



**MACONDO  
Demobilization Project  
for  
MC252-1**

**Surface Flexible Recovery Procedure  
CDP1 and CDP2**

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## ATTACHMENTS

- Attachment 1: Reverse Lay Tables
- Attachment 2: Subsea Construction Drawings
- Attachment 3: Uraduct Protection – Installation Procedure
- Attachment 4: Bend Restrictor Installation Procedure
- Attachment 5: Upper 6-in Flexible Jumper Data Sheet
- Attachment 6: Discrete Buoyancy Module Installation Procedure
- Attachment 7: Trelleborg Friction Clamp Protection Assembly Procedure
- Attachment 8: Equipment for Permanent Storage

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## 1 Introduction

### 1.1. Project Description

The BP upper flexible jumper recovery scope of work includes the recovery of 2 off 1,060-ft 6-in ID flexible jumpers from the FSR 1 and FSR 2 Risers. The FSR 1 upper flexible Jumper was used to flow hydrocarbons from the CDP Manifold to the Helix Producer 1. The FSR 2 flexible jumper was installed onto the top of FSR 2 and kept on standby in a parked position ready for connection to the Toisa Pisces. In addition to the 2 off 1,060-ft 6-in ID flexibles, a 400-ft 4-in ID flexible currently stored on the Helix Express Main aft starboard reel will be transpoiled onto an 86 portable storage reel. The 400-ft of 4-in flexible will be spooled on top of the 1,060-ft 6-in ID FSR2 flexible jumper.

## 2 Scope of Work

This document describes the detailed procedure for the recovery of the Upper 6-in flexible jumpers from the FSR 1 & FSR 2 Upper Riser Assemblies while the FSR's are suspended in the moonpool of the West Sirius Drill Rig.

The "*Helix Express*" Pipelay and construction vessel will execute the recovery of the 6-in flexible jumpers from the FSR's and transfer the flexibles onto portable Coflexip type reels on the aft deck of the vessel.

The following is an outline of the works that will be performed under this procedure:

- Set up *Helix Express* stern to starboard side of West Sirius Drill Rig.
- ROV to release flexible from temp storage clamps attached to FSR.
- West Sirius crew to release flexible from Riser and transfer to Abandonment winch.
- ROV to connect 250-Te A&R winch to Flexible 1st end pulling head
- Transfer 1st end of flexible to Helix Express lay tower
- Remove flooding head (FSR 2 only) and fit pull head.
- Remove Uraduct, DBM's , 45-Te friction clamp and vertebrae from flexible.
- Spool flexible onto 86 / 92 storage reel
- Remove bend stiffener adaptor & kick-off spool from 2nd End fitting
- Install pulling head and secure 2nd end to storage reel.
- Transpool 400-ft of 4-in ID flexible from Starboard Main reel on top of 6-in flexible on 86 storage reel.

The flexible removal analysis are also in the appendices of this procedure.

### 3 Acronyms

Abbreviation	Definition
A/R	Abandonment and Recovery
AHC	Active Heave Compensation
BSA	Bend Stiffener Adapter
CDP	Containment and Disposal Project
DBM	Distributed Buoyancy Modules
HE	Helix Express
FPU	Floating Production Unit
FSR	Free Standing Riser
ID	Inside Diameter
JSA	Job Safety Analysis
MBR	Minimum Bend Radius
No	Number
OD	Outer Diameter
QTY	Quantity
Ref	Reference
ROV	Remotely Operated Vehicle
SI	International System Units
Stbd	Starboard
SWL	Safe Working load
Te	Tonnes (metric)
TBD	To Be Determined
USC	US Customary Units
WT	Wall Thickness

### 4 References

**Table 1: Reference Documents**

N	Origin	Document Title
[1]		Attachment 3 Trelleborg Uraduct Installation Manual (No Document number listed)
[2]		DBM Design Package (Trelleborg) SK-W9674-EN-012, Rev 0

## 5 Technical Data

### 5.1. Flexible Jumper Overview

**Table 2: Flexible Jumper Overview**

Flexible	Type	Initiate At	Terminate At	Est Length	Reel	Approx Water Depth
6-in (FSR2 - Toisa Pisces)	Dynamic	FSR Upper Hub	4-in Flexible connection on Toisa Pisces	1,060-ft	8.6-m Portable	4,984-ft-4,988-ft
6-in (FSR1 - HP1)	Dynamic	FSR Upper Hub	6-in Flexible connection on HP1	1,060-ft	9.2-m Portable	4,984-ft-4,988-ft

### 5.2. Flexible Jumper Overview

**Table 3: Flexible Jumper Data**

Inner Diameter (in)	Outer Diameter (in)	Length (ft)	Weight (lb/ft)	Total Weight (kip)	Minimum Bend Radius (ft)
6.00 <sup>(2)</sup>	9.65	1,060	77.90-in air empty	82.5	5.46 storage 8.19 install
			91.57-in air full	97.0	
			45.40-in water empty	48.1	
			59.08-in water full	62.5	
4.00	7.64	400	58.19-in air empty	23.2	4.14 storage 6.21 install
			64.18-in air full	25.6	
			37.81-in water empty	15.1	
			43.80-in water full	17.5	

Technical Data Sheets: <sup>1</sup> 152.61433 Rev 0

<sup>2</sup> 101.60476 Rev. 1

### 5.3. Flexible Length Markings

There are no relative length markings or attachment installation markings on the 6-in flexible outer sheathing. The outer sheath of the flexible is yellow. The only length markings on the flexible are in small numerals from the manufacturing process and bear no correlation to the actual length of flexible being installed.

### 5.4. Lay System Squeeze Pressures

The following table lists the tensioner system squeeze pressures for the 3-track tensioner in the vertical lay system (VLS). These values are the system pressures to be applied to the flexible during all installation activities. These values will not exceed the maximum allowable radial load on the flexible in accordance with the manufacturer.

**Table 4: Lay System Flexible Squeeze Pressures**

Flexible	Lay System Flexible Squeeze Pressure				Max Static Lay Tension	Number of Tensioner Tracks
	Minimum		Maximum			
-	Bar	psi	bar	psi	Te	#
6-in (FSR to Toisa Pisces) [9.65 OD]	40	588	53	779	20	3
6-in (FSR to HP1) [9.65 OD]	40	588	53	779	20	3

**Note:** The crush load values used for the system squeeze pressures in the above table are obtained from the Technip technical note titled “Flexible Pipes Allowable Crushing Loads,” document # GS017455 TN 006.

## 6 Flexible Jumper Recovery

This procedure details the steps/activities involved in the recovery of the upper 6-in flexible jumper utilizing the installation vessel *Helix Express*.

The 6-in dynamic flexible jumpers will be recovered from the installed positions on both the FSR 1 and FSR 2 risers onto 9.2-m diameter & 8.6-m diameter storage reels respectively on the aft deck of the *Helix Express*. The flexibles will be recovered utilizing the *Helix Express* vertical lay tower with the auxiliary 3-track vertical tensioner located in the tower.

The flexible jumpers are shorter than the water depth.

In the case of the FSR 2 upper flexible jumper (Toisa Pisces), one end of the flexible is fitted with a bend stiffener adapter piece used to connect to the FSR Upper Riser

Assembly. The other end of the flexible is fitted with a temporary flooding, testing pulling head. (Appaloosa Head)

In the case of FSR 1 upper flexible jumper (HP1), one end of the flexible is fitted with a bend stiffener adapter piece used to connect to the FSR Upper Riser Assembly. The other end of the flexible is fitted with a standard pull head which is fitted on the HP1 prior to release.

The recovery of the FSR 2 (Toisa Pisces) upper flexible jumper will commence after the Helix Express ROV has released the flexible from the FSR storage clamps and connected the 250-Te A&R wire to the pulling head. The opposite end of the flexible jumper will have been disconnected and rigged up to the 60-Te A&R winch wire ready for the cross-haul.

The upper 6-in dynamic flexible jumpers are fitted with the following attachments used for Abandonment/recovery of the flexible Jumpers from the host vessel in the event of emergency disconnect. These attachments will be removed from the flexible and put into storage during recovery.

#### **FSR1 Upper Flexible Jumper (HP1)**

- Bend stiffener adapter with Kick-off spool, pulling head (FSR End)
- Bend stiffener
- Uraduct pipe protection at securing clamp locations (4 off)
- Pull head

#### **FSR2 Upper Flexible Jumper (Toisa Pisces)**

- Bend stiffener adapter with Kick-off spool, pulling head (FSR End)
- Bend stiffener
- Uraduct pipe protection at securing clamp locations (4 off)
- Discrete buoyancy modules (15 off) West Sirius end
- 45-Te capacity friction clamp
- 45-Te Friction Clamp Protection
- Vertebrae
- Uraduct pipe protection to protect pipe on chute
- 19-Te SWL handling collar mounted to end fitting
- Flooding & testing Pull head

There are two (2) ROVs onboard the *Express*. Only one (1) ROV is required to perform all the installation activities detailed in this procedure. A second ROV will only be utilized at discretion of the Vessel Superintendent. This shall apply to all works detailed in this procedure.

Site specific weather reports will be obtained onboard the *Express*, multiple times per day.

## 6.1. Pre-Installation Activities

The following operations will occur prior to initiating any flexible installation activities.

- Loadout of empty 86-m & 92-m portable storage reels onto the *Express*.
- Loadout of flexible jumper recovery rigging, pulling heads, reel fastening rigging etc
- Perform proper JSAs
- Confirm a favorable weather window exists to proceed with the estimated duration of the flexible recovery works. Re-evaluate, as needed, if forecasts or on-site weather conditions change. The Vessel Master, Superintendent and BP Company representative will mutually agree that a weather window exists.

Estimated completion time for recovery operations is approximately 24-hours per jumper, with the 6-12-hours where the jumper is still connected to the West Sirius being the most critical part of the operation.

## 6.2. Flexible Jumper Monitoring

During the recovery of the flexible jumpers, the amount of A&R wire paid out on the Helix Express as well as the West Sirius rig will be continuously monitored as well as the amount of flexible recovered. This is to ensure the correct catenary (per the lay tables) is set up to ensure the minimum bend radius is not exceeded during recovery.

The flexible jumper top tension and departure angle will be continuously monitored. The recovery operation will be performed using the set of lay tables in Attachment 1. Attachment 1 includes lay tables for a water filled flexible. In the case of both flexible jumpers, the lines will be flooded but free to vent as the flexible is brought onboard the recovery vessel.

During the 1st end recovery, the A/R winch/crane tension and departure angle will be continuously monitored.

The 2nd end pulling head of the flexible and the position of the sagbend will be visually monitored, via ROV, as it is deployed and lowered through the water column.

An ROV from the West Sirius Rig will monitor the proximity between the flexible/abandonment winch wire and the stbd pontoon of the West Sirius rig throughout the recovery. It should also be noted that the ROV activity is a limiting criteria during recovery operations.

## 7 Upper 6-in Flexible Jumper Dismantle & Recovery Procedure

This subsection details the steps that will be performed to dismantle and recover the upper 6-in flexible jumpers connecting FSR 1 Upper Riser Assembly to the Helix Producer 1 (HP1) QDC connection and FSR 2 Upper Riser Assembly to what would have been the Toisa Pisces QDC connection.

Reference GA Drawing 3837-DGA-3007.

Prior to these steps, all subsea flexibles will have been disconnected from the bottom of the FSR's and the FSR riser stem will have been disconnected from the anchoring pile and the upper riser assembly hung-off in the moonpool of the West Sirius drill rig. The starting point for this procedure will be with the upper flexible jumpers free hanging from FSR 1 and FSR 2 Upper Riser Assemblies. It is assumed that all conditioning (flushing) of the flexibles has taken place and in the case of the FSR 2 flexible, the N2 gas used to dewater the flexible jumper has been vented off through a valve on the Upper Riser assembly tie-in manifold.

## 7.1. Methodology

### 7.1.1. FSR2 (Toisa Pisces Flexible Jumper)

**Note:** Flexible Jumper will be left in a flooded condition after opening the valves on the Appaloosa flooding head and displacing the nitrogen overpressure before recovering the FSR into the West Sirius Moonpool.

1. Set up Helix Express stern to starboard side of West Sirius Drill rig with 15-20-m standoff.
2. ROV to open all 4 riser clamps securing flexible jumper in storage position
3. Separate Flexible jumper from Riser string and move to stbd side of moonpool with tree cart on West Sirius Rig.
4. Deck crew on West Sirius rig to connect 60-Te abandonment winch to Kick-off spool rigging.

**Note:** Ensure all plugs in kick off spool pull head are removed prior to deployment from West Sirius.

5. Pay-in on 60-Te abandonment winch to lift flexible kick-off spool out of tree cart and suspend flexible on winch wire
6. Lower 250-Te A&R wire to depth and connect to flooding head on end of flexible.
7. Offset Helix Express and commence recovery of flexible 1st end to stern of Helix Express.
8. Connect Aft crane to Flexible Jumper recovery rigging
9. Transfer load from 250-Te A&R wire to aft crane
10. Attach 20k deck tugger wire to flex jumper flooding head
11. Raise the flexible with the aft crane and 20k tugger until the 1st Uraduct section is accessible from work platform
12. Remove Uraduct protection
13. Insert flexible into Tri-cat tensioner
14. Continue Pull-in of flexible until 45-Te friction clamp is accessible
15. Remove vertebrae, 45-Te friction clamp protection & 45-Te friction clamp
16. Lower flexible and flooding head to aft deck in front of 86 reel with aft crane

17. Install 25-Te friction hold back clamp and remove flooding head from end of flexible
18. Replace flooding head with standard pull-head.
19. Spool flexible onto Reel per packing arrangement drawing
20. West Sirius deck crew to continue paying out on abandonment winch to lower 2nd end of flexible until 2nd end is suspended below stern of Helix Express
21. ROV to disconnect West Sirius Abandonment wire from 2nd end of flexible
22. Remove 15 off DBM's from flexible and store in Half Height containers
23. Remove 3 more Uraduct sections from flexible
24. Continue to pay in flexible until Kick-off spool arrives at work station
25. Rig aft crane and 20k deck winch to kick-off spool lift rigging
26. Open Tri-cat tensioner and lift flexible out of tensioner
27. Lower flexible and 2nd end kick-off spool down to deck level with aft crane
28. Remove kick-off spool head and bend stiffener adapter from end of flexible
29. Attach 2nd End Pulling head onto flexible end flange
30. Spool remainder of flexible onto reel and secure 2nd end for transport to shore.

#### 7.1.2. **FSR1 (HP1- Flexible Jumper)**

**Note: Flexible Jumper will be left in a flooded state after flushing the flexible on the West Sirius rig.**

1. Set up Helix Express stern to starboard side of West Sirius Drill rig with 15-20-m standoff.
2. ROV to open all 4 riser clamps securing flexible jumper in storage position
3. Separate Flexible jumper from Riser string and move to stbd side of moonpool with tree cart on West Sirius Rig.
4. Deck crew on West Sirius rig to connect 60-Te abandonment winch to Kick-off spool rigging.

**Note: Ensure all plugs in pull head are removed prior to deployment from West Sirius.**

5. Pay-in on 60-Te abandonment winch to lift flexible kick-off spool out of tree cart and suspend flexible on winch wire
6. Lower 250-Te A&R wire to depth and connect to Pulling head on end of flexible
7. Offset Helix Express and commence recovery of flexible 1st end to stern of Helix Express
8. Connect Aft crane to Flexible Jumper recovery rigging
9. Transfer load from 250-Te A&R wire to aft crane
10. Attach 20k deck tugger wire to flex jumper pulling head

11. Raise the flexible with the aft crane and 20k tugger until the 1st Uraduct section is accessible from work platform
12. Remove Uraduct protection
13. Insert flexible into Tri-cat tensioner
14. Lower flexible and pulling head to aft deck in front of 86 reel with aft crane.  
**Note: Ensure all plugs in pull head are removed on the HP1.**
15. Spool flexible onto Reel per packing arrangement drawing
16. West Sirius deck crew to continue paying out on abandonment winch to lower 2nd end of flexible until 2nd end is suspended below stern of Helix Express
17. ROV to disconnect West Sirius Abandonment wire from 2nd end of flexible.
18. Remove 3 more Uraduct sections from flexible
19. Continue to pay in flexible until Kick-off spool arrives at work station
20. Rig aft crane and 20k deck winch to kick-off spool lift rigging
21. Open Tri-cat tensioner and lift flexible out of tensioner
22. Lower flexible and 2nd end kick-off spool down to deck level with aft crane
23. Remove kick-off spool head and bend stiffener adapter from end of flexible
24. Attach 2nd End Pulling head onto flexible end flange. Spool remainder of flexible onto reel and secure 2nd end for transport to shore

## 7.2. Upper Flexible Jumper Recovery (FSR2 Toisa Pisces)

### 7.2.1. Preparation on West Sirius Rig

Step	Description	References / Notes
1.	Prior to recovering the FSR into the moonpool of the West Sirius rig, the West Sirius ROV will have opened the flood valves on the Appaloosa flooding head and opened the ROV vent valves in the FSR upper Riser assembly manifold block.	<u>Attachment 2</u> 3837-DGA-3002 3837-DGA-3320 GS017455-000-DW-5311-0011
2.	Deck crew under supervision from 2H to remove manifold piping from Kick-off spool and fit pulling head with 35-Te shackle to top of kick-off spool. <b>Note: Ensure Pulling head is fitted with drain holes.</b>	<u>Attachment 2</u> 3837-DGA-3002 3837-DGA-3320 3824-DDL-3209-5
3.	Rig up 60-Te SWL Abandonment winch wire to 85-Te shackle on kick-off spool head.	MDP-38-HI-DG-0042

Step	Description	References / Notes
4.	Lift kick-off spool & flexible out of Tree cart clamp with abandonment winch until flexible is clear of hang-off clamp. Move Tree cart clear of flexible. <b>Note: Before lifting kick-off spool out of Tree Cart hang-off support, ensure flexible has been released from the 4 temporary securing clamps by ROV.</b>	<a href="#">Attachment 2</a> 3837-DGA-3015 3824-DGA-0007
5.	Perform Comms check between the winch operator on the West Sirius and the Construction Superintendent on the aft bridge of the Helix Express.	
6.	Standby on instruction from Helix Express Construction Supt to pay out of Abandonment winch.	

**7.2.2. Deployment & Hook-up of 250-Te A&R wire to Flexible Pull-head (FSR2-Toisa Pisces)**

Step	Description	References / Notes
1.	Set up stern of Helix Express to stbd side of West Sirius Rig with 15-20-m (50-70-ft) stand-off	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-01
2.	Deploy 250-Te A&R wire with recovery rigging to depth of 1,000-ft	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-01
3.	Deploy 20K aft deck tugging wire with 11.5-Te Long shank ROV hook and snatch block to depth for ROV to rig up to 250-Te A&R wire swivel.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-01
4.	Helix ROV to connect 1-in diameter tugging wire to recovery rigging bridle attached to 45-Te friction clamp using 11.5-Te ROV hook.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-01
5.	On the Helix Express, pull-in on the 20k tugging wire to crosshaul the flexible pull-head over to 250-Te A&R wire.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-02
6.	Connect 60Te ROV hook on end of 250-Te A&R wire to 12-m long synthetic grommet attached to flexible flooding head.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-02
7.	ROV to disconnect 1-in tugging wire from flexible recovery rigging and recover tugging wire with snatch block to surface.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-02

**6.2.3. Pull-in of 6-in (1,060-ft long) Flexible Jumper to Helix Express (FSR2-Toisa Pisces)**

Step	Description	References / Notes
1.	Offset the Helix Express per the lay tables in the Attachment 1 and start to pay-in on the 250-Te A&R winch to recover 1st end of flexible into the lay tower work station.	<a href="#">Attachment 1</a> Lay tables <a href="#">Attachment 2</a> MDP-38-HI-DG-0024-02
2.	Deploy aft crane over stern of vessel with 60-Te ROV hook on short pennant.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-02
3.	ROV to connect Aft Crane recovery rigging to flexible Jumper flooding head rigging.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-03
4.	Transfer the load of the flexible from the 250-Te A&R winch to the Aft crane wire and release the A&R winch from the pulling head.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-03
5.	Bring the flexible flooding pull-head alongside the aft work station with the aft crane.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-03
6.	Attach the 20k deck tugger wire to the flexible jumper pulling head rigging.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-03
7.	Raise the flexible jumper with the aft crane and 20k tugger until the 23-ft of uraduct protection is accessible from the work platform.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-03
8.	Riggers on the Helix Express lay tower work platform cut bands and remove Uraduct protection from around the flexible and store half shells in half height container on the deck. Two containers should be provided.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-03 <a href="#">Attachment 3</a> Uraduct Protection Procedure
9.	Insert flexible into Tri-cat tensioner with the aft crane.	
10.	With the flexible secured by the aft crane and gripped by the lay tower tensioner, pay out on the West Sirius abandonment winch until all the remaining flexible is free hanging from the stern lay ramp of the Helix Express.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-03
11.	Move Helix Express astern per the lay table to reduce the stand-off between the stern of the Helix Express and the West Sirius rig.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-03

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Step	Description	References / Notes
12.	Helix ROV equipped with 3.5-in hydraulic wire cutter to cut the sacrificial grommet connecting the West Sirius 2-in Abandonment wire to the flexible Kick-off spool rigging.	<u>Attachment 2</u> MDP-38-HI-DG-0024-03 MDP-38-HI-DG-0042
13.	Continue Pull-in of flexible until 45-Te friction clamp vertebrae are accessible.	<u>Attachment 2</u> MDP-38-HI-DG- 0024-03
14.	Riggers in work station to remove vertebrae from flexible above and below 45-Te friction clamp using hand tools (torque wrench). Breakout torque value = 50-ft-lbs.	<u>Attachment 2</u> MDP-38-HI-DG- 0024-03 CDP-39-GE-DG-0072 CDP-39-GE-DG-0073
15.	Remove vertebrae adapter from flexible and from friction clamp.	<u>Attachment 2</u> CDP-39-GE-DG- 0078
16.	Riggers to remove 45-Te friction clamp protection and 45-Te friction clamp from 6-in flexible in stern work station aided by aft crane.	<u>Attachment 2</u> MDP-38-HI-DG-0024-03 CDP-39-GE-DG-0072 CDP-39-GE-DG-0073 <u>Appendix G</u> Trelleborg Friction Clamp Protection Procedure
17.	Using the aft crane and 20k tugger to support the flooding/pulling head, transfer the pulling head down to the aft deck.	<u>Attachment 2</u> MDP-38-HI-DG-0024-04
18.	At deck level, Install 25-Te friction clamp onto flexible near to 1st end fitting and secure friction clamp to d-rings on the deck with 6-Te lever pulls. <b>Torque bolts to 632-ft-lbs.</b>	<u>Attachment 2</u> MDP-38-HI-DG-0024-04 CDP-39-GE-DG-DG-0040
19.	Riggers to remove the "Appaloosa" flooding head from the flexible jumper using flogging spanners to unfasten the studbolts. <b>Note: Flooding head previously installed using Integra hydraulic bolt tensioners set to 11,000 psi.</b>	<u>Attachment 2</u> MDP-38-HI-DG-0024-04 CDP-39-GE-DG-0059
20.	Replace the Appaloosa flooding head with standard 7 1/16-in API flange pulling head and shackle suitable for spooling flexible onto storage reel. Ensure the pull-head is fitted with vent holes and ensure all the plugs in the pull head are removed prior to further spooling. Secure head to flange with 16-in long 1.5-in diameter studbolts.	<u>Attachment 2</u> MDP-38-HI-DG-0024-04 CDP-39-GE-DG-0085
21.	Connect 1-in transfer wire from 86 Reel to 55-Te Crosby 2140 shackle attached to flexible jumper pulling head.	<u>Attachment 2</u> MDP-38-HI-DG-0024-04

Step	Description	References / Notes
22.	Remove 25-Te Friction clamp from flexible and store clamp on deck. Breakout torque required to release bolts is 632-ft-lbs.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-04
23.	Start to pay in on flexible to spool flexible onto 86 storage reel. <b>Note: Total length of time for pull in operations shall be at least one hour, with a 15 minute hold period just below the surface for the second end fitting.</b>	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-04
24.	Continue to pay in on flexible jumper to spool flexible onto storage reel until 1st Distributed Buoyancy Module arrives at the work station.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-04
25.	Remove outer buoyancy and inner clamp from flexible and store buoyancy module and clamp in half height container on deck. Repeat buoyancy module removal for the remaining 14 off DBM's. The DBM's can be reassembled to save storage space. This will likely require 20% additional spare bolts.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-04 <a href="#">Appendix F</a> DBM Installation Procedure
26.	Continue Pay-in and remove Uraduct sections from flexible as they arrive at the aft work station.	
27.	Pull-in flexible until Kick-off spool head arrives at the lay tower work station. <b>Note: During recovery, the flexible will be free flooding. Drain holes in the end of the flexible kick-off spool pull head should allow water to drain from inside flexible during recovery.</b>	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-05
28.	Rig Aft crane and 20k deck tugger to kick-off spool lift rigging.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-05
29.	Open Tri-cat tensioner and lift flexible out of tensioner and over the lay chute with the aft crane.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-05
30.	Lower 2nd end kick-off spool down to deck level and support end of flexible on temporary support blocks (Polyplank).	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-05
31.	Remove kick-off spool and Bend Stiffener adapter from flexible end fitting and from bend stiffener flange respectively. Use pneumatic impact wrench to release tension in bolts. <b>Note: Breakout torque for bend stiffener adapter flange bolts is 934-ft-lbs. Breakout torque for bend stiffener radial bolts is 600-ft-lbs.</b>	<a href="#">Attachment 2</a> MDP-38-HI-DG-0024-05 3837-DDL-3701-1

Step	Description	References / Notes
32.	Install 2nd end 7 1/16-in API flange pulling head onto flexible end fitting and secure by flogging bolts tight with pneumatic impact wrench. Secure head to flange with 16-in long 1.5-in diameter studbolts. Pull head with flooding holes should be retained for use on FSR1.	<u>Attachment 2</u> MDP-38-HI-DG-0024-05 GS017455-000-DD-5311-0001
33.	Spool remainder of flexible onto reel per the reel packing procedure and secure the 2nd end onto the reel for transportation and storage.	

### 7.3. Upper Flexible Jumper Recovery (FSR1 – HP1)

#### 7.3.1. Preparation on West Sirius Rig.

Step	Description	References / Notes
1.	Deck crew under supervision from 2H to remove manifold piping from Kick-off spool and fit pulling head with 35-Te shackle to top of kick-off spool. <b>Note: Ensure pulling head is equipped with drain holes.</b>	<u>Attachment 2</u> 3824-DDL-3209-5
2.	Rig up 60-Te SWL Abandonment winch wire to 35-Te shackle on kick-off spool head.	
3.	Lift kick-off spool & flexible out of Tree cart clamp with abandonment winch until flexible is clear of hang-off clamp. Move Tree cart clear of flexible. <b>Note: Before lifting kick-off spool out of Tree Cart hang-off support, ensure flexible has been released from the 4 temporary securing clamps by ROV.</b>	<u>Attachment 2</u> 3837-DGA-3015 3824-DGA-0007
4.	Perform Comms check between the winch operator on the West Sirius and the Construction Superintendant on the aft bridge of the Helix Express.	
5.	Standby on instruction from Helix Express Construction Supt to pay out of Abandonment winch.	

#### 7.3.2. Deployment & Hook-up of 250-Te A&R wire to Flexible Pull-head (FSR1-HP1)

Step	Description	References / Notes
1.	Set up stern of Helix Express to stbd side of West Sirius Rig with 15-20-m (50-70-ft) stand-off.	<u>Attachment 2</u> MDP-38-HI-DG-0029-01

Step	Description	References / Notes
2.	Deploy 250-Te A&R wire with recovery rigging to depth of 1,000-ft.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-01
3.	Deploy 20k aft deck tugger wire with 11.5-Te Long shank ROV hook and snatch block to depth for ROV to rig up to 250-Te A&R wire swivel.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-01
4.	Helix ROV to connect 1-in diameter tugger wire to 10-ft long 5-Te SWL synthetic grommet connected to 55-Te shackle on pulling head using 11.5-Te ROV hook.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-01
5.	On the Helix Express, pull-in on the 20k tugger wire to cross-haul the flexible pull-head over to 250-Te A&R wire.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-01
6.	Connect 60-Te ROV hook on end of 250-Te A&R wire to 12-m long 18-Te SWL synthetic grommet attached to flexible flooding head.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-01
7.	ROV to disconnect 1-in tugger wire from flexible recovery rigging and recover tugger wire with snatch block to surface.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-01

### 7.3.3. Pull-in of 6-in (1,060-ft long) Flexible Jumper to Helix Express (FSR1-HP1)

Step	Description	References / Notes
1.	Offset the Helix Express per the lay tables in Attachment 1 and start to pay-in on the 250-Te A&R winch to recover 1st end of flexible into the lay tower work station.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-02 <a href="#">Attachment 1</a> Lay Tables
2.	Deploy aft crane over stern of vessel with 60-Te ROV hook on short pennant.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-02
3.	ROV to connect Aft Crane recovery rigging to flexible Jumper Pulling head rigging.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-02
4.	Transfer the load of the flexible from the 250-Te A&R winch to the Aft crane wire and release the A&R winch from the pulling head.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-02
5.	Bring the flexible pull-head alongside the aft work station with the aft crane.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-03

Step	Description	References / Notes
6.	Attach the 20k deck tugger wire to the flexible jumper pulling head rigging.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-03
7.	Raise the flexible jumper with the aft crane and 20k tugger until the 23-ft of uraduct protection is accessible from the work platform.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-03 <a href="#">Attachment 3</a> Uraduct Protection Procedure
8.	Riggers on the Helix Express lay tower work platform to remove Uraduct protection from around the flexible and store half shells in half height container on the deck.	
9.	Insert flexible into Tri-cat tensioner with the aft crane.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-03
10.	With the flexible secured by the aft crane and gripped by the lay tower tensioner, pay out on the West Sirius abandonment winch until all the remaining flexible is free hanging from the stern lay ramp of the Helix Express.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-03
11.	Move Helix Express astern per the lay table to reduce the stand-off between the stern of the Helix Express and the West Sirius rig.	<a href="#">Attachment 2</a> MDP-38-HI-DG- 0029-03
12.	Helix ROV equipped with 3 1/2-in hydraulic wire cutter to cut the sacrificial grommet connecting the West Sirius 2-in Abandonment wire to the flexible Kick-off spool rigging.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-03
13.	Using the aft crane and 20k tugger to support the pulling head, transfer the pulling head down to the aft deck.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-03
14.	Connect 1-in transfer wire from 86 Reel to shackle attached to flexible jumper pulling head.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-03
15.	Start to pay in on flexible to spool flexible onto 86 storage reel. <b>Note: Total length of time for pull in operations shall be at least one hour, with a 15-minute hold period just below the surface for the second end fitting.</b>	<a href="#">Attachment 2</a> MDP-38-HI-DG- 0029-03
16.	Continue Pay-in and cut bands to remove Uraduct sections from flexible as they arrive at the aft work station.	<a href="#">Attachment 2</a> MDP-38-HI-DG-0029-03

Step	Description	References / Notes
17.	Pull-in flexible until Kick-off spool head arrives at the lay tower work station. <b>Note: During recovery, the flexible will be free flooding. Drain holes in the end of the flexible kick-off spool pull head should allow water to drain from inside flexible during recovery.</b>	<u>Attachment 2</u> MDP-38-HI-DG-0029-05
18.	Rig Aft crane and 20k deck tugger to kick-off spool lift rigging.	<u>Attachment 2</u> MDP-38-HI-DG-0029-05
19.	Open Tri-cat tensioner and lift flexible out of tensioner and over the lay chute with the aft crane.	<u>Attachment 2</u> MDP-38-HI-DG-0029-05
20.	Lower 2nd end kick-off spool down to deck level and support end of flexible on temporary support blocks (Polyplank).	<u>Attachment 2</u> MDP-38-HI-DG-0029-03
21.	Remove kick-off spool and Bend Stiffener adapter from flexible end fitting and from bend stiffener flange respectively. Use pneumatic impact wrench to release tension in bolts.	<u>Attachment 2</u> MDP-38-HI-DG-0029-03
22.	Install 2nd end 7 1/16-in API flange pulling head onto flexible end fitting and secure by flogging bolts tight with pneumatic impact wrench.	<u>Attachment 2</u> MDP-38-HI-DG-0029-05 GS017455-000-DD-5311-0001
23.	Spool remainder of flexible onto reel per the reel packing procedure and secure the 2nd end onto the reel for transportation and storage.	

#### 7.4. Spooling and Packing Flexible Jumper onto Transportation / Storage Reel

For recovery of the FSR2 flexible jumpers, an 86-44-50 reel has been provided. The dimensions for this reel are shown below:

Reel	Exterior D (m)	Drum D (m)	Drum Width (m)	Total Width (m)	Empty Weight (Te)	Capacity (Te)
86-44-50	8.6	4.4	5.0	5.89	38.2	284

The 1,060-ft FSR2 Upper Jumper shall be recovered and packed on the 86 reel first, followed by the 400-ft Lower Jumper. This is a temporary packing arrangement for

recovery and transportation. The procedures for packing both jumpers on the reel are described in section 6.4.1 below.

For recovery of the FSR1 flexible jumpers a 92-44-50 reel has been provided. The dimensions for this reel are shown below.

Reel	Exterior D (m)	Drum D (m)	Drum Width (m)	Total Width (m)	Empty Weight (Te)	Capacity (Te)
92-44-50	9.2	4.4	5.0	5.89	38.3	235

The 1,060-ft FSR1 Upper Jumper shall be recovered and packed on the 92 reel along with the 1,350-ft and 1,200-ft seabed flexible jumpers. The 92 reel will be fitted with partitioning to separate the 3 flexible lines. The 1,350-ft flexible jumper will be packed on the reel first followed by the 1,060-ft FSR1 Upper Jumper. The procedure for packing the 1,060-ft FSR1 flexible jumper onto the reel is described in section 6.4.1 below.

#### 7.4.1. **Spooling and Packing of 1,060-ft Upper Flexible Jumper**

**Note:** This procedure can be applied to both FSR1 and FSR2 upper flexible jumpers.

Step	Description	References / Notes
1.	Connect 1-in transfer wire from 86 Reel to shackle attached to flexible jumper pulling head. <b>Note: This instruction is described in Section 6.2.3, step 21.</b>	
2.	Ensure 1st end pull head rigging is installed as per referenced drawing.	MDP-38-HI-DG-0028
3.	Secure the 1st end pull head to the 86 reel by choking the 2 off 3-m slings at the end of the pull head rigging to the reel frame. The attachment should be made to the reel and not the separation.	MDP-38-HI-DG-0028
4.	Start to pay in on flexible using the portable reel drive system to spool flexible onto 86 storage reel.	
5.	Simultaneously spool the flexible through the tensioner.	
6.	Continue to pay in on the reel as the flexible is recovered from depth and through the spooling tower.	
7.	In the event that a level wind mechanism is needed, a dry roller box system is in place that can be fit to the jumper.	

8.	Continue to haul in on the reel until the jumper is completely recovered.	
9.	Install polyplank on the reel just before the bend stiffener and continue to lay polyplank for the length of the bend stiffener, approximately 3.8-m.	
10.	After the 2nd end pull head has been replaced, complete spooling the flexible onto the 86 reel.	<b>Section 6.2.3, Step 32 and 33</b>
11.	Install 2nd end pull head rigging as per referenced drawing.	MDP-38-HI-DG-0028
12.	Secure the 2nd end pull head to the reel by choking the 2 off 3-m slings at the end of the pull head rigging to the reel frame.	MDP-38-HI-DG-0028

#### 7.4.2. Spooling and Packing of 400-ft Flexible Jumper

Step	Description	References / Notes
1.	Connect 1-in transfer wire from 86 Reel to shackle attached to flexible jumper pulling head. <b>Note: Confirm transfer wire dimensions/availability.</b>	MDP-38-HI-DG-0028
2.	Ensure 1st end pull head rigging is installed as per referenced drawing.	MDP-38-HI-DG-0028
3.	Install a sheet of polyplank directly below the first end pull head of the 400-ft jumper to protect the outer sheath of the 1,060-ft jumper already installed on the reel.	MDP-38-HI-DG-0028
4.	Secure the 1st end pull head to the 86 reel separation by choking the 2 off 3-m slings at the end of the pull head rigging to the separation frame.	MDP-38-HI-DG-0028
5.	Start to pay in on flexible using the portable reel drive system to spool flexible onto 86 storage reel.	
6.	Continue to pay in on the reel as the flexible is spooled from the Helix Express reel to the 86 reel.	
7.	In the event that a level wind mechanism is needed, a dry roller box system is in place that can be fit to the jumper.	
8.	Continue to haul in on the reel until the jumper is completely transferred from the Helix Express reel to the 86 reel.	

9.	Install polyplank on the reel directly below the second end pull head to protect the outer sheath of the 1,060-ft flexible jumper already installed on the reel.	
10.	Install 2nd end pull head rigging as per referenced drawing.	MDP-38-HI-DG-0028
11.	Secure the 2nd end pull head to the reel by choking the 2 off 3-m slings at the end of the pull head rigging to the reel frame or separation, whichever is closer.	MDP-38-HI-DG-0028

### 7.5. Contingency for Emergency Abandonment

The personnel on the West Sirius drill rig will continue to pay out on the 60-Te Abandonment winch wire in the event of a DP run-off with the Helix Express while transferring the flexible from the West Sirius.

If a fire or explosion occurs on either Helix Express or West Sirius, the abandonment wire connected to the flexible kick-off spool pull-head will be cut by ROV or personnel on the West Sirius rig.

### **Attachment 1: Reverse Lay Tables**

Attachment 1 includes lay tables for an air-filled and water-filled flexible. In the case of the FSR1 Upper flexible Jumper (HP1) recovery, the jumper will have been flushed and left filled with seawater, hence the flooded lay table will apply.

In the case of FSR 2 Upper flexible Jumper (Toisa Pisces) recovery, the jumper will be air filled and, hence, the dry lay table will apply.

**BP CDP 6" Jumper (1060ft - Flooded) Static Pull - In Steps - No Current**

Step	Description	Helix Wire Pay in (ft) <sup>(1)</sup>	Total Helix Wire Length (ft) <sup>(1)</sup>	Helix Wire Top Tension (kips) <sup>(2)</sup>	Helix Wire Bottom Tension (kips) <sup>(2)</sup>	Helix Wire Top Angle wrt Vertical (deg) <sup>(3)</sup>	Helix Move away from Hang-off on Sirius (ft)	Total Vessel Offset from Hang-off on Sirius (ft)	Sirius Wire Pay Out (ft) <sup>(4)</sup>	Total Sirius Wire Length (ft) <sup>(4)</sup>	Sirius Wire Top Tension (kips) <sup>(4)</sup>	Sirius Wire Bottom Tension (kips) <sup>(5)</sup>	Sirius Wire Top Angle wrt Vertical (deg) <sup>(6)</sup>	6" Jumper Pay-In (ft) <sup>(7)</sup>	6" Jumper Length (ft) <sup>(7)</sup>	6" Jumper Tension <sup>(8)</sup>		6" Jumper MBR (ft)	6" Jumper Tensioner Tension (kips) <sup>(9)</sup>	6" Jumper First End End Fitting Orientation wrt Vertical (deg)	Friction Clamp Water Depth (ft)
																max (kips)	min (kips)				
1	Payout 1100 ft of Helix Wire 160 ft away from the Hangoff Point on Sirius and Attach the Helix Wire to the Pull Head on Jumper. Second End is on Sirius Wire with 5 ft length.	-	1100	8.2	0.2	1.1	-	160	5	5	51	51	0	0	1060	50.6	0.2	83.5	-	172.8	961
2	Move Helix Express 240 ft away	0	1100	8.5	0.7	5.0	240	400	0	5	50	50	1	0	1060	50.3	0.3	16.7	-	143.0	958
3	Move Helix Express 200 ft away	0	1100	9.2	1.5	9.3	200	600	0	5	50	50	2	0	1060	49.7	1.2	10.1	-	106.5	947
4	Move Helix Express 200 ft away	0	1100	9.9	2.4	13.9	200	800	0	5	49	49	3	0	1060	49.2	2.3	10.6	-	86.4	921
5	Pay-in 50 ft of Helix Wire	50	1050	10.1	2.6	14.6	0	800	0	5	49	49	3	0	1060	48.7	2.5	11.0	-	74.2	906
6	Pay-in 50 ft of Helix Wire	50	1000	10.3	2.7	15.2	0	800	0	5	48	48	3	0	1060	48.1	2.7	12.1	-	64.1	887
7	Pay-in 50 ft of Helix Wire	50	950	10.6	2.8	15.6	0	800	0	5	48	48	3	0	1060	47.5	2.8	13.6	-	56.4	864
8	Pay-in 50 ft of Helix Wire	50	900	10.7	3.0	16.0	0	800	0	5	47	47	4	0	1060	47.0	3.0	15.4	-	50.5	837
9	Pay-in 50 ft of Helix Wire	50	850	10.9	3.1	16.4	0	800	0	5	47	47	4	0	1060	46.5	3.1	17.4	-	46.0	806
10	Pay-in 50 ft of Helix Wire	50	800	11.0	3.2	16.8	0	800	0	5	46	46	4	0	1060	46.0	3.2	17.0	-	42.6	773
11	Pay-in 50 ft of Helix Wire	50	750	11.2	3.3	17.3	0	800	0	5	46	46	4	0	1060	45.6	3.3	16.1	-	40.0	736
12	Pay-in 50 ft of Helix Wire	50	700	11.3	3.5	17.9	0	800	0	5	45	45	4	0	1060	45.1	3.4	15.8	-	37.9	698
13	Pay-in 50 ft of Helix Wire	50	650	11.4	3.6	18.5	0	800	0	5	45	45	5	0	1060	44.6	3.6	16.1	-	36.4	657
14	Pay-in 50 ft of Helix Wire	50	600	11.6	3.8	19.3	0	800	0	5	44	44	5	0	1060	44.2	3.8	16.7	-	35.2	615
15	Pay-in 50 ft of Helix Wire	50	550	11.8	4.1	20.2	0	800	0	5	44	44	5	0	1060	43.7	4.0	17.6	-	34.4	572
16	Pay-in 50 ft of Helix Wire	50	500	12.1	4.4	21.2	0	800	0	5	43	43	6	0	1060	43.2	4.4	19.0	-	33.9	527
17	Pay-in 50 ft of Helix Wire	50	450	12.4	4.7	22.4	0	800	0	5	43	43	6	0	1060	42.7	4.7	20.9	-	33.6	482
18	Pay-in 50 ft of Helix Wire	50	400	12.8	5.1	23.7	0	800	0	5	42	42	7	0	1060	42.1	5.1	23.3	-	33.5	436
19	Pay-in 50 ft of Helix Wire	50	350	13.2	5.6	25.1	0	800	0	5	42	41	8	0	1060	41.5	5.6	26.1	-	33.6	390
20	Pay-in 50 ft of Helix Wire	50	300	13.8	6.2	26.5	0	800	0	5	41	41	9	0	1060	40.8	6.2	29.4	-	33.9	344
21	Pay-in 50 ft of Helix Wire	50	250	14.6	6.8	28.0	0	800	0	5	40	40	10	0	1060	40.1	6.8	33.0	-	34.2	298
22	Pay-in 50 ft of Helix Wire	50	200	15.4	7.6	29.5	0	800	0	5	39	39	11	0	1060	39.3	7.6	36.8	-	34.6	253
23	Pay-in 50 ft of Helix Wire	50	150	16.3	8.4	31.1	0	800	0	5	39	39	13	0	1060	38.5	8.4	40.8	-	35.1	209
24	Pay-in 50 ft of Helix Wire, Move Helix Express 100 ft towards West Sirius	50	100	15.7	6.9	26.1	-100	700	0	5	38	38	11	0	1060	37.7	6.9	43.6	-	29.0	178
25	Pay-in 50 ft of Helix Wire, Move Helix Express 100 ft towards West Sirius	50	50	15.4	5.6	21.4	-100	600	0	5	37	37	9	0	1060	36.9	5.6	50.1	-	23.2	141
26	Pay-in 49 ft of Helix Wire, Move Helix Express 100 ft towards West Sirius	49	1	15.3	4.4	16.9	-100	500	0	5	36	36	7	0	1060	36.1	4.4	62.8	-	17.9	100
27	Pay-in 1 ft of Helix Wire and 85 ft of 6" Jumper.	1	0	-	-	-	-	-	0	5	33	33	10	85	975	33.2	5.6	96.7	11.6	-	-

**End of Helix Wire Pay-In. First End is in the Tensioner, Sirius Wire Pay-Out Begins**

28	Pay-Out 95 ft of Sirius Wire	-	-	-	-	-	-	-	95	100	30	29	11	0	975	28.8	5.5	94.7	14	-	-
29	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	200	28	26	11	0	975	26.1	5.3	91.4	16	-	-
30	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	300	26	23	11	0	975	23.3	5.0	87.2	19	-	-
31	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	400	24	20	12	0	975	25.3	4.8	82.3	22	-	-
32	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	500	21	18	12	0	975	28.0	4.4	76.9	24	-	-
33	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	600	19	15	12	0	975	30.7	4.1	70.9	27	-	-
34	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	700	17	12	12	0	975	33.4	3.7	64.3	30	-	-
35	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	800	15	9	12	0	975	36.0	3.3	57.2	32	-	-
36	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	900	13	7	12	0	975	38.7	2.8	33.7	35	-	-
37	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	1000	11	4	12	0	975	41.3	2.2	13.8	38	-	-
38	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	1100	9	2	9	0	975	43.9	0.7	20.8	40	-	-
39	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	1200	9	1	7	0	975	45.1	0.8	53.0	41	-	-
40	Pay-Out 100 ft of Sirius Wire	-	-	-	-	-	-	-	100	1300	9	1	5	0	975	45.7	1.1	83.6	42	-	-

**End of Sirius Wire Pay-Out. Disconnect the Sirius Wire and Recover Remaining Jumper.**

(1) Helix Wire lengths are measured at MWL  
 (2) Helix Wire loads are calculated at MWL  
 (3) Helix Wire end orientations are calculated at MWL  
 (4) Sirius Wire lengths are measured at 40 ft above MWL  
 (5) Sirius Wire loads are calculated at 40 ft above MWL  
 (6) Sirius Wire end orientations are calculated at 40 ft above MWL  
 (7) Jumper Lengths are calculated at MWL  
 (8) Entire Jumper Section  
 (9) Tensioner Loads are calculated at MWL

### Appendix 2: Subsea Construction Drawings

Item	Drawing Title	Drawing Number	Procedure Ref.
1	2H Upper Assembly General Arrangement	3837-DGA-3002	7.2.1, Step 1
2	2H URA Installation Padeye Assembly	3837-DGA-3320	7.2.1 Step 1
3	2H URA Installation Padeye Assembly	3837-DGA-3320	7.2.1, Step 2, 7.3.1 Step 1
4	2H Upper Assembly Padeye	3824-DDL-3209-5	7.2.1, Step 2, 7.3.1 Step 1
5	Rigging Specification Summary 1060 Second End Flexible Recovery Rigging	MDP-38-HI-DG-0042	7.2.1 Step 3, 7.2.3 Step 12,
6	2H Flexible Jumper Clamp General Arrangement	3837-DGA-3015	7.2.1, Step 4 7.3.1 Step 3
7	2H System Configuration General Arrangement	3824-DGA-0007	7.2.1, Step 4 7.3.1 Step 3
8	Containment and Disposal Project Upper 6-in Flexible Decommissioning (FSR2)	MDP-38-HI-DG- 0024-01	7.2.2, Step 1-4
9	Containment and Disposal Project Upper 6-in Flexible Decommissioning (FSR2)	MDP-38-HI-DG- 0024-02	7.2.2, Step 5-7, 7.2.3 Step 1-2
10	Containment and Disposal Project Upper 6-in Flexible Decommissioning (FSR2)	MDP-38-HI-DG- 0024-03	7.2.3 Step 3-14, 16
11	45-Te 6-in Friction Clamp General Arrangement	GS017455-000-DW-5313-0020	7.2.3 Step 14, 16
12	45-Te 6-in Friction Clamp Top Half Assembly	GS017455-000-DW-5313-0021	7.2.3 Step 14, 16
13	Friction Clamp Vertebrae Adapter Details	GS017455-000-DD-5211-0005	7.2.3 Step 15
14	Containment and Disposal Project Upper 6-in Flexible Decommissioning (FSR2)	MDP-38-HI-DG- 0024-04	7.2.3 Step 17-25
15	25-Te 6-in Friction Clamp General Arrangement 9.81 I.D.	GS017455-000-DW-5313-0010	7.2.3 Step 18
16	45-Te Pullhead Modification Using Existing Appaloosa Pullhead	GS017455-000-DD-5311-0011	7.2.3 Step 19
17	Flexible Connections CDP2-Toisa Pisces Bill of Material	GS017698-000-DD-5311-0001	7.2.3 Step 20
18	Containment and Disposal Project Upper 6-in Flexible Decommissioning (FSR2)	MDP-38-HI-DG- 0024-05	7.2.3 Step 27-32
19	2H Upper Bend Stiffener Adapter	3837-DDL-3701-1	7.2.3 Step 31
20	45-Te PullHead Fabrication Using 7 1/16-in 10K API Blind Flange	GS017455-000-DD-5311-0001	7.2.3 Step 32, 7.3.3 Step 22
21	Containment and Disposal Project Upper 6-in Flexible Decommissioning (FSR1)	MDP-38-HI-DG- 0029-01	7.3.2, Step 1-7
22	Containment and Disposal Project Upper 6-in Flexible Decommissioning (FSR1)	MDP-38-HI-DG- 0029-02	7.3.3, Step 1-4
23	Containment and Disposal Project Upper 6-in Flexible Decommissioning (FSR1)	MDP-38-HI-DG- 0029-03	7.3.3, Step 5-7, 9-16, 20-21
24	Containment and Disposal Project Upper 6-in Flexible Decommissioning (FSR1)	MDP-38-HI-DG- 0029-05	7.3.3, Step 17-19, 22
25	PLAC for 4-in and 6-in Top Jumpers - FSR2 Toisa Pisces to FSR2 86 Helix Reel	MDP-38-HI-DG-0028	7.4.1, 7.4.2

LIMITS UNLESS OTHERWISE STATED TO EN 22768-1													
LINEAR TOL:							ANGULAR TOL:(SHORT SIDE OF ANGLE)						
OVER	0	6	30	120	400	1000	2000	OVER	0	10	50	120	400
UPTO	6	30	120	400	1000	2000	-	UPTO	10	50	120	400	-
TOL:	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2.0	TOL:	±1°	±0°'30"	±0°'20"	±0°'10"	±0°'5"

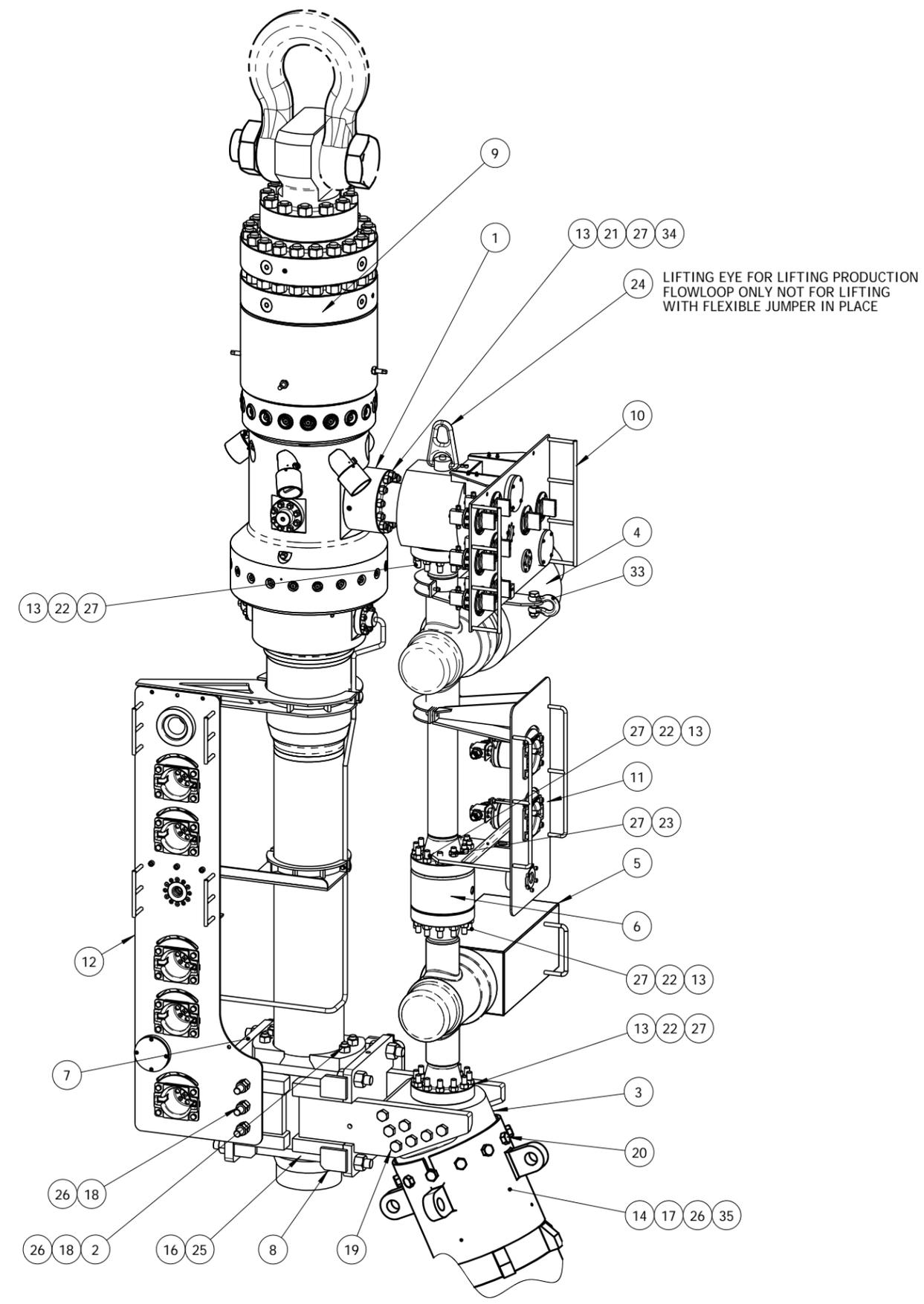
1. REMOVE ALL SHARP EDGES & BURRS  
 2. A RAD OR CHAMFER OF 0.3 MAX IS PERMITTED IN CORNERS OF BLIND HOLES RECESSES & STEPS.

SURFACE FINISH SYMBOLS TO BS.308 PT.2

1.6 TURNING 3.2 MILLING

NOTES

1. INSULATION NOT SHOWN, SEE SHEET 3 FOR DETAIL OF AREAS WHERE INSULATION HAS BEEN APPLIED TO THE URA.



ITEM	QTY			PART NUMBER	DESCRIPTION	MATERIAL		WEIGHT (LBS)		SUPPLIER
	INSTALLED	SPARES	TESTING			GRADE	REMARKS	UNIT	TOTAL	
1	1	-	-	3837-DDL-3205	UPPER ASSEMBLY BLOCK ELBOW	AISI 8630	80 KSI SMYS	1380	1380	RTI
2	2	-	-	3837-DDL-3207	STOP RING	API 2H Gr50	-	98	196	RTI
3	1	-	-	3824-DDL-3212	UPPER ASSEMBLY KICK-OFF SPOOL	A707 Gr1	79 KSI SMYS	1916	1916	RTI
4	1	-	-	3837-DDL-3213	5\"/>					

REV	DATE	DESCRIPTION	DRN	CHKD	APPRVD	CLIENT	APPRVD
1	06.20.10	ISSUED FOR CONSTRUCTION					

16010 BARKER POINT LANE  
 SUITE 120  
 HOUSTON, TX - 77079  
 TEL: (1) 281 258 2000  
 FAX: (1) 281 258 2099

PROJECT: MC252 CDP-2 RISER MODIFICATION

TITLE: UPPER ASSEMBLY GA

ACCORDANCE WITH ASME Y14.5M-1994

SCALE: 1:25

REV: 1 SHT 1 OF 3

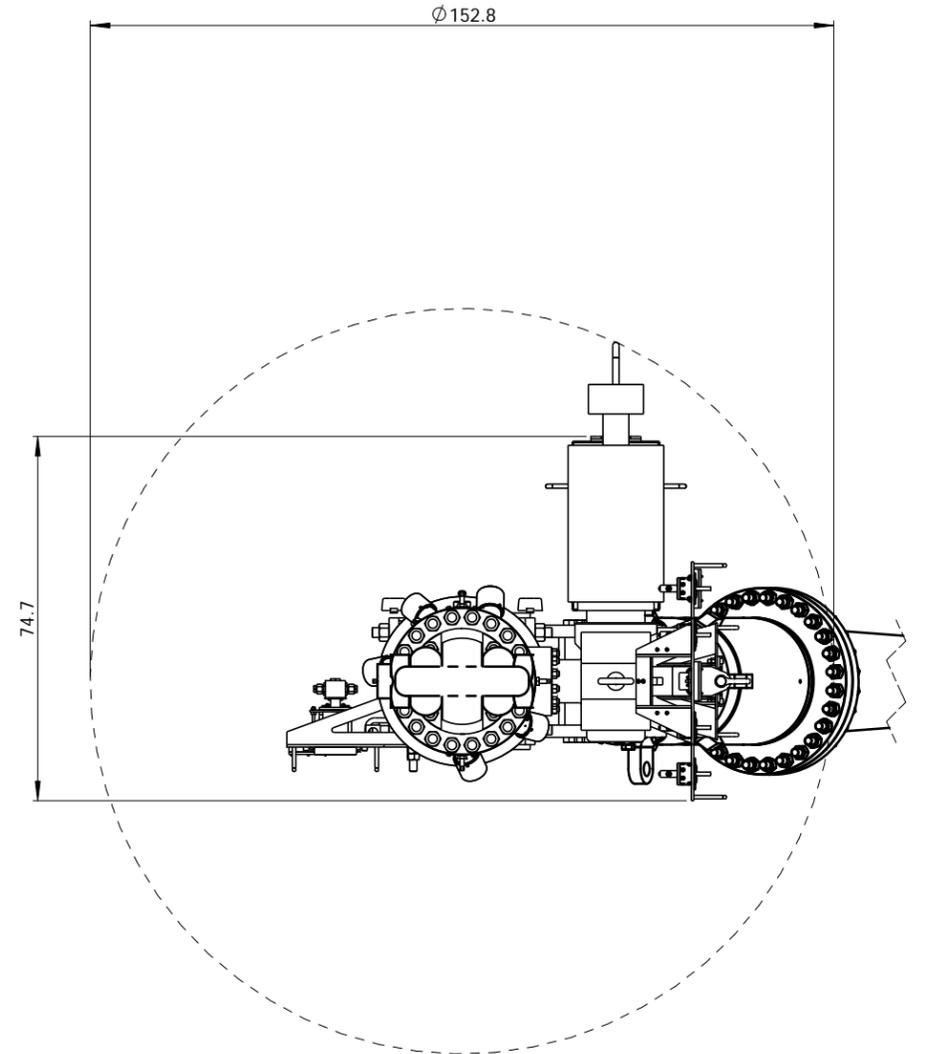
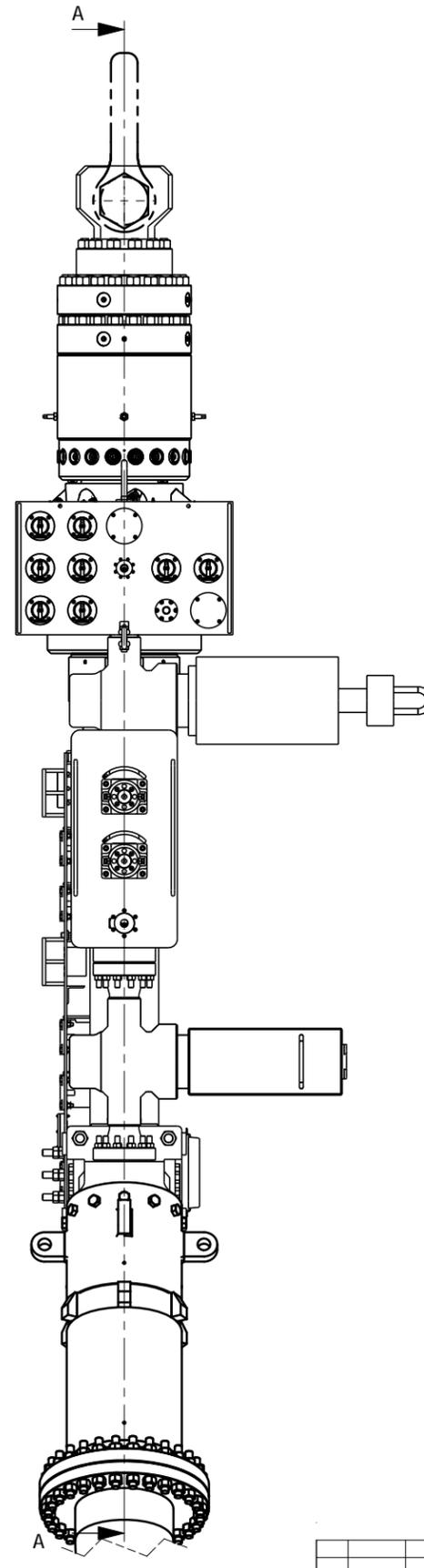
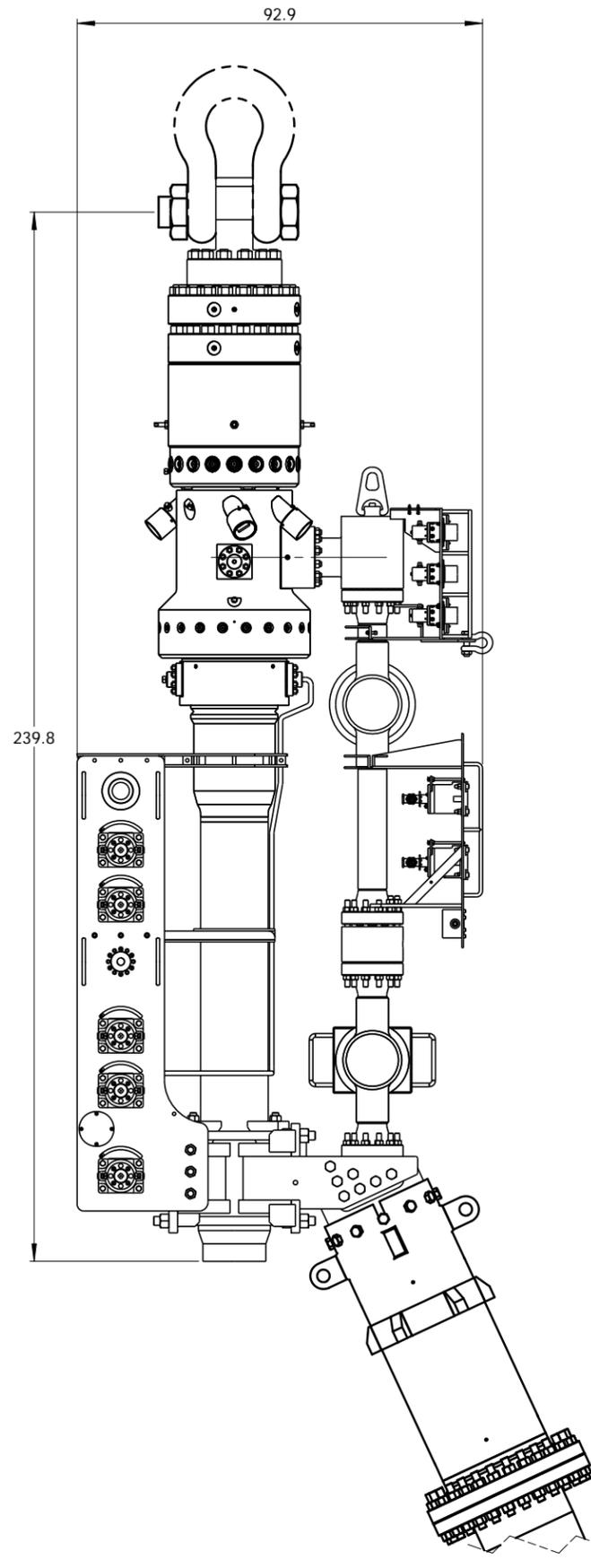
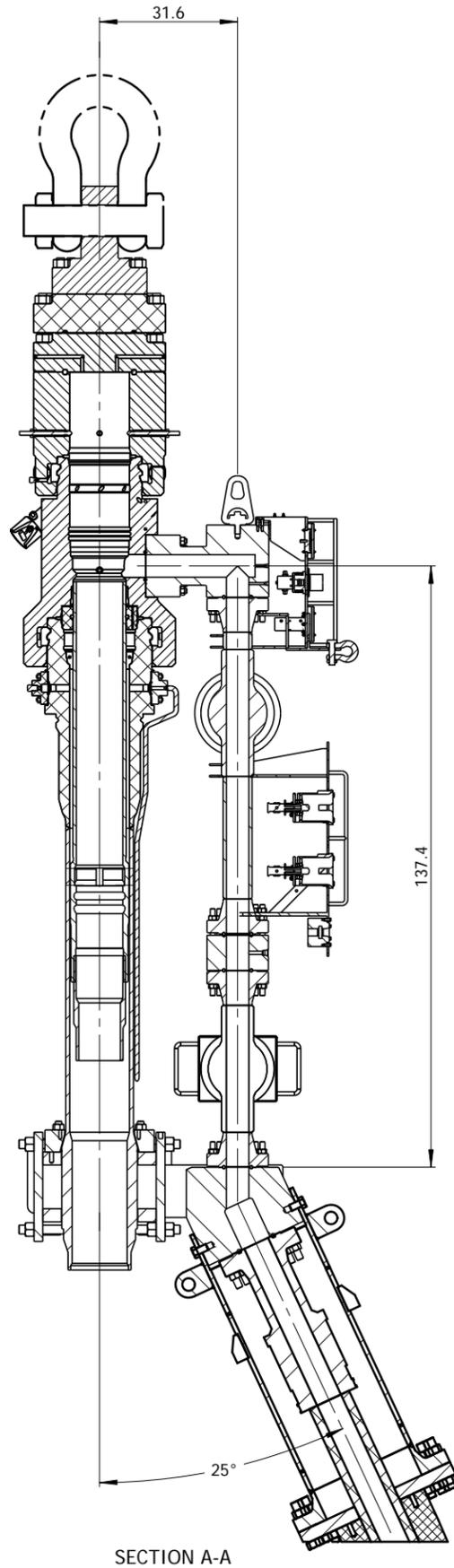
DRG. No: 3837-DGA-3002

LIMITS UNLESS OTHERWISE STATED TO EN 22768-1													
LINEAR TOL:							ANGULAR TOL: (SHORT SIDE OF ANGLE)						
OVER	0	6	30	120	400	1000	2000	OVER	0	10	50	120	400
UPTO	6	30	120	400	1000	2000	-	UPTO	10	50	120	400	-
TOL:	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2.0	TOL:	±1°	±0°'30"	±0°'20"	±0°'10"	±0°'5"

1. REMOVE ALL SHARP EDGES & BURRS
2. A RAD OR CHAMFER OF 0.3 MAX IS PERMITTED IN CORNERS OF BLIND HOLES RECESSES & STEPS.

SURFACE FINISH SYMBOLS TO BS.308 PT.2

1.6 TURNING 3.2 MILLING



REV	DATE	DESCRIPTION	DRN	CHKD	APPRVD	CLIENT APPROVD
1	06.20.10	ISSUED FOR CONSTRUCTION	DG	PP	RT	N/A

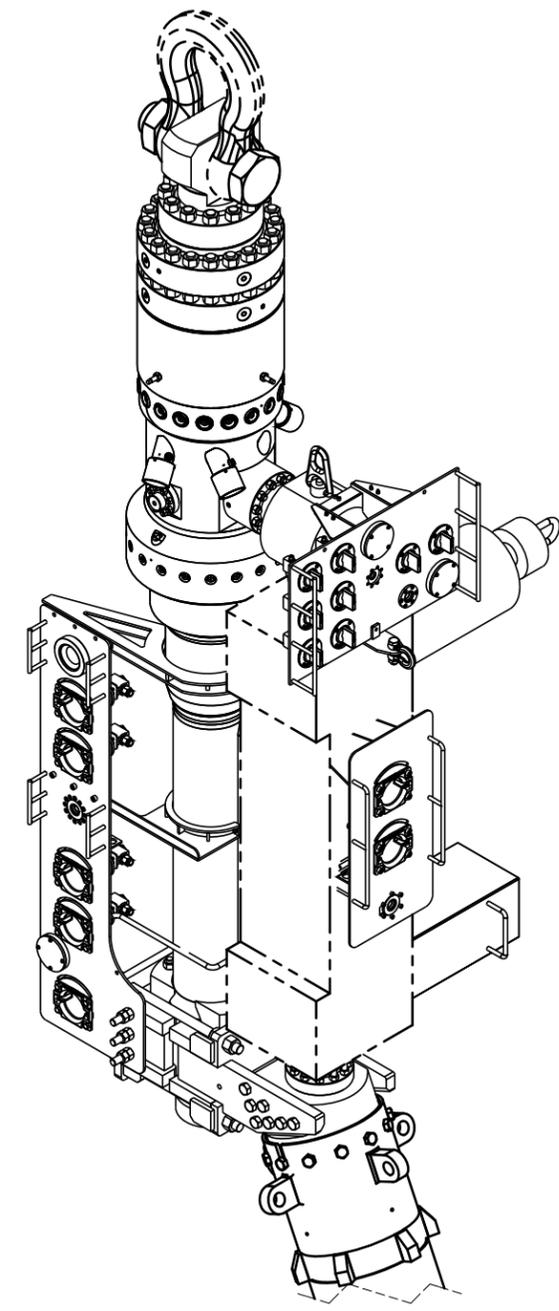
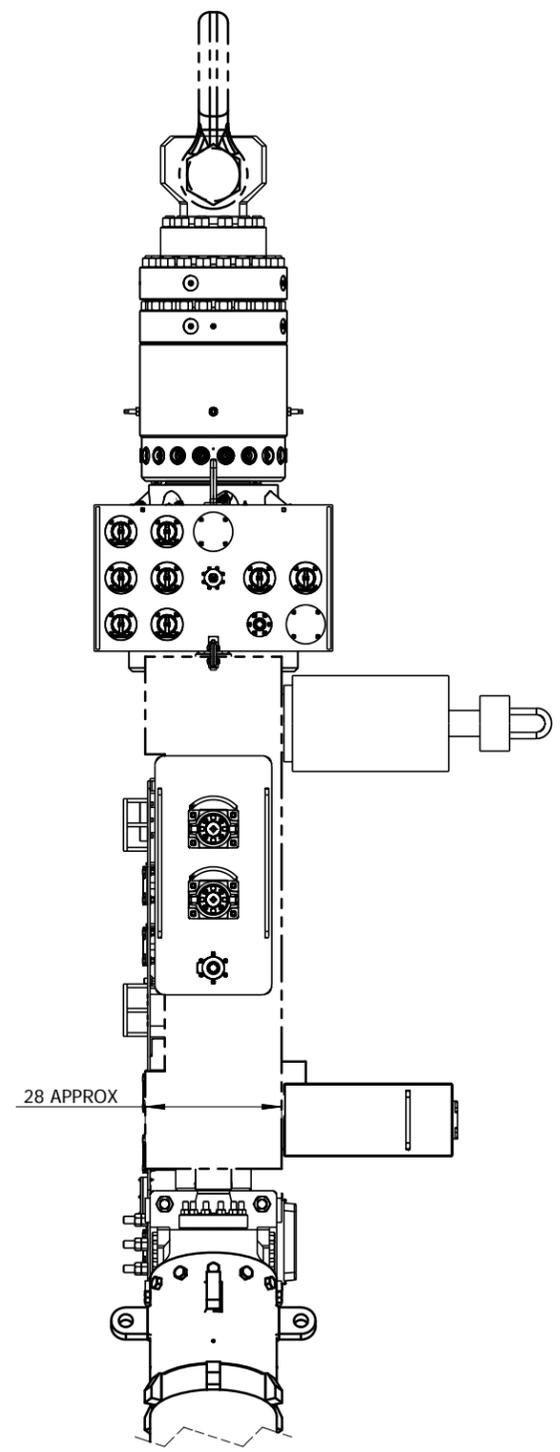
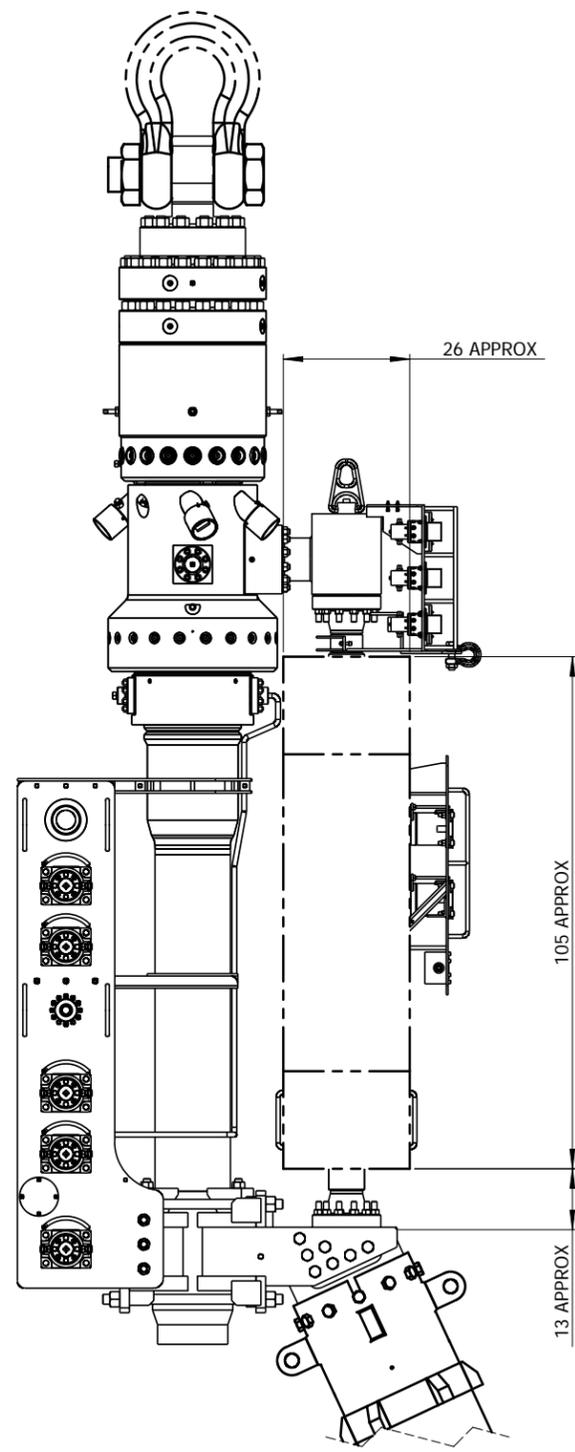
	16010 BARKER POINT LANE SUITE 120 HOUSTON, TX - 77079 TEL: (1) 281 258 2000 FAX: (1) 281 258 2099		
	PROJECT MC252 CDP-2 RISER MODIFICATION	3RD ANGLE PROJECTION	
TITLE UPPER ASSEMBLY GA		ACCORDANCE WITH ASME Y14.5M-1994	SCALE: 1:35 REV: 1 SHT 2 OF 3
		DRG. No.	3837-DGA-3002

LIMITS UNLESS OTHERWISE STATED TO EN 22768-1													
LINEAR TOL:							ANGULAR TOL: (SHORT SIDE OF ANGLE)						
OVER	0	6	30	120	400	1000	2000	OVER	0	10	50	120	400
UPTO	6	30	120	400	1000	2000	-	UPTO	10	50	120	400	-
TOL:	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2.0	TOL:	±1°	±0°'30"	±0°'20"	±0°'10"	±0°'5"

1. REMOVE ALL SHARP EDGES & BURRS
2. A RAD OR CHAMFER OF 0.3 MAX IS PERMITTED IN CORNERS OF BLIND HOLES RECESSES & STEPS.

SURFACE FINISH SYMBOLS TO BS.308 PT.2

1.6 TURNING 3.2 MILLING



TOP ASSEMBLY WITH INSULATION

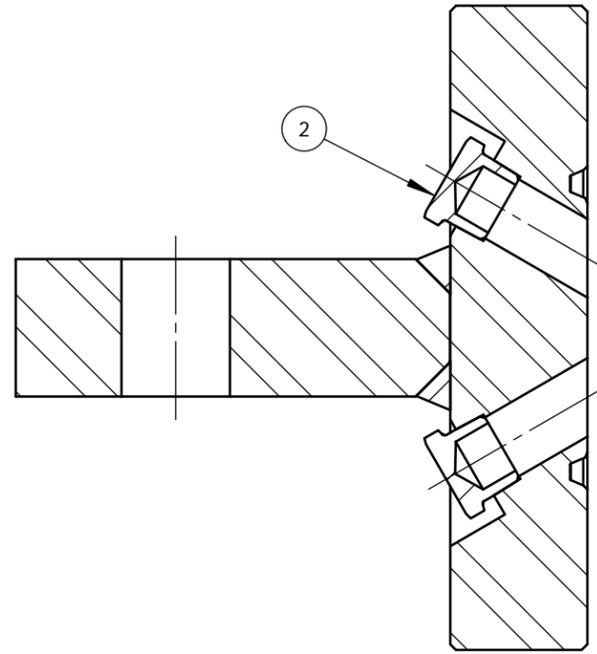
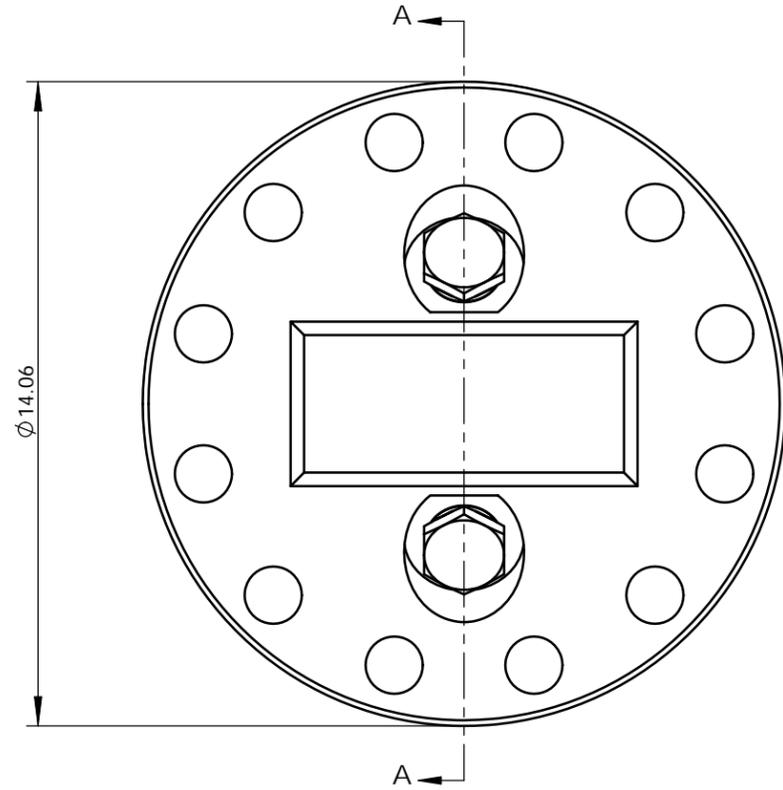
NOTE: ALL DIMENSIONS OF INSULATION ARE APPROXIMATE ONLY

	16010 BARKER POINT LANE SUITE 120 HOUSTON, TX - 77079 TEL: (1) 281 258 2000 FAX: (1) 281 258 2099		
	PROJECT MC252 CDP-2 RISER MODIFICATION	3RD ANGLE PROJECTION	
TITLE UPPER ASSEMBLY GA		ACCORDANCE WITH ASME Y14.5M-1994	SCALE: 1:35 REV: 1 SHT 3 OF 3 DRG. No. 3837-DGA-3002

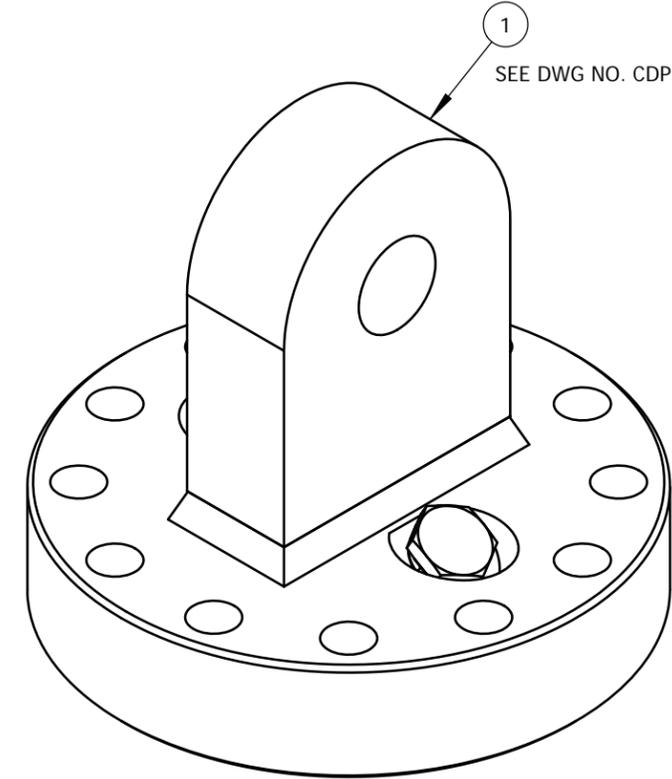
REV	DATE	DESCRIPTION	DRN	CHKD	APPRVD	CLIENT APPRVD
1	06.20.10	ISSUED FOR CONSTRUCTION	DG	PP	RT	N/A

BILL OF MATERIAL

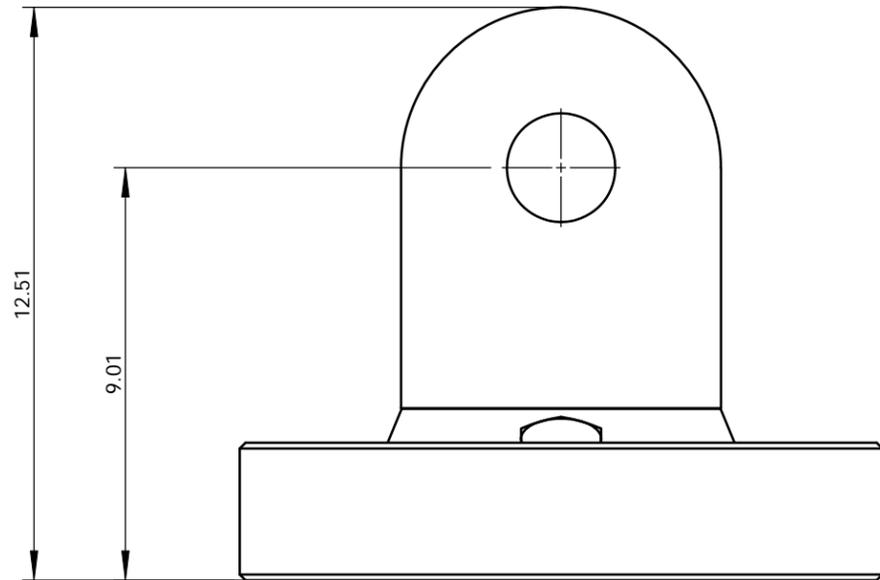
ITEM	QTY	DESCRIPTION	MATERIAL		WEIGHT (LBS)	SUPPLIER
			GRADE	REMARKS		
01	1	URA INSTALLATION PADEYE	50 KSI SMYS	-	166	-
2	2	1.25" NPT HEX HEAD PLUG	STAINLESS STEEL	-	0.62 (EACH)	-



SECTION A-A  
SCALE 1 : 4



ISOMETRIC VIEW



**2H offshore**  
16010 BARKER POINT LANE  
SUITE 120  
HOUSTON, TX - 77079  
TEL: (1) 281 258 2000  
FAX: (1) 281 258 2099



PROJECT  
MC252 CDP-2 RISER MODIFICATION

TITLE  
URA INSTALLATION PADEYE ASSEMBLY

3RD ANGLE PROJECTION  
DIMENSIONS ARE IN inches UNLESS OTHERWISE STATED

ACCORDANCE WITH ASME Y14.5M-1994  
SCALE: 1:8  
REV: 1  
SHT 1 OF 1

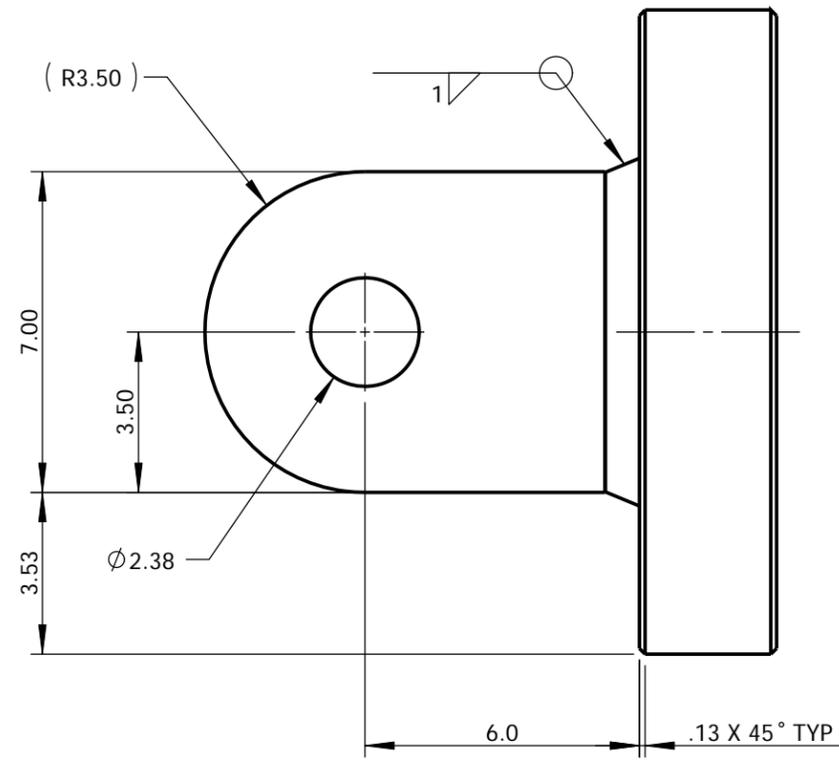
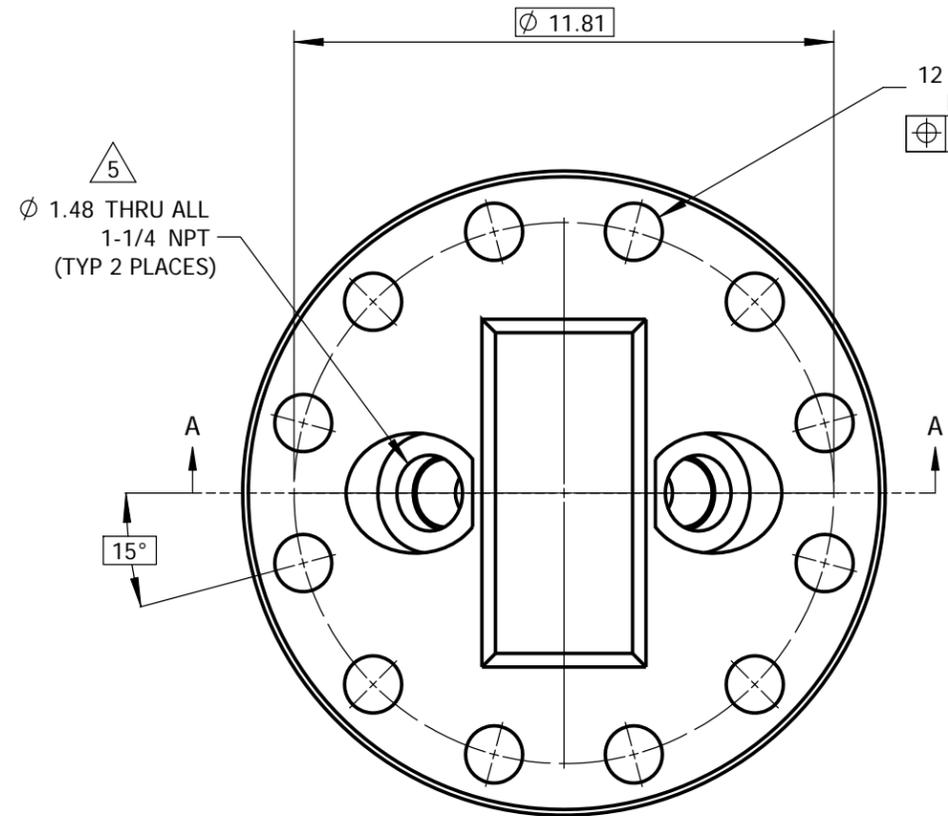
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BP DRAWING NO. CDP-43-RI-DG-0134

REV	DATE	DESCRIPTION	DRN	CHKD	APPRVD	CLIENT APPRVD
1	08.20.10	ISSUED FOR REVIEW				

LIMITS UNLESS OTHERWISE STATED TO EN 22767-1													
LINEAR TOL:							ANGULAR TOL: (SHORT SIDE OF ANGLE)						
OVER	0	0.236	1.181	4.724	15.748	39.37	78.74	OVER	0	10	50	120	360
UP TO	0.236	1.181	4.724	15.748	39.37	78.74	-	UP TO	10	50	120	360	-
TOL:	±0.003	±0.007	±0.011	±0.019	±0.031	±0.047	±0.078	TOL:	±0.1°	±0°30'	±0°20'	±0°10'	±0°05'

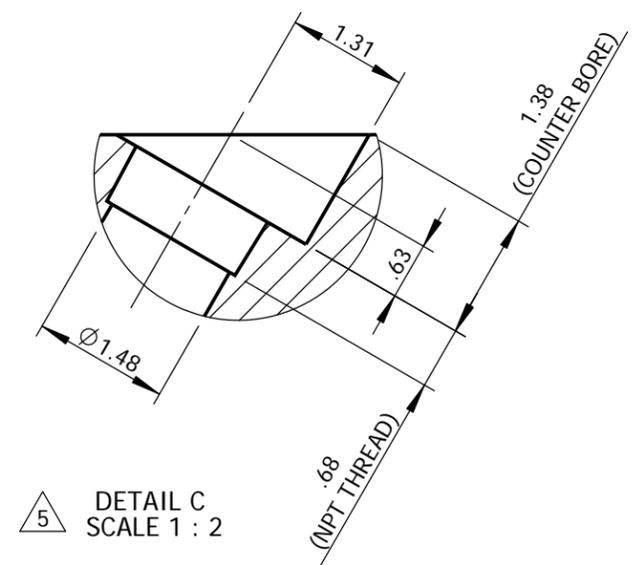
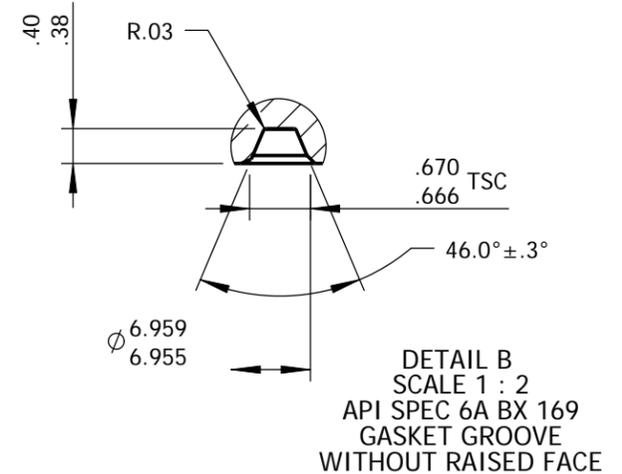
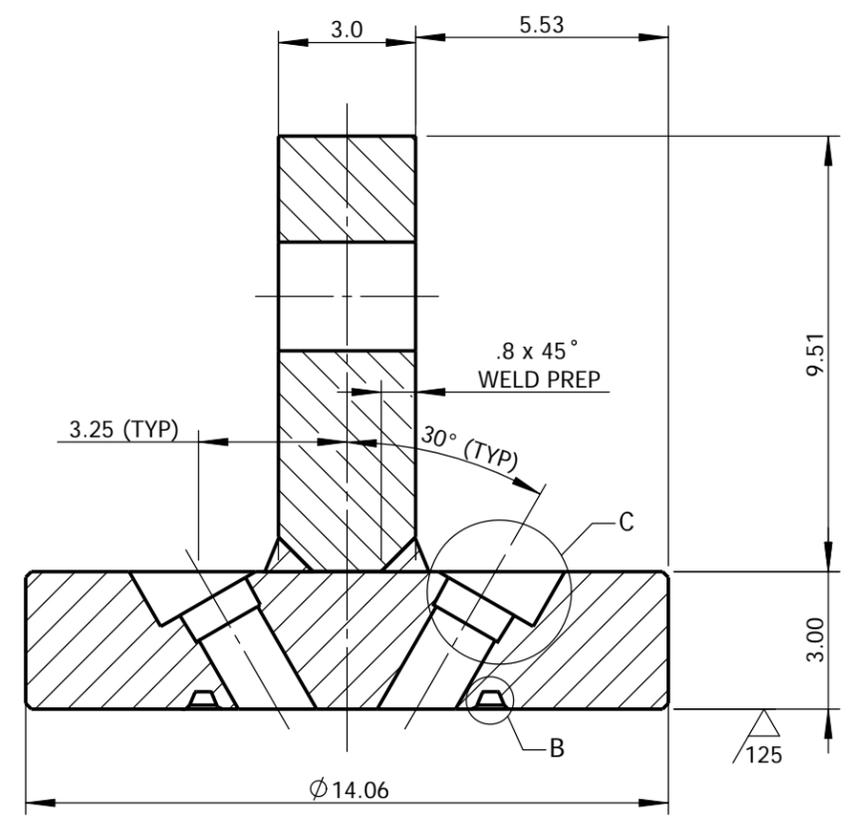
1. REMOVE ALL SHARP EDGES & BURRS  
 2. A RADIUS OR CHAMFER OF 0.01 MAX IS PERMITTED IN CORNERS OF BLIND HOLES RECESSES & STEPS

SURFACE FINISH SYMBOLS TO BS.308 PT.2: 63 TURNING, 125 MILLING



- MATERIAL - 50 KSI SMYS
- WELDING - 1" CONTINUOUS FILLET WELD ALL ROUND
- WELD TO COMPANY APPROVED PROCEDURE
- MACHINING, REAMING OF HOLE TO BE CARRIED OUT AFTER WELDING OF FILLET AND PARTIAL PENETRATION WELDS. ALL FILLET AND PARTIAL PENETRATION WELDS SHALL BE INSPECTED AS FOLLOWS:
  - 100% VISUAL EXAMINATION
  - 100% MAGNETIC PARTICAL INSPECTION
- COATING - TSA
- TO SUIT CROSBY 2" BOLT SHACKLE - 35T WLL TYPE G-2130
- APPROX WEIGHT - 166 LBS.
- PADEYE TO BE LOAD TESTED TO 1.5 X SAFE WORKING LOAD (SWL) = 53T. NDE AFTER PROOF TEST TO INCLUDE:
  - 100% VISUAL EXAMINATION
  - 100% MAGNETIC PARTICAL INSPECTION

63 / [ 125 ]



REV	DATE	DESCRIPTION	DRN	CHKD	APPRVD	CLIENT APPRVD
5	08.20.10	ISSUED FOR CONSTRUCTION	TD	CN	CN	N/A
4	07.03.10	ISSUED FOR CONSTRUCTION	DG	PJC	PP	N/A
3	06.17.10	ISSUED FOR REVIEW	DG	RH	RT	N/A
2	06.14.10	ISSUED FOR REVIEW	RH	KK	RT	N/A
1	06.07.10	ISSUED FOR REVIEW	RH	KK	RT	N/A

**2H offshore**

16010 BARKER POINT LANE  
 SUITE 120  
 HOUSTON, TX - 77079  
 TEL: (1) 281 258 2000  
 FAX: (1) 281 258 2099

PROJECT: MC252 CDP RISER MODIFICATION

TITLE: UPPER ASSY INSTALLATION PADEYE

**bp**

3RD ANGLE PROJECTION

ACCORDANCE WITH ASME Y14.5M-1994

SCALE: 1:10

REV: 5

SHT 1 OF 1

2H DRAWING No: 3824-DDL-3209

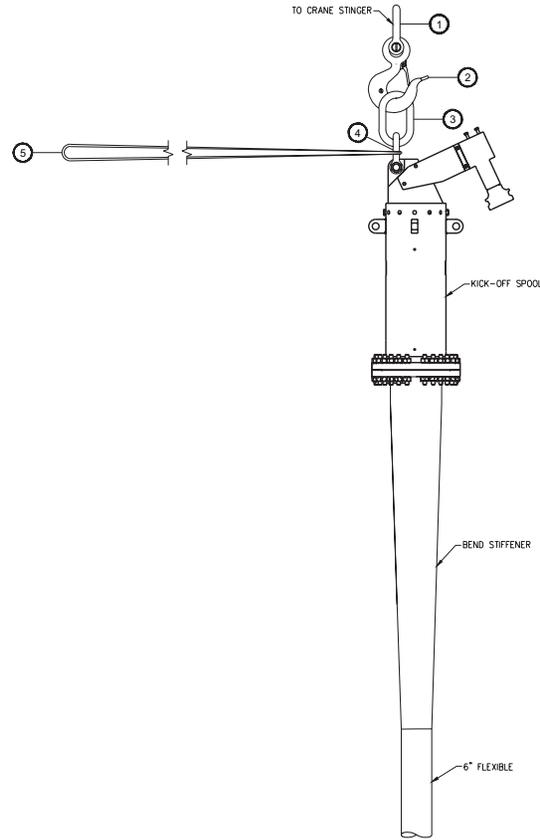
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**OVERALL LIFT RIGGING ARRANGEMENT**

**CALCULATED MAXIMUM MASS = - Te**

**RIGGING DETAILS - MATERIAL TAKE OFF TABLE**

IDENT	QTY	DESCRIPTION	LENGTH ft.	MBL (Te)	SWL (Te)	COMMENT	UNIT WT. (lbs.)	TOTAL WT. (lbs.)	EYE DETAILS	
									TOP EYE	BTM EYE
1	1	CROSBY G-2130	-	-	85	-	-	-	-	-
2	1	CROSBY ROV HOOK	-	-	80	-	-	-	-	-
3	1	CROSBY 3" MASTERLINK	-	-	-	-	-	-	-	-
4	1	CROSBY G-2130	-	-	55	-	-	-	-	-
5	1	WIRE ROPE GROMMET	16.40	-	20	-	-	-	-	-



**ELEVATION VIEW RECOVERY RIGGING**  
SCALE: 1/2" = 1'-0"

<b>STANDARD REFERENCE DRAWINGS</b>
<b>PROJECT SPECIFIC NOTES</b>

OVERALL LOAD DATA		
ITEM	DESCRIPTION	MASS
1	MASS OF LOAD	- Te
2	MASS OF CONTENTS/FILL	- Te
3	MASS OF RIGGING	- Te
4	DESIGN TRIM	LEVEL

<b>PROJECT SPECIFIC REFERENCE DRAWINGS</b>

CAD No: _____ JOB No: _____ DWG No: MDP-38-HI-DG-0042 REV: 0

**1 Te = 1 tonne = 1000 kg (MASS)**

NO.	REFERENCE DRAWING TITLE	REF. DWG. NO.	REV	DATE	BY	DC	ENG	CE	PM	CLIENT	DESCRIPTION
			0								
APPROVED FOR CONSTRUCTION											

DRAWN BY: S. Johnson ENGINEER: _____ PROJECT ENGINEERING MANAGER: _____ SCALE AT D-SIZE: 1/2" = 1'-0"	DATE: 19 AUG 10 DATE: _____ DATE: _____
--	---

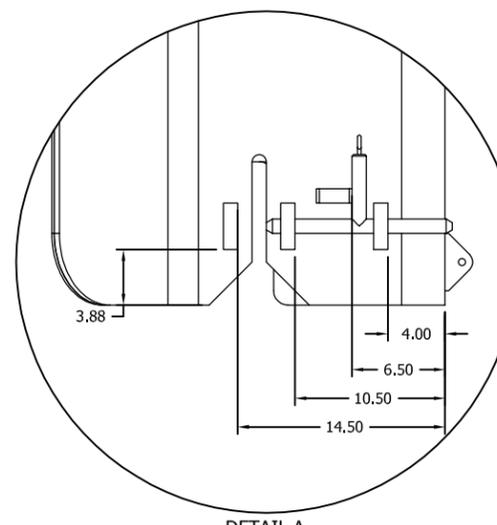
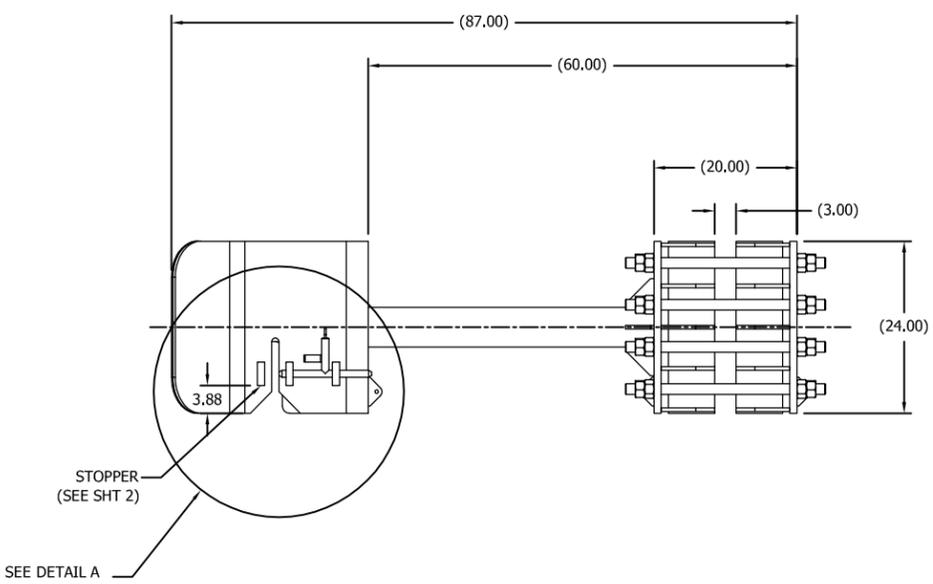
**MACONDO DECONSTRUCTION PROJECT  
RIGGING SPECIFICATION SUMMARY  
1060' SECOND END FLEXIBLE  
RECOVERY RIGGING**

LIMITS UNLESS OTHERWISE STATED TO EN 22768-1													
LINEAR TOL:							ANGULAR TOL:(SHORT SIDE OF ANGLE)						
OVER	0	0.23	1.18	4.72	15.74	39.3	78.7	OVER	0	10	50	120	360
UPTO	0.23	1.18	4.72	15.74	39.3	78.7	-	UPTO	10	50	120	360	-
TOL:	±0.03	±0.07	±0.11	±0.09	±0.081	±0.087	±0.078	TOL:	±1°	±0°30'	±0°10'	±0°5'	-

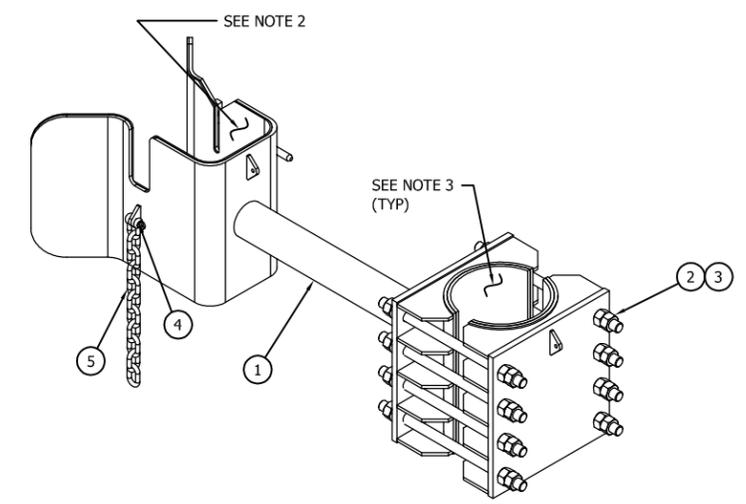
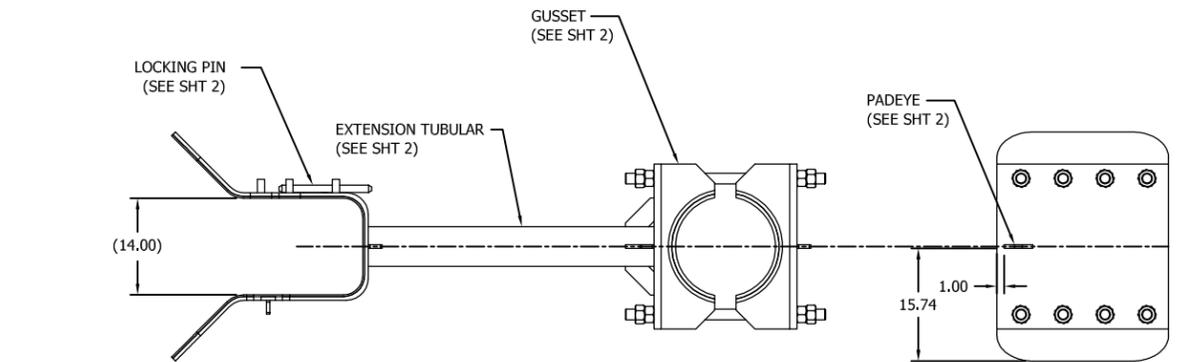
1. REMOVE ALL SHARP EDGES & BURRS  
2. A RAD OR CHAMFER OF 0.3 MAX IS PERMITTED IN CORNERS OF BLIND HOLES RECESSES & STEPS.

SURFACE FINISH SYMBOLS TO BS.308 PT.2

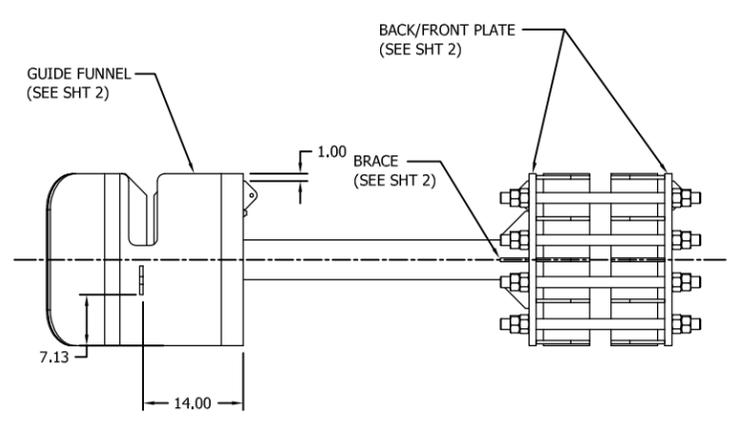
1.6	TURNING	3.2	MILLING
-----	---------	-----	---------



BILL OF MATERIAL						
ITEM	QTY	DESCRIPTION	MATERIAL		WEIGHT (lbs)	SUPPLIER
			GRADE	REMARK		
1	5	FLEXIBLE JUMPER CLAMP	50 ksi SMYS	-	-	OCEANEERING
2	40	STUD Ø1-1/2" x 28" LENGTH	ASTM A193 B7	XYLAN COATING	-	OCEANEERING
3	160	HEX NUT Ø1-1/2"	ASTM A194 L7	XYLAN COATING	-	OCEANEERING
4	5	3/8" CROSBY SHACKLE G-2130	-	-	-	OCEANEERING
5	5	5/8" CHAIN X 3FT LENGTH	-	CROSBY Gr 100 ALLOY CHAIN	-	OCEANEERING



ISOMETRIC VIEW OF FLEXIBLE JUMPER CLAMP



- NOTES:**
- ALL EXTERNAL SURFACES TO BE COATED WITH 2 PART EPOXY
    - LAYER 1: SIGMACOVER PRIMER (7413), 50-75µ
    - LAYER 2: SIGMACOVER EHB (7433), 100-150µ
    - LAYER 3: SIGMACOVER EHB (7433), 100-150µ
  - NEOPRENE LINER (1/8" THICK). SEE NOTE 5.
  - NEOPRENE LINER (1/2" THICK). SEE NOTE 5.
  - WELDING IN ACCORDANCE WITH AWS D1.1
  - NEOPRENE TO BE BONDED TO SPECIFIED SURFACE USING LOCTITE 9464 A & B HYSOL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS

REV	DATE	DESCRIPTION	DRN	CHKD	APPRVD	CLIENT APPRVD
1	06.18.10	ISSUED FOR REVIEW				

	16010 BARKERS POINT LANE SUITE 120 HOUSTON, TEXAS - 77079 TEL: (1) 281 258 2000 FAX: (1) 281 258 2099		
	PROJECT MC252 CDP-2 RISER MODIFICATION	3RD ANGLE PROJECTION	
TITLE FLEXIBLE JUMPER CLAMP GA	ACCORDANCE WITH ASME Y14.5M-1994	SCALE: NTS	REV: 1 SHT 1 OF 3
3837-DGA-3015			

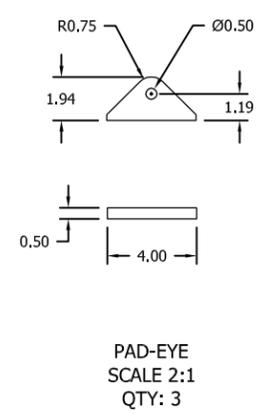
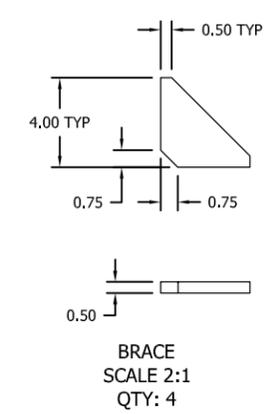
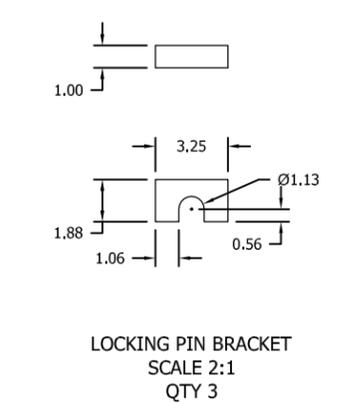
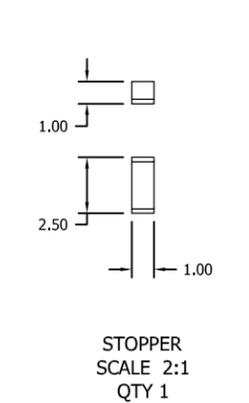
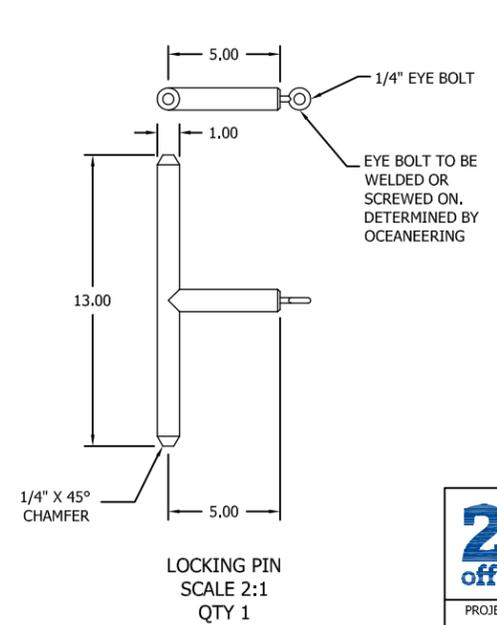
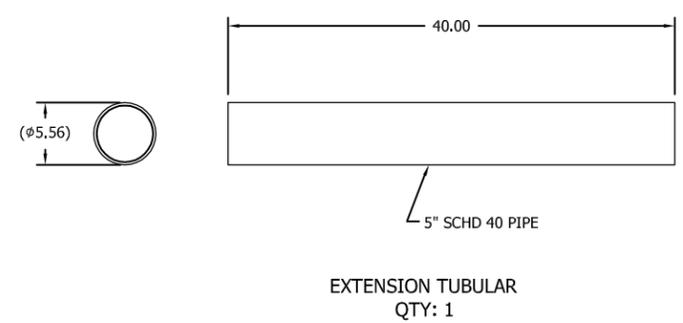
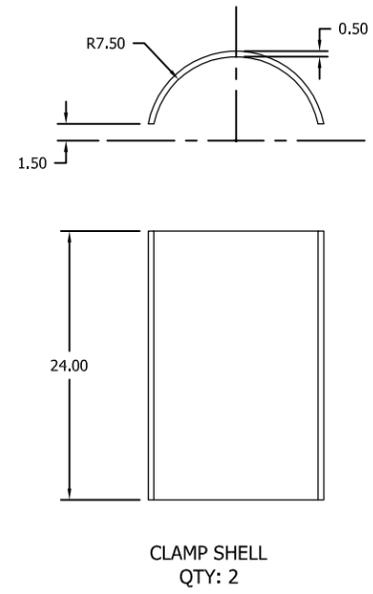
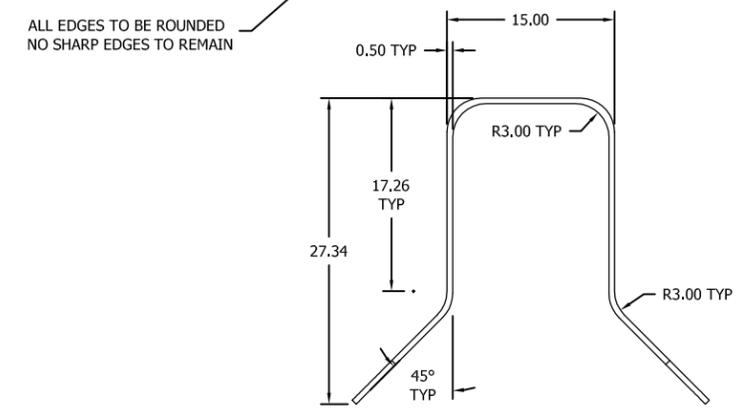
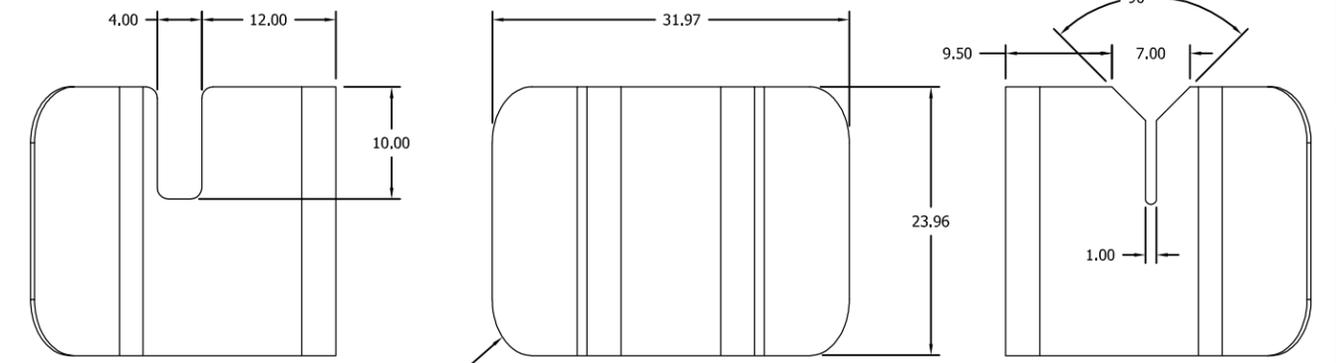
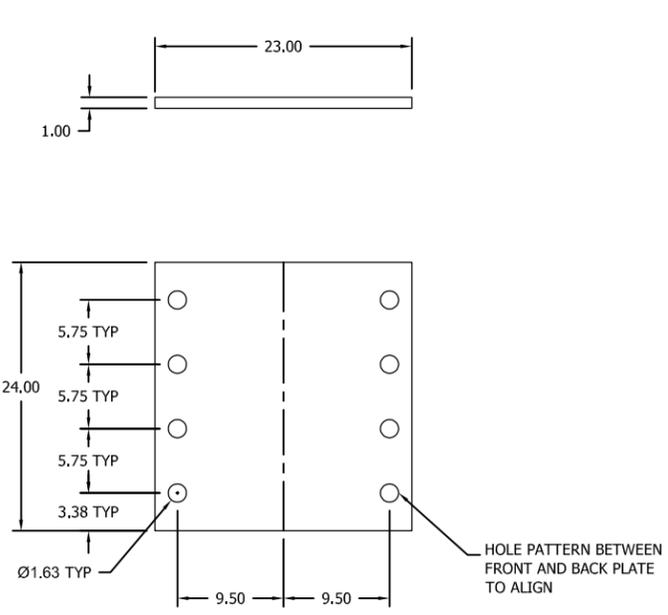
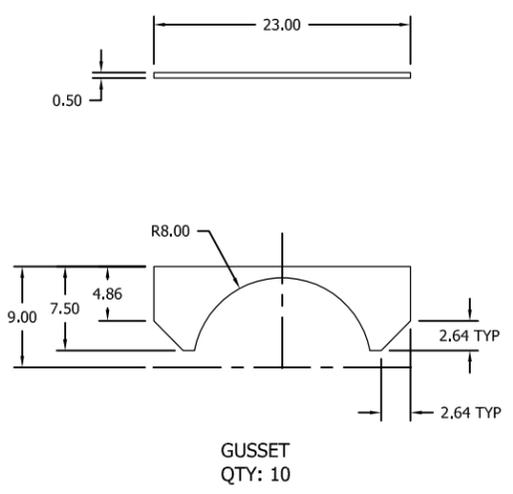
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LIMITS UNLESS OTHERWISE STATED TO EN 22768-1													
LINEAR TOL:						ANGULAR TOL:(SHORT SIDE OF ANGLE)							
OVER	0	0.23	1.18	4.72	15.748	39.3	78.7	OVER	0	10	50	120	360
UPTO	0.23	1.18	4.72	15.748	39.3	78.7	-	UPTO	10	50	120	360	-
TOL:	±0.03	±0.07	±0.11	±0.09	±0.081	±0.087	±0.078	TOL:	±1°	±0°30'	±0°20'	±0°10'	±0°5'

1. REMOVE ALL SHARP EDGES & BURRS
2. A RAD OR CHAMFER OF 0.3 MAX IS PERMITTED IN CORNERS OF BLIND HOLES RECESSES & STEPS.

SURFACE FINISH SYMBOLS TO BS.308 PT.2

1.6	TURNING	3.2	MILLING
-----	---------	-----	---------



REV	DATE	DESCRIPTION	DRN	CHKD	APPRVD	CLIENT APPRVD
1	06.18.10	ISSUED FOR REVIEW				

**2H offshore**

16010 BARKERS POINT LANE  
SUITE 120  
HOUSTON, TEXAS - 77079  
TEL: (1) 281 258 2000  
FAX: (1) 281 258 2099

PROJECT: MC252 CDP-2 RISER MODIFICATION

TITLE: FLEXIBLE JUMPER CLAMP GA

**bp**

3RD ANGLE PROJECTION

DIMENSIONS ARE IN Inches UNLESS OTHERWISE STATED

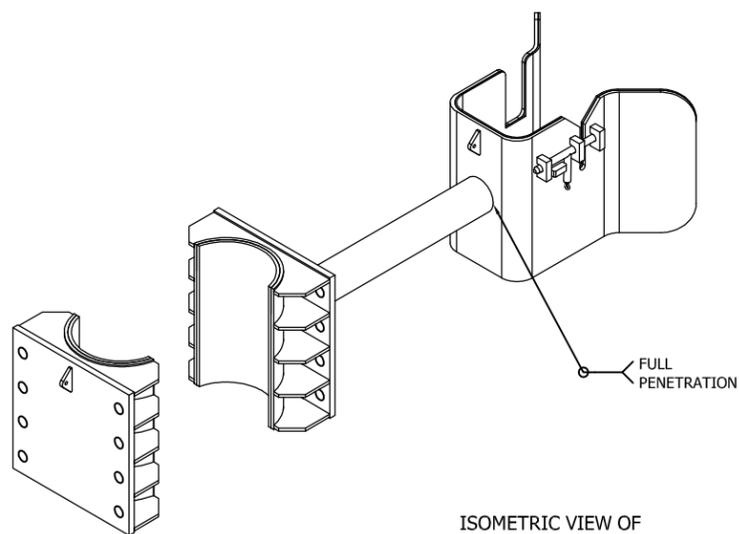
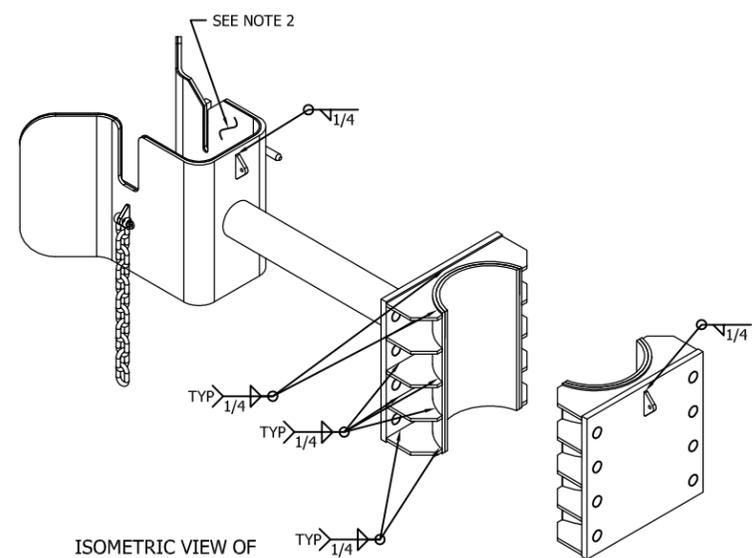
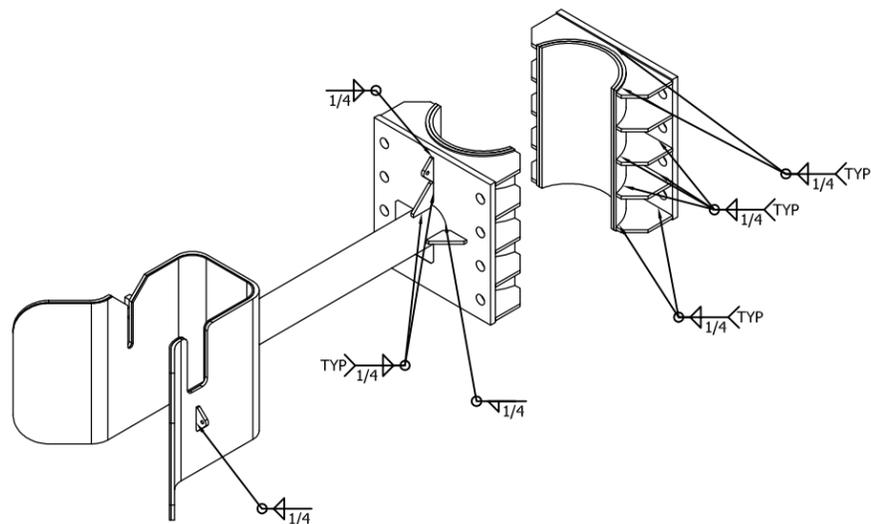
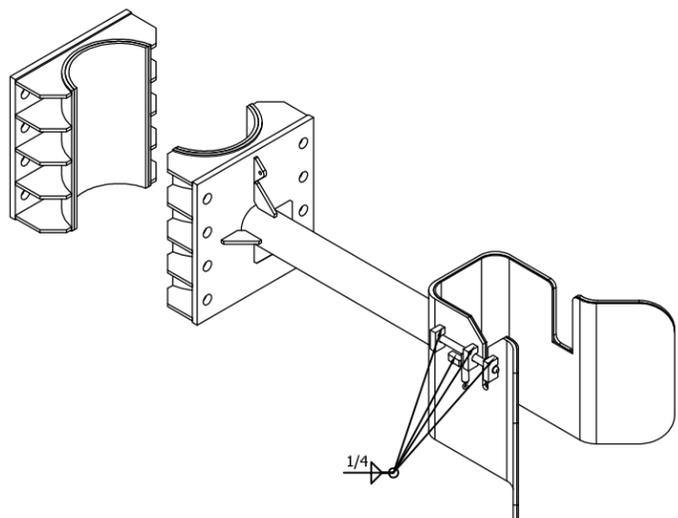
ACCORDANCE WITH ASME Y14.5M-1994

SCALE: NTS

REV: 1

SHT 2 OF 3

3837-DGA-3015



ISOMETRIC VIEW OF FLEXIBLE JUMPER CLAMP (FASTENERS OMITTED FOR CLARITY)

ISOMETRIC VIEW OF FLEXIBLE JUMPER CLAMP (FASTENERS OMITTED FOR CLARITY)

NOTES:  
SEE SEET 1 FOR NOTES

**2H offshore**  
16010 BARKERS POINT LANE  
SUITE 120  
HOUSTON, TEXAS - 77079  
TEL: (1) 281 258 2000  
FAX: (1) 281 258 2099



PROJECT  
MC252 CDP-2 RISER MODIFICATION

3RD ANGLE PROJECTION

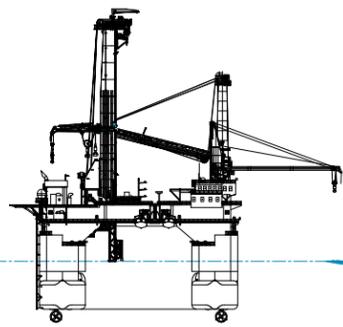
DIMENSIONS ARE IN Inches UNLESS OTHERWISE STATED

TITLE  
FLEXIBLE JUMPER CLAMP GA

ACCORDANCE WITH ASME Y14.5M-1994 SCALE: NTS REV: 1 SHT 3 OF 3

3837-DGA-3015

REV	DATE	DESCRIPTION	DRN	CHKD	APPRVD	CLIENT APPRVD
1	06.18.10	ISSUED FOR REVIEW	PC	SL	RT	--



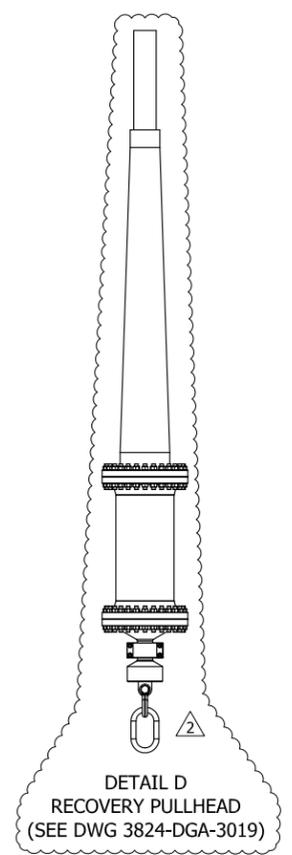
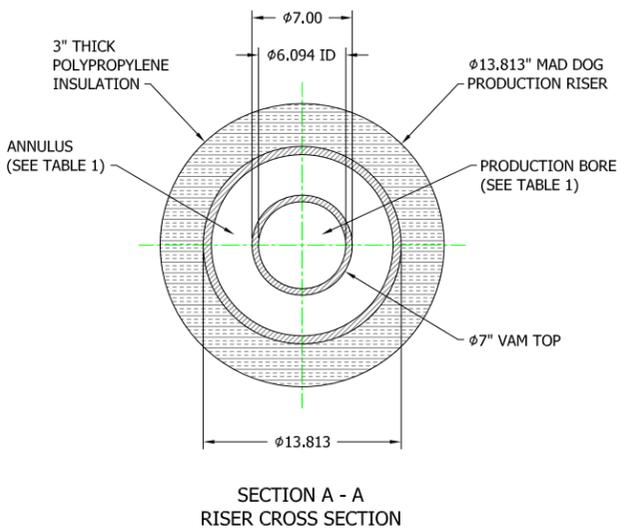
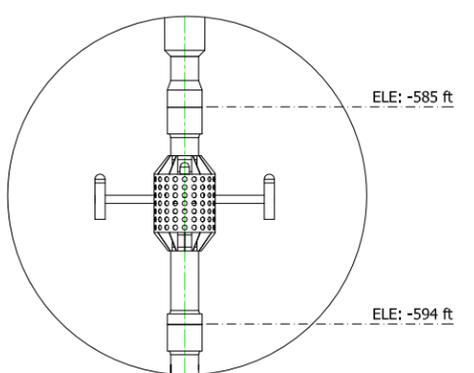
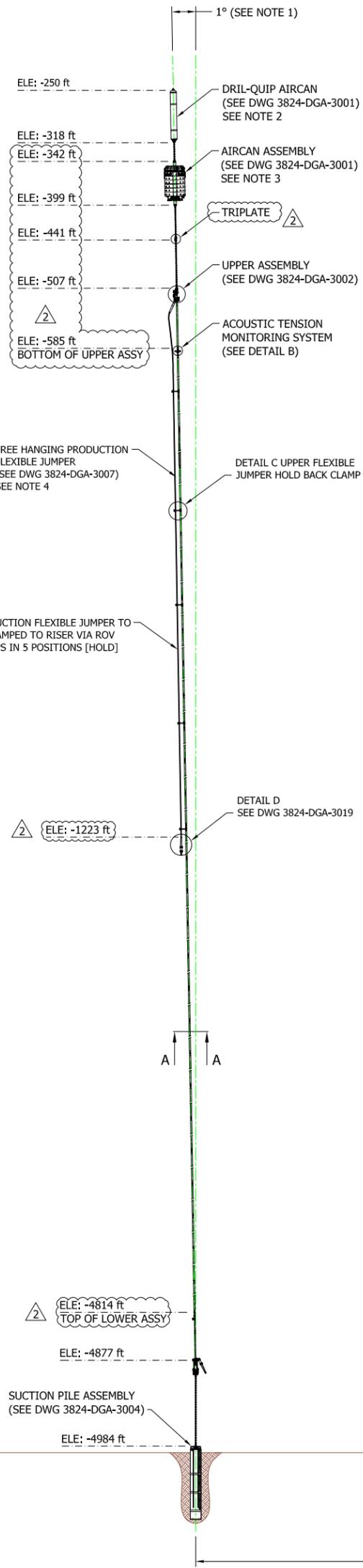
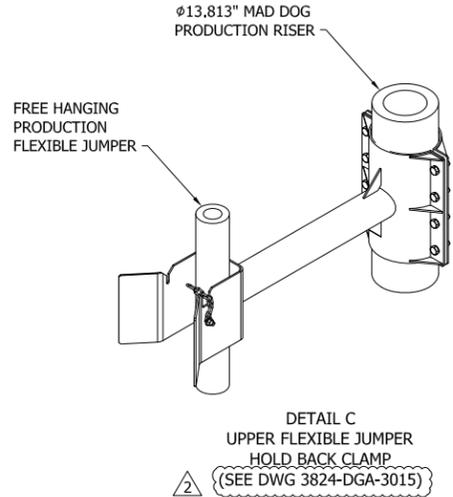
- NOTES:
- FROM NOMINAL POSITION
  - Ø93" x 64 ft LENGTH DRIL-QUIP AIRCAN
  - Ø26.5 ft x 44.75 ft LENGTH SBM TLP TENDON AIRCAN
  - PRODUCTION FLEXIBLE JUMPER COMPRISES: 6" ID FLEXIBLE PIPE, 700 ft LENGTH AND 6" x 4" REDUCER.

FLEXIBLE PIPE PRESSURE DATA			
TYPE	MAOP (1) (psi)	TEST (psi)	BURST (psi)
6" ID	5,500	8,250	12,980
4" ID	10,000	15,000	-
(1) MAXIMUM OPERATING PRESSURE			

MSL, ELE: 0,0 ft

TABLE 1 - RISER CONDITION		
RISER BORE	WATER	AIR
RISER ANNULUS	AIR FILLED	AIR
PRODUCTION FLEXIBLE JUMPER	FREE HANGING WITH 6" x 4" REDUCER (1)	FREE HANGING WITH 6" x 4" REDUCER (1)
AIRCAN (2)	FULLY AIRED	FULLY AIRED
CHAMBER REDUNDANCY	1	2

(1) FREE HANGING FLEXIBLE EXCLUDES 4" ID FLEXIBLE PIPE  
(2) 6 + 1 CHAMBERS



REV	DATE	DESCRIPTION	DRN	CHKD	APPRVD	CLIENT APPRVD
2	06.01.10	ISSUED FOR REVIEW				
1	05.28.10	ISSUED FOR REVIEW				

**2H offshore**

16010 BARKERS POINT LANE  
SUITE 120  
HOUSTON, TEXAS - 77079  
TEL: (1) 281 258 2000  
FAX: (1) 281 258 2099

PROJECT  
MC252 CDP RISER MODIFICATION

TITLE  
SYSTEM CONFIGURATION GA  
INSTALLATION

**bp**

3RD ANGLE PROJECTION

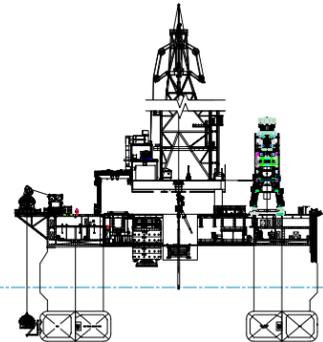
ACCORDANCE WITH ASME Y14.5M-1994

SCALE: NTS

REV: 2

SHT 1 OF 1

3824-DGA-0007



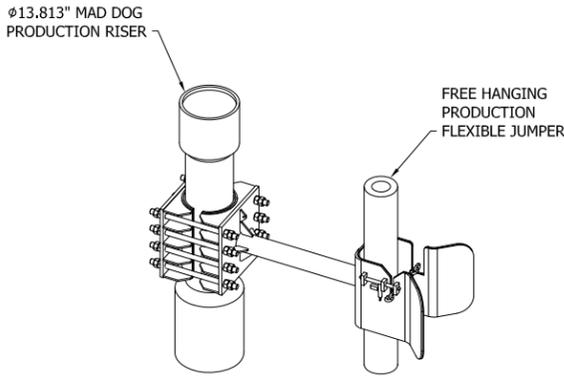
**NOTES:**

1.  $\phi 93"$  x 64 ft LENGTH DRIL-QUIP AIRCAN
2.  $\phi 26.5$  ft x 44.75 ft LENGTH SBM TLP TENDON AIRCAN
3. PRODUCTION FLEXIBLE JUMPER COMPRISES: 6" ID FLEXIBLE PIPE, 700 ft LENGTH AND 6" x 4" REDUCER.

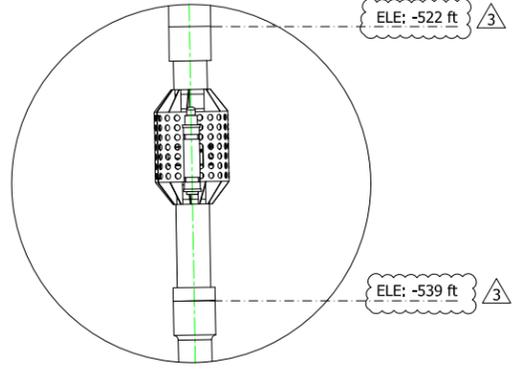
FLEXIBLE PIPE PRESSURE DATA			
TYPE	MAOP (1) (psi)	TEST (psi)	BURST (psi)
6" ID	5,500	8,250	12,980
4" ID	15,000	22,500	34,212
(1) MAXIMUM ALLOWABLE OPERATING PRESSURE			

TABLE 1 - RISER CONDITION		
RISER BORE	WATER	AIR
RISER ANNULUS	WATER (3)	AIR
PRODUCTION FLEXIBLE JUMPER	FREE HANGING WITH 6" x 4" REDUCER (1)	FREE HANGING WITH 6" x 4" REDUCER (1)
AIRCAN (2)	FULLY AIRED	FULLY AIRED
CHAMBER REDUNDANCY	1	2
(1) FREE HANGING FLEXIBLE EXCLUDES 4" ID FLEXIBLE PIPE		
(2) 6 + 1 CHAMBERS		

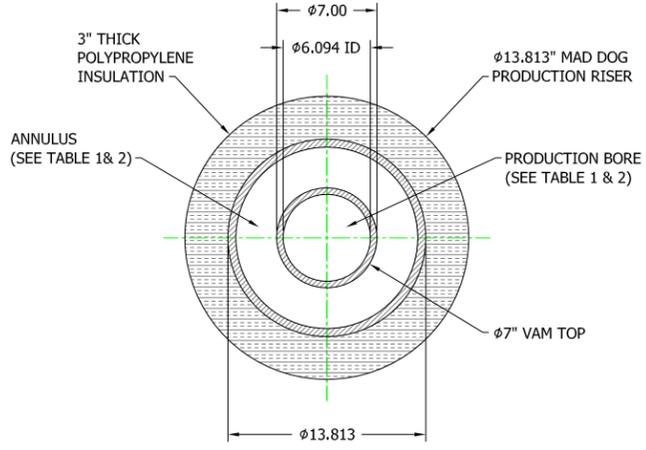
TABLE 2 - TEST PRESSURE DATA		
	PRODUCTION BORE (psi)	ANNULUS (psi)
FAT MINIMUM TEST PRESSURE	7,500	-
INFIELD SYSTEM TEST PRESSURE	7,125 (1)	3,000
(1) INFIELD PRESSURE TEST TO BE PERFORMED ON COMPLETION OF MANIFOLD INSTALLATION, FLEXIBLE JUMPER CONNECTION TO BOP AND RISER		



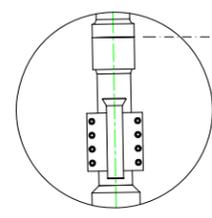
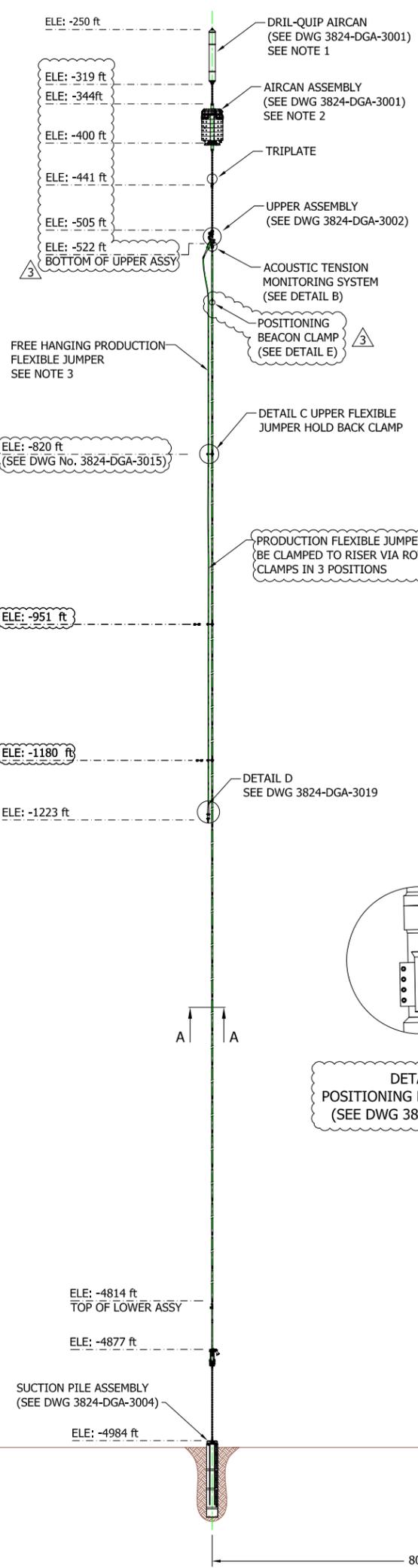
**DETAIL C**  
UPPER FLEXIBLE JUMPER HOLD BACK CLAMP  
VIEW ROTATED FOR CLARITY OF CHAIN LOCKING PIN  
(SEE DWG 3824-DGA-3015)



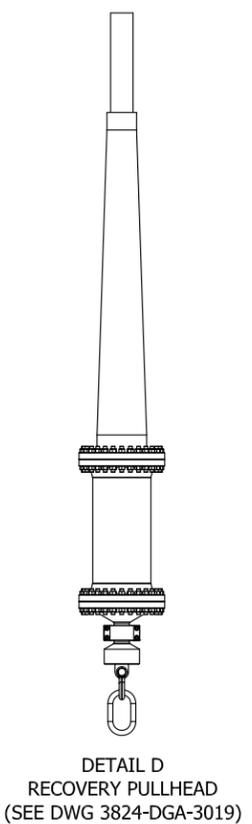
**DETAIL B**  
ACOUSTIC TENSION MONITORING STATION  
(SEE DWG 3824-DGA-3016)



**SECTION A - A**  
RISER CROSS SECTION



**DETAIL E**  
POSITIONING BEACON CLAMP  
(SEE DWG 3824-DGA-3020)



**DETAIL D**  
RECOVERY PULLHEAD  
(SEE DWG 3824-DGA-3019)

MUDLINE, ELE: -4992 ft

800 ft [HOLD]

REV	DATE	DESCRIPTION	DRN	CHKD	APPRVD	CLIENT APPRVD
3	06.05.10	ISSUED FOR REVIEW	AF	WF	RT	-
2	06.01.10	ISSUED FOR REVIEW	TD	PP	RT	-
1	05.28.10	ISSUED FOR REVIEW	TD	PP	RT	-

**2H offshore**

16010 BARKERS POINT LANE  
SUITE 120  
HOUSTON, TEXAS - 77079  
TEL: (1) 281 258 2000  
FAX: (1) 281 258 2099

PROJECT: MC252 CDP RISER MODIFICATION

TITLE: SYSTEM CONFIGURATION GA INSTALLATION

**bp**

3RD ANGLE PROJECTION

ACCORDANCE WITH ASME Y14.5M-1994

SCALE: NTS

REV: 3

SHT 1 OF 1

3824-DGA-0007