/30/2010 08:44:03 am (I am in full agreement with report contents) Chief Inspector Signature

06/30/2010 08:45:29 am (I am in full agreement with report contents)

Equipment Photographs:

01-A0443655 Data Plate

02-A0443655 Overview Inside

03-A0443655 Overview Outside

04-A0443655 PSV Discharge Staining

05-A0443655 Vessel to roof Interface

06-A0443655 Product Staining

07-A0443655 Flaking Paint at Base

MATRIX INSPECTION

CORROSION INSPECTION SERVICES

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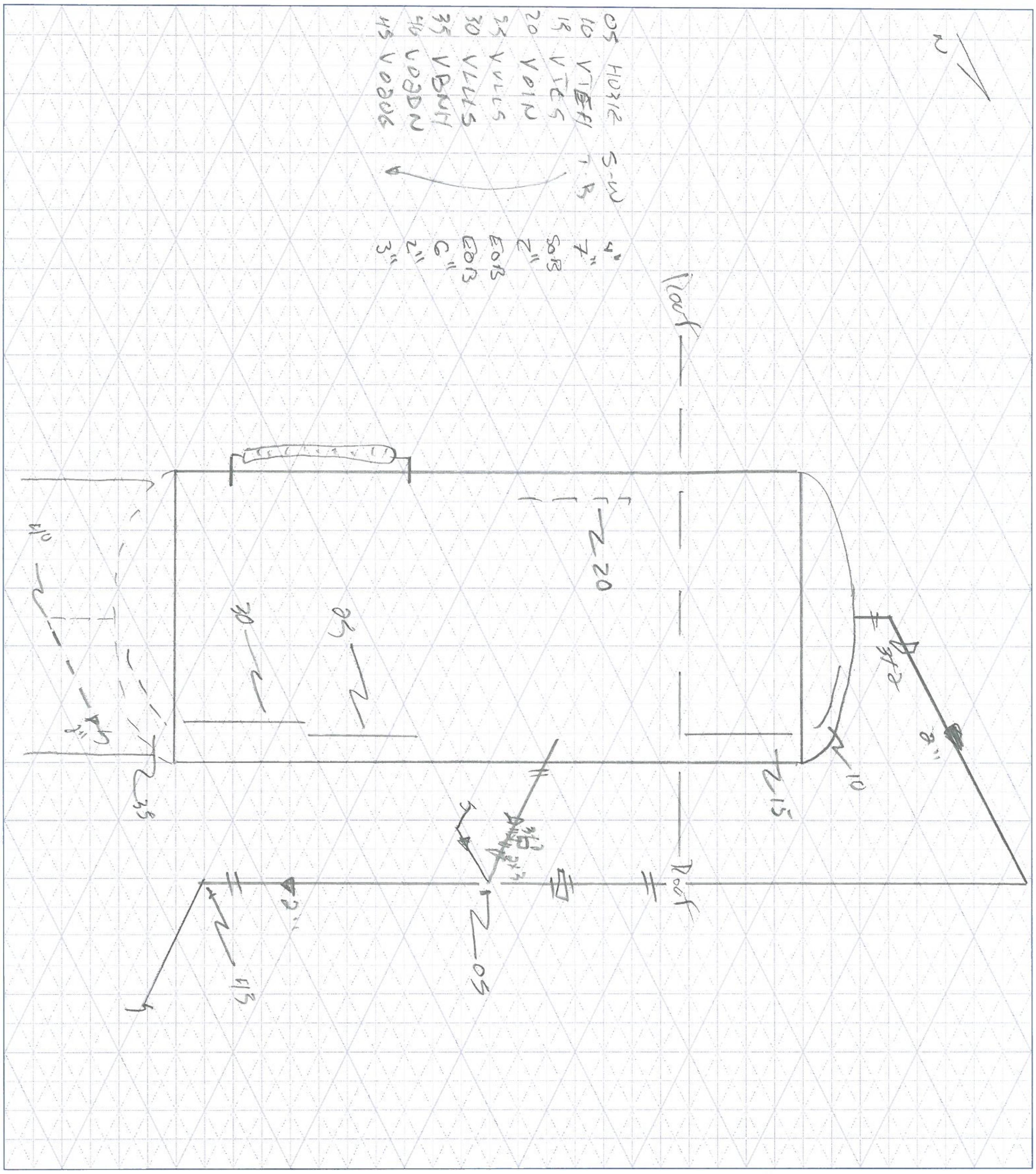

CUSTOMER: CNRL **FACILITY:** 12-09 Hobbema Field **LSD:** 04-16-044-24W4M

P & ID: **DRAWN BY:** KK **DATE:** 05-09-12 **DRAWING NO.** 156816-KK-23

VESSEL DESCRIPTION: Separator

Equip. No. Pro.Reg.No. (A) A0443655 C.R.N. N0684.21 Serial No. PE 5252 Yr. Inst.

Code/Div. U W Size: 24" ID/OD X Manufacturer: Pro Fabco Yr. Blt. 1998

C. Stamp Service: Sweet PWHT: HT J.E.: Radiography: RT-1 Insulated: NO

HEAD **SHELL:**

Top Mat'l Top Nom. Top C.A. .125 Material Nominal C.A. .125

Btm Mat'l Btm Nom. Btm C.A. .125 MDMT 1440 psi @Temp -20°F

BOOT **CHANNEL:**

Head Mat'l Head Nom. Head C.A. Top Mat'l Top Nom. Top C.A.

Shell Mat'l Shell Nom. Shell C.A. Btm Mat'l Btm Nom. Btm C.A.

MAWP Shell side: 1440 psi @ Temp. 100°F MAWP Tube side: @ Temp.

PIPING INFORMATION:

Circuit. No. Line No. (s) **(PLEASE PUT LINE NUMBERS ON APPLICABLE LINES ON THE DRAWING)**

Piping Class Service: Yr. Blt.

MAWP: @ Temp. Size & Schedule of Piping **(PLEASE PUT APPROPRIATE SIZES AND SCHEDULES OF PIPING ON DRAWING)**

A0443655
Readings in inches

	PNT1	PNT2	PNT3
LOC5	0.265	0.253	0.245
LOC10	1.095	1.190	1.086
LOC15	1.136	1.145	1.136
LOC20	1.150	1.151	1.150
LOC25	1.150	1.146	1.146
LOC30	1.147	1.136	1.136
LOC35	1.198	1.088	1.083
LOC40	0.439	0.435	0.433
LOC45	0.184	0.186	0.177