



PRESSURE VESSEL & COLUMN INSPECTION REPORT

LSD: 03-06-049-18W5

Date: 2013-01-28

SAP Equipment ID: 66146035

VESSEL STATIC DATA																	
Plant:		MINEHEAD		Op Unit		FH01		System									
Prov. Insp. #		A0528420		CRN		R8180.2		Equip Tag # 66146035									
Equipment Description				FLARE KNOCKOUT DRUM				Serial # 13728									
Manufacturer				BILTON WELDING & MANUFACTURING				Vessel Class VESSEL									
Internal Access:		NO		Description:				Year Built 2005									
MAWP		345		kPa		@ 150		°C									
CODE :				RT :				PWHT : NO									
Diameter		1829		Length		3048		(T/T) OAL mm									
Shell		Mat'l		UNKNOWN		Thickness		0.375" 0 mm									
Head		Mat'l		UNKNOWN		Thickness		0.313" 0 mm									
Nozzle		Mat'l				Thickness		mm									
Internal Coating :				NO		Internal Clad :				NO							
Manway :				NO		Inspection Port :				NO							
Nozzle Rating				lb ANSI		Painted :		NO		Insulated YES							
PROCESS DATA																	
Product Description						Sweet Sour											
Operating Pressure						kPa											
Operating Temperature						°C											
PSV STATIC DATA																	
Serial No.		Location		Inlet		Size		Set		Capacity		Manufacturer		Model		Service	
						Outlet		Pressure		SCFM / Lbs/Hr / GPM				/ Type		Date	

INSPECTION SUMMARY

FIT FOR SERVICE.

RECOMMENDATIONS

NONCONFORMANCES / INSPECTION DEFICIENCIES

INSPECTION PLANNING

Inspection Strategy		Availability		Inspection Interval	
Inspection Date 2013/01/24		Date of Last Inspect		Date of Next Inspect 01/2018	

REPORT CERTIFICATION

The signatures below certify that inspections/tests have been completed in accordance with the identified inspection strategy and that the specified equipment is considered fit for service until the date of next inspection.

Inspected by		ROGER DLUGOSZ		Date 2013/01/24	
Reviewed and Approved by		Bob Marchak		Date 2013/01/30	
Criticality Assessment Rerun		01/2018		Inspection Planning Rerun	
Assessed Next Inspection Date					

✓

PRESSURE VESSEL & COLUMN INSPECTION REPORT

LSD: 03-06-049-18W5

Date: 2013-01-28

SAP Equipment ID: 66146035

DETAILED INSPECTION VISUAL EXTERNAL

ID	Description	Condition	Location	NCR	Comments
V1	General Other (Please Explain)	ACCEPT			MAJORITY OF VESSEL INSULATED. EXPOSED SHELL ON UNDERSIDE OF VESSEL
V2	General Corrosion	ACCEPT			
V3	General Leaks	ACCEPT			NO LEAKS OBSERVED.
V4	Vibration	ACCEPT			NO VIBRATION OBSERVED.
V5	Dissimilar Flange Rating	ACCEPT			
V6	Ladder/Stairway	ACCEPT			SECURE TO VESSEL.
V7	Heads	ACCEPT			
V8	Guy Wires	N/A			
V9	Electrical Ground	ACCEPT			
V10	Painted Inactive Corrosion	N/A			
V11	Coating/Painting	ACCEPT			PAINT IN GOOD CONDITION.
V12	Expansion Joint or Bellows	N/A			
V13	Gauge/Site Glass	ACCEPT			
V14	Shell	ACCEPT			
V15	Jacket	N/A			
V21	Support Other (Please explain)	ACCEPT			SECURE. GOOD CONDITION.
V22	Foundation	ACCEPT			ON PILINGS. GOOD CONDITION.
V23	Anchor Bolts	N/A			
V24	Saddle/Skirt	ACCEPT			GOOD CONDITION.
V25	Davit	N/A			
V26	Fireproofing	N/A			
V31	Connections Other (Please explain)	ACCEPT			ALL CONNECTIONS IN GOOD CONDITION.
V32	Small Branches	ACCEPT			GOOD CONDITION.
V33	Nozzles	ACCEPT			GOOD CONDITION. STUD TREADS ARE FULLY ENGAGED.
V34	Manways	ACCEPT			GOOD CONDITION.
V35	Reinforcing Pads	N/A			
V36	Inadequate Thread Engagement	N/A			
V37	Bolting	ACCEPT			GOOD CONDITION.
V38	Flanges	ACCEPT			GOOD CONDITION.
V39	Leak Clamps	N/A			
V41	Insulation Other (Please explain)	ACCEPT			GOOD CONDITION. GOOD SEAL AROUND NOZZLES AND INSULATION LAPS.
V42	Damage	N/A			NO DAMAGE OBSERVED.
V43	Penetrations	N/A			
V44	Insulation Jacket	ACCEPT			GOOD CONDITION.
V45	Banding	N/A			
V46	Seals/Joints	ACCEPT			GOOD CONDITION.
V51	Relief Devices Other (Please explain)	N/A			VENT TO FLARE.
V52	Corrosion	N/A			NO CORROSION OBSERVED.
V53	Leaks	ACCEPT			NO LEAKS OBSERVED.
V54	Restricted Inlet/Outlet	N/A			
V55	Manual Operation Lever	N/A			



PRESSURE VESSEL & COLUMN INSPECTION REPORT

LSD: 03-06-049-18W5

Date: 2013-01-28

SAP Equipment ID: 66146035

DETAILED INSPECTION VISUAL INTERNAL

ID	Description	Condition	Location	NCR	Comments
V1	General Other (Please Explain)	ACCEPT			INTERNAL ANODE, ABOUT 5-10 PERCENT CONSUMED.
V2	Corrosion (depth, length, width)	ACCEPT			NO PITTING, ONLY MINOR SURFACE CORROSION.
V3	Erosion	N/A			
V4	Distortion	N/A			
V5	Blisters	N/A			
V6	Deposits	N/A			TIDE LINE VISIBLE ON BOTTOM OF VESSEL.
V7	Heads	ACCEPT			VERY GOOD CONDITION.
V8	Welds	ACCEPT			VERY GOOD CONDITION, MINOR SURFACE CORROSION.
V9	Nozzles	ACCEPT			INLET AND OUTLET NOZZLES HAVE MINOR SURFACE CORROSION.
V10	Shell	ACCEPT			ONLY MINOR SURFACE CORROSION.
V11	Gasket Surfaces	ACCEPT			VERY GOOD CONDITION, NO DAMAGE
V21	Internals Other (Please explain)	ACCEPT			2 FLOAT INTERNAL COLUMNS, MINOR SURFACE CORROSION.
V22	Demister	N/A			
V23	Baffle/Wier	N/A			
V24	Sparger	N/A			
V25	Thermowells	ACCEPT			MINOR SURFACE CORROSION
V26	Metallic Linings	N/A			
V27	Nonmetallic Linings	N/A			
V28	Trays	N/A			
V29	Tray Rings	N/A			
V30	Other Welded Attachments	ACCEPT			INLET/OUTLET PIPES IN GOOD CONDITION, NO DAMAGE, MINOR SURFACE CORROSION

DETAILED INSPECTION OTHER TECHNIQUES

ID	Location	Observation/Measurement	Acceptance Criteria	NCR	Comments
1					
2					
3					
4					
5					
6					
7					
8					

DETAILED INSPECTION UT THICKNESS

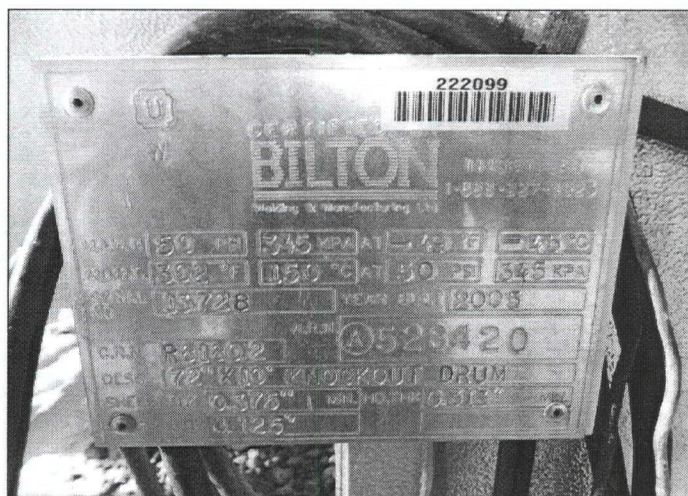
CML	Nom. Thk	Current Reading	Short Term Corr Rate	Long Term Corr Rate	Remaining Life	Comments
05 (HEAD)	9.53	9.86	0.0000	0.0000	99.0	
10 (SHELL)	9.53	10.01	0.0000	0.0000	99.0	
15 (SHELL)	9.53	9.88	0.0000	0.0000	99.0	
20 (BAND 3 XS)	7.62	7.57	0.0003	0.0003	587.2	

PRESSURE VESSEL & COLUMN INSPECTION REPORT

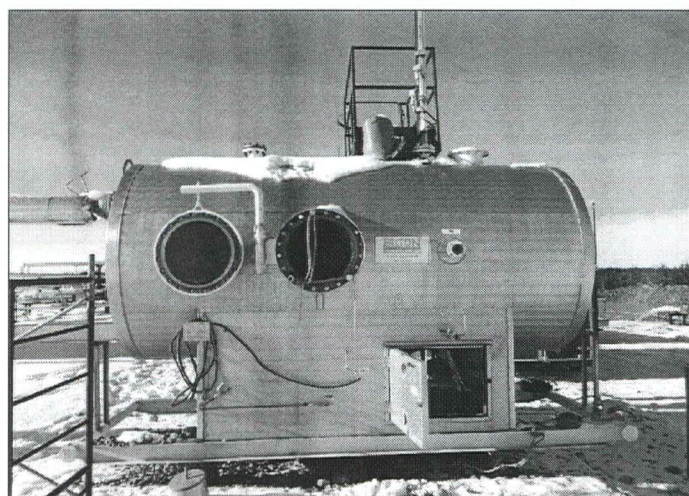
LSD: 03-06-049-18W5

Date: 2013-01-28

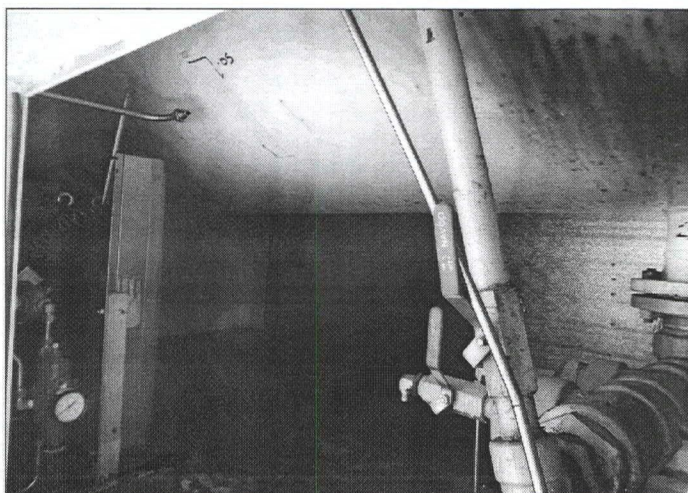
SAP Equipment ID: 66146035



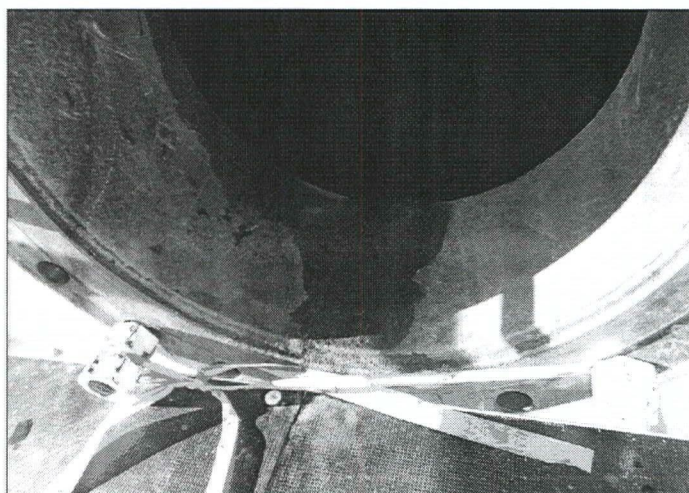
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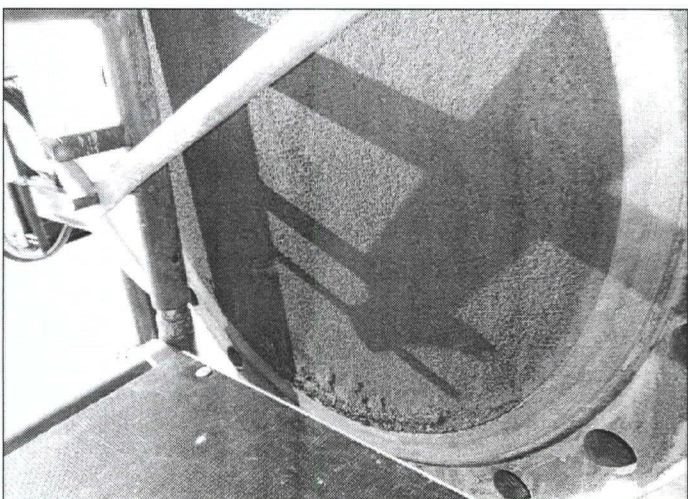
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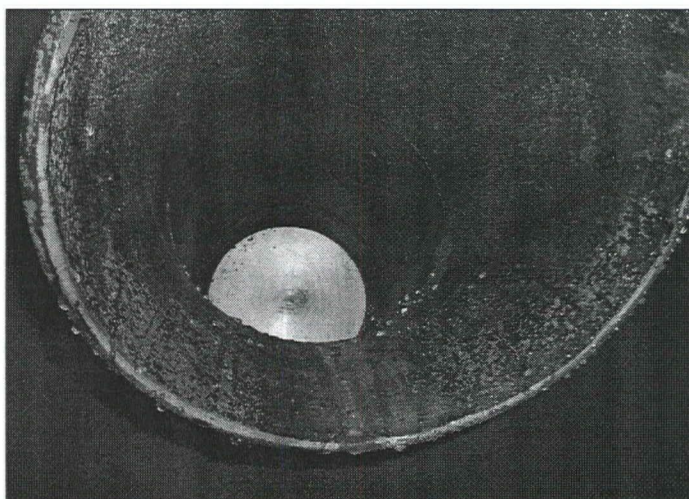
OVERALL



INTERNAL



INTERNAL



INTERNAL

PRESSURE VESSEL & COLUMN INSPECTION REPORT

LSD: 03-06-049-18W5

Date: 2013-01-28

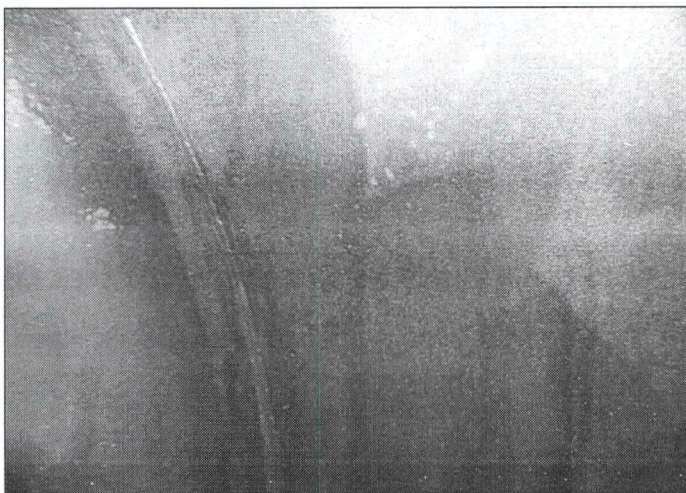
SAP Equipment ID: 66146035



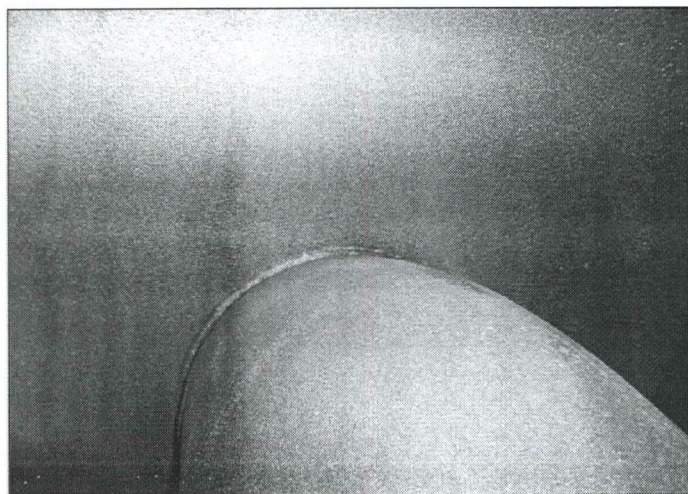
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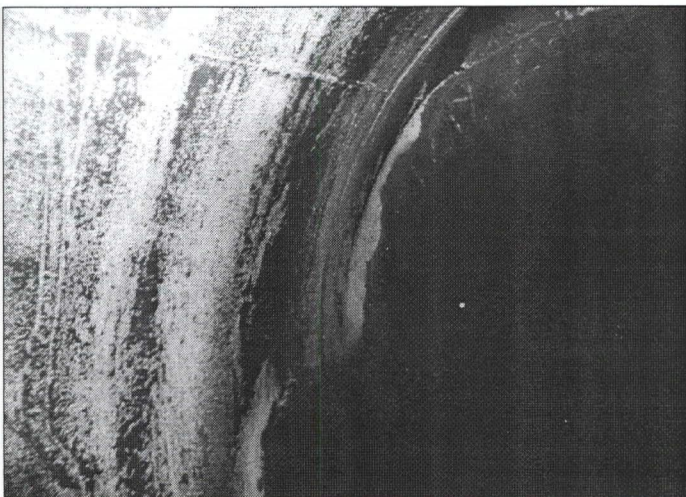
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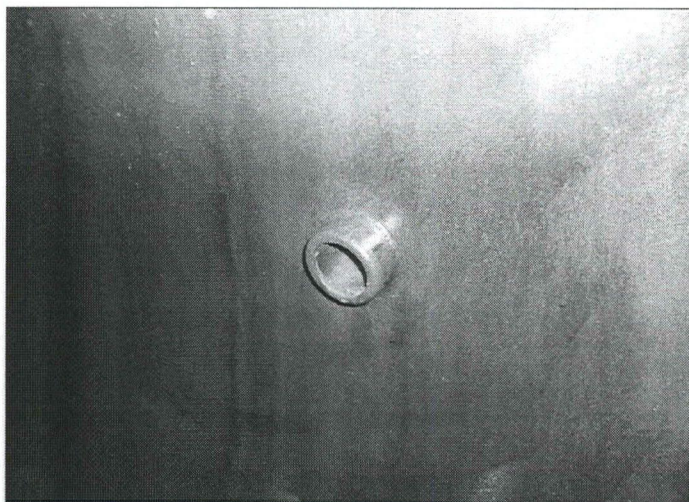
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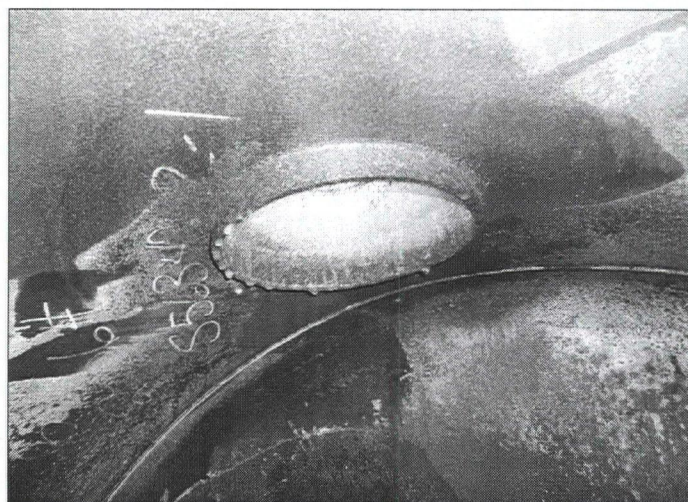
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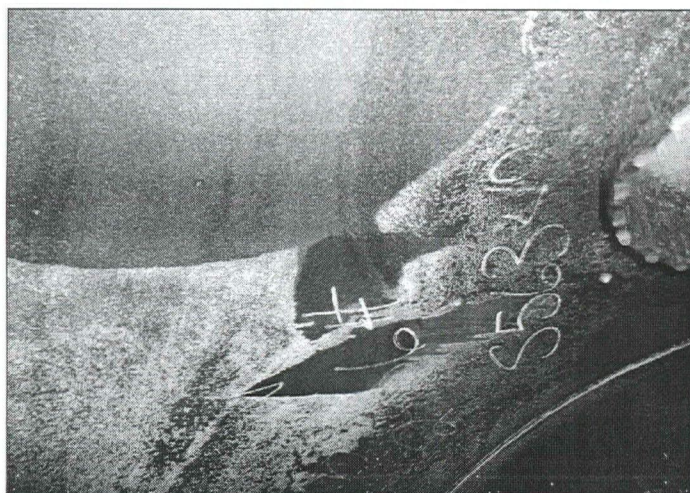
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INTERNAL



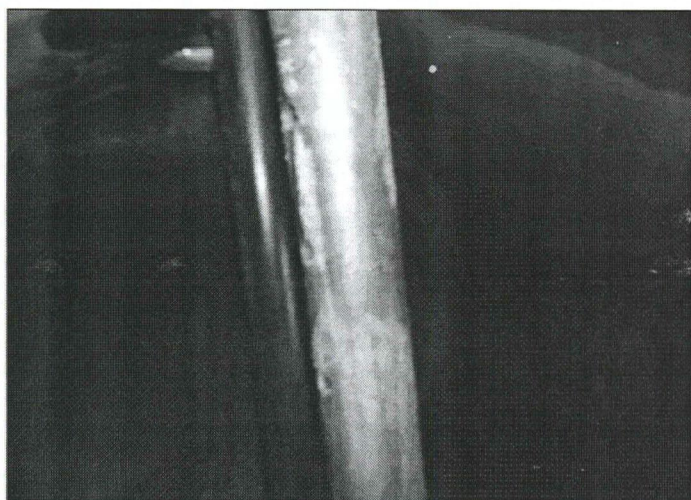
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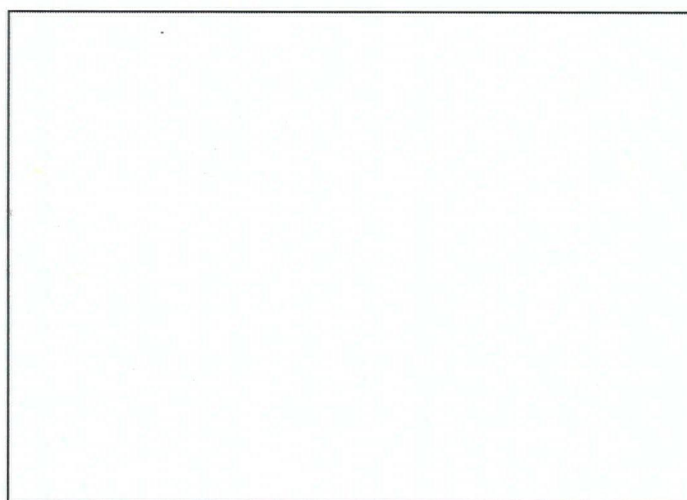
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INTERNAL

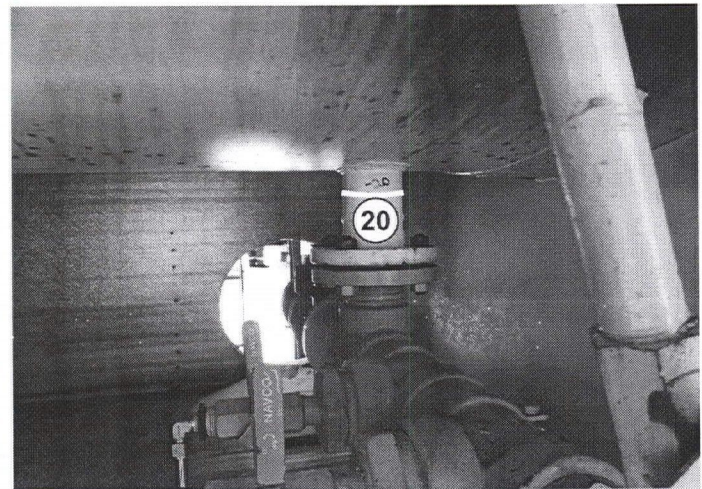
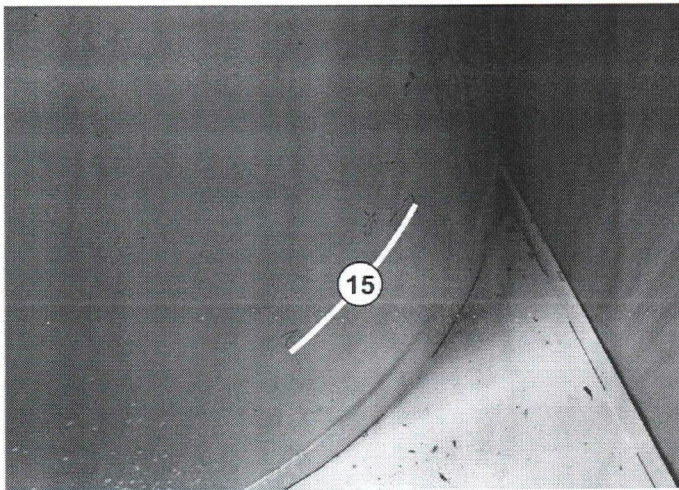
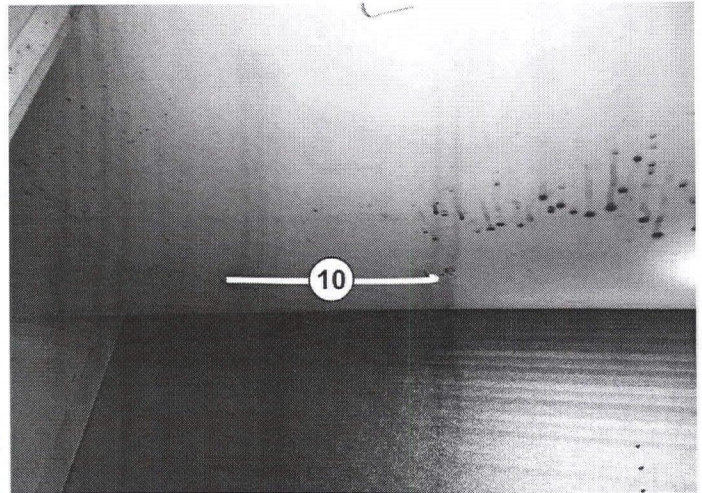
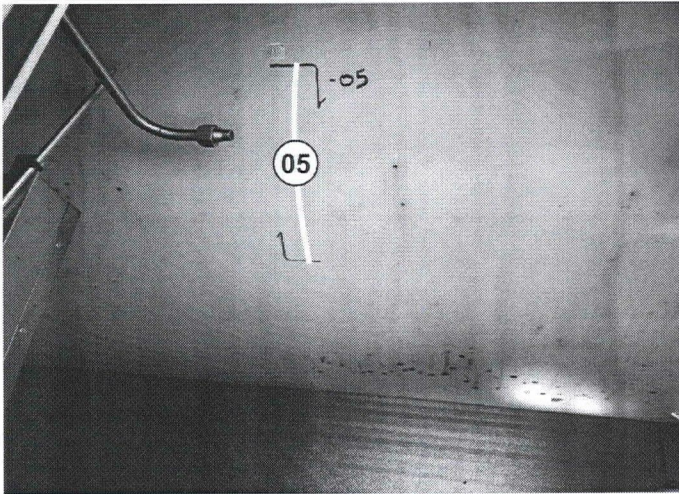


INTERNAL



Western Quality Services

TOTAL INTEGRITY MANAGEMENT SOLUTIONS



OWNER: HUSKY
EQUIPMENT NAME: FLARE KNOCKOUT
REGISTRATION # 0528420
EQUIPMENT # 66146035

SERIAL # 13728
NB#
OWNER ID

NOTES

Pressure Vessel External Visual Inspection Report



Organization: Husky

Inspection Date: 23/09/2010 12:00:00AM

Plant: Foothills

Equipment ID: 66146035

Asset No: 66146035

System: 00007 Minehead 03-06-049-18W5 Compressor Stn.

Operating Unit: FH-FW-013 Ansell

A #0528420

Background

Description:	Drum, Flare Knockout, 6' X 10', 50 Psi
Asset Type:	

Inspection

Inspector:	Bob Marchak	Company:	Husky Energy	Insulated:	N
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External Location Categories

Barrier Penetrations:		Damaged Insulation:		Vessel Supports:		Insulation Rings:	
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Inspection Comments

ID	Description	Condition	Location	NCR	Comments

Inspection Summary

An external visual inspection was carried out to determine the integrity of the flare knock out drum. The nameplate is attached and legible with A# 528420 stamped on it. The FKOD is fully insulated and the insulation is in good condition with no open seams or tears noted. The piping, bolting and attachments are all in good condition with no concerns noted. The vessel does not have a PSV as it is directly vented to the flare stack with no block valves between the knock out drum and the stack. The saddles are welded to the shell and securely attached to the skid. The groundwire is securely attached.

The overall condition of the flare knock out drum is good and it is acceptable for continued service.

The external inspection interval is to be set at 5 years as per ABSA AB-506 grade 2.
The internal inspection interval is to be set at 5 years as per ABSA AB-506 grade 2.

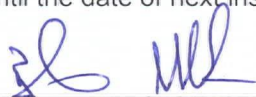
Pressure Vessel External Visual Inspection Report

Inspection Planning

Date of Inspection: 09/23/2010 Date of last Inspection: _____ Date of Next Inspection: 09/2015

The signature below certify that the above is a true report of the inspection / test of the equipment specified and consider fit for service until the date of next inspection.

Competent Inspector: _____



Report Generation Date: _____

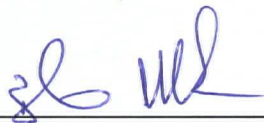
Jan. 7/2011

Reviewed and Accepted by:

Next Inspection Date: 09/2015

Approved by:

Signature: _____



Date: _____

Jan. 7/2011

Signature: _____

Date: _____

Pressure Vessel Internal Visual Inspection Report



Organization: Husky

Inspection Date: 23/09/2010 12:00:00AM

Plant: Foothills

Equipment ID: 66146035

Asset No: 66146035

System: 00007 Minehead 03-06-049-18W5 Compr

Operating Unit: FH-FW-013 Ansell

Background

Description:	Drum, Flare Knockout, 6' X 10', 50 Psi
Asset Type:	

Inspection

Inspector:	Bob Marchak	Company:	Husky Energy	Internal Lining/Coating:	N
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Inspection Comments

ID	Description	Condition	Location	NCR	Comments

Inspection Summary

An internal visual inspection was carried out to determine the integrity of the flare knock out drum. The FKOD was opened and steamed out for an internal inspection. The internal surfaces were not very clean, product was covering the majority of the surfaces. Scrapping and cloths were needed to inspect all the surfaces. Ultrasonic thickness inspections were carried out from the internal of the vessel as there were no UT ports cut in the insulation.

The nameplate is attached and legible with A# 528420 stamped on it.

There is no internal coating in this FKOD. The manway had isolated pitting 0.010". The shell, heads, nozzles, welds all showed no signs of corrosion, erosion or mechanical damage. The level gauge sleeve is in good condition with no erosion, corrosion or mechanical damage.

The sacrificial anode located on the bottom of the vessel is in as new condition with no signs of deterioration.

There is no PSV as the FKOD is directly open to the flare stack with no block valves in between.

The manway and cover gasket seating face showed no wire draw or corrosion.

The overall condition of the flare knock out drum is good.

The external inspection interval is to be set at 5 years as per ABSA AB-506 grade 2.

The internal inspection interval is to be set at 5 years as per ABSA AB-506 grade 2.

Pressure Vessel Internal Visual Inspection Report

Inspection Planning

Date of Inspection: 09/23/2010 Date of last Inspection: _____ Date of Next Inspection: 09/2015

The signature below certify that the above is a true report of the inspection / test of the equipment specified and consider fit for service until the date of next inspection.

Competent Inspector: _____

Report Generation Date: _____

Jan. 7/2011

Reviewed and Accepted by:

Next Inspection Date: 09/2015

Approved by:

Signature: _____

Date: _____

Jan. 7/2011

Signature: _____

Date: _____

NDE Report Pressure Vessel



Organization: Husky

Plant: Foothills

EquipmentID: 66146035

System ID: 00007 Minehead 03-06-049-18W5 Compressor Stn.

Unit Name: FH-FW-013 Ansell

Background

Description:	Drum, Flare Knockout, 6` X 10`, 50 Psi
Asset Type:	Pressure Vessel

Summary

Component Type	Short Term Avg. Corrosion Rate	Long Term Avg. Corrosion Rate	Remaining Life
Vessel	0	0	

NDE

Inspection Location	Location Description	Component Type	Status	Nominal Thickness	Minimum Thickness	Initial Reading	Initial Date	Previous Rdg	Previous Date	Current Reading	Current Date	ST CR	LT CR	Remain Life
005	Head Btm South	Vessel	Active	7.95	3.20	7.95	01/01/2005	7.95	01/01/2005	8.31	23/09/2010	-0.0628	-0.0628	
010	Shell Mid South	Vessel	Active	9.53	3.20	9.53	01/01/2005	9.53	01/01/2005	9.7	23/09/2010	-0.0297	-0.0297	
015	Shell Btm Center	Vessel	Active	9.53	3.20	9.53	01/01/2005	9.53	01/01/2005	9.58	23/09/2010	-0.0087	-0.0087	
020	Shell Mid North	Vessel	Active	9.53	3.20	9.53	01/01/2005	9.53	01/01/2005	9.83	23/09/2010	-0.0524	-0.0524	
025	Head Btm North	Vessel	Active	7.95	3.20	7.95	01/01/2005	7.95	01/01/2005	8.36	23/09/2010	-0.0716	-0.0716	

**NDE Report
Pressure Vessel**

Inspection Planning

Date of Inspection: 09/23/2010 Date of last Inspection: _____ Date of Next Inspection: 09/2015

The signature below certify that the above is a true report of the inspection / test of the equipment specified and consider fit for service until the date of next inspection.

Competent Inspector:  Report Generation Date: Jan. 7/2011

Reviewed and Accepted by:

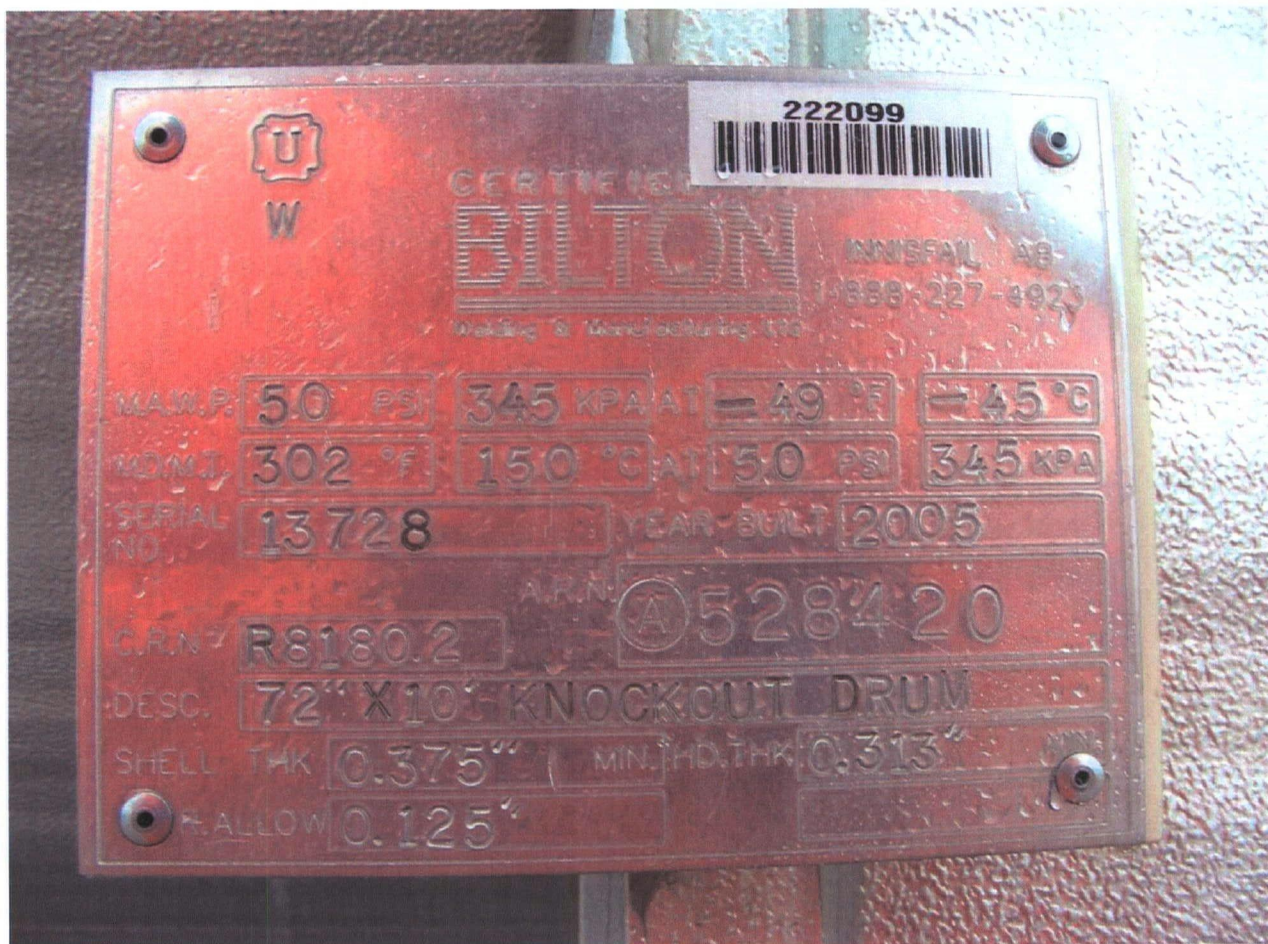
Next Inspection Date: 09/2015

Approved by:

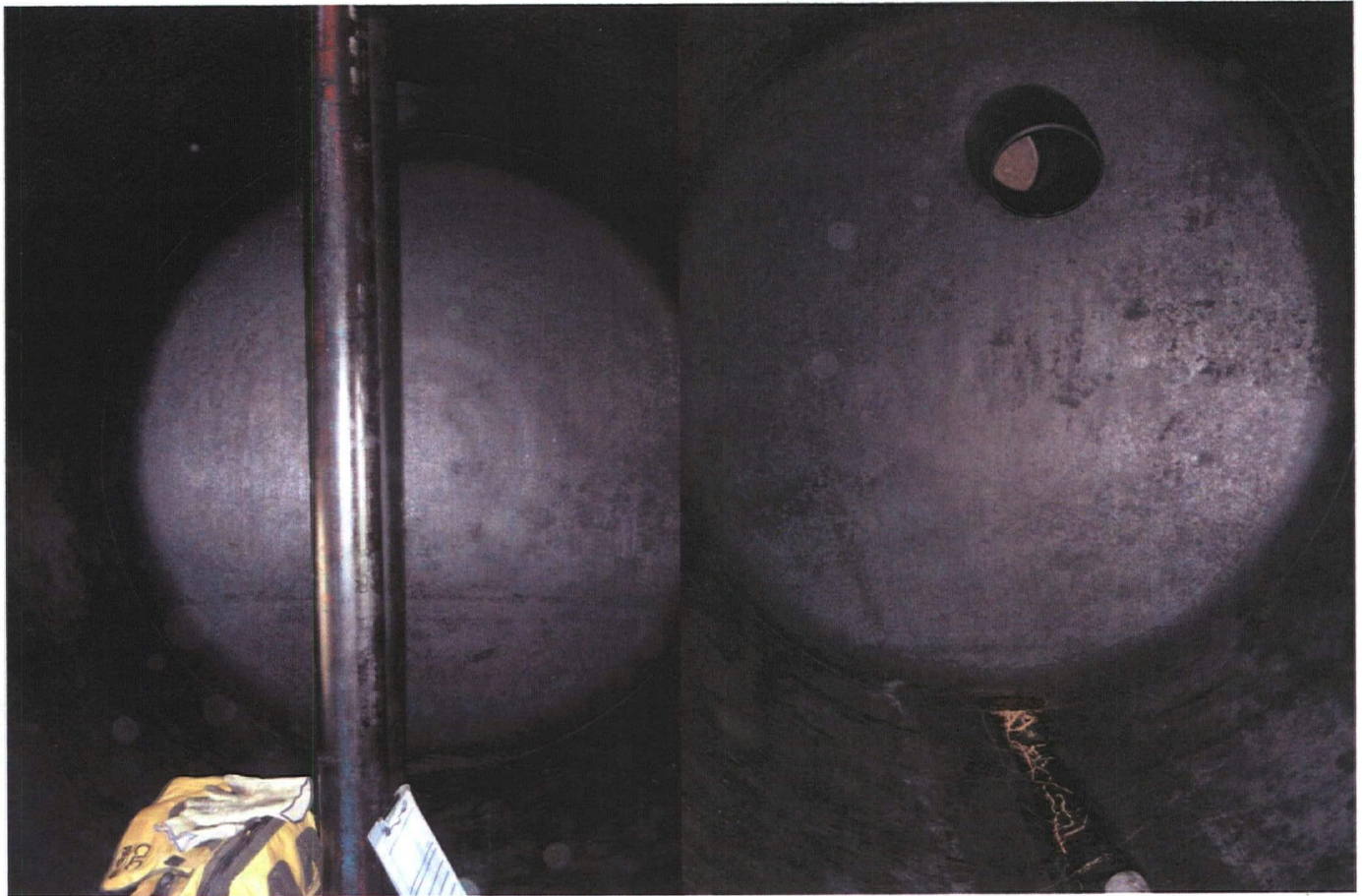
Signature:  Date: Jan. 7/2011

Signature: _____ Date: _____

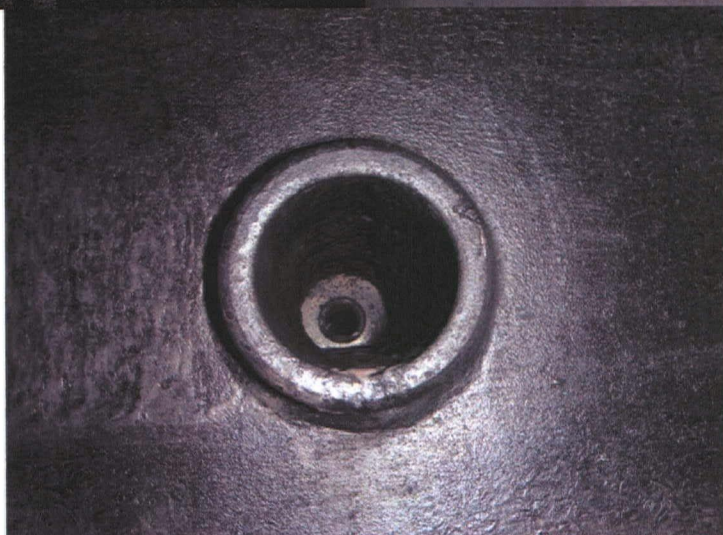
**A# 528420, Flare Knockout Drum
03-06-049-18W5M Minehead CS**



A# 528420, Flare Knockout Drum
03-06-049-18W5M Minehead CS



**A# 528420, Flare Knockout Drum
03-06-049-18W5M Minehead CS**



Pressure Vessel External Visual Inspection Report



Organization: Husky

Inspection Date: 10/06/2010 12:00:00AM

Plant: Foothills

Equipment ID: 66146035

Asset No: 66146035

System: 00007 Minehead 03-06-049-18W5 Compressor Stn.

Operating Unit: FH-FW-013 Ansell

Background

Description:	Drum, Flare Knockout, 6' X 10', 50 Psi
Asset Type:	

Inspection

Inspector:	Bob Marchak	Company:	Husky Energy	Insulated:	Y
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External Location Categories

Barrier Penetrations:	0	Damaged Insulation:	0	Vessel Supports:	2	Insulation Rings:	0
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Inspection Comments

ID	Description	Condition	Location	NCR	Comments

Inspection Summary

An external visual inspection was carried out to determine the integrity of the flare knock out drum. The nameplate is attached and legible with A# 528420 stamped on it. The flare knock out drum is fully insulated and the insulation is in good condition with no open seams or tears noted. The piping, bolting and attachments are all in good condition with no concerns noted. The vessel does not have a PSV as it is directly vented to the flare stack with no block valves between the knock out drum and the stack. The groundwire is securely attached. The overall condition of the flare knock out drum is good and it is acceptable for continued service.

An internal inspection is planned for the fall of 2010.

The external inspection interval is to be set at 5 years.

The internal inspection interval is 5 years and is due for inspection in 2010.

Pressure Vessel External Visual Inspection Report

Inspection Planning

Date of Inspection: Jun. 10/2010 Date of last Inspection: _____ Date of Next Inspection: 06/2015

The signature below certify that the above is a true report of the inspection / test of the equipment specified and consider fit for service until the date of next inspection.

Competent Inspector:  Report Generation Date: 7-23-2010

Reviewed and Accepted by:

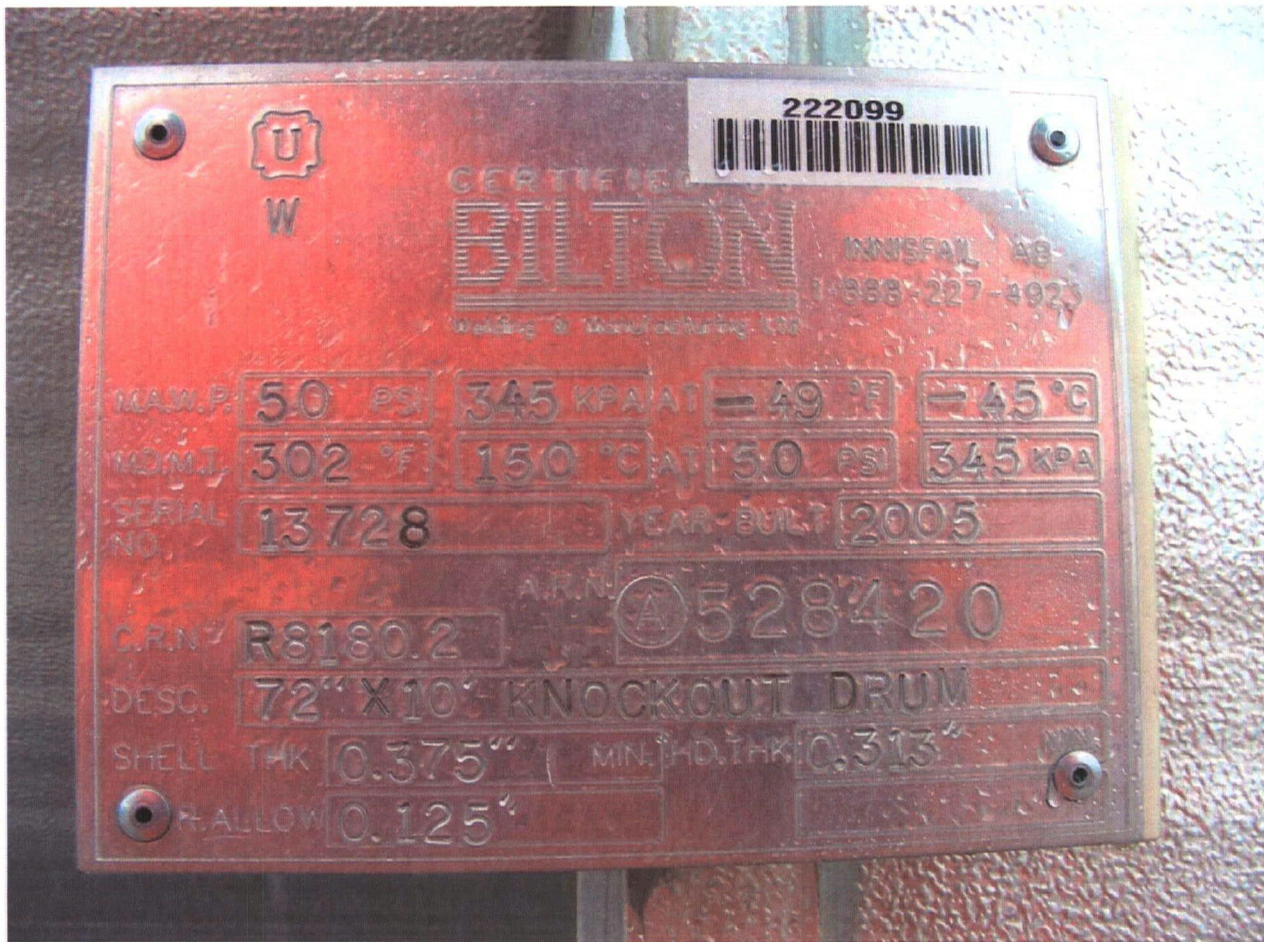
Next Inspection Date: 06/2015

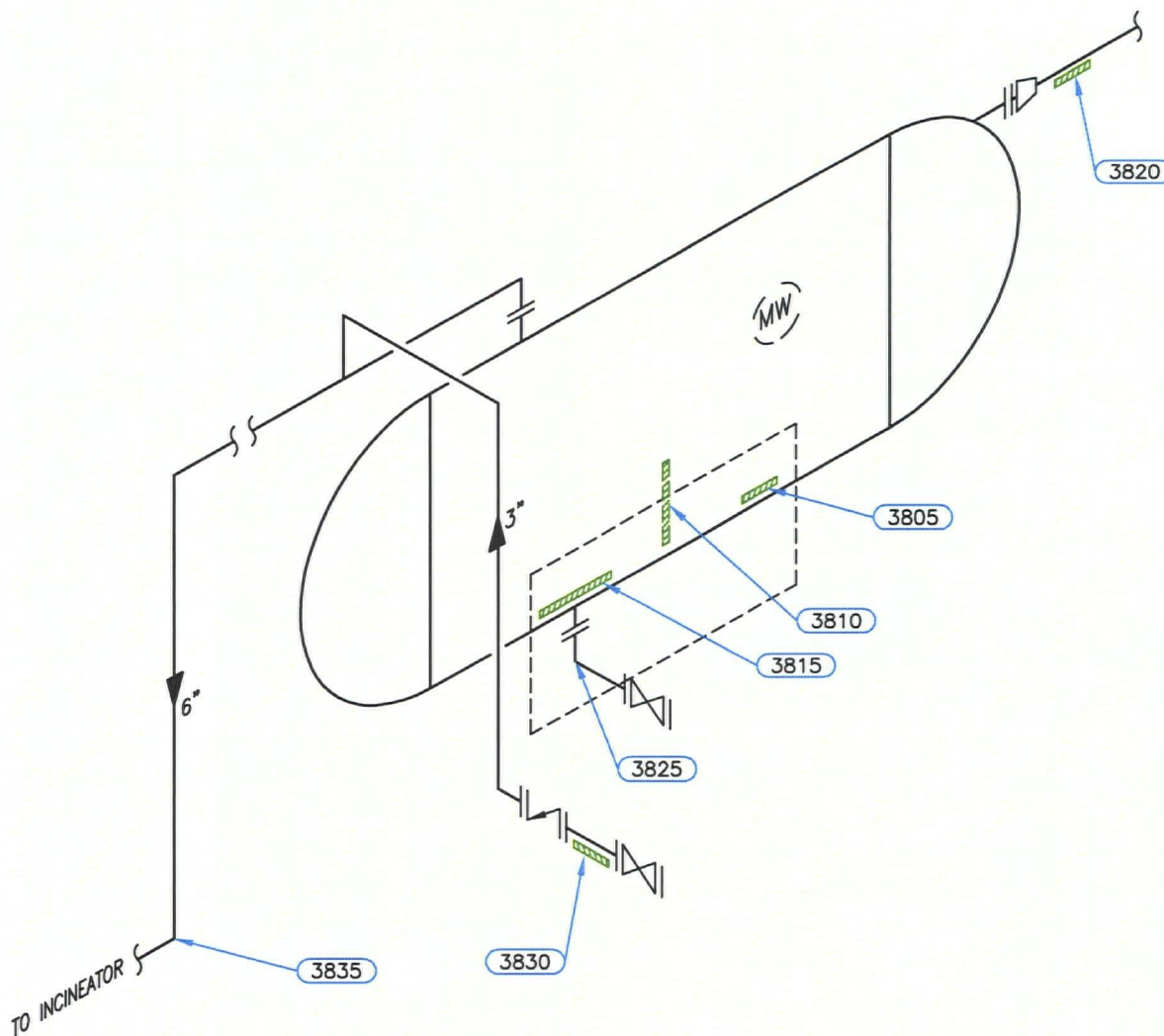
Approved by:

Signature:  Date: 7-23-2010

Signature: _____ Date: _____

**A# 528420, Flare Knockout Drum
03-06-049-18W5M Minehead CS**





Equip. No. N\S Prov. Reg. No. Ⓐ 528420 C.R.N. R8180.2 Serial No. 13728 Yr. Inst. N\S
Code/Div. ASME VIII, Div.1 Size: 72"x10' Manufacturer: BILTON Yr. Blt. 2005
C. Stamp: U Service: SWEET PWHT: NO Radiography: NO Insulated: YES

Design & Materials Data

HEAD:
Top Mat'l. N\S Top Nom. 7.9mm Top C.A. 3.2mm
Btm. Mat'l. _____ Btm. Nom. _____ Btm. C.A. _____
SHELL:
Material: N\S Nominal: 9.5mm C.A. 3.2mm
BOOT/CHANNEL:
Head Mat'l. _____ Head Nom. _____ Head C.A. _____
Shell Mat'l. _____ Shell Nom. _____ Shell C.A. _____
PIPE:
Material: _____ Nominal: _____ C.A. _____
MAWP Shell Side: 345 kPa @ Temp. 150°C
MAWP Tube Side: _____ @ Temp. _____

CLIENT

PETRO CANADA OIL AND GAS

FACILITY

HANLAN - ROBB

UNIT 50 MINEHEAD

LSD 03-06-49-18 W5M

ITEM

FLARE KNOCK-OUT DRUM

BY: EG

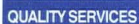
DATE: 07/2005

ACAD File:

83

DWG.#

83



CLIENT: PETRO-CANADA OIL AND GAS
EQUIPMENT: FLARE KNOCKOUT DRUM
INSTRUMENT ID#:
PROV REG: A 528420
USED ON STREAM

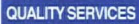
SERVICE: SWEET

LOCATION: 03-06-49-18 W5M

RTD JOB #: 2121176

REFER TO DRAWING: 83

Test Point	THICKNESS DATA				Flag	Crit	C.A.	Nom.	Short Term	Long Term	Ave. mm/py	Flag Date
8305												
Description:	BTM SOUTH SHELL											
	2005	7										
Min. Thick.	9.8			6.3	6.3	3.2	9.5				L	
Average:	9.9							0	0		L	
Analysis:												
8310												
Description:	LOWER SIDE SHELL											
	2005	7										
Min. Thick.	9.8			6.3	6.3	3.2	9.5				L	
Average:	9.9							0	0		L	
Analysis:												
8315												
Description:	BTM NORTH SHELL											
	2005	7										
Min. Thick.	9.6			6.3	6.3	3.2	9.5				L	
Average:	9.8							0	0		L	
Analysis:												



CLIENT: PETRO-CANADA OIL AND GAS
EQUIPMENT: FLARE KNOCKOUT DRUM PIPING
INSTRUMENT ID#:
PROV REG:

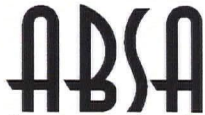
SERVICE: SWEET

RTD JOB #: 2121176

REFER TO DRAWING: 83

TESTED ON STREAM

Test Point	THICKNESS DATA					Flag	Crit	C.A.	Nom.	Short Term	Long Term	Ave. mm/py	Flag Date
8320													
Description: 6" BTM BAND													
2005 7													
Min. Thick.	6.7					2.5	2.5	4.6	7.1				L
Average:	6.9									0	0		L
Analysis:													
8325													
Description: 3" 90° ELBOW													
2005 7													
Min. Thick.	7.3					2.5	2.5	5.1	7.6				L
Average:	7.7									0	0		L
Analysis:													
8330													
Description: 3" BTM BAND													
2005 7													
Min. Thick.	5.2					2.5	2.5	4.6	7.1				L
Average:	5.3									0	0		L
Analysis:													
8335													
Description: 2" 90° ELBOW													
2005 7													
Min. Thick.	6.5					2.5	2.5	4.6	7.1				L
Average:	6.7									0	0		L
Analysis:													



the pressure equipment safety authority

03-06

V-400

A0528420

66146035

Please submit to:

9410 - 20th Avenue

Edmonton, AB T6N 0A4

Tel (780) 437-9100 Fax (780) 437-7787

AB-10 2008-04

BOILER AND PRESSURE VESSEL STATUS REPORT

Note: This form may be used to provide notification of changes in ownership, location, operating status or scrapping of boilers and pressure vessels.

Please review the responsibilities of the vendor and the new owner under Section 36 of the Pressure Equipment Safety Regulation.

Re: Vessel (A) 1) see attach 2) 3)
Serial No. _____
CRN _____

☒ Vessel(s) **sold or purchased**. Please transfer the registration of the vessel(s) to:

Name of New Owner: Husky Oil Operation Ltd

Mailing Address: _____

New Location of Vessel: _____

(Street Address or LSD)

Contact Person: _____

Tel: _____

Date of Sale: June 6, 2008

PO No.: _____

☐ Vessel(s) removed from service¹ on _____

☐ Vessel(s) relocated _____

(Street Address or LSD)

☐ We own but do not know the location of this vessel. (our records will indicate the vessel location is unknown, the applicable annual fee is charged unless you tell us it is not in service).

☐ We are not operating this vessel, we sold it but do not know to whom. (Your name will remain as owner in our records).

☐ Vessel(s) operating outside of the Province of Alberta since _____ (Date).
Please remove from annual registration¹.

☐ The above vessel(s) returned to service on: _____ (Date).

Inspected on: _____ (Date). Inspection Report attached ☐

☐ The above vessel(s) **are unfit for service** and were destroyed and/or disposed of as scrap material on: _____ (Date).

The Alberta Identification (A) Number has been obliterated.

NOTE: Scrapped and Destroyed vessels **Shall Not** return to service.

Company Name: PetroCanada Oil and Gas Limited

Position Title: Asset Integrity Supervisor

Tel: 403 296 6363

(Please print name): Philip Girard

E-mail: pgirard@petro-canada.ca

Signature: _____

Date: July 29, 2008

Note ¹: The owner of the boiler or pressure vessel is responsible for ensuring that the above equipment is inspected by ABSA prior to it being returned to service in the Province of Alberta

520291	IPS MANUFACTURING	V-3024-001B	01-23-049-19W5	T0211.2	VS	3 PHASE VERTICAL SEPARATOR
528016	IPS MANUFACTURING	V-3304-001E	07-31-048-18W5	T0211.2	VS	3 PHASE VERTICAL SEPARATOR
495600	PRESSON	B6940-50	03-06-049-18W5	E9867.2, E9865.	FL	14-06 WELLSITE HEATER
506454	2003 PRESSON	B6994-20	03-06-049-18W5	R3254.2	VS	VERTICAL SOUR GAS SEPARATOR
520757	ENERFLEX MANUFACTURING	050021-06	03-06-049-18W5	P6185.213	VB	2ND STAGE DISCHARGE BOTTLE
520758	ENERFLEX MANUFACTURING	050021-05	03-06-049-18W5	L6206.213	VB	2ND STAGE SUCTION BOTTLE
520759	ENERFLEX MANUFACTURING	050021-03	03-06-049-18W5	L6204.213	VB	1ST STAGE SUCTION BOTTLE
520788	ENERFLEX MANUFACTURING	050021-04	03-06-049-18W5	T1493.213	VB	1ST STAGE DISCHARGE BOTTLE
523529	ENERFLEX MANUFACTURING	050021-02	03-06-049-18W5	P6183.213	VS	2ND STAGE SUCTION SCRUBBER
523541	ENERFLEX MANUFACTURING	050021-01	03-06-049-18W5	P6182.213	VS	1ST STAGE SUCTION SCRUBBER
526475	RUSHTON	C2391A.H.S	03-06-049-18W5	T1583.2	VS	HORIZONTAL SEPARATOR
526476	RUSHTON	C2391.A.HB	03-06-049-18W5	T1656.2	VS	BLOWCASE
526623	ENERFLEX MANUFACTURING	040819-04	03-06-049-18W5	K-6363.213	VS	COMPRESSOR FUEL GAS FILTER
526699	AIR-X-CHANGERS	045289.3	03-06-049-18W5	R7618.213	HA	COMPRESSOR INTERCOOLER
526700	AIR-X-CHANGERS	045289.4	03-06-049-18W5	R7619.213	HA	COMPRESSOR AFTERCOOLER
528420	V-410 BILTON WELDING & MANUFACTURING LTD	13728	03-06-049-18W5	R8180.2	VS	FLARE KNOVK OUT DRUM
495593	PRESSON	B6940-20	03-07-049-18W5	R3254.2	VS	VERTICAL SOUR GAS SEPARATOR
497953	PRESSON	B7047-20	03-07-049-18W5	R4547.2	VS	WATER BOOT
506462	PRESSON	B 6994-50	03-07-049-18W5	E9865.213	FL	05-07 WELLSITE HEATER
509893	MARQUINN INDUSTRIES	135-10-04	03-07-049-18W5	R4156.2	VF	#2 PRODUCED WATER FILTER
509894	MARQUINN INDUSTRIES	135-11-04	03-07-049-18W5	R4156.2	VF	#1 PRODUCED WATER FILTER
527837	IPS MANUFACTURING	V-3151-001C	05-14-049-19W5	R4582.231	VS	3 PHASE VERTICAL SEPARATOR
577647	MARQUINN	148-87-07	06-16-048-18W5	P3289.213	VS	3 PHASE SEPARATOR
528042	IPS MANUFACTURING	V-3304-001B	06-01-049-19W5	T0211.2	VS	3 PHASE VERTICAL SEPARATOR
536245	IPS MANUFACTURING	V-4043-001	06-18-049-18W5	T0211.2	VS	3 PHASE VERTICAL SEPARATOR
527994	IPS MANUFACTURING	V-3193-001E	06-29-048-18W5	T0211.2	VS	3 PHASE VERTICAL SEPARATOR
527944	IPS MANUFACTURING	V-3193-001C	07-21-048-18W5	T0211.2	VS	3 PHASE VERTICAL SEPARATOR
497985	PRESSON	B7054-20	07-32-048-18W5	R3254.2	VS	VERTICAL SOUR GAS SEPARATOR
497987	PRESSON	B7054-50	07-32-048-18W5		FL	11-32 WELLSITE HEATER
502846	PRESSON	K3012-21	07-32-048-18W5	R4763.2C	VS	VERTICAL SEPARATOR
495735	MARQUINN INDUSTRIES	133-24-03	08-13-049-19W5	R4156.2	VF	#2 PRODUCED WATER FILTER
495736	MARQUINN INDUSTRIES	133-25-03	08-13-049-19W5	R4156.2	VF	#1 PRODUCED WATER FILTER
495768	PRESSON	B6977-20	08-13-049-19W5	R3254.2	VS	VERTICAL SOUR GAS SEPARATOR
502821	PRESSON	B6982-20	08-13-049-19W5	E4547.2	VS	PRODUCED WATER FLASH VESSEL
502824	PRESSON	B6977-50	08-13-049-19W5	E9867.213, E986	FL	01-13 WELLSITE HEATER
516664	MARQUINN INDUSTRIES	138-02-04	08-13-049-19W5	R9125.213	VS	Sour Horizontal Inlet Separator (Rental)
518339	ENERFLEX MANUFACTURING	040634-01	08-13-049-19W5	P8054.213	VS	COMPRESSOR SUCTION SCRUBBER
520710	AIR-X-CHANGERS	045585.3	08-13-049-19W5	R8538.213	HA	COMPRESSOR INTERCOOLER
520711	AIR-X-CHANGERS	045585.4	08-13-049-19W5	T0393.213	HA	COMPRESSOR AFTERCOOLER
521072	ENERFLEX MANUFACTURING	040820-01	08-13-049-19W5	L2030.213	VS	COMPRESSOR FUEL GAS SCRUBBER
522612	SUNWELL INDUSTRIES	04-393	08-13-049-19W5	R8991.213	VS	MINI-BLOWCASE
522799	SUNWELL INDUSTRIES	05-006	08-13-049-19W5	T0932.2	VS	BLOWCASE
523479	ENERFLEX MANUFACTURING	040844-02	08-13-049-19W5	T0674.213	VB	1ST STAGE SUCTION BOTTLE
523480	ENERFLEX MANUFACTURING	040844-03	08-13-049-19W5	T0675.213	VB	1ST STAGE DISCHARGE BOTTLE
526681	ENERFLEX MANUFACTURING	040844-01	08-13-049-19W5	R9967.213	VS	SLUG CATCHER
550849	IPS MANUFACTURING	V4631-001	08-36-048-19W5	T5094.2	VS	3 PHASE VERTICAL SEPARATOR
527954	IPS MANUFACTURING	V-3193-001A	10-18-048-18W5	T0211.2	VS	3 PHASE VERTICAL SEPARATOR
536195	IPS MANUFACTURING	V-4042-001	10-26-049-19W5	T0211.2	VS	3 PHASE VERTICAL SEPARATOR
549492	RJV	2006	11-01-049-18W5	P7217.2	VS	3 PHASE VERTICAL SEPARATOR
527830	IPS MANUFACTURING	V-3151-001C	11-11-049-19W5	R4582.231	VS	3 PHASE VERTICAL SEPARATOR
547686	IPS MANUFACTURING	V-4664-001	11-12-049-19W5	R6694.213	VS	3 PHASE VERTICAL SEPARATOR
525094	NUSCO	9930-200	11-16-048-18W5	R2959.213	VS	3 PHASE VERTICAL SEPARATOR
527961	IPS MANUFACTURING	V-3193-001D	11-16-048-18W5	T0211.2	VS	3 PHASE VERTICAL SEPARATOR
550869	IPS MANUFACTURING	V-4688-001	14-30-048-18W5	R6694.213	VS	3 PHASE VERTICAL SEPARATOR
536246	IPS MANUFACTURING	V-4044-001	14-35-049-19W5	T0211.2	VS	3 PHASE VERTICAL SEPARATOR



INSPECTION REPORT

EQUIPMENT NO: 750 VS 306 E

FACILITY: Haulan Robb

PROV. REG. NO: A 528420

EQUIPMENT NAME: Flare X.O. Drum

TAG NO: 50-0306-V-410

SHELL

MAWP _____ kpag@ _____ °C

MDMT _____ kpag@ _____ °C

PSV Tag _____ set@ _____

TUBE

_____ kpag@ _____ °C

_____ kpag@ _____ °C

_____ kpag _____ set@ _____ kpag

ITEM INSPECTED: _____

MANWAY ☐ YES ☐ NOSERVICE: ☐ SOUR ☒ SWEET ☐ CRYOGENIC

FLUID: _____

SCOPE OF INSPECTION

☒ PRECOMMISSIONING☐ INITIAL☐ REINSPECTION

TYPE OF INSPECTION:

☐ AE ☐ MT ☐ RT☐ ET ☐ MFL ☐ UT☐ LT ☐ PT ☒ VT☐ OTHER

CLEANING:

☐ GOOD☐ FAIR☐ INADEQUATE

ACCESS:

☐ FULL☐ PARTIAL☒ EXTERNAL

ADD PAGES AND SKETCHES AS NEEDED (TURN OVER FOR CHECK LISTS)

OBSERVATIONS:

☒ EXTERNAL☐ INTERNAL

No defects

RECOMMENDATIONS:

SUITABLE FOR

FURTHER SERVICE:

☒ YES☐ NO

REMEDIAL ACTION

PRIORITY:

☐ HIGH☐ MEDIUM☐ LOW

INSPECTION PERFORMED BY:

DATE OF INSPECTION

May 13/05

FOLLOW-UP INSPECTION REQUIRED:

☐ YES☐ NO

BY DATE:



INSPECTION REPORT

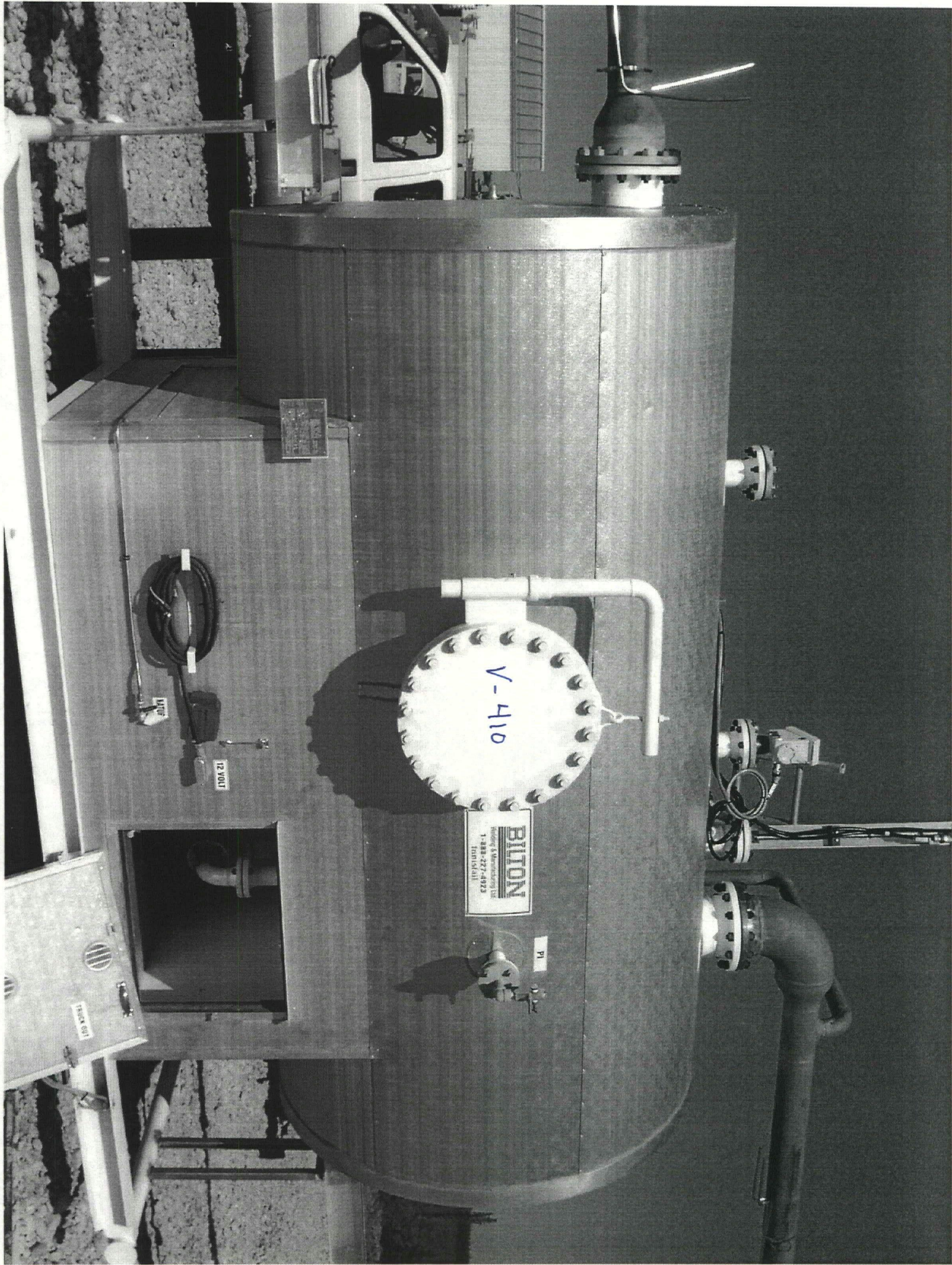
EQUIPMENT NO:

External Inspection Check List

Item	N/A	OK	Comments
1. Ladders, platforms	✓	✓	
2. Foundation and supports		✓	
3. Dyke	✓		
4. Double floor/wall, interstitial space	✓		
5. Nozzles		✓	
6. Ground connections		✓	
7. Protective coatings and insulation		✓	
8. External metal surfaces		✓	
9. Pressure relief devices	✓		
10. Name plate		✓	
11. Leak test	✓		
12. Cathodic protection	✓		
13.			
14.			
15.			

Internal Inspection Check List

Item	N/A	OK	Comments
1. Safe vessel entry secured	✓		
2. Cleaning adequate for VT	✓		
3. Fouling before cleaning including tubes	✓		
4. Internal equipment checked (trays/baffles/etc)	✓		
5. Condition of internal surfaces	✓		
6. Protecting coating	✓		
7. Welds checked for defects	✓		
8. Tubes: ends/ligaments/joints/walls/fins	✓		
9. Tubes: thinning/pitting (internal/external)	✓		
10. Nozzles	✓		
11. Burner	✓		
12. Refractory	✓		
13. Damage marked for further inspection/nde	✓		
14. Cleaning for nde adequate	✓		
15. Nde completed	✓		
16. Condition of anodes	✓		
17. Leak test	✓		
18.	✓		
19.	✓		
20.	✓		



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Welding & Manufacturing Ltd

INNISFAIL AB
1-888-227-4923

MAW.P. 50 PSI 345 KPA AT -49 °F -45 °C

MD.M.T. 302 °F 150 °C AT 50 PSI 345 KPA

SERIAL NO 13728 YEAR BUILT 2005

C.R.N. R8180.2 A.R.N. A528420

DESC. 72" X 10' KNOCKOUT DRUM

SHELL THK 0.375" MIN. HD. THK 0.313" MIN.

R.ALLOW 0.125"

GENERAL NOTES

1. QUALITY CONTROL PROGRAM NUMBER: AQP-1317(S)
2. WELDING PROCEDURE REGISTRATION NUMBER: WP1970.2
3. SHELL AND HEAD MATERIAL: SA-516-70N
4. FLANGE MATERIAL: SA-105-N
5. PIPE MATERIAL: SA-106-B
6. PLATE MATERIAL: SA-516-70N/SA-36
7. BOLTING MATERIAL: SA-193-B7/SA-194-2H
INTERNAL SANDBLAST: SSPC-SP10 (NEAR WHITE)
INTERNALLY COAT: DEVCO 253 AS PER MANUFACTURER'S SPECIFICATION
3-5mils ON FLANGE FACES
10. EXTERNAL SANDBLAST: SSPC-SP3 (POWER TOOL)
11. EXTERNAL COATING: ONE COAT OF CARBOLINE 890 (MOUNTAIN LEDGE WHITE #1898)
12. INSULATION: 1 1/2" THK ALUMINUM CLAD RIGID URETHANE
13. ALL BOLT HOLES TO STRADDLE CENTERLINE
14. ALL OPENINGS TO BE COVERED PRIOR TO SHIPPING
15. ALL OUTSIDE PROJECTIONS ARE TO BE MEASURED ALONG THE CENTERLINE
OF THE NOZZLE
16. FABRICATION TOLERANCE AS PER BILTON WELDING DRAWING NUMBER TOL2002
17. IMPACT TEST EXEMPTIONS:
PLATE: EXEMPT AS PER FIG UCS-66
NOZZLES: EXEMPT AS PER UCS-66(b)
18. PRODUCTION IMPACT TESTS OF HAZ EXEMPT PER UCS-67(d)(3)
PRODUCTION IMPACT TEST OF FILLER METAL REQUIRED AS PER UG-84(i)
TO EXCEED 15-12 FT-LBS • TEMP. NOT WARMER THAN -49°F
19. ANODE TO BE ATTACHED WITH DOUBLE NUTS
-STAINLESS TAB TO BE IN BETWEEN NUTS
20. SERIAL NUMBER: 13728
21. VESSEL TO BE REGISTERED IN ALBERTA
22. VESSEL TO BE SUPPLIED WITH U-STAMP
23. SHIPPING DIMENSIONS: 9'-0" W x 11'-0" H x 24'-6" LG

NOZZLE SCHEDULE

MARK	NO. REQ'D	DESCRIPTION	SIZE	ANSI	TYPE	PROJECTION		WELD DETAIL	WELD				REPAD	BILL OF MATERIALS ITEM NUMBER
						INSIDE	OUTSIDE		A	B	C	D		
N1	1	INLET	10"	150#	RFWN	1"	12"	1,3	1/4	-	-	-	-	9,10,11
N2	1	OUTLET	10"	150#	RFWN	1"	8"	1,3	1/4	-	-	-	-	9,12
N3	1	LG/LSH/LSHH	4"	150#	RFWN	SHOWN	8"	1,3	1/4	-	-	-	-	13,14,15,16,17,31,32,55
N4	1	LIT	4"	150#	RFWN	SHOWN	8"	1,3	1/4	-	-	-	-	13,14
N5	1	SPARE	4"	150#	RFWN	1"	8"	1,3	1/4	-	-	-	-	13,19
N6	1	PI	2"	150#	RFWN	1"	8"	1,3	1/4	-	-	-	-	20,21
N7	1	TRUCKOUT	3"	150#	RFWN	FLUSH	6"	1,4	1/4	-	-	-	-	22,23,24,25,26,27,28,29,30,31,32
C1	1	SUCKOUT	1/2"	3000#	TOL	-	-	-	1/4	-	-	-	-	33,34,35,36,37,38
M1	1	MANWAY	20"	150#	RFSO	1"	8"	2,3	1/4	-	-	-	-	39,40,41,42,43,44,45

BILL OF MATERIALS

ITEM	REQ'D	PART	DESCRIPTION	MATERIAL	WEIGHT
1	1	SHELL	3/8" THK x 120" W ROLL TO 72" ID x 228 1/2" LG	SA-516-70N	2900#
2	2	HEAD	3/8" THK (0.3130" MIN) x 72" ID F&D (CR=66" & KR=5")	SA-516-70N	1100#
3	2	SADDLE	8" x 1/4" THK FLATBAR ROLL TO 72 3/4" ID x 84 3/8" LG	SA-36	80#
4	4	SADDLE	6" x 3/8" FLATBAR x 3'-6 1/8" LG	SA-36	40#
5	2	SADDLE	3/8" THK x 42 1/8" W x 63 1/4" LG (SEE DETAIL)	SA-36	140#
6	1	NAMEPLATE	6" x 8" NAMEPLATE BRACKET	SA-36	3#
7	1	HEATER	12" x 12" CATADYNE HEATER, 12 VOLT NATURAL GAS	-	-
8	1	SKID	SKID (SEE DWG B392-2 FOR DETAIL)	-	1200#
9	2	N1,N2	10" x 150# RFWN FLG SCH STD	SA-105-N	-
10	1	N1	10" PIPE SCH STD x 11 1/2" LG (BBE)	SA-106-B	-
11	1	N1	10" x 45" LR BW ELBOW SCH STD	SA-234-WPB	-
12	1	N2	10" PIPE SCH STD x 5 3/4" LG (BOE,ROE)	SA-106-B	-
13	3	N3,N4,N5	4" x 150# RFWN FLG SCH XH	SA-105-N	-
14	2	N3,N4	4" PIPE SCH XH x 6'-2 3/8" LG c/w HOLES (BOE,ROE)	SA-106-B	-
15	1	N3	4" x 150# RF BLIND FLG TAPPED TO 1"	SA-105-N	-
16	1	N3	4" x 150# RF FLEX GASKET	304SS	-
17	1	N3	TGS-5020 LIQUID LEVEL GAUGE (SOUR)	-	-
19	1	N5	4" PIPE SCH XH x 6 1/2" LG (BOE,ROE)	SA-106-B	-
20	1	N6	2" x 150# RFWN FLG SCH 160	SA-105-N	-
21	1	N6	2" PIPE SCH 160 x 6 7/8" LG (BOE,ROE)	SA-106-B	-
22	3	N7	3" x 150# RFWN FLG SCH XH	SA-105-N	-
23	1	N7	3" x 150# RFTO FLG	SA-105-N	8#
24	1	N7	3" x 150# RF RP BALL VALVE	SA-105-N	-
25	3	N7	3" x 150# RF FLEX GASKET	304SS	-
26	1	N7	3" x 90" LR BW ELBOW SCH XH	SA-234-WPB	-
27	1	N7	3" PIPE SCH XH x 3 3/4" LG (BOE,COE)	SA-106-B	-
28	1	N7	3" PIPE SCH XH x 6" LG (BBE)	SA-106-B	-
29	1	N7	3" x 4" LG NIPPLE SCH XH	SA-106-B	5#
30	1	N7	3" MALE/FEMALE CAMLOCK c/w CAP	-	-
31	20	N3,N7	5/8" DIA x 3 1/2" LG STUD	SA-193-B7	-
32	40	N3,N7	5/8" DIA NUT	SA-194-2H	-
33	1	C1	1/2" x 3000# TOL	SA-105-N	1#
34	2	C1	1/2" x CLOSE NIPPLE	SA-106-B	1#
35	1	C1	1/2" x 2000# 90° THRD ELBOW	SA-105-N	1#
36	1	C1	1/2" PIPE SCH XH x 7 1/2" LG (TOE,COE)	SA-106-B	1#
37	1	C1	1/2" x 2000# S.E. NACE BARSTOCK BALL VALVE	SA-105-N	-
38	1	C1	12 GAUGE 36" x 24" x 3" LIP CONTAINMENT TRAY	-	48#
39	1	M1	20" x 150# RFSO FLG	SA-105-N	-
40	1	M1	20" x 150# RF BLIND FLG	SA-105-N	-
41	1	M1	20" x 150# RF FLEX GASKET	304SS	-
42	1	M1	20" PIPE SCH STD x 10 1/4" LG (COE,ROE)	SA-106-B	-
43	1	M1	20" DAVIT ARM	-	-
44	20	M1	1 1/8" DIA x 6 1/4" LG STUD	SA-193-B7	-
45	40	M1	1 1/8" DIA NUT	SA-194-2H	-
46	5	INSULATION	1 1/2" x 45" x 13'-6" LG RIGID URETH. CORR & STUCCO EMBOSS ALUM ONE SIDE (CURFS)	-	-
47	3	INSULATION	1 1/2" x 45" x 8'-6" LG RIGID URETH. CORR & STUCCO EMBOSS ALUM BOTH SIDES	-	-
48	2	INSULATION	1 1/2" x 45" x 12'-6" LG RIGID URETH. CORR & STUCCO EMBOSS ALUM ONE SIDE	-	-
49	60 FT	INSULATION	SEA "L" FLASHING	-	-
50	400	INSULATION	SCREWS - #8 - 1/2" STAINLESS STEEL	-	-
51	1	ANODE	3" x 22" x 3/8" INTERNAL ANODE (SEE NOTE 19)	-	-
52	1	ANODE	3" x 1/4" x 3" LG TAB c/w HOLE	SA-240-TP316	-
53	2	N3	PROXIMITY SWITCHES (ELECTRIC)	-	-


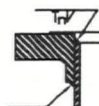





WEB PLATE DETAIL

SADDLE DETAILS

ELEVATION VIEW

ORIENTATION VIEW A-A

WELD NUMBER	REGISTERED WELDING PROCEDURE NUMBER			BACKWELD/GOUGE
	ROOT	HOT PASS	FILL & CAP	
1,2,3,4,5	BWM-015 (GMAW)	BWM-015 (SAW)	BWM-015 (SAW)	N/A
6	BWM-015 (GMAW)	BWM-008 (SAW)	BWM-008 (SAW)	N/A
7	N/A	N/A	BWM-018 (SAW)	N/A

WELD NECK FLANGE	2	SLIP ON FLANGE	3	NOZZLE NECK	4	NOZZLE NECK	5	ATTACHMENTS	6	SEAM	7	STAINLESS ATTACHMENTS
												
$\alpha=75^{\circ}(15^{\circ})$ $G=1/8^{\circ}(1/16^{\circ})$	$T=1/4$	$\alpha=40^{\circ}(15^{\circ})$ $G=1/8^{\circ}(1/16^{\circ})$ $h=1/16^{\circ}(1/16^{\circ})$	$\alpha=40^{\circ}(15^{\circ})$ $G=1/8^{\circ}(1/16^{\circ})$ $h=1/16^{\circ}(1/16^{\circ})$	$\alpha=40^{\circ}(15^{\circ})$ $G=1/8^{\circ}(1/16^{\circ})$ $h=1/16^{\circ}(1/16^{\circ})$	$\alpha=60^{\circ}(15^{\circ})$ $G=1/8^{\circ}(1/16^{\circ})$ $h=3/32$	$\alpha=60^{\circ}(15^{\circ})$ $G=1/8^{\circ}(1/16^{\circ})$ $h=3/32$						

REV. NO.	DATE	REVISION	BY	APP'D
A	03/22/05	ISSUED FOR APPROVAL	DSG	
0	03/28/05	ISSUED FOR FABRICATION	DSG	
1	03/29/05	ADDED (2) PROXIMITY SWITCHES	DSG	

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BOX 6106
5815 37 Street
INNISFAIR, AB
CANADA
403-227-7799
1-888-227-4923
FAX 227-7796

DESIGN SPECIFICATIONS

DESIGN & FABRICATE TO: 2004 EDITION ASME BOILER & PRESSURE
VESSEL CODE SEC VIII, DIV 1
DESIGN PRESSURE & TEMPERATURE: 50 PSI @ 302°F
MINIMUM DESIGN METAL TEMP: -49°F @ 50 PSI
IMPACT TESTS: SEE NOTES 17 & 18
RADIOGRAPHY: NONE AS PER UW-11(c)
POST WELD HEAT TREATMENT: NONE AS PER UCS-56
HYDROSTATIC TEST PRESSURE: 75 PSIG PREHEAT: 50°F
CORROSION ALLOWANCE: 1/8" MAWP: 50 PSI @ 302°F
HEAD THK. MIN.: 0.3130" VOLUME: 614 CuFt, 17.4 Cum
WEIGHT EMPTY: 6,800 LBS WEIGHT FULL: 45,100 LBS

PETRO CANADA

60 BBL SINGLE WALL FLARE KNOCKOUT DRUM
72" ID x 10'-0" S/S x 50 PSI MAWP
DATE: 03/21/05 SHEET: 1 OF 2
SCALE: N.T.S. JOB NO.: B392
DRAWN BY: DSG DRAWING NO.: B392-1
PURCHASE ORDER: 5128-RL-001 REV. 1
LOCATION: MINEHEAD 03-06-49-18 WSM
CRN DWG: BWM-111-04 R4
CRN NUMBER: R8180.2 APP'D:

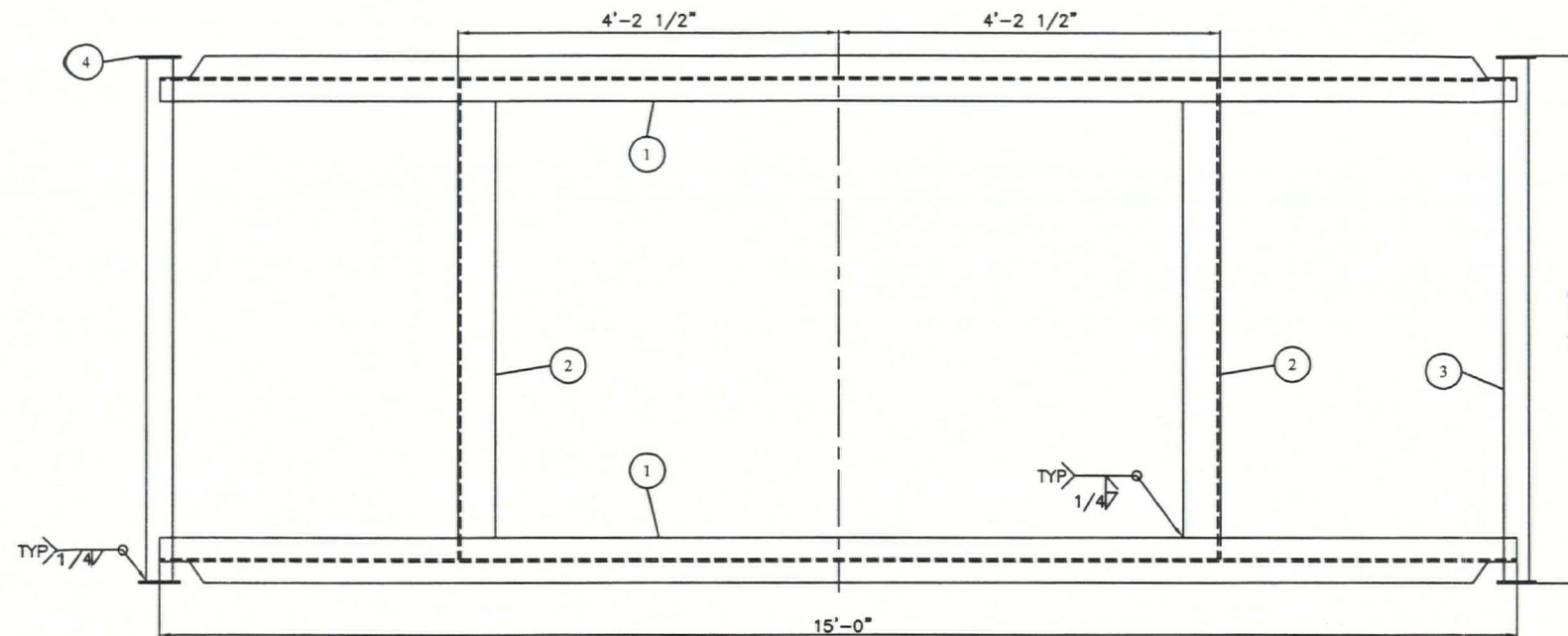
Hdms ✓

BILL OF MATERIALS

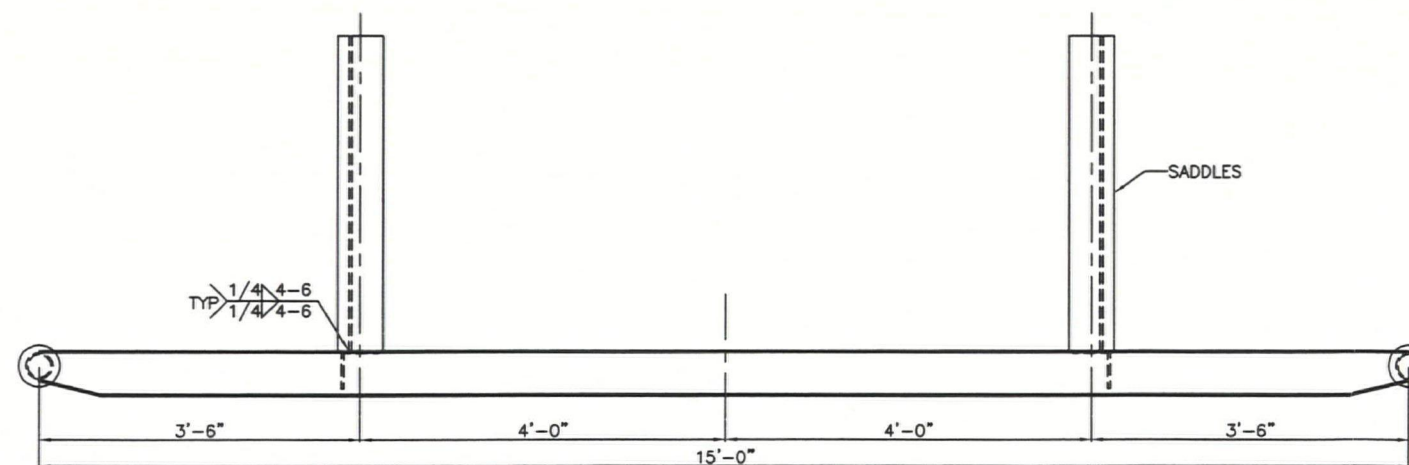
ITEM	REQ'D	PART	DESCRIPTION	MATERIAL	WEIGHT
1	2	RUNNER	W6@15# x 15'-0" LG (ROUGH CUT TO 180 1/2")	SA-36	485#
2	2	CROSSMEM	5" x 5" x 3/8" ANGLE x 5'-3 11/16" LG	SA-36	133#
3	2	PULL	3" STD PIPE x 5'-9 1/2" LG	SA-106-B	90#
4	4	PULLCAP	1/4" THK x 5 1/2" OD	SA-36	5#

GENERAL NOTES

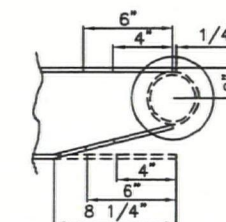
1. SANDBLAST: SSPC-SP3 (POWER TOOL)
2. PAINT: ONE COAT OF CARBOLINE 890 (MOUNTAIN LEDGE WHITE #1898)
4. ALL WELDS FULL PENETRATION, 1/4" FILLETS
5. APPROXIMATE WEIGHT: 1200 LBS



PLAN VIEW



ELEVATION VIEW



COPE DETAIL

REV. NO.	DATE	REVISION	BY	APP'D
A	03/21/05	ISSUED FOR APPROVAL	DSG	
O	03/28/05	ISSUED FOR FABRICATION	DSG	

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PETRO CANADA

60 BBL FLARE KNOCKOUT DRUM
SKID DETAILS

DATE: 03/21/05	SHEET: 2 OF 2
SCALE: N.T.S.	JOB NO.:
DRAWN BY: DSG	B392
PURCHASE ORDER: 5128-RL-001	DRAWING NO.:
LOCATION: MINEHEAD 03-06-49-18 WSM	B392-2
APP'D BY:	REV. 0