Submit 1 Copy To Appropriate District Office
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised July 18, 2013

WELL API NO.
30-025-46505

5. Indicate Type of Lease
STATE ☒ FEE ☐

6. State Oil & Gas Lease No.
VB-2117

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well: Oil Well ☒ Gas Well ☐ Other

7. Lease Name or Unit Agreement Name
Parade State Com

8. Well Number 603H

2. Name of Operator
Franklin Mountain Energy, LLC

9. OGRID Number 393710

3. Address of Operator
44 Cook Street, Suite 1000, Denver CO 80206

10. Pool name or Wildcat: 98185; WC-025 G-09 S253502B; LWR BONE SPRING

4. Well Location
Unit Letter B : 675 feet from the North line and 2624 feet from the East line
Section 2 Township 25S Range 35E NMPM County Lea

11. Elevation *(Show whether DR, RKB, RT, GR, etc.)*
3244'

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
PERFORM REMEDIAL WORK	☐	PLUG AND ABANDON	☐	REMEDIAL WORK	☐	ALTERING CASING	☐
TEMPORARILY ABANDON	☐	CHANGE PLANS	☒	COMMENCE DRILLING OPNS.	☐	P AND A	☐
PULL OR ALTER CASING	☐	MULTIPLE COMPL	☐	CASING/CEMENT JOB	☐		
DOWNHOLE COMMINGLE	☐						
CLOSED-LOOP SYSTEM	☐						
OTHER:	☐			OTHER:			☐

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Franklin Mountain Energy, LLC (FME), Operator, respectfully requests approval to make the following changes to the proposed drilling plan for the above referenced well:

BHL Change: FME requests approval to change the BHL for this well to 150' FSL 2260' FEL Sec 11 25S 35E SHL remains the same. Please see attached Plan#3, revised casing & cement plans, geo prog and plats including C-102.

Production Casing: FME would like approval to utilize 5.5 inch Anaconda 656 23lb. P-110 in the drilling of this bore. Please see attached data sheet and revised casing design.

WH: A multi-bowl wellhead system will be utilized while drilling; FME would like approval to use the attached multi-bowl Cactus WH running procedure.

Spud Date: Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Rachael Overbey TITLE Dir. Ops Planning & Regulatory DATE 10/15/2020

Type or print name Rachael Overbey E-mail address: roverbey@fmellc.com PHONE: 303-570-4057

For State Use Only

APPROVED BY: TITLE DATE **12/14/2020**

Conditions of Approval (if any):

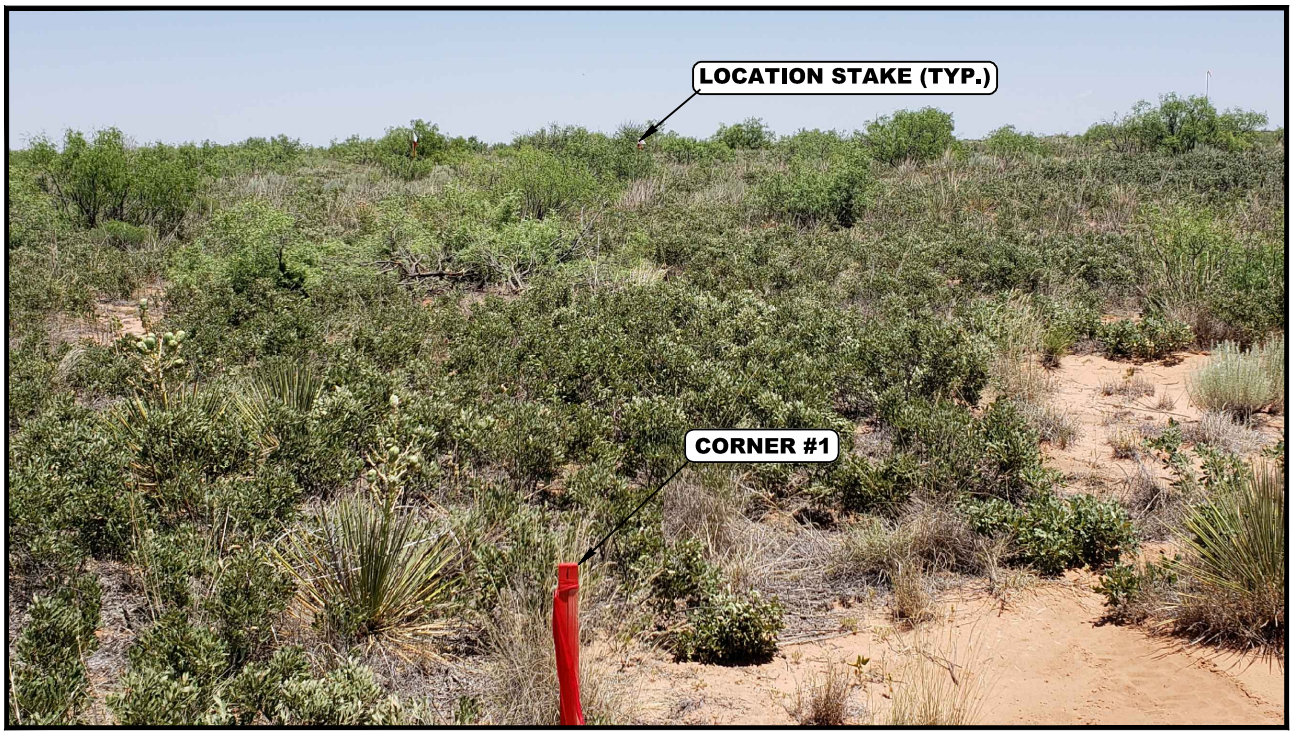


PHOTO: VIEW FROM CORNER #1 TO LOCATION STAKES CAMERA ANGLE: NORTHERLY

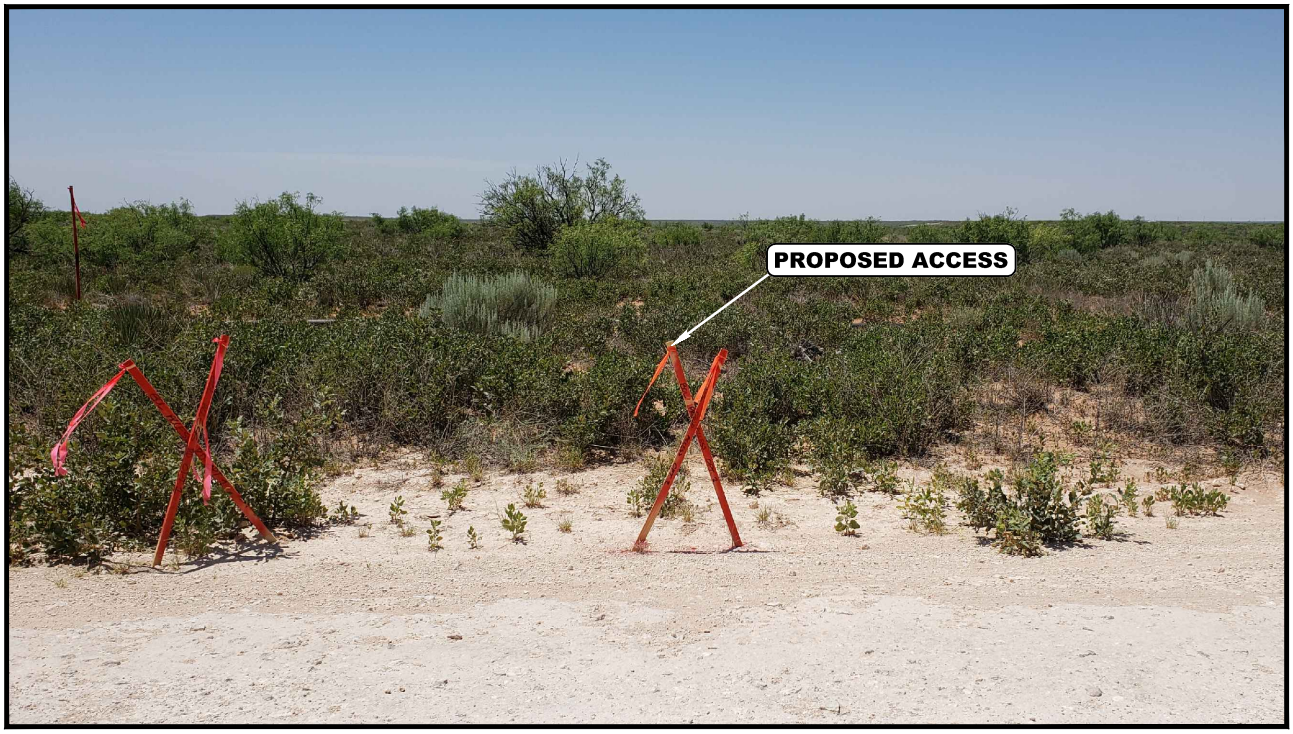


PHOTO: VIEW FROM BEGINNING OF PROPOSED ACCESS CAMERA ANGLE: SOUTHERLY

FRANKLIN MOUNTAIN ENERGY LLC

BLUE RIBBON FED COM 703H &
PARADE STATE 603H
LOTS 2 & 3, SECTION 2, T25S, R35E, N.M.P.M.
LEA COUNTY, NEW MEXICO

TAKEN BY	S.R., I.R.	06-19-19	
DRAWN BY	D.J.S.	06-21-19	
LOCATION PHOTOS			PHOTO

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-025-46505	98185	WC-025 G-09 S253502B;LWR BONE SPRING

[4] Property Code	[5] Property Name	[6] Well Number
326234	PARADE STATE COM	603H

[7] OGRID No.	[8] Operator Name	[9] Elevation
373910	FRANKLIN MOUNTAIN ENERGY LLC	3244.0'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
2	2	25S	35E		675	NORTH	2624	EAST	LEA

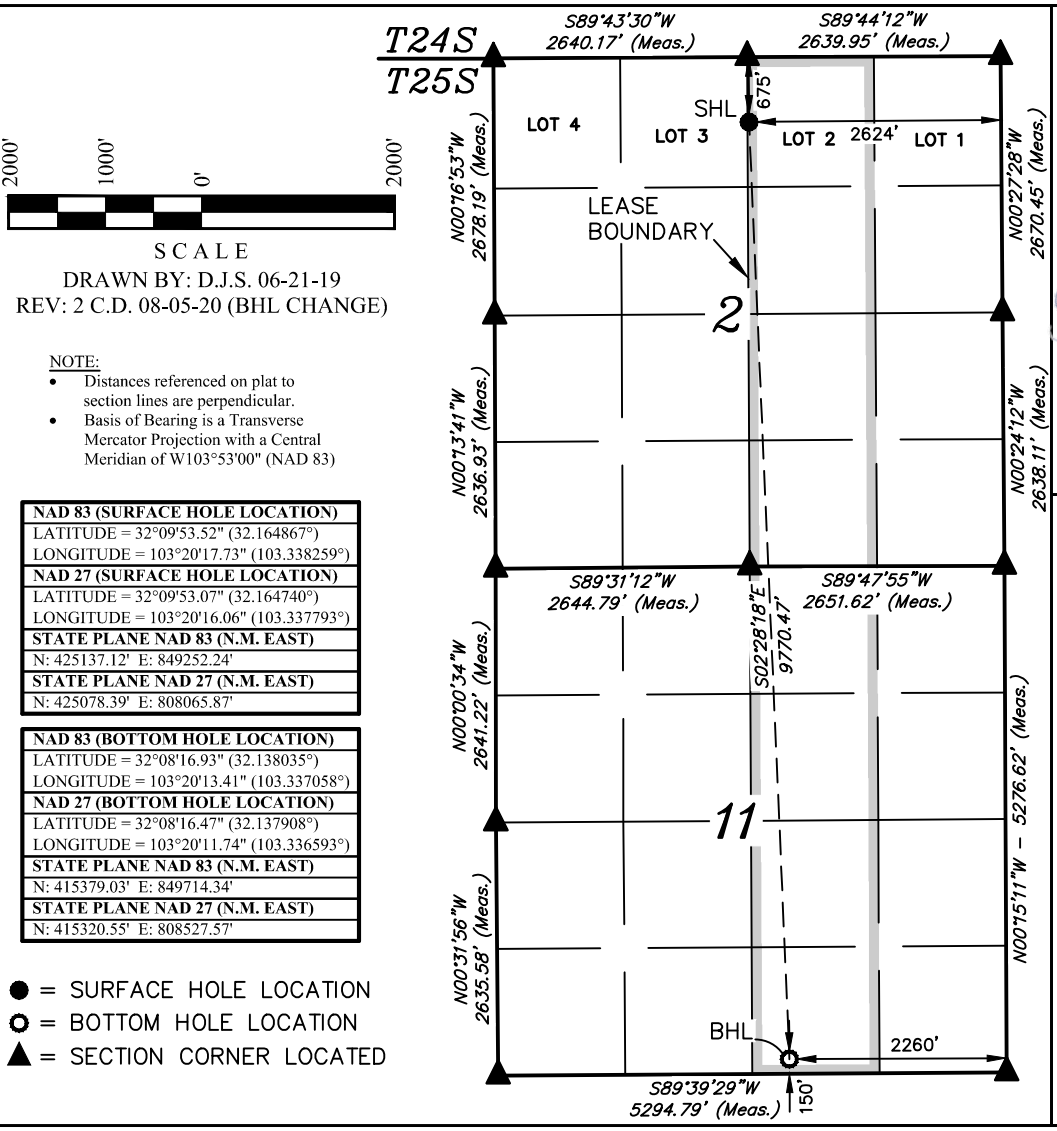
[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
O	11	25S	35E		150	SOUTH	2260	EAST	LEA

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320.85			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

[16]



SCALE
DRAWN BY: D.J.S. 06-21-19
REV: 2 C.D. 08-05-20 (BHL CHANGE)

NOTE:
- Distances referenced on plat to section lines are perpendicular.
- Basis of Bearing is a Transverse Mercator Projection with a Central Meridian of W103°53'00" (NAD 83)

NAD 83 (SURFACE HOLE LOCATION)
LATITUDE = 32°09'53.52" (32.164867°)
LONGITUDE = 103°20'17.73" (103.338259°)
NAD 27 (SURFACE HOLE LOCATION)
LATITUDE = 32°09'53.07" (32.164740°)
LONGITUDE = 103°20'16.06" (103.337793°)
STATE PLANE NAD 83 (N.M. EAST)
N: 425137.12' E: 849252.24'
STATE PLANE NAD 27 (N.M. EAST)
N: 425078.39' E: 808065.87'

NAD 83 (BOTTOM HOLE LOCATION)
LATITUDE = 32°08'16.93" (32.138035°)
LONGITUDE = 103°20'13.41" (103.337058°)
NAD 27 (BOTTOM HOLE LOCATION)
LATITUDE = 32°08'16.47" (32.137908°)
LONGITUDE = 103°20'11.74" (103.336593°)
STATE PLANE NAD 83 (N.M. EAST)
N: 415379.03' E: 849714.34'
STATE PLANE NAD 27 (N.M. EAST)
N: 415320.55' E: 808527.57'

● = SURFACE HOLE LOCATION
○ = BOTTOM HOLE LOCATION
▲ = SECTION CORNER LOCATED

[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

8/10/2020
Signature Date

Shelly Albrecht
Printed Name

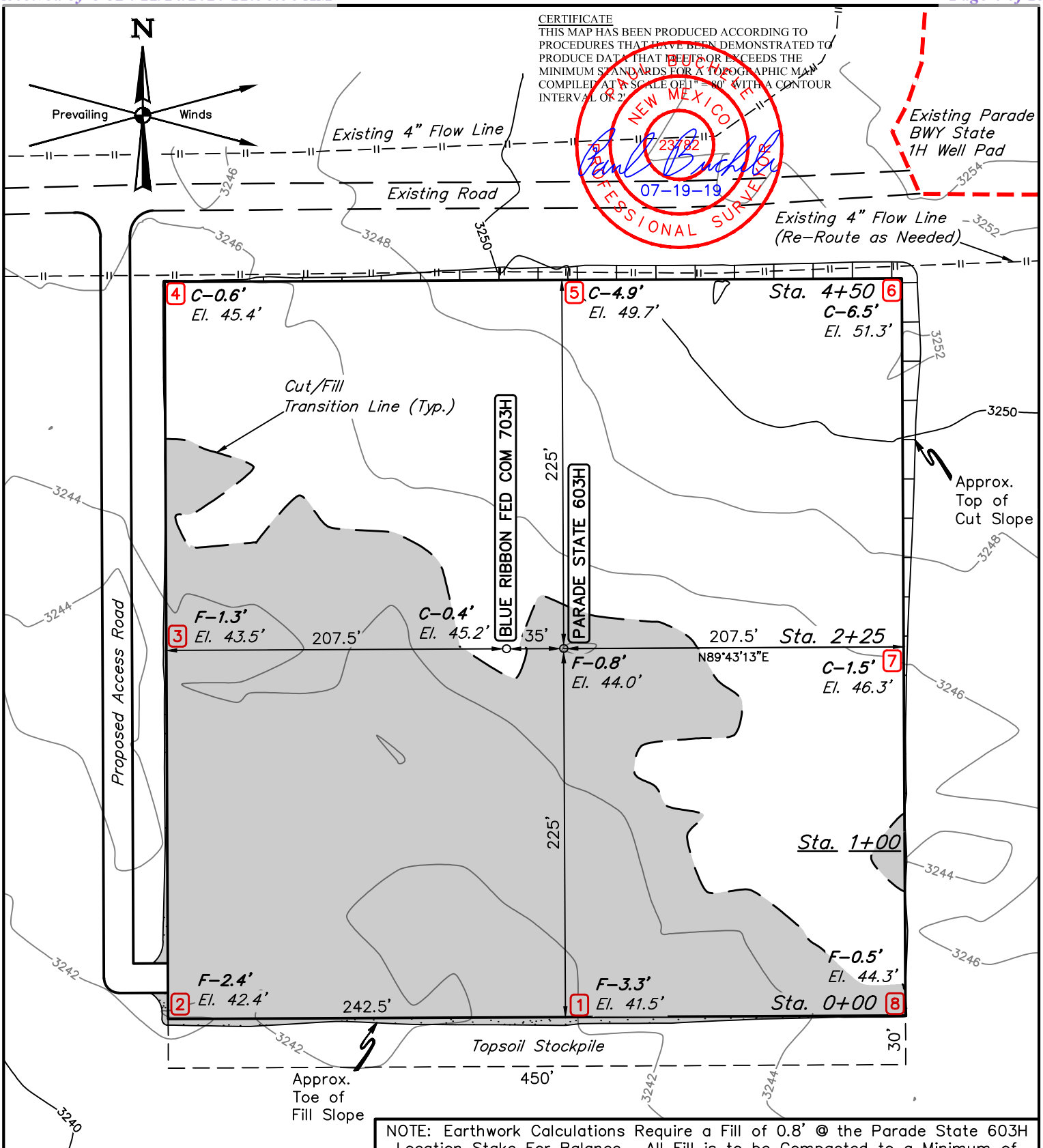
salbrecht@fmellc.com
E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

June 19, 2019
Date of Survey
Signature and Seal of Professional Surveyor:

Certificate Number:



FINISHED GRADE ELEVATION = **3244.8'**

NOTE: Earthwork Calculations Require a Fill of 0.8' @ the Parade State 603H Location Stake For Balance. All Fill is to be Compacted to a Minimum of 95% of the Maximum Dry Density Obtained by AASHTO Method t-99.

NOTES:

- Contours shown at 2' intervals.
- Underground utilities shown on this sheet are for visualization purposes only, actual locations to be determined prior to construction.
- Cut/Fill slopes 1 1/2:1 (Typ.)
- Basis of Bearings is a Transverse Mercator Projection with a Central Meridian of W103°53'00"

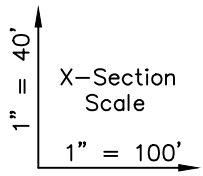
UINTAH ENGINEERING & LAND SURVEYING

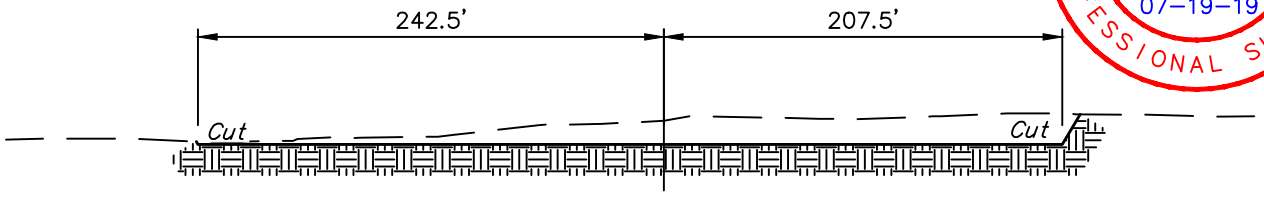
UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017

FRANKLIN MOUNTAIN ENERGY LLC

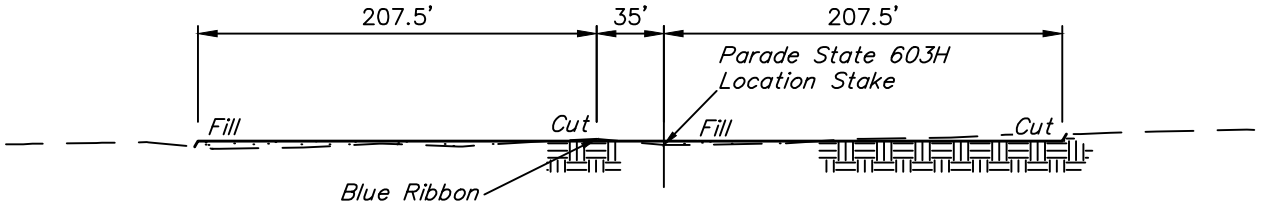
BLUE RIBBON FED COM 703H & PARADE STATE 603H
LOTS 2 & 3, SECTION 2, T25S, R35E, N.M.P.M.
LEA COUNTY, NEW MEXICO

SURVEYED BY	S.R., I.R.	06-19-19	SCALE
DRAWN BY	D.J.S.	06-21-19	1" = 80'
LOCATION LAYOUT			FIGURE #1

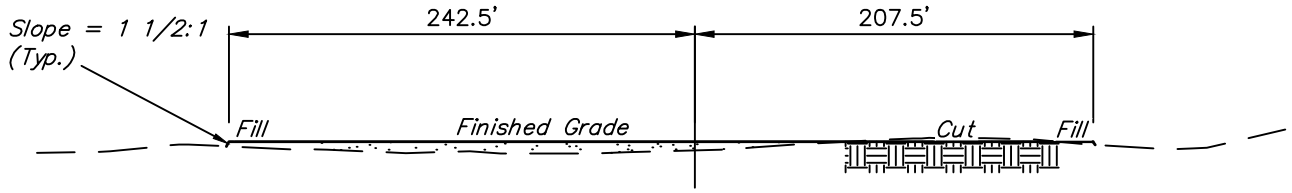




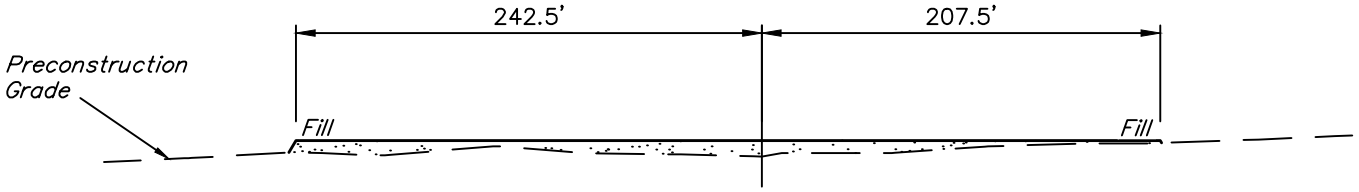
STA. 4+50



STA. 2+25



STA. 1+00



STA. 0+00

APPROXIMATE EARTHWORK QUANTITIES	
(6") TOPSOIL STRIPPING	3,880 Cu. Yds.
REMAINING LOCATION	7,150 Cu. Yds.
TOTAL CUT	**11,030 Cu. Yds.**
FILL	**7,150 Cu. Yds.**
EXCESS MATERIAL	3,880 Cu. Yds.
TOPSOIL	3,880 Cu. Yds.
EXCESS UNBALANCE (After Interim Rehabilitation)	**0 Cu. Yds.**

APPROXIMATE SURFACE DISTURBANCE AREAS		
	DISTANCE	**ACRES**
WELL SITE DISTURBANCE	NA	±5.082
30' WIDE ACCESS ROAD R-O-W DISTURBANCE	±506.58'	±0.349
TOTAL SURFACE USE AREA		**±5.431**

NOTES:

- Fill quantity includes 5% for compaction.

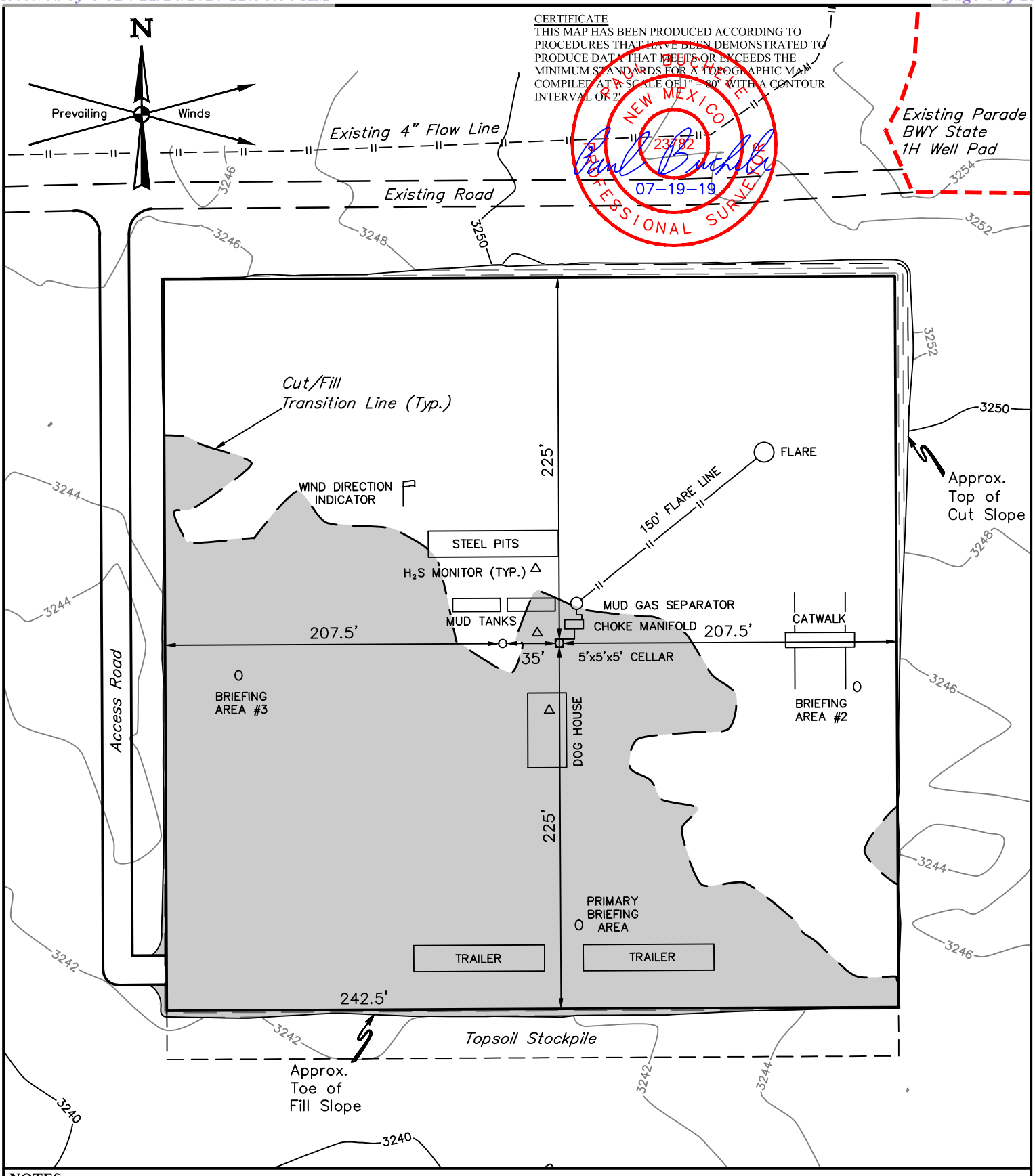
FRANKLIN MOUNTAIN ENERGY LLC

BLUE RIBBON FED COM 703H &
PARADE STATE 603H
LOTS 2 & 3, SECTION 2, T25S, R35E, N.M.P.M.
LEA COUNTY, NEW MEXICO

SURVEYED BY	S.R., I.R.	06-19-19	**SCALE**
DRAWN BY	D.J.S.	06-21-19	AS SHOWN
TYPICAL CROSS SECTIONS			**FIGURE #2**

UINTAH ENGINEERING & LAND SURVEYING

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017



NOTES:

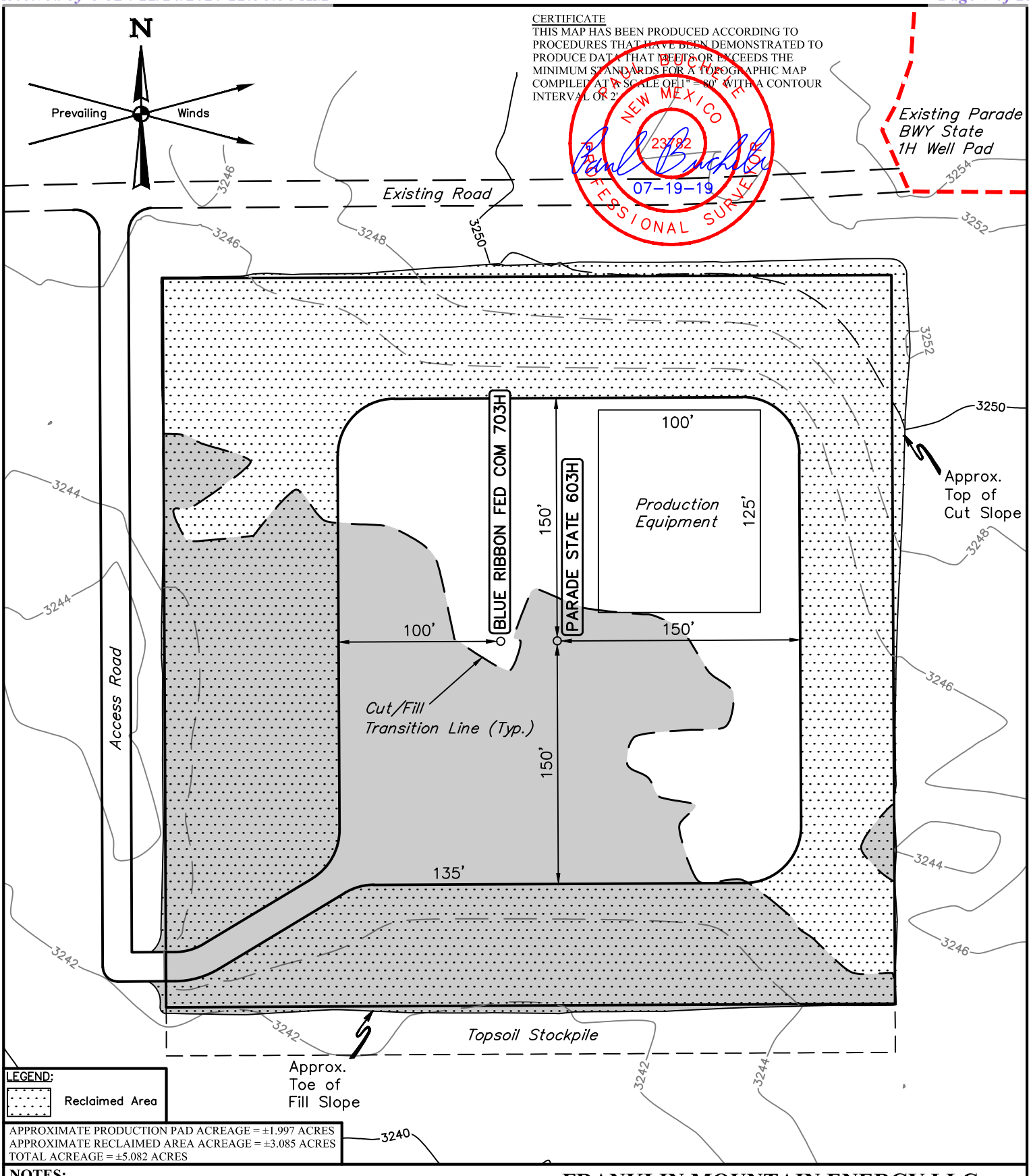
- Contours shown at 2' intervals.

FRANKLIN MOUNTAIN ENERGY LLC

BLUE RIBBON FED COM 703H & PARADE STATE 603H
LOTS 2 & 3, SECTION 2, T25S, R35E, N.M.P.M.
LEA COUNTY, NEW MEXICO

SURVEYED BY	S.R., I.R.	06-19-19	SCALE
DRAWN BY	D.J.S.	06-21-19	1" = 80'
TYPICAL RIG LAYOUT			FIGURE #3

UINTAH ENGINEERING & LAND SURVEYING
UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017



NOTES:

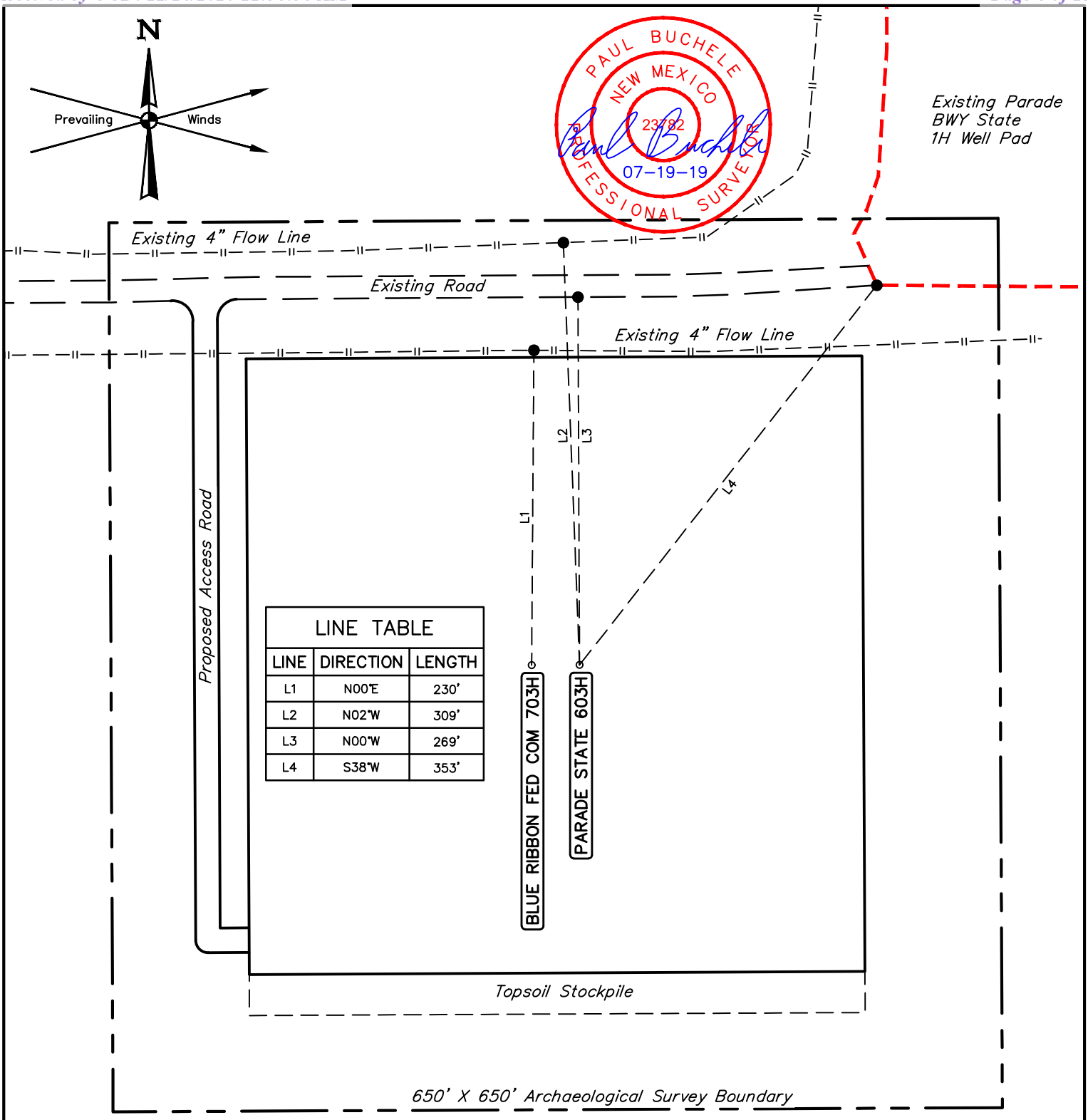
- Contours shown at 2' intervals.

FRANKLIN MOUNTAIN ENERGY LLC

BLUE RIBBON FED COM 703H &
PARADE STATE 603H
LOTS 2 & 3, SECTION 2, T25S, R35E, N.M.P.M.
LEA COUNTY, NEW MEXICO

SURVEYED BY	S.R., I.R.	06-19-19	SCALE
DRAWN BY	D.J.S.	06-21-19	1" = 80'
RECLAMATION DIAGRAM			FIGURE #4

UINTAH ENGINEERING & LAND SURVEYING
UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017



LINE TABLE		
LINE	DIRECTION	LENGTH
L1	N00°E	230'
L2	N02°W	309'
L3	N00°W	269'
L4	S38°W	353'

NOTES:
- Basis of Bearings is a Transverse Mercator Projection with a Central Meridian of W103°53'00"

FRANKLIN MOUNTAIN ENERGY LLC

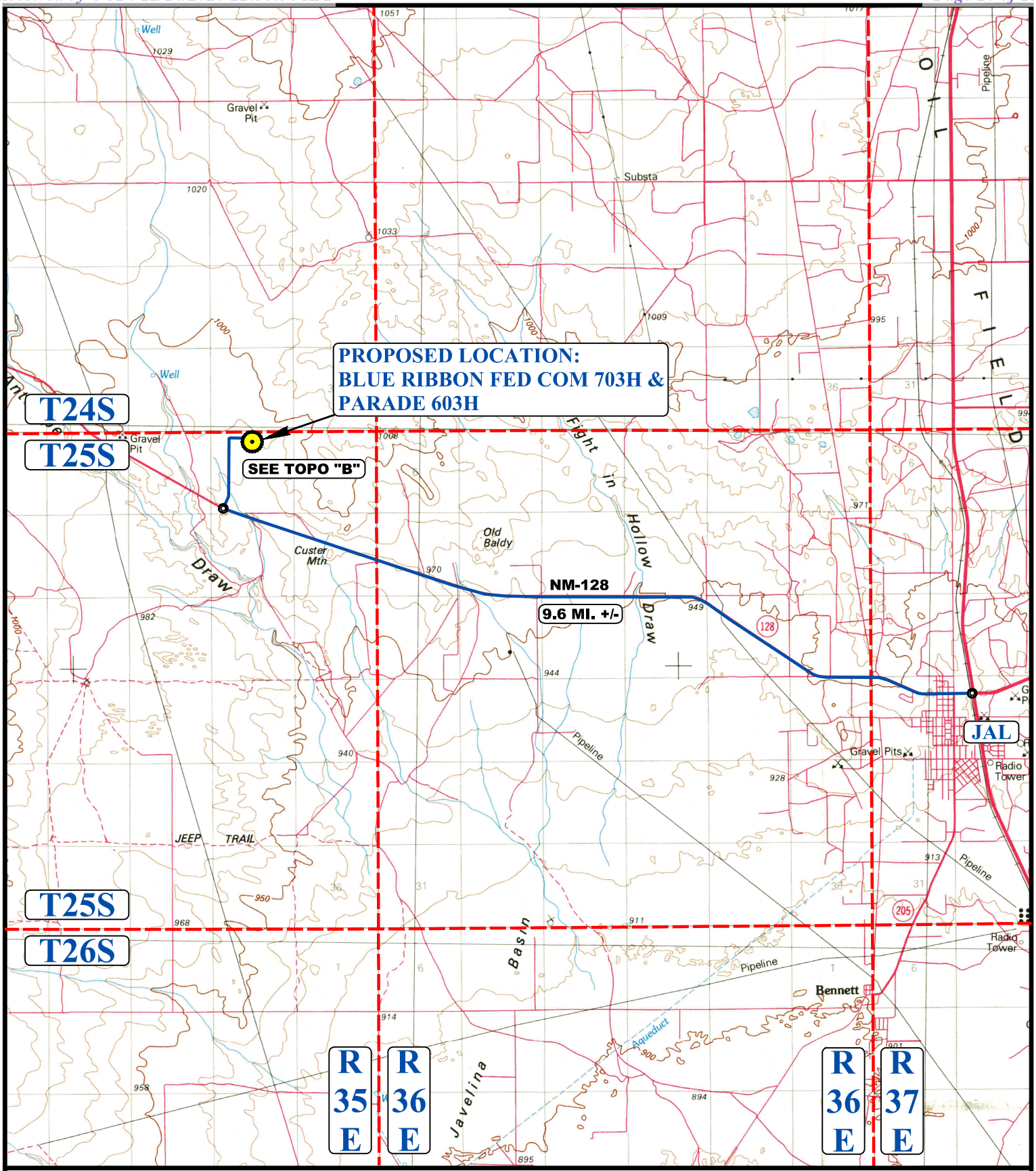
BLUE RIBBON FED COM 703H &
PARADE STATE 603H
LOTS 2 & 3, SECTION 2, T25S, R35E, N.M.P.M.
LEA COUNTY, NEW MEXICO

SURVEYED BY	S.R., I.R.	06-19-19	SCALE
DRAWN BY	D.J.S.	06-21-19	1" = 100'
ARCHAEOLOGICAL SURVEY BOUNDARY			FIGURE #5

UINTAH ENGINEERING & LAND SURVEYING
UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017

PROCEED IN A WESTERLY, THEN NORTHWESTERLY, THEN WESTERLY, THEN NORTHWESTERLY DIRECTION FROM JAL, NEW MEXICO ALONG NM-128 APPROXIMATELY 9.6 MILES TO THE JUNCTION OF THIS ROAD AND AN EXISTING ROAD TO THE NORTHEAST; TURN RIGHT AND PROCEED IN A NORTHEASTERLY, THEN NORTHERLY, THEN EASTERLY DIRECTION APPROXIMATELY 1.1 MILES TO THE BEGINNING OF THE PROPOSED ACCESS ROAD TO THE SOUTH; FOLLOW ROAD FLAGS IN A SOUTHERLY, THEN EASTERLY DIRECTION APPROXIMATELY 507' TO THE PROPOSED LOCATION.

TOTAL DISTANCE FROM JAL, NEW MEXICO TO THE PROPOSED WELL LOCATION IS APPROXIMATELY 10.8 MILES.



LEGEND:

PROPOSED LOCATION

N

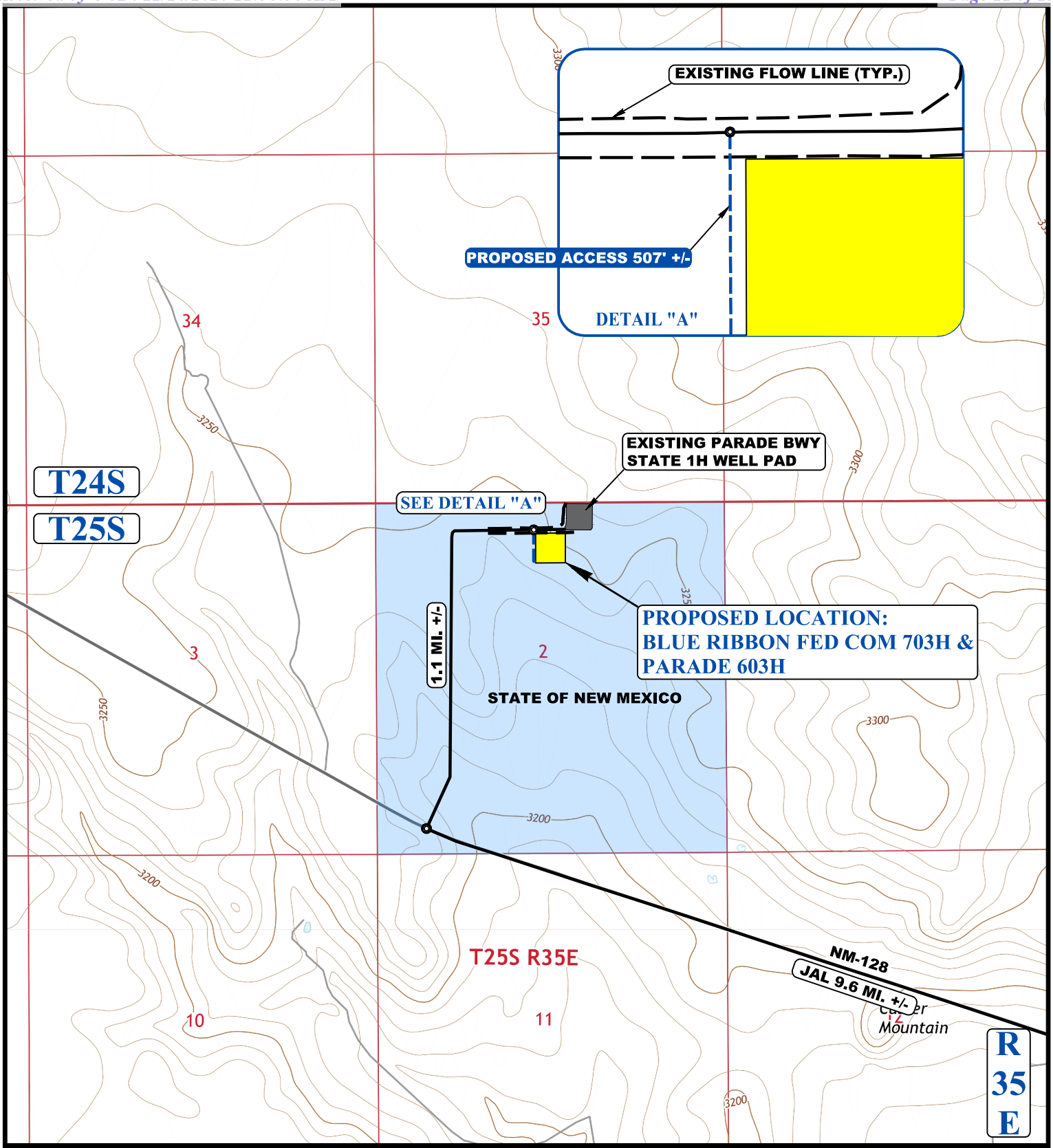
FRANKLIN MOUNTAIN ENERGY LLC

BLUE RIBBON FED COM 703H &
PARADE STATE 603H
LOTS 2 & 3, SECTION 2, T25S, R35E, N.M.P.M.
LEA COUNTY, NEW MEXICO

SURVEYED BY	S.R., I.R.	06-19-19	SCALE
DRAWN BY	D.J.S.	06-21-19	1 : 100,000
ACCESS ROAD MAP			TOPO A

UINTAH ENGINEERING & LAND SURVEYING

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017



NOTE: PARCEL DATA SHOWN HAS BEEN OBTAINED FROM VARIOUS SOURCES AND SHOULD BE USED FOR MAPPING, GRAPHIC AND PLANNING PURPOSES ONLY. NO WARRANTY IS MADE BY UINTAH ENGINEERING AND LAND SURVEYING (UELS) FOR ACCURACY OF THE PARCEL DATA.

LEGEND:

- EXISTING ROAD
- PROPOSED ROAD
- EXISTING FLOW LINE

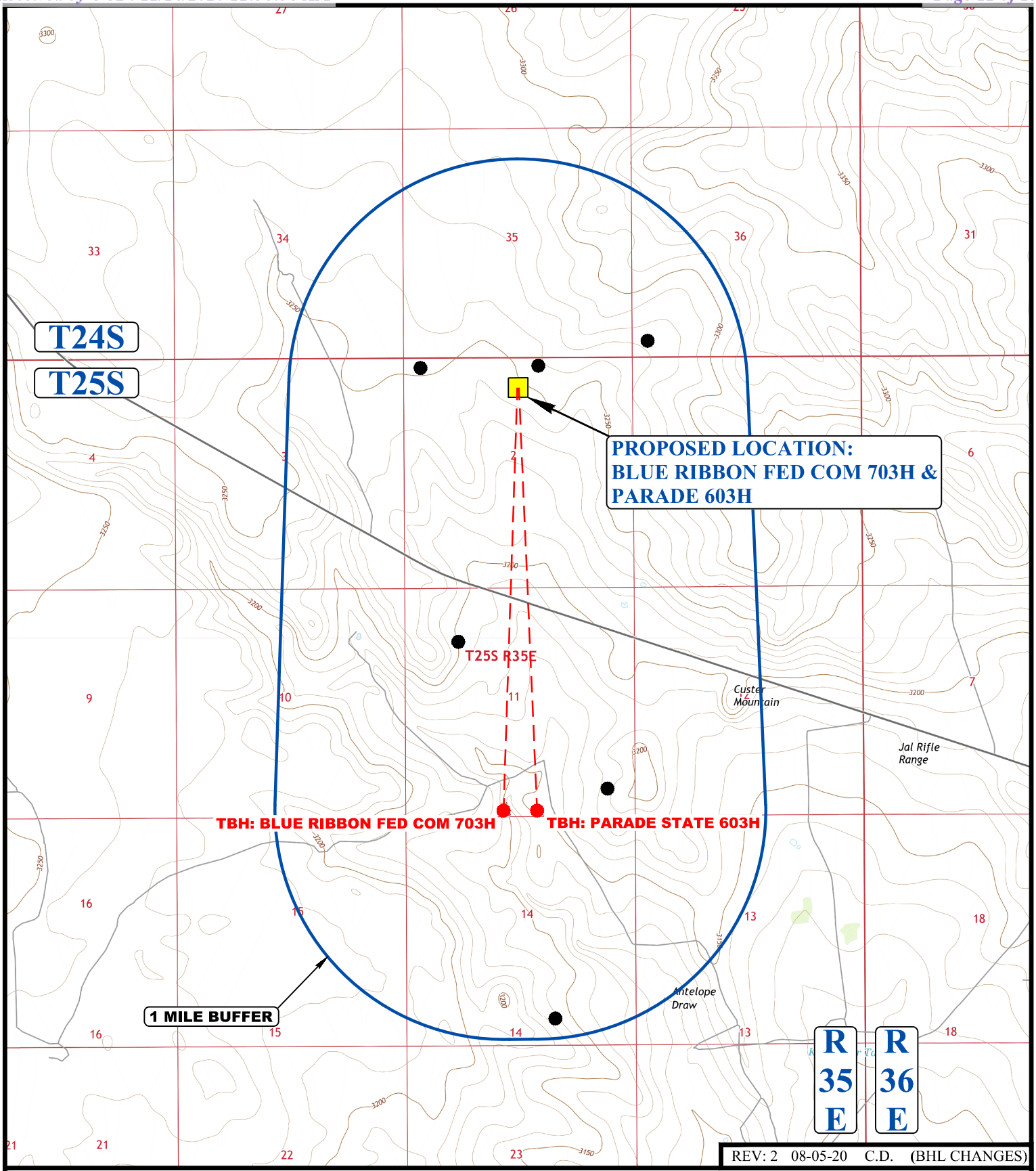
N

FRANKLIN MOUNTAIN ENERGY LLC

BLUE RIBBON FED COM 703H &
PARADE STATE 603H
LOTS 2 & 3, SECTION 2, T25S, R35E, N.M.P.M.
LEA COUNTY, NEW MEXICO

SURVEYED BY	S.R., I.R.	06-19-19	SCALE
DRAWN BY	D.J.S.	06-21-19	1 : 24,000
ACCESS ROAD MAP			TOPO B

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017



REV: 2 08-05-20 C.D. (BHL CHANGES)

LEGEND:

● EXISTING WELLS

N

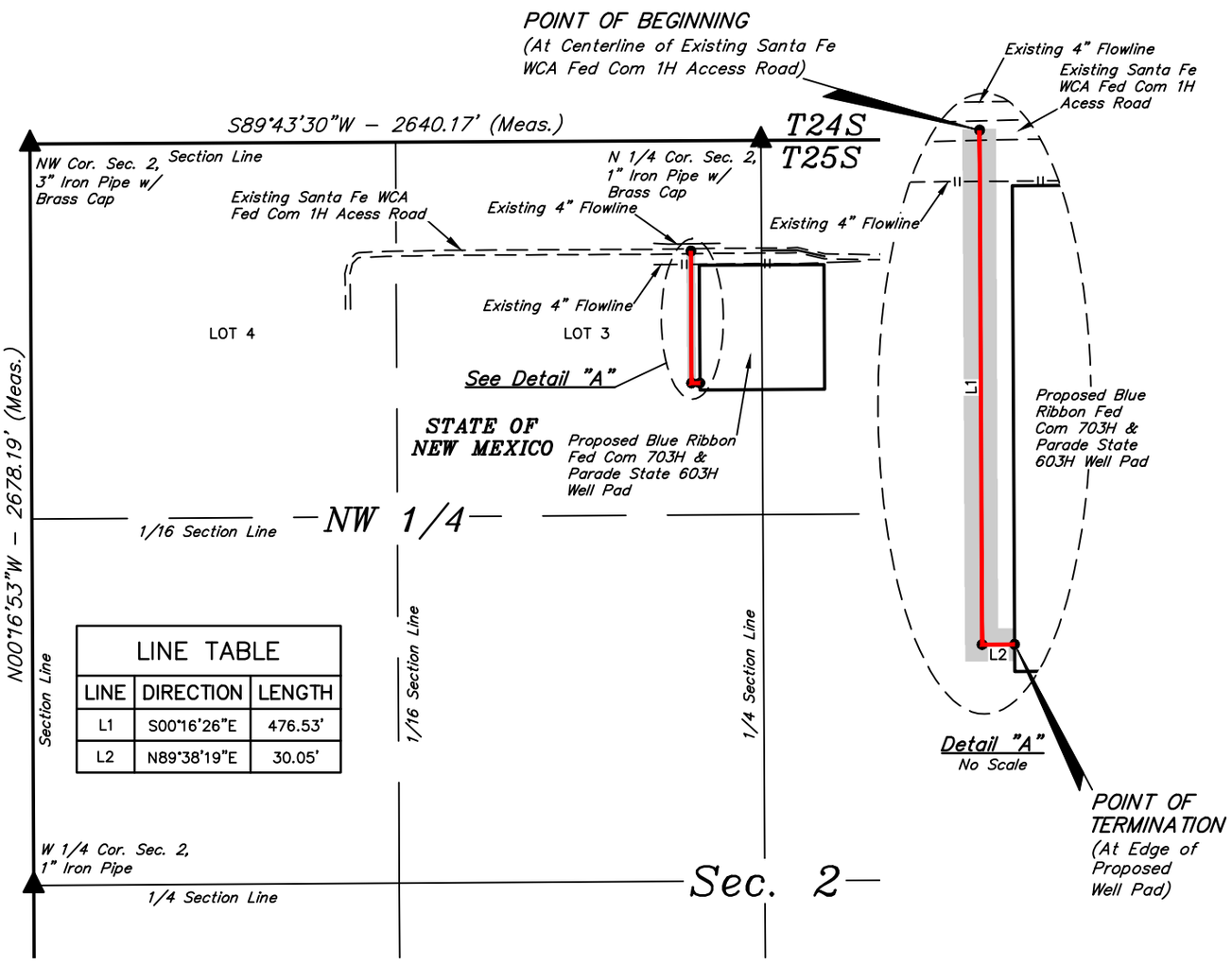
FRANKLIN MOUNTAIN ENERGY LLC

BLUE RIBBON FED COM 703H &
PARADE STATE 603H
LOTS 2 & 3, SECTION 2, T25S, R35E, N.M.P.M.
LEA COUNTY, NEW MEXICO

SURVEYED BY	S.R., I.R.	06-19-19	SCALE
DRAWN BY	D.J.S.	06-21-19	1 : 36,000
WELL PROXIMITY MAP			TOPO C

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017

UINTAH ENGINEERING & LAND SURVEYING

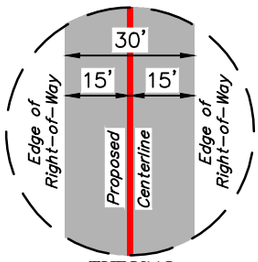


LINE TABLE		
LINE	DIRECTION	LENGTH
L1	S00°16'26"E	476.53'
L2	N89°38'19"E	30.05'

ROAD RIGHT–OF–WAY DESCRIPTION

A 30' WIDE RIGHT–OF–WAY 15' ON EACH SIDE OF THE FOLLOWING DESCRIBED CENTERLINE.

BEGINNING AT A POINT IN LOT 3 OF SECTION 2, T25S, R35E, N.M.P.M., WHICH BEARS S32°18'00"W 472.91' FROM THE NORTH 1/4 CORNER OF SAID SECTION 2, THENCE S00°16'26"E 476.53'; THENCE N89°38'19"E 30.05' TO A POINT IN LOT 3 OF SAID SECTION 2 AND THE POINT OF TERMINATION, WHICH BEARS S14°07'11"W 903.36' FROM THE NORTH 1/4 CORNER OF SAID SECTION 2. THE SIDE LINES OF SAID DESCRIBED RIGHT–OF–WAY BEING SHORTENED OR ELONGATED TO MEET THE GRANTOR'S PROPERTY LINES. BASIS OF BEARINGS IS A TRANSVERSE MERCATOR PROJECTION WITH A CENTRAL MERIDIAN OF W103°53'00". CONTAINS 0.349 ACRES MORE OR LESS.



TYPICAL RIGHT–OF–WAY DETAIL
NO SCALE

POINT OF BEGINNING BEARS S32°18'00"W 472.91' FROM THE NORTH 1/4 CORNER OF SECTION 2, T25S, R35E, N.M.P.M.

POINT OF TERMINATION BEARS S14°07'11"W 903.36' FROM THE NORTH 1/4 CORNER OF SECTION 2, T25S, R35E, N.M.P.M.

600' 250' 0' 600'

ACREAGE / LENGTH TABLE			
LOCATION	FEET	RODS	ACRES
SEC. 2 (LOT 3)	506.58	30.70	0.349

▲ = SECTION CORNERS LOCATED.

CERTIFICATE
THIS IS TO CERTIFY THAT THIS EASEMENT PLAT AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

STATE OF NEW MEXICO
23782
PROFESSIONAL SURVEYOR
07–19–19

FILE: F-427-A1

NOTES:
- The maximum grade of existing ground for the proposed access road is ±1.20%.
- Basis of Bearings is a Transverse Mercator Projection with a Central Meridian of W103°53'00"

N

FRANKLIN MOUNTAIN ENERGY LLC
BLUE RIBBON FED COM 703H & PARADE STATE 603H
ON STATE OF NEW MEXICO LANDS IN SECTION 2, T25S, R35E, N.M.P.M. LEA COUNTY, NEW MEXICO

SURVEYED BY	S.R., I.R.	06-19-19	SCALE
DRAWN BY	J.P.P.	07.19-19	1" = 600'

ACCESS ROAD R-O-W

UINTAH ENGINEERING & LAND SURVEYING
UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017

Franklin Mountain Energy

Project: Lea County, NM (NAD83)
Site: Blue Ribbon/Parade State
Well: Parade State 603H
Wellbore: OH
Design: Plan #3

3244' GE + 21' KB @ 3265.00usft

Azimuths to Grid North
True North: -0.53°
Magnetic North: 6.08°

Magnetic Field
Strength: 47708.2nT
Dip Angle: 60.02°
Date: 8/8/2019
Model: IGRF2015

PROJECT DETAILS: Lea County, NM (NAD83)

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone

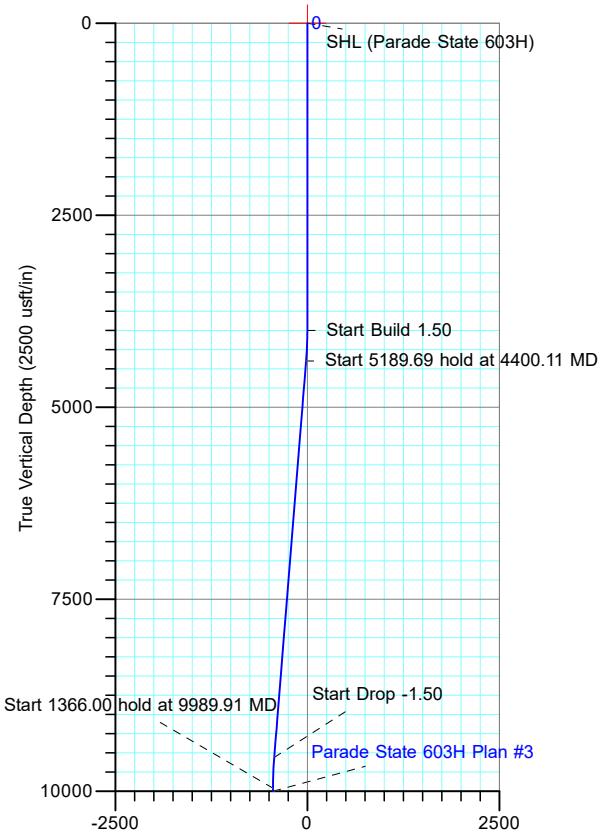
FRANKLIN MOUNTAIN ENERGY

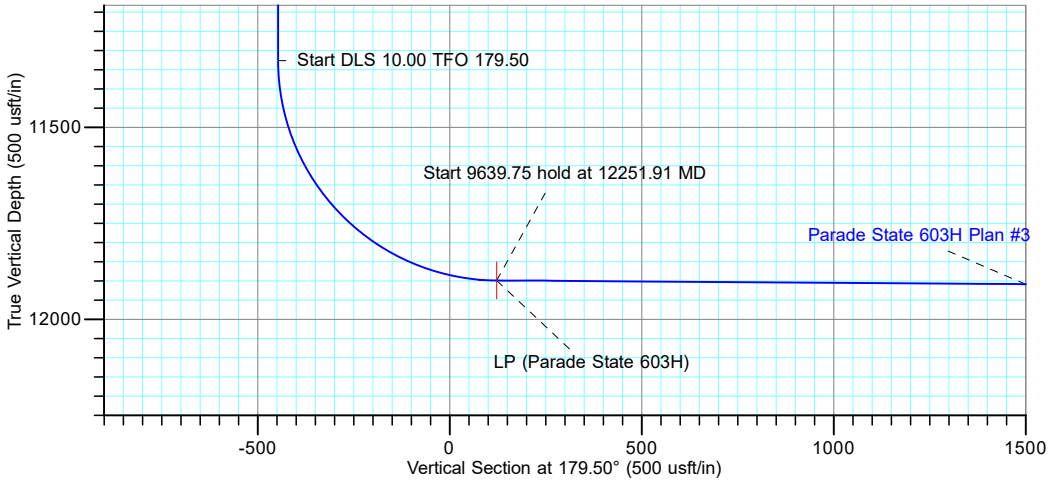
SECTION DETAILS

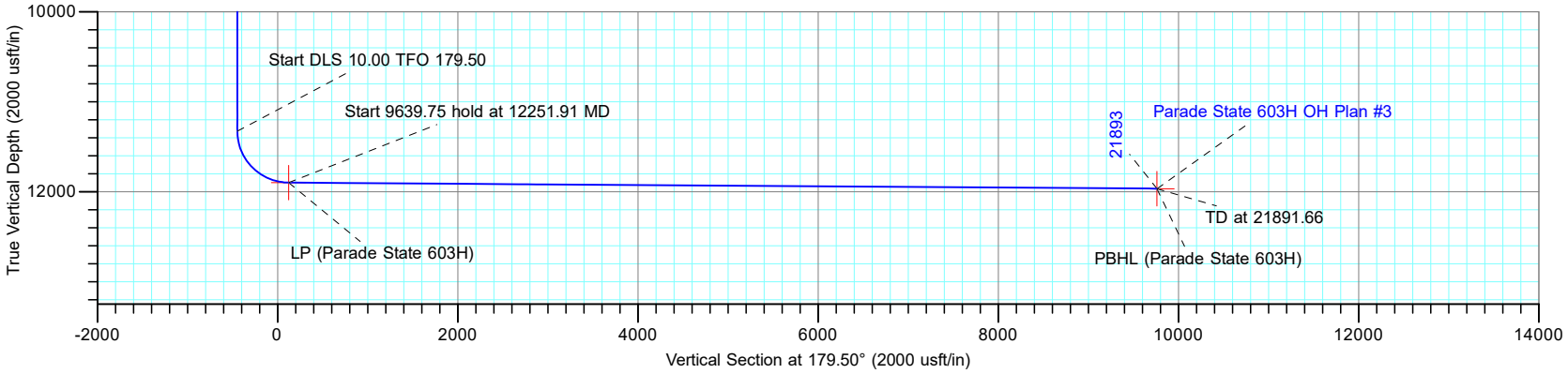
MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4000.00	0.00	0.00	4000.00	0.00	0.00	0.00	0.00	0.00	Start Build 1.50
4400.11	6.00	39.65	4399.38	16.12	13.36	1.50	39.65	-16.00	Start 5189.69 hold at 4400.11 MD
9589.80	6.00	39.65	9560.62	433.88	359.64	0.00	0.00	-430.73	Start Drop -1.50
9989.91	0.00	0.00	9960.00	450.00	373.00	1.50	180.00	-446.73	Start 1366.00 hold at 9989.91 MD
11355.91	0.00	0.00	11326.00	450.00	373.00	0.00	0.00	-446.73	Start DLS 10.00 TFO 179.50
12251.91	89.60	179.50	11898.94	-118.94	377.97	10.00	179.50	122.24	Start 9639.75 hold at 12251.91 MD
21891.66	89.60	179.50	11966.15	-9758.09	462.10	0.00	0.00	9761.75	TD at 21891.66

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
LP	11898.94	-118.94	377.97	32.164530	-103.337041
PBHL	11966.15	-9758.09	462.10	32.138035	-103.337058
SHL	0.00	0.00	0.00	32.164867	-103.338259







TOTAL DIRECTIONAL SERVICES LLC
671 Academy Ct, Windsor, CO 80550
Phone: (970) 460-9402

Plan: Plan #3 (Parade State 603H/OH)
Blue Ribbon/Parade State
Created By: Dustin Ault Date: 15:16, August 13 202
Date: _____
Approved: _____ Date: _____

Franklin Mountain Energy

Project: Lea County, NM (NAD83)
Site: Blue Ribbon/Parade State
Well: Parade State 603H
Wellbore: OH
Design: Plan #3

Azimuths to Grid North
True North: -0.53°
Magnetic North: 6.08°

Magnetic Field
Strength: 47708.2nT
Dip Angle: 60.02°
Date: 8/8/2019
Model: IGRF2015

PROJECT DETAILS: Lea County, NM (NAD83)
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone

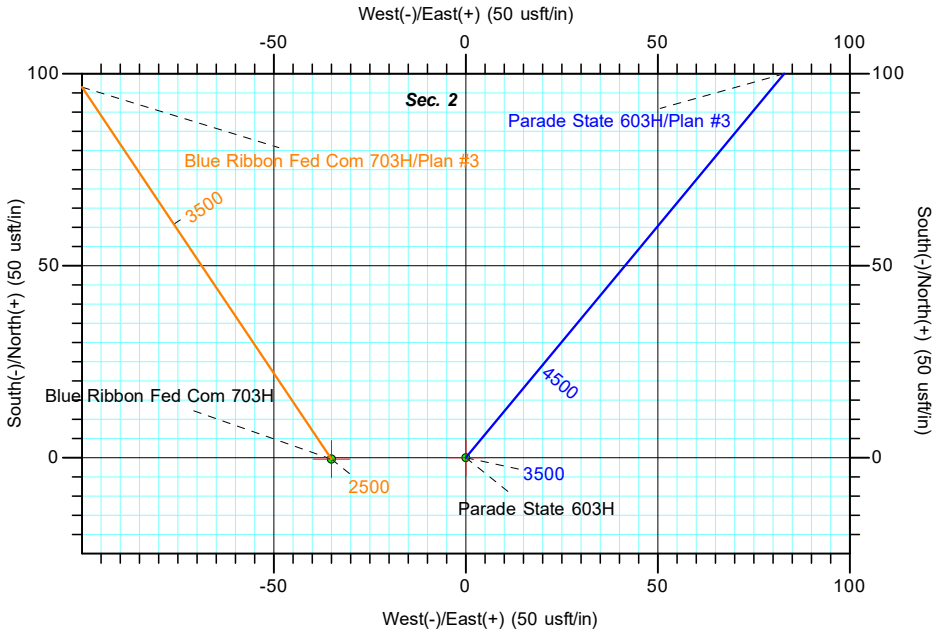
FRANKLIN MOUNTAIN ENERGY

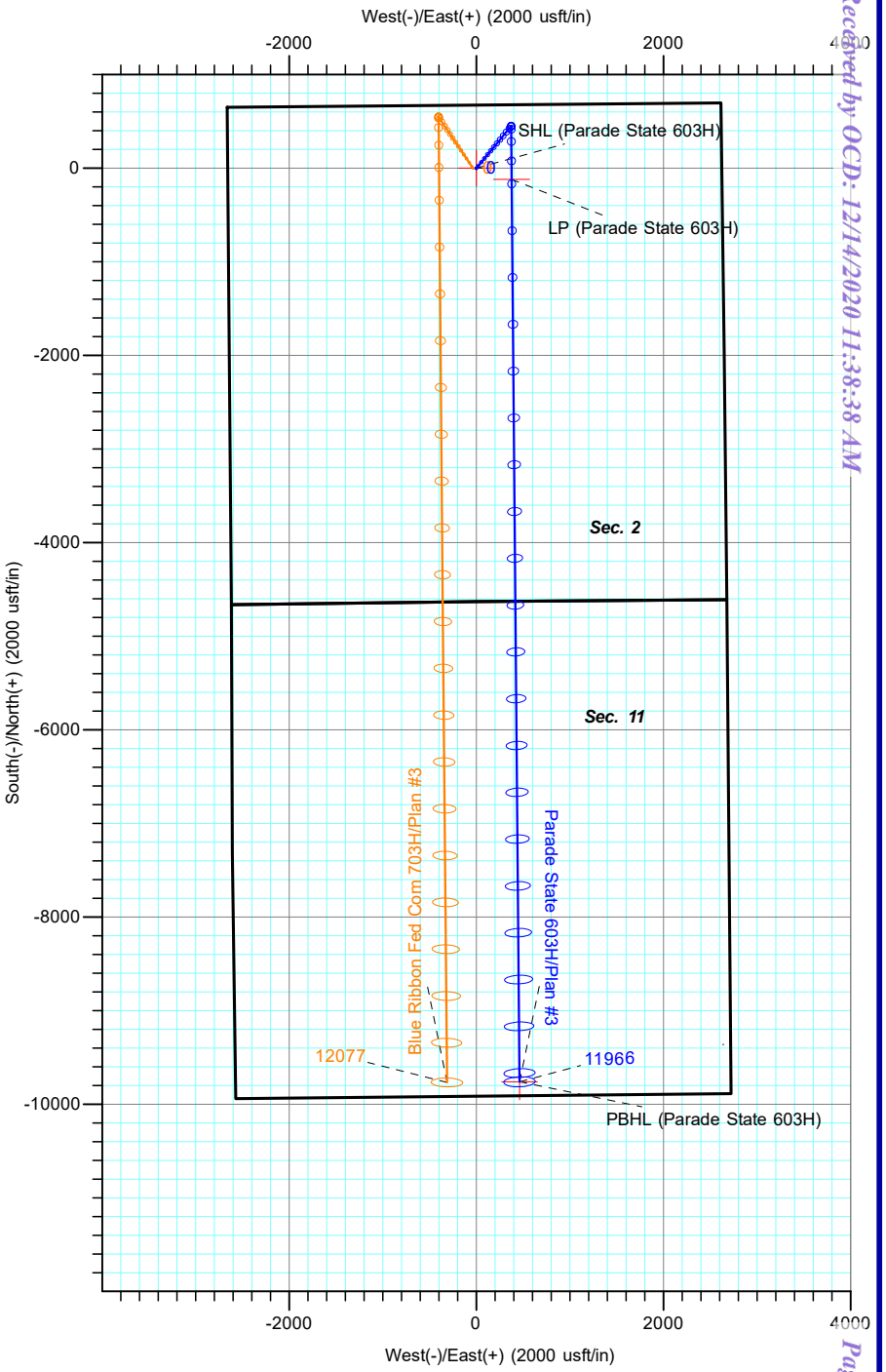
DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
LP	11898.94	-118.94	377.97	425018.18	849630.21	32.164530	-103.337041
PBHL	11966.15	-9758.09	462.10	415379.03	849714.34	32.138035	-103.337058
SHL	0.00	0.00	0.00	425137.12	849252.24	32.164867	-103.338259

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4000.00	0.00	0.00	4000.00	0.00	0.00	0.00	0.00	0.00	Start Build 1.50
4400.11	6.00	39.65	4399.38	16.12	13.36	1.50	39.65	-16.00	Start 5189.69 hold at 4400.11 MD
9589.80	6.00	39.65	9560.62	433.88	359.64	0.00	0.00	-430.73	Start Drop -1.50
9989.91	0.00	0.00	9960.00	450.00	373.00	1.50	180.00	-446.73	Start 1366.00 hold at 9989.91 MD
11355.91	0.00	0.00	11326.00	450.00	373.00	0.00	0.00	-446.73	Start DLS 10.00 TFO 179.50
12251.91	89.60	179.50	11898.94	-118.94	377.97	10.00	179.50	122.24	Start 9639.75 hold at 12251.91 MD
21891.66	89.60	179.50	11966.15	-9758.09	462.10	0.00	0.00	9761.75	TD at 21891.66





TOTAL DIRECTIONAL SERVICES LLC
671 Academy Ct, Windsor, CO 80550
Phone: (970) 460-9402

Plan: Plan #3 (Parade State 603H/OH)
Blue Ribbon/Parade State
Created By: Dustin Ault Date: 15:17, August 13 2020
Date: _____
Approved: _____ Date: _____

Franklin Mountain Energy

Lea County, NM (NAD83)
Blue Ribbon/Parade State
Parade State 603H

OH

Plan: Plan #3

Standard Planning Report

13 August, 2020

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Planning Report

total

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Parade State 603H
Company:	Franklin Mountain Energy	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site:	Blue Ribbon/Parade State	**North Reference:**	Grid
Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #3		

Project Lea County, NM (NAD83)

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site Blue Ribbon/Parade State

Site Position:		**Northing:**	425,136.81 usft	**Latitude:**	32.164867
From:	Map	**Easting:**	849,217.25 usft	**Longitude:**	-103.338372
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.53 °

Well Parade State 603H

Well Position	**+N/-S**	0.31 usft	**Northing:**	425,137.12 usft	**Latitude:**	32.164867
	+E/-W	34.99 usft	**Easting:**	849,252.24 usft	**Longitude:**	-103.338259
Position Uncertainty		0.00 usft	**Wellhead Elevation:**		**Ground Level:**	3,244.00 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	8/8/2019	6.61	60.02	47,708.17254640

Design Plan #3

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	179.50

Plan Survey Tool Program **Date** 8/13/2020

	Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	21,891.66	Plan #3 (OH)	OWSG (Rev2) MWD	
				OWSG MWD - Standard	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,400.11	6.00	39.65	4,399.38	16.12	13.36	1.50	1.50	0.00	39.65	
9,589.80	6.00	39.65	9,560.62	433.88	359.64	0.00	0.00	0.00	0.00	
9,989.91	0.00	0.00	9,960.00	450.00	373.00	1.50	-1.50	0.00	180.00	
11,355.91	0.00	0.00	11,326.00	450.00	373.00	0.00	0.00	0.00	0.00	
12,251.91	89.60	179.50	11,898.94	-118.94	377.97	10.00	10.00	20.03	179.50	
21,891.66	89.60	179.50	11,966.15	-9,758.09	462.10	0.00	0.00	0.00	0.00	PBHL (Parade State 6

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Planning Report

total

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Parade State 603H
Company:	Franklin Mountain Energy	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site:	Blue Ribbon/Parade State	**North Reference:**	Grid
Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SHL (Parade State 603H)									
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 1.50									
4,100.00	1.50	39.65	4,099.99	1.01	0.84	-1.00	1.50	1.50	0.00
4,200.00	3.00	39.65	4,199.91	4.03	3.34	-4.00	1.50	1.50	0.00
4,300.00	4.50	39.65	4,299.69	9.07	7.51	-9.00	1.50	1.50	0.00
4,400.11	6.00	39.65	4,399.38	16.12	13.36	-16.00	1.50	1.50	0.00
Start 5189.69 hold at 4400.11 MD									
4,500.00	6.00	39.65	4,498.72	24.16	20.03	-23.98	0.00	0.00	0.00
4,600.00	6.00	39.65	4,598.17	32.21	26.70	-31.98	0.00	0.00	0.00
4,700.00	6.00	39.65	4,697.63	40.26	33.37	-39.97	0.00	0.00	0.00
4,800.00	6.00	39.65	4,797.08	48.31	40.04	-47.96	0.00	0.00	0.00
4,900.00	6.00	39.65	4,896.53	56.36	46.72	-55.95	0.00	0.00	0.00

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Planning Report

total

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Parade State 603H
Company:	Franklin Mountain Energy	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site:	Blue Ribbon/Parade State	**North Reference:**	Grid
Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,000.00	6.00	39.65	4,995.98	64.41	53.39	-63.94	0.00	0.00	0.00
5,100.00	6.00	39.65	5,095.43	72.46	60.06	-71.93	0.00	0.00	0.00
5,200.00	6.00	39.65	5,194.88	80.51	66.73	-79.92	0.00	0.00	0.00
5,300.00	6.00	39.65	5,294.34	88.56	73.41	-87.91	0.00	0.00	0.00
5,400.00	6.00	39.65	5,393.79	96.61	80.08	-95.91	0.00	0.00	0.00
5,500.00	6.00	39.65	5,493.24	104.66	86.75	-103.90	0.00	0.00	0.00
5,600.00	6.00	39.65	5,592.69	112.71	93.42	-111.89	0.00	0.00	0.00
5,700.00	6.00	39.65	5,692.14	120.76	100.10	-119.88	0.00	0.00	0.00
5,800.00	6.00	39.65	5,791.60	128.81	106.77	-127.87	0.00	0.00	0.00
5,900.00	6.00	39.65	5,891.05	136.86	113.44	-135.86	0.00	0.00	0.00
6,000.00	6.00	39.65	5,990.50	144.91	120.11	-143.85	0.00	0.00	0.00
6,100.00	6.00	39.65	6,089.95	152.96	126.78	-151.85	0.00	0.00	0.00
6,200.00	6.00	39.65	6,189.40	161.01	133.46	-159.84	0.00	0.00	0.00
6,300.00	6.00	39.65	6,288.86	169.06	140.13	-167.83	0.00	0.00	0.00
6,400.00	6.00	39.65	6,388.31	177.11	146.80	-175.82	0.00	0.00	0.00
6,500.00	6.00	39.65	6,487.76	185.16	153.47	-183.81	0.00	0.00	0.00
6,600.00	6.00	39.65	6,587.21	193.21	160.15	-191.80	0.00	0.00	0.00
6,700.00	6.00	39.65	6,686.66	201.26	166.82	-199.79	0.00	0.00	0.00
6,800.00	6.00	39.65	6,786.11	209.31	173.49	-207.78	0.00	0.00	0.00
6,900.00	6.00	39.65	6,885.57	217.36	180.16	-215.78	0.00	0.00	0.00
7,000.00	6.00	39.65	6,985.02	225.41	186.84	-223.77	0.00	0.00	0.00
7,100.00	6.00	39.65	7,084.47	233.46	193.51	-231.76	0.00	0.00	0.00
7,200.00	6.00	39.65	7,183.92	241.51	200.18	-239.75	0.00	0.00	0.00
7,300.00	6.00	39.65	7,283.37	249.56	206.85	-247.74	0.00	0.00	0.00
7,400.00	6.00	39.65	7,382.83	257.61	213.53	-255.73	0.00	0.00	0.00
7,500.00	6.00	39.65	7,482.28	265.66	220.20	-263.72	0.00	0.00	0.00
7,600.00	6.00	39.65	7,581.73	273.71	226.87	-271.72	0.00	0.00	0.00
7,700.00	6.00	39.65	7,681.18	281.76	233.54	-279.71	0.00	0.00	0.00
7,800.00	6.00	39.65	7,780.63	289.81	240.22	-287.70	0.00	0.00	0.00
7,900.00	6.00	39.65	7,880.09	297.85	246.89	-295.69	0.00	0.00	0.00
8,000.00	6.00	39.65	7,979.54	305.90	253.56	-303.68	0.00	0.00	0.00
8,100.00	6.00	39.65	8,078.99	313.95	260.23	-311.67	0.00	0.00	0.00
8,200.00	6.00	39.65	8,178.44	322.00	266.91	-319.66	0.00	0.00	0.00
8,300.00	6.00	39.65	8,277.89	330.05	273.58	-327.65	0.00	0.00	0.00
8,400.00	6.00	39.65	8,377.35	338.10	280.25	-335.65	0.00	0.00	0.00
8,500.00	6.00	39.65	8,476.80	346.15	286.92	-343.64	0.00	0.00	0.00
8,600.00	6.00	39.65	8,576.25	354.20	293.60	-351.63	0.00	0.00	0.00
8,700.00	6.00	39.65	8,675.70	362.25	300.27	-359.62	0.00	0.00	0.00
8,800.00	6.00	39.65	8,775.15	370.30	306.94	-367.61	0.00	0.00	0.00
8,900.00	6.00	39.65	8,874.60	378.35	313.61	-375.60	0.00	0.00	0.00
9,000.00	6.00	39.65	8,974.06	386.40	320.29	-383.59	0.00	0.00	0.00
9,100.00	6.00	39.65	9,073.51	394.45	326.96	-391.58	0.00	0.00	0.00
9,200.00	6.00	39.65	9,172.96	402.50	333.63	-399.58	0.00	0.00	0.00
9,300.00	6.00	39.65	9,272.41	410.55	340.30	-407.57	0.00	0.00	0.00
9,400.00	6.00	39.65	9,371.86	418.60	346.98	-415.56	0.00	0.00	0.00
9,500.00	6.00	39.65	9,471.32	426.65	353.65	-423.55	0.00	0.00	0.00
9,589.80	6.00	39.65	9,560.62	433.88	359.64	-430.73	0.00	0.00	0.00
Start Drop -1.50									
9,600.00	5.85	39.65	9,570.77	434.69	360.31	-431.53	1.50	-1.50	0.00
9,700.00	4.35	39.65	9,670.37	441.53	365.98	-438.32	1.50	-1.50	0.00
9,800.00	2.85	39.65	9,770.17	446.37	369.99	-443.12	1.50	-1.50	0.00
9,900.00	1.35	39.65	9,870.10	449.19	372.32	-445.92	1.50	-1.50	0.00
9,989.91	0.00	0.00	9,960.00	450.00	373.00	-446.73	1.50	-1.50	0.00
Start 1366.00 hold at 9989.91 MD									

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Planning Report

total

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Parade State 603H
Company:	Franklin Mountain Energy	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site:	Blue Ribbon/Parade State	**North Reference:**	Grid
Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,000.00	0.00	0.00	9,970.09	450.00	373.00	-446.73	0.00	0.00	0.00
10,100.00	0.00	0.00	10,070.09	450.00	373.00	-446.73	0.00	0.00	0.00
10,200.00	0.00	0.00	10,170.09	450.00	373.00	-446.73	0.00	0.00	0.00
10,300.00	0.00	0.00	10,270.09	450.00	373.00	-446.73	0.00	0.00	0.00
10,400.00	0.00	0.00	10,370.09	450.00	373.00	-446.73	0.00	0.00	0.00
10,500.00	0.00	0.00	10,470.09	450.00	373.00	-446.73	0.00	0.00	0.00
10,600.00	0.00	0.00	10,570.09	450.00	373.00	-446.73	0.00	0.00	0.00
10,700.00	0.00	0.00	10,670.09	450.00	373.00	-446.73	0.00	0.00	0.00
10,800.00	0.00	0.00	10,770.09	450.00	373.00	-446.73	0.00	0.00	0.00
10,900.00	0.00	0.00	10,870.09	450.00	373.00	-446.73	0.00	0.00	0.00
11,000.00	0.00	0.00	10,970.09	450.00	373.00	-446.73	0.00	0.00	0.00
11,100.00	0.00	0.00	11,070.09	450.00	373.00	-446.73	0.00	0.00	0.00
11,200.00	0.00	0.00	11,170.09	450.00	373.00	-446.73	0.00	0.00	0.00
11,300.00	0.00	0.00	11,270.09	450.00	373.00	-446.73	0.00	0.00	0.00
11,355.91	0.00	0.00	11,326.00	450.00	373.00	-446.73	0.00	0.00	0.00
Start DLS 10.00 TFO 179.50									
11,400.00	4.41	179.50	11,370.05	448.30	373.01	-445.03	10.00	10.00	0.00
11,450.00	9.41	179.50	11,419.67	442.29	373.07	-439.02	10.00	10.00	0.00
11,500.00	14.41	179.50	11,468.58	431.98	373.16	-428.70	10.00	10.00	0.00
11,550.00	19.41	179.50	11,516.40	417.44	373.28	-414.17	10.00	10.00	0.00
11,600.00	24.41	179.50	11,562.78	398.79	373.45	-395.52	10.00	10.00	0.00
11,650.00	29.41	179.50	11,607.35	376.17	373.64	-372.89	10.00	10.00	0.00
11,700.00	34.41	179.50	11,649.78	349.75	373.88	-346.47	10.00	10.00	0.00
11,750.00	39.41	179.50	11,689.75	319.73	374.14	-316.46	10.00	10.00	0.00
11,800.00	44.41	179.50	11,726.94	286.35	374.43	-283.07	10.00	10.00	0.00
11,850.00	49.41	179.50	11,761.09	249.85	374.75	-246.57	10.00	10.00	0.00
11,900.00	54.41	179.50	11,791.93	210.51	375.09	-207.23	10.00	10.00	0.00
11,950.00	59.41	179.50	11,819.22	168.63	375.46	-165.35	10.00	10.00	0.00
12,000.00	64.41	179.50	11,842.75	124.54	375.84	-121.25	10.00	10.00	0.00
12,050.00	69.41	179.50	11,862.36	78.56	376.24	-75.27	10.00	10.00	0.00
12,100.00	74.41	179.50	11,877.88	31.05	376.66	-27.76	10.00	10.00	0.00
12,150.00	79.41	179.50	11,889.20	-17.63	377.08	20.92	10.00	10.00	0.00
12,200.00	84.41	179.50	11,896.23	-67.12	377.51	70.41	10.00	10.00	0.00
12,251.91	89.60	179.50	11,898.94	-118.94	377.97	122.23	10.00	10.00	0.00
Start 9639.75 hold at 12251.91 MD - LP (Parade State 603H)									
12,300.00	89.60	179.50	11,899.28	-167.03	378.39	170.32	0.00	0.00	0.00
12,400.00	89.60	179.50	11,899.98	-267.02	379.26	270.32	0.00	0.00	0.00
12,500.00	89.60	179.50	11,900.67	-367.01	380.13	370.32	0.00	0.00	0.00
12,600.00	89.60	179.50	11,901.37	-467.01	381.00	470.31	0.00	0.00	0.00
12,700.00	89.60	179.50	11,902.07	-567.00	381.88	570.31	0.00	0.00	0.00
12,800.00	89.60	179.50	11,902.77	-666.99	382.75	670.31	0.00	0.00	0.00
12,900.00	89.60	179.50	11,903.46	-766.99	383.62	770.31	0.00	0.00	0.00
13,000.00	89.60	179.50	11,904.16	-866.98	384.50	870.30	0.00	0.00	0.00
13,100.00	89.60	179.50	11,904.86	-966.98	385.37	970.30	0.00	0.00	0.00
13,200.00	89.60	179.50	11,905.55	-1,066.97	386.24	1,070.30	0.00	0.00	0.00
13,300.00	89.60	179.50	11,906.25	-1,166.96	387.11	1,170.30	0.00	0.00	0.00
13,400.00	89.60	179.50	11,906.95	-1,266.96	387.99	1,270.29	0.00	0.00	0.00
13,500.00	89.60	179.50	11,907.65	-1,366.95	388.86	1,370.29	0.00	0.00	0.00
13,600.00	89.60	179.50	11,908.34	-1,466.94	389.73	1,470.29	0.00	0.00	0.00
13,700.00	89.60	179.50	11,909.04	-1,566.94	390.60	1,570.29	0.00	0.00	0.00
13,800.00	89.60	179.50	11,909.74	-1,666.93	391.48	1,670.28	0.00	0.00	0.00
13,900.00	89.60	179.50	11,910.43	-1,766.93	392.35	1,770.28	0.00	0.00	0.00
14,000.00	89.60	179.50	11,911.13	-1,866.92	393.22	1,870.28	0.00	0.00	0.00
14,100.00	89.60	179.50	11,911.83	-1,966.91	394.10	1,970.28	0.00	0.00	0.00

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Planning Report

total

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Parade State 603H
Company:	Franklin Mountain Energy	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site:	Blue Ribbon/Parade State	**North Reference:**	Grid
Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,200.00	89.60	179.50	11,912.53	-2,066.91	394.97	2,070.27	0.00	0.00	0.00
14,300.00	89.60	179.50	11,913.22	-2,166.90	395.84	2,170.27	0.00	0.00	0.00
14,400.00	89.60	179.50	11,913.92	-2,266.89	396.71	2,270.27	0.00	0.00	0.00
14,500.00	89.60	179.50	11,914.62	-2,366.89	397.59	2,370.27	0.00	0.00	0.00
14,600.00	89.60	179.50	11,915.31	-2,466.88	398.46	2,470.27	0.00	0.00	0.00
14,700.00	89.60	179.50	11,916.01	-2,566.88	399.33	2,570.26	0.00	0.00	0.00
14,800.00	89.60	179.50	11,916.71	-2,666.87	400.21	2,670.26	0.00	0.00	0.00
14,900.00	89.60	179.50	11,917.41	-2,766.86	401.08	2,770.26	0.00	0.00	0.00
15,000.00	89.60	179.50	11,918.10	-2,866.86	401.95	2,870.26	0.00	0.00	0.00
15,100.00	89.60	179.50	11,918.80	-2,966.85	402.82	2,970.25	0.00	0.00	0.00
15,200.00	89.60	179.50	11,919.50	-3,066.84	403.70	3,070.25	0.00	0.00	0.00
15,300.00	89.60	179.50	11,920.19	-3,166.84	404.57	3,170.25	0.00	0.00	0.00
15,400.00	89.60	179.50	11,920.89	-3,266.83	405.44	3,270.25	0.00	0.00	0.00
15,500.00	89.60	179.50	11,921.59	-3,366.83	406.31	3,370.24	0.00	0.00	0.00
15,600.00	89.60	179.50	11,922.29	-3,466.82	407.19	3,470.24	0.00	0.00	0.00
15,700.00	89.60	179.50	11,922.98	-3,566.81	408.06	3,570.24	0.00	0.00	0.00
15,800.00	89.60	179.50	11,923.68	-3,666.81	408.93	3,670.24	0.00	0.00	0.00
15,900.00	89.60	179.50	11,924.38	-3,766.80	409.81	3,770.23	0.00	0.00	0.00
16,000.00	89.60	179.50	11,925.07	-3,866.79	410.68	3,870.23	0.00	0.00	0.00
16,100.00	89.60	179.50	11,925.77	-3,966.79	411.55	3,970.23	0.00	0.00	0.00
16,200.00	89.60	179.50	11,926.47	-4,066.78	412.42	4,070.23	0.00	0.00	0.00
16,300.00	89.60	179.50	11,927.17	-4,166.78	413.30	4,170.22	0.00	0.00	0.00
16,400.00	89.60	179.50	11,927.86	-4,266.77	414.17	4,270.22	0.00	0.00	0.00
16,500.00	89.60	179.50	11,928.56	-4,366.76	415.04	4,370.22	0.00	0.00	0.00
16,600.00	89.60	179.50	11,929.26	-4,466.76	415.92	4,470.22	0.00	0.00	0.00
16,700.00	89.60	179.50	11,929.96	-4,566.75	416.79	4,570.21	0.00	0.00	0.00
16,800.00	89.60	179.50	11,930.65	-4,666.74	417.66	4,670.21	0.00	0.00	0.00
16,900.00	89.60	179.50	11,931.35	-4,766.74	418.53	4,770.21	0.00	0.00	0.00
17,000.00	89.60	179.50	11,932.05	-4,866.73	419.41	4,870.21	0.00	0.00	0.00
17,100.00	89.60	179.50	11,932.74	-4,966.73	420.28	4,970.20	0.00	0.00	0.00
17,200.00	89.60	179.50	11,933.44	-5,066.72	421.15	5,070.20	0.00	0.00	0.00
17,300.00	89.60	179.50	11,934.14	-5,166.71	422.02	5,170.20	0.00	0.00	0.00
17,400.00	89.60	179.50	11,934.84	-5,266.71	422.90	5,270.20	0.00	0.00	0.00
17,500.00	89.60	179.50	11,935.53	-5,366.70	423.77	5,370.19	0.00	0.00	0.00
17,600.00	89.60	179.50	11,936.23	-5,466.69	424.64	5,470.19	0.00	0.00	0.00
17,700.00	89.60	179.50	11,936.93	-5,566.69	425.52	5,570.19	0.00	0.00	0.00
17,800.00	89.60	179.50	11,937.62	-5,666.68	426.39	5,670.19	0.00	0.00	0.00
17,900.00	89.60	179.50	11,938.32	-5,766.68	427.26	5,770.19	0.00	0.00	0.00
18,000.00	89.60	179.50	11,939.02	-5,866.67	428.13	5,870.18	0.00	0.00	0.00
18,100.00	89.60	179.50	11,939.72	-5,966.66	429.01	5,970.18	0.00	0.00	0.00
18,200.00	89.60	179.50	11,940.41	-6,066.66	429.88	6,070.18	0.00	0.00	0.00
18,300.00	89.60	179.50	11,941.11	-6,166.65	430.75	6,170.18	0.00	0.00	0.00
18,400.00	89.60	179.50	11,941.81	-6,266.64	431.63	6,270.17	0.00	0.00	0.00
18,500.00	89.60	179.50	11,942.50	-6,366.64	432.50	6,370.17	0.00	0.00	0.00
18,600.00	89.60	179.50	11,943.20	-6,466.63	433.37	6,470.17	0.00	0.00	0.00
18,700.00	89.60	179.50	11,943.90	-6,566.63	434.24	6,570.17	0.00	0.00	0.00
18,800.00	89.60	179.50	11,944.60	-6,666.62	435.12	6,670.16	0.00	0.00	0.00
18,900.00	89.60	179.50	11,945.29	-6,766.61	435.99	6,770.16	0.00	0.00	0.00
19,000.00	89.60	179.50	11,945.99	-6,866.61	436.86	6,870.16	0.00	0.00	0.00
19,100.00	89.60	179.50	11,946.69	-6,966.60	437.73	6,970.16	0.00	0.00	0.00
19,200.00	89.60	179.50	11,947.38	-7,066.60	438.61	7,070.15	0.00	0.00	0.00
19,300.00	89.60	179.50	11,948.08	-7,166.59	439.48	7,170.15	0.00	0.00	0.00
19,400.00	89.60	179.50	11,948.78	-7,266.58	440.35	7,270.15	0.00	0.00	0.00
19,500.00	89.60	179.50	11,949.48	-7,366.58	441.23	7,370.15	0.00	0.00	0.00

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Planning Report

total

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Parade State 603H
Company:	Franklin Mountain Energy	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site:	Blue Ribbon/Parade State	**North Reference:**	Grid
Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
19,600.00	89.60	179.50	11,950.17	-7,466.57	442.10	7,470.14	0.00	0.00	0.00
19,700.00	89.60	179.50	11,950.87	-7,566.56	442.97	7,570.14	0.00	0.00	0.00
19,800.00	89.60	179.50	11,951.57	-7,666.56	443.84	7,670.14	0.00	0.00	0.00
19,900.00	89.60	179.50	11,952.26	-7,766.55	444.72	7,770.14	0.00	0.00	0.00
20,000.00	89.60	179.50	11,952.96	-7,866.55	445.59	7,870.13	0.00	0.00	0.00
20,100.00	89.60	179.50	11,953.66	-7,966.54	446.46	7,970.13	0.00	0.00	0.00
20,200.00	89.60	179.50	11,954.36	-8,066.53	447.34	8,070.13	0.00	0.00	0.00
20,300.00	89.60	179.50	11,955.05	-8,166.53	448.21	8,170.13	0.00	0.00	0.00
20,400.00	89.60	179.50	11,955.75	-8,266.52	449.08	8,270.12	0.00	0.00	0.00
20,500.00	89.60	179.50	11,956.45	-8,366.51	449.95	8,370.12	0.00	0.00	0.00
20,600.00	89.60	179.50	11,957.15	-8,466.51	450.83	8,470.12	0.00	0.00	0.00
20,700.00	89.60	179.50	11,957.84	-8,566.50	451.70	8,570.12	0.00	0.00	0.00
20,800.00	89.60	179.50	11,958.54	-8,666.50	452.57	8,670.11	0.00	0.00	0.00
20,900.00	89.60	179.50	11,959.24	-8,766.49	453.44	8,770.11	0.00	0.00	0.00
21,000.00	89.60	179.50	11,959.93	-8,866.48	454.32	8,870.11	0.00	0.00	0.00
21,100.00	89.60	179.50	11,960.63	-8,966.48	455.19	8,970.11	0.00	0.00	0.00
21,200.00	89.60	179.50	11,961.33	-9,066.47	456.06	9,070.10	0.00	0.00	0.00
21,300.00	89.60	179.50	11,962.03	-9,166.46	456.94	9,170.10	0.00	0.00	0.00
21,400.00	89.60	179.50	11,962.72	-9,266.46	457.81	9,270.10	0.00	0.00	0.00
21,500.00	89.60	179.50	11,963.42	-9,366.45	458.68	9,370.10	0.00	0.00	0.00
21,600.00	89.60	179.50	11,964.12	-9,466.45	459.55	9,470.10	0.00	0.00	0.00
21,700.00	89.60	179.50	11,964.81	-9,566.44	460.43	9,570.09	0.00	0.00	0.00
21,800.00	89.60	179.50	11,965.51	-9,666.43	461.30	9,670.09	0.00	0.00	0.00
21,891.66	89.60	179.50	11,966.15	-9,758.09	462.10	9,761.75	0.00	0.00	0.00
TD at 21891.66 - PBHL (Parade State 603H)									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL (Parade State 603H - plan hits target center - Point	0.00	0.00	0.00	0.00	0.00	425,137.12	849,252.24	32.164867	-103.338259
LP (Parade State 603H) - plan misses target center by 0.01usft at 12251.91usft MD (11898.94 TVD, -118.94 N, 377.97 E) - Point	0.00	0.00	11,898.94	-118.94	377.97	425,018.18	849,630.21	32.164530	-103.337041
PBHL (Parade State 603 - plan hits target center - Point	0.00	0.00	11,966.15	-9,758.09	462.10	415,379.03	849,714.34	32.138035	-103.337058

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Planning Report

total

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Parade State 603H
Company:	Franklin Mountain Energy	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Project:	Lea County, NM (NAD83)	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site:	Blue Ribbon/Parade State	**North Reference:**	Grid
Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #3		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
4,000.00	4,000.00	0.00	0.00	Start Build 1.50
4,400.11	4,399.38	16.12	13.36	Start 5189.69 hold at 4400.11 MD
9,589.80	9,560.62	433.88	359.64	Start Drop -1.50
9,989.91	9,960.00	450.00	373.00	Start 1366.00 hold at 9989.91 MD
11,355.91	11,326.00	450.00	373.00	Start DLS 10.00 TFO 179.50
12,251.91	11,898.94	-118.94	377.97	Start 9639.75 hold at 12251.91 MD
21,891.66	11,966.15	-9,758.09	462.10	TD at 21891.66

FRANKLIN MOUNTAIN ENERGY

Franklin Mountain Energy

Lea County, NM (NAD83)
Blue Ribbon/Parade State
Parade State 603H

OH
Plan #3

Anticollision Report

13 August, 2020

total

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Anticollision Report

total

Company:	Franklin Mountain Energy	**Local Co-ordinate Reference:**	Well Parade State 603H
Project:	Lea County, NM (NAD83)	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Reference Site:	Blue Ribbon/Parade State	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Reference Plan #3

Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum ellipse separation of 1,000.00 usft	**Error Surface:**	Combined Separation
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 8/13/2020

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	21,891.66	Plan #3 (OH)	OWSG (Rev2) MWD	OWSG MWD - Standard

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Blue Ribbon/Parade State						
Blue Ribbon Fed Com 703H - OH - Plan #3	2,516.26	2,517.46	34.99	22.54	2.810	CC
Blue Ribbon Fed Com 703H - OH - Plan #3	2,600.00	2,601.19	34.99	22.11	2.717	ES
Blue Ribbon Fed Com 703H - OH - Plan #3	2,700.00	2,700.67	35.74	22.36	2.671	SF

Offset Design Blue Ribbon/Parade State - Blue Ribbon Fed Com 703H - OH - Plan #3

Survey Program: 0-OWSG (Rev2) MWD

Offset Site Error: 0.00 usft

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	1.20	1.20	0.00	0.00	-90.51	-0.31	-34.99	34.99				
100.00	100.00	101.20	101.20	0.14	0.15	-90.51	-0.31	-34.99	34.99	34.79	0.20	172.107	
200.00	200.00	201.20	201.20	0.50	0.50	-90.51	-0.31	-34.99	34.99	34.28	0.71	49.266	
300.00	300.00	301.20	301.20	0.86	0.86	-90.51	-0.31	-34.99	34.99	33.77	1.22	28.747	
400.00	400.00	401.20	401.20	1.22	1.22	-90.51	-0.31	-34.99	34.99	33.27	1.72	20.295	
500.00	500.00	501.20	501.20	1.58	1.58	-90.51	-0.31	-34.99	34.99	32.76	2.23	15.683	
600.00	600.00	601.20	601.20	1.93	1.94	-90.51	-0.31	-34.99	34.99	32.25	2.74	12.780	
700.00	700.00	701.20	701.20	2.29	2.30	-90.51	-0.31	-34.99	34.99	31.75	3.25	10.783	
800.00	800.00	801.20	801.20	2.65	2.66	-90.51	-0.31	-34.99	34.99	31.24	3.75	9.326	
900.00	900.00	901.20	901.20	3.01	3.01	-90.51	-0.31	-34.99	34.99	30.73	4.26	8.216	
1,000.00	1,000.00	1,001.20	1,001.20	3.37	3.37	-90.51	-0.31	-34.99	34.99	30.23	4.77	7.342	
1,100.00	1,100.00	1,101.20	1,101.20	3.73	3.73	-90.51	-0.31	-34.99	34.99	29.72	5.27	6.636	
1,200.00	1,200.00	1,201.20	1,201.20	4.08	4.09	-90.51	-0.31	-34.99	34.99	29.21	5.78	6.054	
1,300.00	1,300.00	1,301.20	1,301.20	4.44	4.45	-90.51	-0.31	-34.99	34.99	28.70	6.29	5.566	
1,400.00	1,400.00	1,401.20	1,401.20	4.80	4.81	-90.51	-0.31	-34.99	34.99	28.20	6.79	5.151	
1,500.00	1,500.00	1,501.20	1,501.20	5.16	5.16	-90.51	-0.31	-34.99	34.99	27.69	7.30	4.793	
1,600.00	1,600.00	1,601.20	1,601.20	5.52	5.52	-90.51	-0.31	-34.99	34.99	27.18	7.81	4.482	
1,700.00	1,700.00	1,701.20	1,701.20	5.88	5.88	-90.51	-0.31	-34.99	34.99	26.68	8.31	4.208	
1,800.00	1,800.00	1,801.20	1,801.20	6.24	6.24	-90.51	-0.31	-34.99	34.99	26.17	8.82	3.967	
1,900.00	1,900.00	1,901.20	1,901.20	6.59	6.60	-90.51	-0.31	-34.99	34.99	25.66	9.33	3.751	
2,000.00	2,000.00	2,001.20	2,001.20	6.95	6.96	-90.51	-0.31	-34.99	34.99	25.16	9.84	3.558	
2,100.00	2,100.00	2,101.20	2,101.20	7.31	7.32	-90.51	-0.31	-34.99	34.99	24.65	10.34	3.383	
2,200.00	2,200.00	2,201.20	2,201.20	7.67	7.67	-90.51	-0.31	-34.99	34.99	24.14	10.85	3.225	
2,300.00	2,300.00	2,301.20	2,301.20	8.03	8.03	-90.51	-0.31	-34.99	34.99	23.64	11.36	3.081	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Anticollision Report

total

Company:	Franklin Mountain Energy	**Local Co-ordinate Reference:**	Well Parade State 603H
Project:	Lea County, NM (NAD83)	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Reference Site:	Blue Ribbon/Parade State	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Offset Design Blue Ribbon/Parade State - Blue Ribbon Fed Com 703H - OH - Plan #3

Offset Site Error: 0.00 usft

Survey Program: 0-OWSG (Rev2) MWD

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
2,400.00	2,400.00	2,401.20	2,401.20	8.39	8.39	-90.51	-0.31	-34.99	34.99	23.13	11.86	2.950	
2,500.00	2,500.00	2,501.20	2,501.20	8.74	8.75	-90.51	-0.31	-34.99	34.99	22.62	12.37	2.829	
2,516.26	2,516.26	2,517.46	2,517.46	8.80	8.81	-90.51	-0.31	-34.99	34.99	22.54	12.45	2.810	CC
2,600.00	2,600.00	2,601.19	2,601.19	9.10	9.11	-90.51	-0.31	-34.99	34.99	22.11	12.88	2.717	ES
2,700.00	2,700.00	2,700.67	2,700.66	9.46	9.46	-88.73	0.79	-35.73	35.74	22.36	13.38	2.671	SF
2,800.00	2,800.00	2,800.00	2,799.91	9.82	9.82	-83.92	4.04	-37.91	38.14	24.27	13.87	2.749	
2,900.00	2,900.00	2,899.08	2,898.77	10.18	10.17	-77.23	9.41	-41.51	42.63	28.27	14.36	2.969	
3,000.00	3,000.00	2,997.75	2,997.03	10.54	10.52	-70.06	16.87	-46.52	49.66	34.83	14.83	3.349	
3,100.00	3,100.00	3,097.17	3,095.91	10.90	10.88	-64.01	25.50	-52.31	58.43	43.11	15.33	3.813	
3,200.00	3,200.00	3,196.62	3,194.82	11.25	11.24	-59.56	34.14	-58.10	67.69	51.87	15.82	4.278	
3,300.00	3,300.00	3,296.08	3,293.72	11.61	11.60	-56.20	42.77	-63.90	77.25	60.93	16.33	4.732	
3,400.00	3,400.00	3,395.53	3,392.63	11.97	11.96	-53.58	51.41	-69.69	87.02	70.20	16.83	5.171	
3,500.00	3,500.00	3,494.98	3,491.54	12.33	12.33	-51.50	60.05	-75.48	96.94	79.60	17.33	5.593	
3,600.00	3,600.00	3,594.43	3,590.44	12.69	12.70	-49.80	68.68	-81.28	106.95	89.12	17.84	5.997	
3,700.00	3,700.00	3,693.88	3,689.35	13.05	13.06	-48.40	77.32	-87.07	117.04	98.71	18.34	6.382	
3,800.00	3,800.00	3,793.34	3,788.26	13.41	13.43	-47.21	85.95	-92.86	127.20	108.35	18.84	6.750	
3,900.00	3,900.00	3,892.79	3,887.16	13.76	13.80	-46.21	94.59	-98.66	137.39	118.04	19.35	7.101	
4,000.00	4,000.00	3,992.24	3,986.07	14.12	14.18	-45.34	103.22	-104.45	147.63	127.77	19.85	7.436	
4,100.00	4,099.99	4,091.72	4,085.00	14.48	14.55	-84.56	111.86	-110.25	157.76	137.40	20.36	7.749	
4,200.00	4,199.91	4,191.21	4,183.95	14.83	14.92	-85.06	120.50	-116.04	167.67	146.80	20.86	8.037	
4,300.00	4,299.69	4,290.64	4,282.83	15.19	15.30	-86.34	129.13	-121.83	177.41	156.04	21.37	8.303	
4,400.11	4,399.38	4,390.05	4,381.70	15.54	15.67	-88.27	137.76	-127.63	187.17	165.29	21.87	8.557	
4,500.00	4,498.72	4,489.16	4,480.26	15.90	16.05	-90.51	146.37	-133.40	197.13	174.75	22.38	8.808	
4,600.00	4,598.17	4,588.37	4,578.94	16.26	16.42	-92.54	154.98	-139.18	207.38	184.49	22.89	9.059	
4,700.00	4,697.63	4,687.59	4,677.61	16.62	16.80	-94.37	163.60	-144.96	217.86	194.46	23.40	9.309	
4,800.00	4,797.08	4,786.81	4,776.28	16.98	17.17	-96.04	172.21	-150.74	228.55	204.63	23.91	9.557	
4,900.00	4,896.53	4,886.03	4,874.96	17.34	17.55	-97.56	180.83	-156.52	239.41	214.98	24.43	9.800	
5,000.00	4,995.98	4,985.24	4,973.63	17.70	17.93	-98.94	189.44	-162.30	250.42	225.47	24.94	10.039	
5,100.00	5,095.43	5,084.46	5,072.30	18.07	18.31	-100.21	198.06	-168.08	261.56	236.10	25.46	10.273	
5,200.00	5,194.88	5,183.68	5,170.98	18.44	18.69	-101.38	206.67	-173.86	272.82	246.85	25.98	10.502	
5,300.00	5,294.34	5,282.89	5,269.65	18.80	19.07	-102.45	215.29	-179.64	284.19	257.69	26.50	10.726	
5,400.00	5,393.79	5,382.11	5,368.32	19.17	19.45	-103.44	223.90	-185.42	295.64	268.63	27.01	10.944	
5,500.00	5,493.24	5,481.33	5,467.00	19.54	19.83	-104.35	232.52	-191.20	307.18	279.64	27.53	11.156	
5,600.00	5,592.69	5,580.55	5,565.67	19.91	20.21	-105.20	241.13	-196.98	318.78	290.73	28.05	11.363	
5,700.00	5,692.14	5,679.76	5,664.34	20.28	20.59	-105.99	249.75	-202.76	330.45	301.88	28.57	11.564	
5,800.00	5,791.60	5,778.98	5,763.02	20.65	20.97	-106.73	258.36	-208.54	342.18	313.09	29.10	11.760	
5,900.00	5,891.05	5,878.20	5,861.69	21.02	21.35	-107.41	266.98	-214.32	353.96	324.34	29.62	11.951	
6,000.00	5,990.50	5,977.41	5,960.36	21.40	21.73	-108.06	275.59	-220.10	365.79	335.65	30.14	12.136	
6,100.00	6,089.95	6,076.63	6,059.03	21.77	22.11	-108.66	284.21	-225.88	377.66	347.00	30.67	12.316	
6,200.00	6,189.40	6,175.85	6,157.71	22.15	22.50	-109.22	292.82	-231.66	389.57	358.38	31.19	12.491	
6,300.00	6,288.86	6,275.06	6,256.38	22.52	22.88	-109.76	301.44	-237.44	401.52	369.80	31.71	12.661	
6,400.00	6,388.31	6,374.28	6,355.05	22.90	23.26	-110.26	310.05	-243.22	413.49	381.25	32.24	12.826	
6,500.00	6,487.76	6,473.50	6,453.73	23.27	23.64	-110.73	318.67	-249.00	425.50	392.74	32.76	12.987	
6,600.00	6,587.21	6,572.72	6,552.40	23.65	24.03	-111.18	327.28	-254.78	437.53	404.24	33.29	13.143	
6,700.00	6,686.66	6,671.93	6,651.07	24.03	24.41	-111.60	335.90	-260.56	449.59	415.78	33.82	13.295	
6,800.00	6,786.11	6,771.15	6,749.75	24.40	24.79	-112.00	344.51	-266.34	461.67	427.33	34.34	13.443	
6,900.00	6,885.57	6,870.37	6,848.42	24.78	25.18	-112.38	353.13	-272.12	473.77	438.91	34.87	13.587	
7,000.00	6,985.02	6,969.58	6,947.09	25.16	25.56	-112.74	361.74	-277.90	485.90	450.50	35.40	13.727	
7,100.00	7,084.47	7,068.80	7,045.77	25.54	25.95	-113.09	370.36	-283.68	498.04	462.11	35.92	13.864	
7,200.00	7,183.92	7,168.02	7,144.44	25.92	26.33	-113.42	378.97	-289.46	510.19	473.74	36.45	13.996	
7,300.00	7,283.37	7,267.23	7,243.11	26.30	26.71	-113.73	387.59	-295.24	522.37	485.39	36.98	14.126	
7,400.00	7,382.83	7,366.45	7,341.79	26.68	27.10	-114.03	396.20	-301.02	534.55	497.05	37.51	14.252	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Anticollision Report

total

Company:	Franklin Mountain Energy	**Local Co-ordinate Reference:**	Well Parade State 603H
Project:	Lea County, NM (NAD83)	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Reference Site:	Blue Ribbon/Parade State	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Offset Design Blue Ribbon/Parade State - Blue Ribbon Fed Com 703H - OH - Plan #3

Offset Site Error: 0.00 usft

Survey Program: 0-OWSG (Rev2) MWD

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
7,500.00	7,482.28	7,465.67	7,440.46	27.06	27.48	-114.31	404.82	-306.80	546.75	508.72	38.04	14.374	
7,600.00	7,581.73	7,564.89	7,539.13	27.44	27.87	-114.58	413.43	-312.57	558.97	520.40	38.57	14.494	
7,700.00	7,681.18	7,664.10	7,637.80	27.82	28.25	-114.84	422.05	-318.35	571.19	532.10	39.09	14.610	
7,800.00	7,780.63	7,763.32	7,736.48	28.20	28.64	-115.09	430.66	-324.13	583.43	543.81	39.62	14.724	
7,900.00	7,880.09	7,862.54	7,835.15	28.58	29.02	-115.33	439.28	-329.91	595.68	555.52	40.15	14.835	
8,000.00	7,979.54	7,961.75	7,933.82	28.96	29.41	-115.56	447.89	-335.69	607.93	567.25	40.68	14.943	
8,100.00	8,078.99	8,060.97	8,032.50	29.35	29.79	-115.78	456.51	-341.47	620.20	578.99	41.21	15.048	
8,200.00	8,178.44	8,160.19	8,131.17	29.73	30.18	-116.00	465.12	-347.25	632.48	590.73	41.74	15.151	
8,300.00	8,277.89	8,259.40	8,229.84	30.11	30.56	-116.20	473.74	-353.03	644.76	602.48	42.27	15.252	
8,400.00	8,377.35	8,358.62	8,328.52	30.49	30.95	-116.40	482.35	-358.81	657.05	614.24	42.81	15.350	
8,500.00	8,476.80	8,457.84	8,427.19	30.88	31.34	-116.59	490.97	-364.59	669.35	626.01	43.34	15.445	
8,600.00	8,576.25	8,557.06	8,525.86	31.26	31.72	-116.77	499.58	-370.37	681.65	637.79	43.87	15.539	
8,700.00	8,675.70	8,656.27	8,624.54	31.65	32.11	-116.95	508.20	-376.15	693.97	649.57	44.40	15.630	
8,800.00	8,775.15	8,755.49	8,723.21	32.03	32.49	-117.12	516.81	-381.93	706.28	661.35	44.93	15.720	
8,900.00	8,874.60	8,854.71	8,821.88	32.41	32.88	-117.28	525.43	-387.71	718.61	673.15	45.46	15.807	
9,000.00	8,974.06	8,957.11	8,923.73	32.80	33.28	-117.45	534.26	-393.64	730.89	684.88	46.01	15.885	
9,100.00	9,073.51	9,072.32	9,038.54	33.18	33.71	-117.76	542.25	-399.00	741.73	695.11	46.62	15.910	
9,200.00	9,172.96	9,187.81	9,153.85	33.57	34.14	-118.25	547.37	-402.43	750.46	703.25	47.20	15.898	
9,300.00	9,272.41	9,303.35	9,269.36	33.95	34.54	-118.91	549.59	-403.92	757.11	709.34	47.77	15.850	
9,400.00	9,371.86	9,407.05	9,373.06	34.34	34.90	-119.62	549.69	-403.99	762.32	714.03	48.29	15.786	
9,500.00	9,471.32	9,506.50	9,472.52	34.72	35.24	-120.29	549.69	-403.99	767.56	718.76	48.81	15.727	
9,589.80	9,560.62	9,595.81	9,561.82	35.07	35.54	-120.89	549.69	-403.99	772.36	723.09	49.27	15.677	
9,600.00	9,570.77	9,605.96	9,571.97	35.11	35.57	-120.97	549.69	-403.99	772.90	723.58	49.32	15.671	
9,700.00	9,670.37	9,705.56	9,671.57	35.49	35.91	-121.59	549.69	-403.99	777.53	727.70	49.83	15.603	
9,800.00	9,770.17	9,805.36	9,771.37	35.86	36.26	-122.02	549.69	-403.99	780.84	730.51	50.34	15.513	
9,900.00	9,870.10	9,905.29	9,871.30	36.22	36.60	-122.27	549.69	-403.99	782.79	731.96	50.84	15.399	
9,989.91	9,960.00	9,995.19	9,961.20	36.53	36.90	-82.69	549.69	-403.99	783.36	732.08	51.28	15.276	
10,000.00	9,970.09	10,005.28	9,971.29	36.56	36.94	-82.69	549.69	-403.99	783.36	732.03	51.33	15.262	
10,100.00	10,070.09	10,105.28	10,071.29	36.91	37.28	-82.69	549.69	-403.99	783.36	731.54	51.82	15.117	
10,200.00	10,170.09	10,205.28	10,171.29	37.26	37.62	-82.69	549.69	-403.99	783.36	731.05	52.31	14.975	
10,300.00	10,270.09	10,305.28	10,271.29	37.60	37.97	-82.69	549.69	-403.99	783.36	730.56	52.80	14.836	
10,400.00	10,370.09	10,405.28	10,371.29	37.95	38.31	-82.69	549.69	-403.99	783.36	730.07	53.29	14.699	
10,500.00	10,470.09	10,505.28	10,471.29	38.29	38.65	-82.69	549.69	-403.99	783.36	729.57	53.79	14.565	
10,600.00	10,570.09	10,605.28	10,571.29	38.64	39.00	-82.69	549.69	-403.99	783.36	729.08	54.28	14.432	
10,700.00	10,670.09	10,705.28	10,671.29	38.99	39.34	-82.69	549.69	-403.99	783.36	728.59	54.77	14.303	
10,800.00	10,770.09	10,805.28	10,771.29	39.34	39.69	-82.69	549.69	-403.99	783.36	728.10	55.26	14.175	
10,900.00	10,870.09	10,905.28	10,871.29	39.68	40.03	-82.69	549.69	-403.99	783.36	727.60	55.76	14.050	
11,000.00	10,970.09	11,005.28	10,971.29	40.03	40.38	-82.69	549.69	-403.99	783.36	727.11	56.25	13.927	
11,100.00	11,070.09	11,105.28	11,071.29	40.38	40.72	-82.69	549.69	-403.99	783.36	726.62	56.74	13.805	
11,200.00	11,170.09	11,205.28	11,171.29	40.73	41.07	-82.69	549.69	-403.99	783.36	726.12	57.24	13.686	
11,300.00	11,270.09	11,305.28	11,271.29	41.07	41.41	-82.69	549.69	-403.99	783.36	725.63	57.73	13.569	
11,355.91	11,326.00	11,361.19	11,327.20	41.27	41.61	-82.69	549.69	-403.99	783.36	725.35	58.01	13.505	
11,400.00	11,370.05	11,405.24	11,371.25	41.41	41.76	97.91	549.69	-403.99	783.59	725.37	58.22	13.460	
11,450.00	11,419.67	11,454.86	11,420.87	41.56	41.93	98.26	549.69	-403.99	784.44	726.00	58.44	13.423	
11,500.00	11,468.58	11,510.07	11,476.07	41.69	42.11	98.89	548.95	-403.98	785.92	727.26	58.66	13.399	
11,550.00	11,516.40	11,573.41	11,539.02	41.81	42.29	99.60	542.25	-403.92	787.46	728.61	58.85	13.381	
11,600.00	11,562.78	11,638.32	11,602.36	41.92	42.45	100.22	528.22	-403.80	788.89	729.89	59.00	13.371	
11,650.00	11,607.35	11,704.65	11,665.02	42.01	42.60	100.74	506.59	-403.61	790.14	731.03	59.11	13.367	
11,700.00	11,649.78	11,772.18	11,725.82	42.09	42.71	101.16	477.27	-403.35	791.17	731.99	59.18	13.370	
11,750.00	11,689.75	11,840.66	11,783.51	42.16	42.81	101.46	440.46	-403.03	791.92	732.70	59.21	13.374	
11,800.00	11,726.94	11,909.77	11,836.86	42.21	42.88	101.63	396.60	-402.64	792.35	733.13	59.22	13.380	
11,850.00	11,761.09	11,979.16	11,884.74	42.25	42.93	101.67	346.43	-402.20	792.45	733.22	59.22	13.381	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Anticollision Report

total

Company:	Franklin Mountain Energy	**Local Co-ordinate Reference:**	Well Parade State 603H
Project:	Lea County, NM (NAD83)	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Reference Site:	Blue Ribbon/Parade State	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Offset Design Blue Ribbon/Parade State - Blue Ribbon Fed Com 703H - OH - Plan #3

Offset Site Error: 0.00 usft

Survey Program: 0-OWSG (Rev2) MWD

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
11,900.00	11,791.93	12,048.48	11,926.15	42.29	42.96	101.57	290.90	-401.71	792.20	732.97	59.23	13.375	
11,950.00	11,819.22	12,117.37	11,960.37	42.31	42.97	101.35	231.16	-401.19	791.63	732.37	59.26	13.358	
12,000.00	11,842.75	12,185.48	11,986.92	42.32	42.96	101.00	168.48	-400.64	790.75	731.43	59.32	13.330	
12,050.00	11,862.36	12,252.54	12,005.62	42.32	42.96	100.54	104.13	-400.07	789.62	730.20	59.42	13.289	
12,100.00	11,877.88	12,318.29	12,016.53	42.32	42.95	99.97	39.32	-399.50	788.28	728.73	59.55	13.237	
12,150.00	11,889.20	12,381.42	12,019.97	42.32	42.96	99.33	-23.68	-398.95	786.79	727.08	59.71	13.177	
12,200.00	11,896.23	12,430.95	12,020.27	42.36	42.99	98.96	-73.21	-398.51	785.71	725.86	59.85	13.127	
12,251.91	11,898.94	12,482.79	12,020.58	42.44	43.06	98.82	-125.04	-398.05	785.33	725.36	59.97	13.095	
12,300.00	11,899.28	12,530.88	12,020.87	42.53	43.15	98.82	-173.13	-397.63	785.32	725.24	60.08	13.070	
12,400.00	11,899.98	12,630.88	12,021.47	42.76	43.39	98.81	-273.12	-396.75	785.30	724.92	60.38	13.006	
12,500.00	11,900.67	12,730.88	12,022.08	43.06	43.69	98.80	-373.12	-395.87	785.28	724.52	60.76	12.924	
12,600.00	11,901.37	12,830.88	12,022.68	43.40	44.05	98.80	-473.11	-394.99	785.26	724.03	61.23	12.825	
12,700.00	11,902.07	12,930.88	12,023.28	43.80	44.46	98.79	-573.10	-394.11	785.24	723.46	61.78	12.710	
12,800.00	11,902.77	13,030.88	12,023.88	44.26	44.93	98.78	-673.10	-393.23	785.22	722.80	62.42	12.581	
12,900.00	11,903.46	13,130.88	12,024.48	44.77	45.46	98.78	-773.09	-392.35	785.20	722.07	63.13	12.439	
13,000.00	11,904.16	13,230.88	12,025.09	45.34	46.03	98.77	-873.09	-391.47	785.18	721.26	63.91	12.285	
13,100.00	11,904.86	13,330.88	12,025.69	45.95	46.66	98.76	-973.08	-390.60	785.15	720.38	64.77	12.122	
13,200.00	11,905.55	13,430.88	12,026.29	46.61	47.33	98.76	-1,073.07	-389.72	785.13	719.43	65.70	11.950	
13,300.00	11,906.25	13,530.88	12,026.89	47.33	48.05	98.75	-1,173.07	-388.84	785.11	718.41	66.70	11.771	
13,400.00	11,906.95	13,630.88	12,027.50	48.08	48.81	98.74	-1,273.06	-387.96	785.09	717.33	67.76	11.586	
13,500.00	11,907.65	13,730.88	12,028.10	48.88	49.62	98.74	-1,373.06	-387.08	785.07	716.18	68.89	11.396	
13,600.00	11,908.34	13,830.88	12,028.70	49.73	50.47	98.73	-1,473.05	-386.20	785.05	714.98	70.07	11.204	
13,700.00	11,909.04	13,930.88	12,029.30	50.61	51.36	98.72	-1,573.05	-385.32	785.03	713.72	71.31	11.009	
13,800.00	11,909.74	14,030.88	12,029.90	51.53	52.28	98.72	-1,673.04	-384.44	785.01	712.41	72.60	10.813	
13,900.00	11,910.43	14,130.88	12,030.51	52.48	53.24	98.71	-1,773.03	-383.56	784.99	711.05	73.94	10.617	
14,000.00	11,911.13	14,230.88	12,031.11	53.47	54.23	98.70	-1,873.03	-382.68	784.96	709.64	75.33	10.421	
14,100.00	11,911.83	14,330.88	12,031.71	54.49	55.25	98.70	-1,973.02	-381.80	784.94	708.18	76.76	10.226	
14,200.00	11,912.53	14,430.88	12,032.31	55.54	56.31	98.69	-2,073.02	-380.92	784.92	706.69	78.24	10.033	
14,300.00	11,913.22	14,530.88	12,032.91	56.62	57.39	98.68	-2,173.01	-380.04	784.90	705.15	79.75	9.842	
14,400.00	11,913.92	14,630.88	12,033.52	57.73	58.50	98.68	-2,273.01	-379.16	784.88	703.58	81.30	9.654	
14,500.00	11,914.62	14,730.88	12,034.12	58.86	59.63	98.67	-2,373.00	-378.28	784.86	701.97	82.89	9.468	
14,600.00	11,915.31	14,830.88	12,034.72	60.02	60.79	98.66	-2,472.99	-377.40	784.84	700.32	84.51	9.286	
14,700.00	11,916.01	14,930.88	12,035.32	61.20	61.97	98.66	-2,572.99	-376.52	784.82	698.65	86.17	9.108	
14,800.00	11,916.71	15,030.88	12,035.93	62.40	63.17	98.65	-2,672.98	-375.64	784.80	696.95	87.85	8.933	
14,900.00	11,917.41	15,130.88	12,036.53	63.62	64.39	98.64	-2,772.98	-374.76	784.77	695.21	89.56	8.762	
15,000.00	11,918.10	15,230.88	12,037.13	64.86	65.63	98.64	-2,872.97	-373.88	784.75	693.45	91.30	8.595	
15,100.00	11,918.80	15,330.88	12,037.73	66.12	66.88	98.63	-2,972.97	-373.00	784.73	691.67	93.06	8.432	
15,200.00	11,919.50	15,430.88	12,038.33	67.39	68.16	98.62	-3,072.96	-372.12	784.71	689.86	94.85	8.273	
15,300.00	11,920.19	15,530.88	12,038.94	68.69	69.45	98.62	-3,172.95	-371.24	784.69	688.03	96.66	8.118	
15,400.00	11,920.89	15,630.88	12,039.54	69.99	70.75	98.61	-3,272.95	-370.36	784.67	686.18	98.49	7.967	
15,500.00	11,921.59	15,730.88	12,040.14	71.31	72.07	98.60	-3,372.94	-369.49	784.65	684.31	100.34	7.820	
15,600.00	11,922.29	15,830.88	12,040.74	72.65	73.40	98.59	-3,472.94	-368.61	784.63	682.42	102.21	7.677	
15,700.00	11,922.98	15,930.88	12,041.35	73.99	74.75	98.59	-3,572.93	-367.73	784.61	680.51	104.10	7.537	
15,800.00	11,923.68	16,030.88	12,041.95	75.35	76.11	98.58	-3,672.93	-366.85	784.59	678.58	106.00	7.402	
15,900.00	11,924.38	16,130.88	12,042.55	76.72	77.47	98.57	-3,772.92	-365.97	784.57	676.64	107.92	7.270	
16,000.00	11,925.07	16,230.88	12,043.15	78.11	78.85	98.57	-3,872.91	-365.09	784.54	674.69	109.86	7.141	
16,100.00	11,925.77	16,330.88	12,043.75	79.50	80.24	98.56	-3,972.91	-364.21	784.52	672.72	111.81	7.017	
16,200.00	11,926.47	16,430.88	12,044.36	80.90	81.64	98.55	-4,072.90	-363.33	784.50	670.73	113.77	6.895	
16,300.00	11,927.17	16,530.88	12,044.96	82.31	83.05	98.55	-4,172.90	-362.45	784.48	668.73	115.75	6.777	
16,400.00	11,927.86	16,630.88	12,045.56	83.73	84.47	98.54	-4,272.89	-361.57	784.46	666.72	117.74	6.663	
16,500.00	11,928.56	16,730.88	12,046.16	85.16	85.90	98.53	-4,372.89	-360.69	784.44	664.70	119.74	6.551	
16,600.00	11,929.26	16,830.88	12,046.76	86.60	87.33	98.53	-4,472.88	-359.81	784.42	662.67	121.75	6.443	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Anticollision Report

total

Company:	Franklin Mountain Energy	**Local Co-ordinate Reference:**	Well Parade State 603H
Project:	Lea County, NM (NAD83)	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Reference Site:	Blue Ribbon/Parade State	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Offset Design Blue Ribbon/Parade State - Blue Ribbon Fed Com 703H - OH - Plan #3

Offset Site Error: 0.00 usft

Survey Program: 0-OWSG (Rev2) MWD

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
16,700.00	11,929.96	16,930.88	12,047.37	88.04	88.78	98.52	-4,572.87	-358.93	784.40	660.63	123.77	6.337	
16,800.00	11,930.65	17,030.88	12,047.97	89.49	90.22	98.51	-4,672.87	-358.05	784.38	658.57	125.80	6.235	
16,900.00	11,931.35	17,130.88	12,048.57	90.95	91.68	98.51	-4,772.86	-357.17	784.36	656.51	127.85	6.135	
17,000.00	11,932.05	17,230.88	12,049.17	92.41	93.14	98.50	-4,872.86	-356.29	784.34	654.44	129.90	6.038	
17,100.00	11,932.74	17,330.88	12,049.78	93.89	94.61	98.49	-4,972.85	-355.41	784.32	652.36	131.96	5.944	
17,200.00	11,933.44	17,430.88	12,050.38	95.36	96.09	98.49	-5,072.85	-354.53	784.29	650.27	134.02	5.852	
17,300.00	11,934.14	17,530.88	12,050.98	96.84	97.57	98.48	-5,172.84	-353.65	784.27	648.18	136.10	5.763	
17,400.00	11,934.84	17,630.88	12,051.58	98.33	99.05	98.47	-5,272.83	-352.77	784.25	646.07	138.18	5.676	
17,500.00	11,935.53	17,730.88	12,052.18	99.83	100.55	98.47	-5,372.83	-351.89	784.23	643.96	140.27	5.591	
17,600.00	11,936.23	17,830.88	12,052.79	101.32	102.04	98.46	-5,472.82	-351.01	784.21	641.84	142.37	5.508	
17,700.00	11,936.93	17,930.88	12,053.39	102.83	103.54	98.45	-5,572.82	-350.13	784.19	639.72	144.47	5.428	
17,800.00	11,937.62	18,030.88	12,053.99	104.33	105.05	98.45	-5,672.81	-349.25	784.17	637.59	146.58	5.350	
17,900.00	11,938.32	18,130.88	12,054.59	105.85	106.56	98.44	-5,772.81	-348.38	784.15	635.45	148.70	5.273	
18,000.00	11,939.02	18,230.88	12,055.20	107.36	108.07	98.43	-5,872.80	-347.50	784.13	633.31	150.82	5.199	
18,100.00	11,939.72	18,330.88	12,055.80	108.88	109.59	98.42	-5,972.79	-346.62	784.11	631.16	152.95	5.127	
18,200.00	11,940.41	18,430.88	12,056.40	110.41	111.11	98.42	-6,072.79	-345.74	784.09	629.01	155.08	5.056	
18,300.00	11,941.11	18,530.88	12,057.00	111.93	112.64	98.41	-6,172.78	-344.86	784.07	626.85	157.22	4.987	
18,400.00	11,941.81	18,630.88	12,057.60	113.46	114.17	98.40	-6,272.78	-343.98	784.05	624.68	159.36	4.920	
18,500.00	11,942.50	18,730.88	12,058.21	115.00	115.70	98.40	-6,372.77	-343.10	784.03	622.52	161.51	4.854	
18,600.00	11,943.20	18,830.88	12,058.81	116.54	117.24	98.39	-6,472.77	-342.22	784.01	620.34	163.66	4.790	
18,700.00	11,943.90	18,930.88	12,059.41	118.08	118.78	98.38	-6,572.76	-341.34	783.99	618.17	165.82	4.728	
18,800.00	11,944.60	19,030.88	12,060.01	119.62	120.32	98.38	-6,672.75	-340.46	783.96	615.99	167.98	4.667	
18,900.00	11,945.29	19,130.88	12,060.61	121.17	121.86	98.37	-6,772.75	-339.58	783.94	613.80	170.14	4.608	
19,000.00	11,945.99	19,230.88	12,061.22	122.72	123.41	98.36	-6,872.74	-338.70	783.92	611.61	172.31	4.549	
19,100.00	11,946.69	19,330.88	12,061.82	124.27	124.96	98.36	-6,972.74	-337.82	783.90	609.42	174.48	4.493	
19,200.00	11,947.38	19,430.88	12,062.42	125.82	126.51	98.35	-7,072.73	-336.94	783.88	607.22	176.66	4.437	
19,300.00	11,948.08	19,530.88	12,063.02	127.38	128.07	98.34	-7,172.73	-336.06	783.86	605.02	178.84	4.383	
19,400.00	11,948.78	19,630.88	12,063.63	128.94	129.63	98.34	-7,272.72	-335.18	783.84	602.82	181.02	4.330	
19,500.00	11,949.48	19,730.88	12,064.23	130.50	131.19	98.33	-7,372.71	-334.30	783.82	600.62	183.20	4.278	
19,600.00	11,950.17	19,830.88	12,064.83	132.06	132.75	98.32	-7,472.71	-333.42	783.80	598.41	185.39	4.228	
19,700.00	11,950.87	19,930.88	12,065.43	133.63	134.31	98.32	-7,572.70	-332.54	783.78	596.20	187.58	4.178	
19,800.00	11,951.57	20,030.88	12,066.03	135.20	135.88	98.31	-7,672.70	-331.66	783.76	593.98	189.78	4.130	
19,900.00	11,952.26	20,130.88	12,066.64	136.77	137.45	98.30	-7,772.69	-330.78	783.74	591.77	191.97	4.083	
20,000.00	11,952.96	20,230.88	12,067.24	138.34	139.02	98.30	-7,872.69	-329.90	783.72	589.55	194.17	4.036	
20,100.00	11,953.66	20,330.88	12,067.84	139.92	140.59	98.29	-7,972.68	-329.02	783.70	587.32	196.37	3.991	
20,200.00	11,954.36	20,430.88	12,068.44	141.49	142.17	98.28	-8,072.67	-328.14	783.68	585.10	198.58	3.946	
20,300.00	11,955.05	20,530.88	12,069.05	143.07	143.74	98.28	-8,172.67	-327.27	783.66	582.87	200.79	3.903	
20,400.00	11,955.75	20,630.88	12,069.65	144.65	145.32	98.27	-8,272.66	-326.39	783.64	580.64	202.99	3.860	
20,500.00	11,956.45	20,730.87	12,070.25	146.23	146.90	98.26	-8,372.66	-325.51	783.62	578.41	205.21	3.819	
20,600.00	11,957.15	20,830.87	12,070.85	147.81	148.48	98.26	-8,472.65	-324.63	783.60	576.18	207.42	3.778	
20,700.00	11,957.84	20,930.87	12,071.45	149.39	150.07	98.25	-8,572.65	-323.75	783.58	573.94	209.64	3.738	
20,800.00	11,958.54	21,030.87	12,072.06	150.98	151.65	98.24	-8,672.64	-322.87	783.56	571.70	211.85	3.699	
20,900.00	11,959.24	21,130.87	12,072.66	152.57	153.24	98.23	-8,772.63	-321.99	783.54	569.46	214.07	3.660	
21,000.00	11,959.93	21,230.87	12,073.26	154.16	154.82	98.23	-8,872.63	-321.11	783.51	567.22	216.29	3.622	
21,100.00	11,960.63	21,330.87	12,073.86	155.74	156.41	98.22	-8,972.62	-320.23	783.49	564.98	218.52	3.586	
21,200.00	11,961.33	21,430.87	12,074.46	157.34	158.00	98.21	-9,072.62	-319.35	783.47	562.73	220.74	3.549	
21,300.00	11,962.03	21,530.87	12,075.07	158.93	159.59	98.21	-9,172.61	-318.47	783.45	560.49	222.97	3.514	
21,400.00	11,962.72	21,630.87	12,075.67	160.52	161.18	98.20	-9,272.61	-317.59	783.43	558.24	225.20	3.479	
21,500.00	11,963.42	21,730.87	12,076.27	162.12	162.78	98.19	-9,372.60	-316.71	783.41	555.99	227.43	3.445	
21,600.00	11,964.12	21,830.87	12,076.87	163.71	164.37	98.19	-9,472.59	-315.83	783.39	553.74	229.66	3.411	
21,700.00	11,964.81	21,930.87	12,077.48	165.31	165.97	98.18	-9,572.59	-314.95	783.37	551.48	231.89	3.378	
21,800.00	11,965.51	22,030.87	12,078.08	166.91	167.57	98.17	-9,672.58	-314.07	783.35	549.23	234.12	3.346	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Anticollision Report

total

Company:	Franklin Mountain Energy	**Local Co-ordinate Reference:**	Well Parade State 603H
Project:	Lea County, NM (NAD83)	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Reference Site:	Blue Ribbon/Parade State	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Offset Design Blue Ribbon/Parade State - Blue Ribbon Fed Com 703H - OH - Plan #3

Offset Site Error: 0.00 usft

Survey Program: 0-OWSG (Rev2) MWD

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
21,891.66	11,966.15	22,122.54	12,078.63	168.37	169.03	98.17	-9,764.24	-313.27	783.33	547.16	236.17	3.317	
21,892.66	11,966.16	22,123.53	12,078.64	168.39	169.05	98.17	-9,765.23	-313.26	783.33	547.14	236.19	3.316	

FRANKLIN MOUNTAIN ENERGY

Total Directional Services

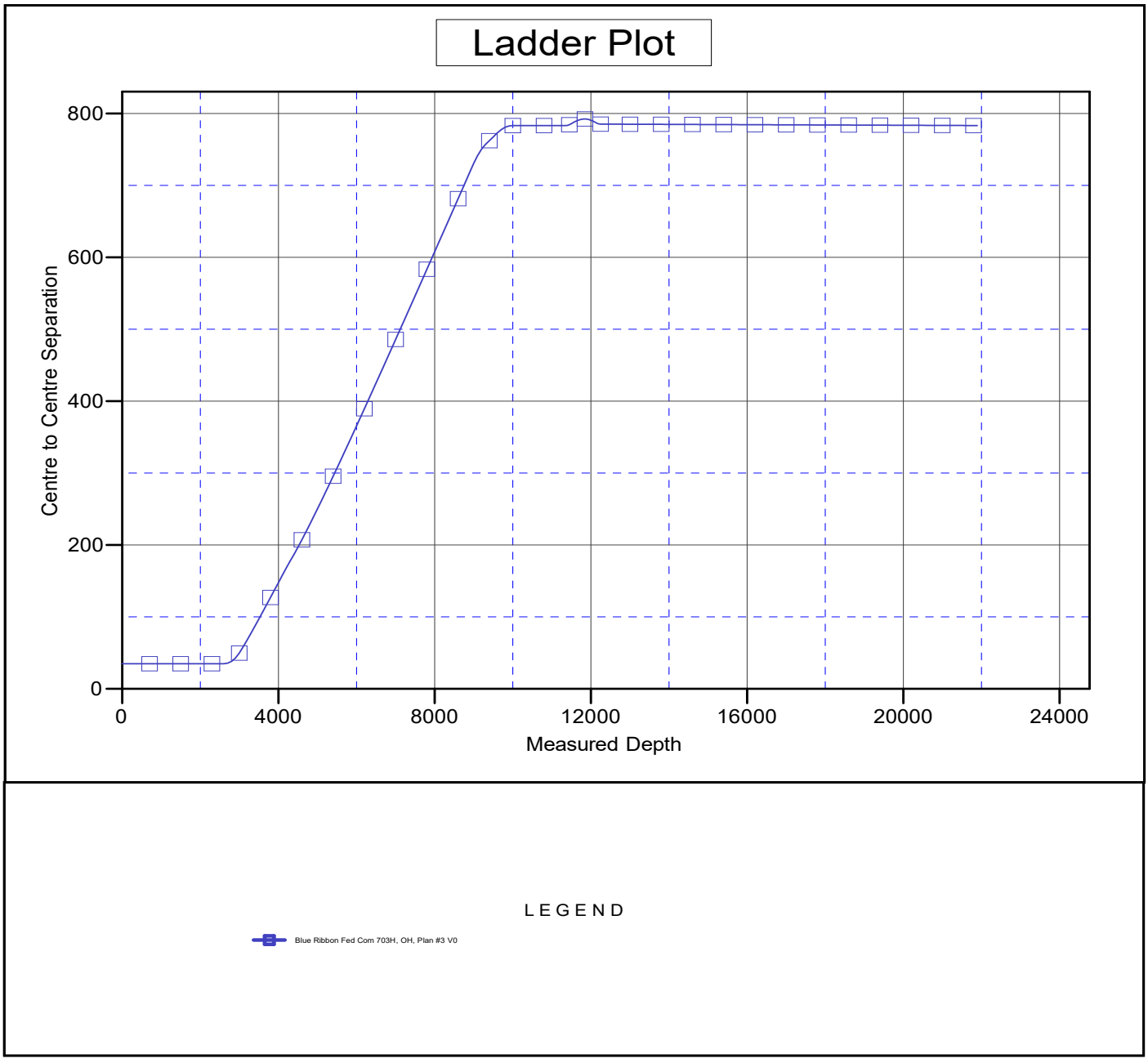
Anticollision Report

total

Company:	Franklin Mountain Energy	**Local Co-ordinate Reference:**	Well Parade State 603H
Project:	Lea County, NM (NAD83)	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Reference Site:	Blue Ribbon/Parade State	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to 3244' GE + 21' KB @ 3265.00usft
Offset Depths are relative to Offset Datum
Central Meridian is -104.333334

Coordinates are relative to: Parade State 603H
Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Grid Convergence at Surface is: 0.53°



FRANKLIN MOUNTAIN ENERGY

Total Directional Services

Anticollision Report

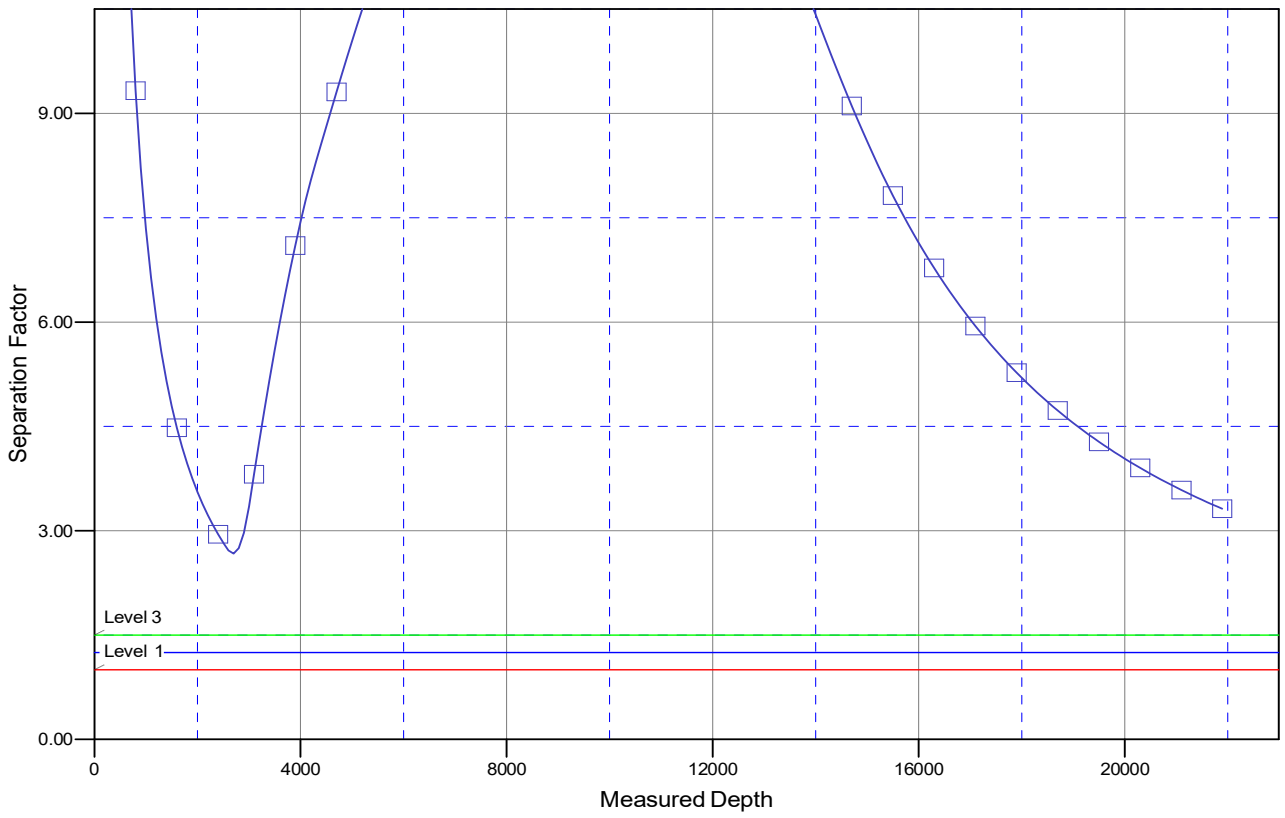
total

Company:	Franklin Mountain Energy	**Local Co-ordinate Reference:**	Well Parade State 603H
Project:	Lea County, NM (NAD83)	**TVD Reference:**	3244' GE + 21' KB @ 3265.00usft
Reference Site:	Blue Ribbon/Parade State	**MD Reference:**	3244' GE + 21' KB @ 3265.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	Parade State 603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #3	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to 3244' GE + 21' KB @ 3265.00usft
Offset Depths are relative to Offset Datum
Central Meridian is -104.333334

Coordinates are relative to: Parade State 603H
Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Grid Convergence at Surface is: 0.53°

Separation Factor Plot



LEGEND

Blue Ribbon Fed Com 703H, OH, Plan #3 V0

FRANKLIN MOUNTAIN ENERGY

Geologic Prognosis

Well Name	**Parade State 603H**
Operator	Franklin Mountain Energy, LLC
Project Area	Carnival Wells
Well Type	10,000' Third Bone Spring Lateral
API	
Permit Number	
Rig	

State	NM	**County**	Lea						
SHL	**Township**	25S/35E	**Section**	2	2,623'	FWL	675'	FNL	
BHL	**Township**	25S/35E	**Section**	11	2,260'	FEL	150'	FSL	
Surface Latitude			**NAD 83**	32.164867					
Surface Longitude			**NAD 83**	103.338372					
Bottom Hole Lattitude			**NAD 83**	32.138033					
Bottom Hole Longitude			**NAD 83**	103.336593					
Ground Level			3,244'	**Rig KB**	30'	**KB**	3,274'		

Formations	PROG SS	PROG TVD	Picked TVD	delta	Potential/Issues
Cenozoic Alluvium (surface)	3,244'	30'	30'	0	Sand/Gravels/unconsolidated
Rustler	2,513'	761'			Carbonates
Salado	2,346'	928'			Salt, Carbonate & Clastics
Base Salt	924'	2,350'			Shaley Carbonate & Shale
Lamar	-1,776'	5,050'			Carbonate & Clastics
Bell Canyon	-1,812'	5,086'			Sandstone - oil/gas/water
Cherry Canyon	-2,759'	6,033'			Sandstone - oil/gas/water
Brushy Canyon	-4,009'	7,283'			Sand/carb/shales - oil/gas/water
Bone Spring Lime	-5,446'	8,720'			Shale/Carbonates - oil/gas
Avalon	-5,490'	8,764'			Shale/Carbonates - oil/gas
First Bone Spring Sand	-6,747'	10,021'			Sandstone - oil/gas/water
Second Bone Spring Carbonates	-6,839'	10,113'			Shale/Carbonates - oil/gas
Second Bone Spring Sand	-7,320'	10,594'			Sandstone - oil/gas/water
Third Bone Spring Carbonates	-7,835'	11,109'			Shale/Carbonates - oil/gas
Third Bone Spring Sand	-8,360'	11,634'			Sandstone - oil/gas/water
HZ Target at SHL	-8,623'	11,897'			Overpressure shale/sand- Oil/Gas
Wolfcamp	-8,714'	11,988'			Overpressure shale/sand- Oil/Gas
Wolfcamp A	-8,750'	12,024'			Overpressure Shale - Oil/Gas
Wolfcamp B	-8,945'	12,219'			Overpressure Shale - Oil/Gas

Target interval is expected to have an average apparent dip of ~0.4 degrees down along the lateral based on the Wolfcamp A structure

Target window tolerance is set at +/- 10'

Target Line: 11898' KBTVD @ 0' VS w/ 89.6° inc.
Offset Log: Reno Com-1 (300252686700)
Updated 8/12/20

FME Geologist	Ben Kessel		bkessel@fmellc.com	
	Office	720.414.7868	Cell	303.868.9946
FME Engineer				

Electric Logs					From	To
Open-Hole						
	n/a					
MWD/LWD						
	MWD GR				Int. 1 Csg. Point	TD

Mud Log:

t drill out of surface casing

Sampling:	10' samples in vertical and through curve, 30' samples in lateral
Samples:	1 set dry samples at footage frequency noted above
Mud Gas:	Continuous
Daily Contact:	Email distribution of mud log/daily report at 7:30am and 4:30 pm CST

Daily Mud Log Email Distribution List

Final Mud Log Distribution

	Ben Kessel (bkessel@fmellc.com)	email	

Cuttings/Samples Shipment Information

Parade State 603H

Casing Program

Casing string	Weight	Grade	Burst	Collapse	Tension	Conn	Length	API design factor			
								Burst	Collapse	Tension	Coupling
Surface 13 3/8"	54.5	J-55	2730	1130	853	BTC 909	1300	1.18	1.67	4.99	5.32
Intermediate 9 5/8"	40	HCL-80	7430	4230	916	BTC 1042	5400	1.72	1.67	2.90	3.30
Intermediate 7 5/8"	29.7	HCP-110	8280	7150	827	Stinger 564	12251	1.08	1.25	1.78	1.22
Production 5 1/2"	23	P-110	14520	14520	729	Anaconda 656	21891	1.32	1.42	1.21	1.09

Collapse Design Factor for production casing calculated for 21,868’ TVD. The deepest point of the well is at 11,953’ TVD

Parade State 603H

Cement volumes

String Type	Hole Size	Casing				Lead			Tail			Excess
		Size	Grade	Weight (lbs/ft)	Setting Depth	Sacks	Type of cmt	TOC of Lead	Sacks	Type of cmt	TOC of Tail	
Surf	17.5	13.375	J-55	54.5	1300	803	Extenda Cem, 13.5 ppg	0	330	HalCem TM, 14.8 ppg	1000	100%
Int1	12.25	9.625	HCL-80	40	5400	1523	Econocem TM, 12.9 ppg	0	154	HalCem TM, 14.8 ppg	5100	100%
Int2	8.5	7.625	HCP-110	29.7	12251	224	NeoCem, 9 ppg	4400	120	NeoCem 15 ppg	11251	50%
Prod	6.75	5.5	P-110	23	21891	406	SoluCem, 15 ppg	11251				20%

5.5 23# P-110 MS2 Anaconda-SP SF

Pipe Body Data		
Nominal OD	5.500	Inches
Wall Thickness	0.415	Inches
Weight	23.00	lb/ft
PE Weight	22.56	lb/ft
Nominal ID	4.670	Inches
Drift	4.545	Inches
Minimum Yield Strength	110,000	PSI
Minimum Tensile Strength	120,000	PSI
RBW	87.5%	Rating

Connection Data		
Connection OD	5.753	Inches
Connection ID	4.670	Inches
Make-Up loss	4.774	Inches
Tension Efficiency	90%	Rating
Compression Efficiency	90%	Rating
Yield Strength in Tension	656,000	LBS.
Yield Strength in Compression	656,000	LBS.
MIYP (Burst)	14,530	PSI
Collapse Pressure	14,540	PSI
Uniaxial Bending	83	degrees

Make-Up torques		
Yield torque	42,000	FT-LBS.
Max Operating Torque	33,600	FT-LBS.
Max Make-Up	20,000	FT-LBS.
Optimum Make-Up	16,500	FT-LBS.
Minimum Make-Up	13,000	FT-LBS.

Technical Sales Support: Rafael Escamilla Jr., Cell: 281-961-7704, jescamilla@ofsint.com

Product is sold by OFSI under a license from Fermata Technologies, LLC

Installation Procedure Prepared For:

Franklin Mountain Operating LLC.

(20”) x 13-3/8” x 9-5/8” x 7-5/8” x 5-1/2”
MBU-4T-CFL-R-DBLO Wellhead System
With CTH-DBLHPS Tubing Head

Publication # IP1104 Rev. 0

February, 2020

Table of Contents

Warning, Caution & Note Defined

WARNING:

Definition:

An operating or servicing procedure, practice, condition or statement, which if not strictly observed could result in environmental harm, serious injury or death to personnel or long term health hazards.

CAUTION:

Definition:

An operating or service procedure, practice, condition or statement, which if not strictly observed could result in damage to or destruction of equipment or rig down time.

NOTE:

Definition:

An operating procedure, condition or statement which is essential to highlight.

Reference Documents

Health, Safety and Environmental Handbook

CAS-003 Rev. B
Assembly of Threaded Connections to Valves and Wellhead Equipment

Field Service Manual Sections 3 Page 3-4 - Lockscrews

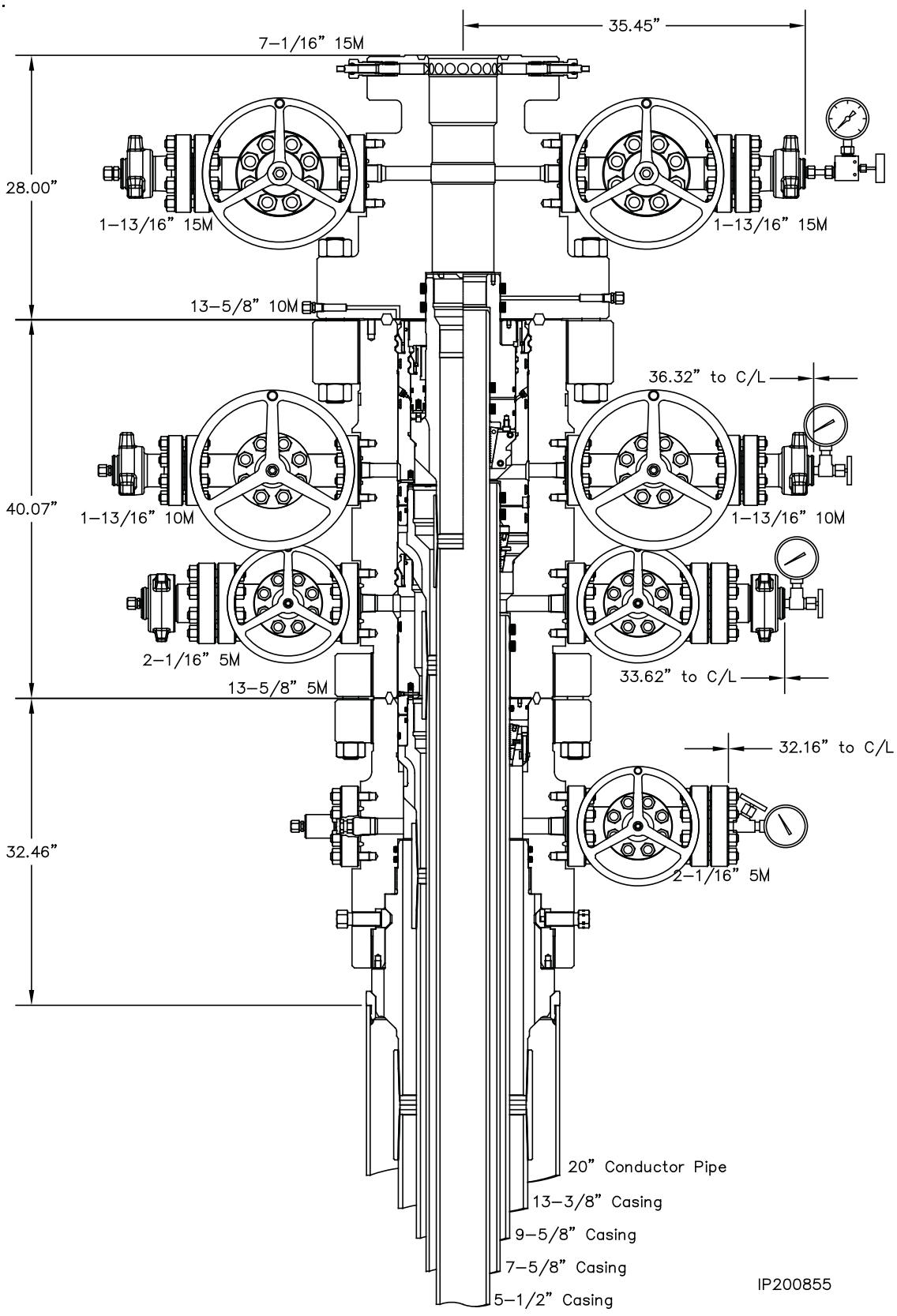
Field Service Manual Sections 7 - Service Tools

Field Service Manual Sections 9 - Quick Connects

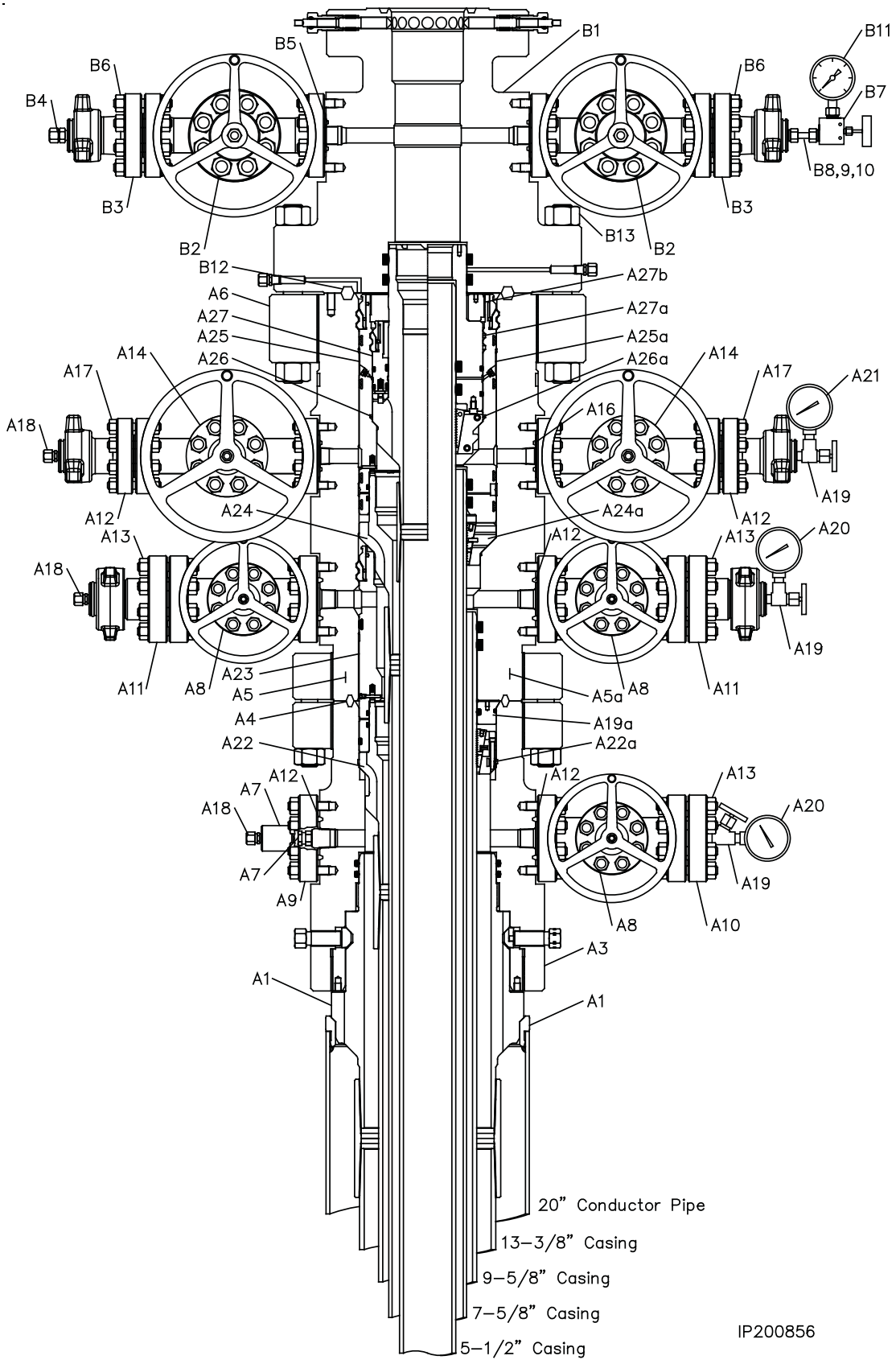
Field Service Manual Sections 10 - Specifications
Flange Bolting/Torque Requirements, Tubing Specifications, and Casing Specifications

OM-016
Installation, Operation and Maintenance Manual for 6-3/4” Type LR Back Pressure Valve

System Drawing



Bill of Materials



MBU-4T HOUSING ASSEMBLY

Item	Qty	Description
A1	1	Landing Ring, CW, 20” SOW x 3/8” Casing Weight x 20.06” O.D. x 18.13” I.D., 4140 110K Part # 116444
A2	1	Casing Hanger, CW, MBU-3T-CFL-R, 13-3/8”, 13-3/8” (54.5-61#) Buttress Pin Bottom x 14.000” 2 Stub Acme 2G LH Pin Top, 12.489” Min. Bore, 6A-U-AA-1-2 Part # 118174
A3	1	Housing, CW, MBU-4T-LWR-CFL-R-DBLO, 13-3/8”, 13-5/8” 5M Threaded Flange, With Two 2-1/16” 5M Studded Outlets, 6A-PU-EE-NL-1-2 Part # 122608
A4	1	Ring Gasket, BX-160, 13-5/8” 5M Part # BX160
A5	1	Housing, CW, MBU-4T-UPR-SF, 13-5/8” 5M Threaded Flange Studded Bottom x 13-5/8” 10M Threaded Flange Top, With Two 1-13/16” 10M Studded Upper Outlets & Two 2-1/16” 5M Studded Lower Outlets, Without 13-5/8” 10M Threaded Flange, 6A-PU-EE-2-2 Part # 122622P2
A6	1	Flange, Threaded, 13-5/8” 10M With 21.750” 2 Stub Acme 2G Left Hand Box Thread. 31.00” O.D., 4130 75K Part # 110578
A7	1	Valve Removal Plug, CW, 1-1/2” (1.900”) Sharp Vee x 1-1/4” Hex, 6A-DD-NL Part # VR2
A8	3	Valve, Hand Wheel Operated, CEPAI, M-EXP, 2-1/16” 3/5M Flanged End 6A LU AA/DD-NL PSL2 PR1 Hand Wheel Operated, 4130 QPQ Seat/Gate, 4140 QPQ Stem Part # 125097
A9	1	Companion Flange, CW, 2-1/16” 5M x 2” Line Pipe, 6A-KU-EE-NL-1 Part # 200002

MBU-4T HOUSING ASSEMBLY

Item	Qty	Description
A10	1	Blind Flange, CW, 2-1/16” 5M x 1/2” NPT, 6A-LU-E-1 Part # 191005
A11	2	Adapter, CFH, 2-1/16” 5M x 2” figure 1502 x 1/2” NPT Part # 117656
A12	7	Ring Gasket, R-24, 2-1/16” 3/5M Part # R24
A13	24	Stud, All-Thread With Two Nuts, Black, 7/8” x 6-1/2” Long, B7/2H Part # 780067
A14	2	Gate Valve, AOZE, FC, 1-13/16” 10M, Flanged End, Handwheel Operated, 6A-LU-EE-0,5-3-1 Part # 103188
A15	2	Adapter, FH, 1-13/16” 10M x 2” figure 1502 x 1/2” NPT, nace service Part # 100981
A16	4	Ring Gasket, BX-151, 1-13/16” 10M Part # BX151
A17	16	Stud, All-Thread With Two Nuts, Black, 3/4” x 5-1/2” Long, B7/2H Part # 780080
A18	3	Fitting, Grease, Vented Cap, 1/2” NPT, 4140 -50F, With Electroless Nickel Coating Nace, K-Monel Ball, Inconel X-750 Spring Part # 100048
A19	3	Needle Valve, MFA, 1/2” NPT, 10M Service Part # NVA
A20	2	Pressure Gauge, 5M, 4-1/2” Face, Liquid Filled, 1/2” NPT Part # PG5M
A21	1	Pressure Gauge, 10M, 4-1/2” Face, Liquid Filled, 1/2” NPT Part # PG10M
A22	1	Casing Hanger, CW, MBU-3T LWR-TP4, Fluted, 13-5/8” x 9-5/8” (40#) Buttress Pin Bottom x 10.250” 4 Stub Acme 2G RH Box Top, With 11-1/2” OD Neck, 6A-U-AA-1-2 Part # 117760

MBU-4T HOUSING ASSEMBLY

Item	Qty	Description
A23	1	Packoff, CW, MBU-4T-LWR, Mandrel, 13-5/8” Stack, With 10.500” 4 Stub Acme 2G Left Hand Box Top, 6A-U-AA-1-2 Part # 124176
A24	1	Casing Hanger, CW, MBU-4T-MID-TP8, Fluted, 13-5/8” x 7-5/8” (29.7#) STINGER FLUSH Pin Bottom x 10.250” 4 Stub Acme 2G Right Hand Box Top, With 11-1/2” O.D. Neck, 4140 110K, temp U, material AA, PSL2, PR2 Part # NPN
A25	1	Packoff, CW, MBU-3T, Mandrel, 13-5/8” Nested x 11”, With 11.250” 4 Stub Acme 2G Left Hand Box Top, With Rupture Disk, 6A-PU-AA-1-2 Part # 120158
A26	1	Casing Hanger, CW, MBU-3T-TP8-UPR, SN, 7-5/8” fluted, 11” nested x 5-1/2” (20#) ANACONDA FLUSH pin bottom x 6.125” 4 Stub Acme 2G RH box top & 4-13/16” BPV thread, special for rotating casing string, 4130 85K, temp U, material DD, PSL3, PR2 Part # NPN ALTERNATE HANGER IF 7-5/8” EMERGENCY HANGER IS USED: Casing Hanger, CW, MBU-4T-TP8-UPR, SN, 7-5/8” fluted, 11” nested x 5-1/2” (20#) ANACONDA FLUSH pin bottom x 6.125” 4 Stub Acme 2G RH box top & 4-13/16” BPV thread, special for rotating casing string, 4130 85K, temp U, material DD, PSL3, PR2 Part # NPN
A27	1	Packoff, CW, CTF-SN, arranged for 7.75” seal prep with 8.750” 4 Stub Acme 2G LH box top, to land on 45°, 10,000 psi max WP, 6A-PU-DD-NL-2-2 Part # 115867

TUBING HEAD ASSEMBLY

Item	Qty	Description
B1	1	Tubing Head, CW, CTH-DBLHPS, 7-5/8", 13-5/8" 10M x 7-1/16" 15M, With Two 1-13/16" 15M Studded Outlets, With 6.375" Minimum Bore, 17-4PH Lock Down Screws, 6A-PU-EE-0,5-3-2 Part # 115302
B2	2	Gate Valve, CW, SB100, 1-13/16" 15M, Flanged End, Handwheel Operated, BB/EE-0,5, (6A-LU-BB/EE-0,5-3-1) Part # 113880
B3	2	Flange Adapter, CFH, 1-13/16" 15M x 2" figure 1502, 9/16 Autoclave, STD SRV, Non-Nace Part # 112316
B4	1	Fitting, grease, vented cap, 9/16 Autoclave or equivalent, 316SS Part #100326
B5	4	Ring Gasket, BX151, 1-13/16" 15M Part # BX-151
B6	16	Studs, all thread with two nuts, black, 7/8" x 6-1/2" long, B7/2H, no plating Part # 105477
B7	1	Needle Valve, Autoclave, 2 Way angle, 9/16 SOG, without collar and gland Part # 810023
B8	2	Fitting, collar, 9/16 Autoclave Part # 810021
B9	2	Fitting, Gland, 9/16 Autoclave Part # 810020
B10	1	Nipple, 9/16 Autoclave x 4" long threaded and cone both ends, 316 SS Part # 810026
B11	1	Pressure Gauge, 15M, 5-1/2" face, liquid filled, 9/16 Autoclave Part # PG15M
B12	1	Ring Gasket, BX-159, 13-5/8" 10M Part # BX159
B13	20	Stud All-Thread, With Two Nuts, Black, 1-7/8" x 17-3/4" B7/2H, No Plating Part # 102825

EMERGENCY EQUIPMENT

Item	Qty	Description
A5a	1	Housing, CW, MBU-4T-DBLHPS-UPR-SF, 9-5/8", 13-5/8" 5M Threaded Flange Studded Bottom x 13-5/8" 10M Threaded Flange Top, With Two 1-13/16" 10M Studded Upper Outlets & Two 2-1/16" 5M Studded Lower Outlets, 6A-PU-EE-NL-2-2 Part # NPN
A22a	1	Casing Hanger, CW, C21, 13-5/8" x 9-5/8" Part # 100586
A23a	1	Primary Seal, CW, H, 13-5/8" x 9-5/8", 6A-PU-AA-1-1 Part # 123962
A24a	1	Casing Hanger, CW, MBU-4T-MID, Emergency, 13-5/8" x 7-5/8", 6A-PU-DD-NL-3-1 Part # 122659
A25a	1	Packoff, CW, MBU-3T, Emergency, 13-5/8" Nested x 11" x 7-5/8" With 11.250" 4 Stub Acme 2G Left Hand Box Top, With Rupture Disk, 6A-U-AA-1-1 Part # 120920
A2a	1	Casing Hanger, CW, MBU-3T/2LR, Upper, 11" x 5-1/2", 6A-PU-DD-3-2 Part # 108211
A27a	1	Packoff, CW, MBU-3T, Inner, Emergency, Nested, 11" x 5-1/2" With 7-5/8" Seal Neck, 4-13/16" HBPV Threads & 4.74" Min. Bore, Arranged For Hold Down Ring, 6A-PU-EE-NL-1-2 Part # 119402
A27b	1	Hold Down Ring, For 22 Slip Casing Hanger, With 11.250" 4 Stub Acme 2G Left Hand Thread Pin x 8.00" I.D. x 2.62" Long, 4140 110K Part # 116161

RENTAL EQUIPMENT

Item	Qty	Description
R1	1	Riser Adapter, CW, SRA, 20" x 20" SOW top x 19.5" ID, 8.5" Long With (8) 1" 8UNC-2B Taped Holes Part # 100549
R2	1	Hub, CW, Threaded, MBU-3T, 13-5/8" 10M With 21.750" 2 Stub Acme 2G Left Hand Box Thread Part # 116992
R3	1	Drilling Adapter, CW, MBU-3T, 13-5/8" 10M Quick Connect Bottom x 13-5/8" 10M Studded Top x 15.0" Long, Temp. Rating PU Part # 116966
R4	1	TA Cap, CW, MBU-3T-HPS, 9", 13-5/8" 10M Quick Connect, With One 1-13/16" 10M Studded Outlet, VR Thread & 1/2" NPT Port, 6A-U-AA-1-1 Part # 117347
R5	1	Secondary Seal Bushing, CW, TA-HPS, 9" x 7-5/8" x 4.31" Long, With 7.731 Min. Bore, 6A-U-AA-1-1 Part # 108466
R6	1	Packoff Running/Cementing Tool, CW, MBU-3T-UPR, 13-5/8" with 11.250" 4 Stub Acme-2G LH pin bottom x 7-5/8" Buttress box top, with ball bearings Part # 125221

RECOMMENDED SERVICE TOOLS

Item	Qty	Description
ST1	1	Casing Hanger Lift Ring, CFL-R, With 14.000" 2 Stub Acme 2G Left Hand Threads, 4140 110K Part # 119126
ST2	1	Casing Hanger Running Tool, CW, MBU-3T-CFL-R, 13-3/8" Buttress Box Top x 14.000" 2 Stub Acme 2G Left Hand Box Bottom Landing Thread, 12.60" Min. Bore Part # 118176
ST3	1	Casing Hanger Torque Collar, CW, MBU-3T-CFL-R, For 16" Neck, 4140 110K Part # 118178
ST4	1	Test Plug/Retrieving Tool, CW, MBU-3T, 13-5/8" x 4-1/2" IF (NC50) Box Bottom & Top, With 1-1/4" Line Pipe Bypass & Spring Loaded Dogs Part # 116972
ST5	1	Test Plug Assembly With Spacer Subs, 13-5/8" 4-1/2" IF (NC50) Consisting Of:
	2	Test Plug/Retrieving Tool, CW, 13-5/8" x 4-1/2" IF (NC50) Box Bottom & Top, With 1-1/4" Line Pipe Bypass & Spring Loaded Dogs Part # 104467
	2	Sub, DARCO, 4-1/2" IF (NC50) Pin x 4-1/2" IF (NC50) Pin, 18" Long, (Threads On), 4140 110K Part # 123926
ST6	1	Wear Bushing, CW, MBU-4T-LWR, 13-5/8" x 12.31" Min. Bore x 50.0" Long, With 12.489" I.D. From Top To 3.0" From Bottom, With 3/8" Upper O-Ring Part # 126048
ST7	1	Casing Hanger Running Tool, CW, TP4, 13-5/8" x 9-5/8" Buttress Box Top x 10.250" 4 Stub Acme 2G Right Hand Pin Bottom, 1000K Max. Load Capacity, 18,000 Ft-Lbs Max. Torque, Spec. For Rotating Casing String Part # 117769

RECOMMENDED SERVICE TOOLS

Item	Qty	Description
ST8	1	Torque Collar, CW, For Use With Running Tool, TP, 10.250" 4 Stub Acme 2G Right Hand Pin Bottom, Arranged For 11.50" O.D. x 5.00" Long Box Hanger Neck, 36,000 Ft-Lbs Max. Torque Part # 118906
ST9	1	Wash Tool, CW, MBU-3T-LR, MBS2 & Fluted, 13-5/8" x 4-1/2" IF (NC50) Box Top Thread, With Brushes Part # 106277
ST10	1	Packoff Running Tool, CW, MBU-4T-LWR, 13-5/8" Stack With 10.500" 4 Stub Acme 2G Left Hand Pin Bottom x 4-1/2" IF (NC50) Box Top, With Ball Bearings Part # 122647
ST11	1	Wear Bushing, CW, MBU-4T-MID, Stack, 13-5/8" x 9.00" I.D. x 28.0" Long Part # 123523
ST12	1	Casing Hanger Running Tool, CW, TP8, 13-5/8" x 7-5/8" (29.7#) STINGER FLUSH Box Top x 10.250" 4 Stub Acme 2G Right Hand Pin Bottom, max load capacity 1000K, Max. Torque 18,000 Ft-Lbs, Spec. For Rotating Casing String Part # NPN
ST13	1	Packoff Running Tool, CW, MBU-3T-UPR, 13-5/8" Nested, With 11.250" 4 Stub Acme 2G Left Hand Pin Bottom x 4-1/2" IF NC50 Box Top, With Seal Sleeve & Ball Bearings (Seal Sleeve Removed) Part # 117310 OR Packoff Running Tool, CW, MBU-3T-UPR, 13-5/8" Stack With 11.250" 4 Stub Acme-2G LH Pin Bottom x 4-1/2" IF (NC50) Box Bottom And Top, With Ball Bearings Part # 116996
ST14	1	Test Plug, CW, MBU-3T Inner, 11" x 4-1/2" IF (NC50) Box Bottom & Top, 1-1/4" Line Pipe bypass Part # 125190

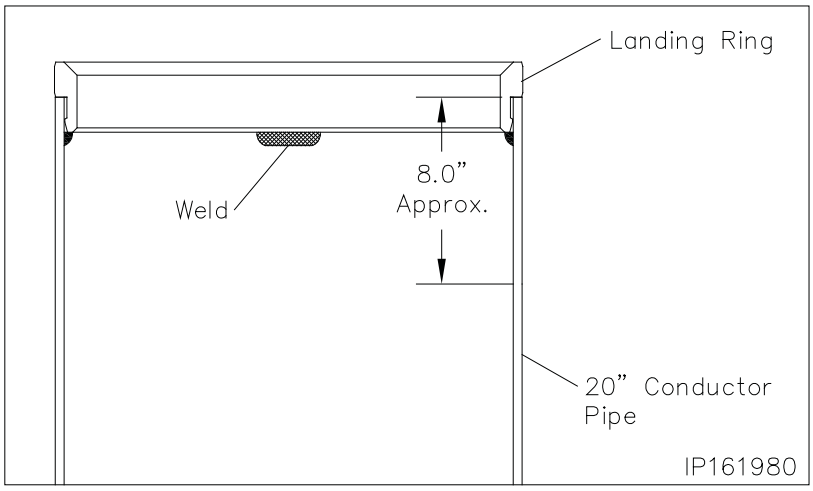
RECOMMENDED SERVICE TOOLS

Item	Qty	Description
ST15	1	Wear Bushing, CW, MBU-3T (-ONE), Upper, Nested, 13-5/8" x 11" x 7.00" I.D. x 20.0" Long, Arranged For 13-5/8" Retrieving Tool Part # 123959
ST16	1	Casing Hanger Running Tool, CW, TP8, 6.125" 4 Stub Acme RH pin bottom x 5-1/2" (20#) ANACONDA FLUSH box top, with 4.762" minimum bore & load capacity TBD, max torque TBD, special for rotating casing string, 4140 125K Part # NPN
ST17	1	Torque Collar, CW, casing hanger, for use with 7.62" OD x 15.44" long hanger neck and 10.83" OD running tool, maximum torque 35000 ft lbs. Part # 117319
ST18	1	Wash Tool, CW, casing hanger, MBU-2LR/MBS2-R fluted, 11" x 4-1/2" IF (NC-50) box top threads, fabricated Part # 103164
ST19	1	Packoff Running Tool, CW, MBU-3T-SN, 7-5/8", 8.750" 4 Stub Acme 2G LH pin bottom x 4-1/2" IF (NC-50) box top, with ball bearings Part # 117306
ST20	1	Emergency Packoff Running Tool, Crossover Sub, CW, 4-13/16" HBPV Pin Thread Bottom x 4-1/2" IF (NC50) Box Top, 18.0" Long, 4140 110K Part # 118942
ST21	1	Back Pressure Valve, CW, H-CW, 4-13/16" One Way 6A-DD Part # 114980

Stage 1 — Install the Landing Ring

1. Run the 20” conductor pipe to the required depth and cement.
2. Cut the 20” conductor pipe at predetermined elevation below grade to facilitate the installation of the balance of the wellhead equipment.
3. Grind stub level with the horizon and place an 1/8” x 1/8” bevel on the I.D. and O.D. of the stub.
4. Examine the ***20” Nominal x 20” x 3/8” WT, Landing Ring (Item A1)***. Verify the following:
   - grinding nib is free of excessive scratches or gouges
   - entire ring is clean and free of debris
5. Using a wire brush, thoroughly clean the top 6” of the conductor pipe stub, inside and outside, removing all loose rust and scale.
6. Using a pair of I.D. callipers, measure the I.D. of the 20” pipe stub in two opposing positions.
7. Using the O.D. caliper, measure the O.D. of the landing ring grind nib.
8. Using a disc grinder, grind the O.D. of the nib until its dimension is slightly smaller then the I.D. of the pipe.
9. Pick up the landing ring and carefully push it into the pipe stub until the stub contacts the stop shoulder on the O.D. of the ring as shown.

NOTE: Tack weld the bottom of the ring to the I.D. of the pipe in four equally spaced places. Tacks should be approximately 2” long.



Stage 2 — Install the Diverter

The diverter riser is designed to carry the drilling fluids to the reserve pit during the drilling of the surface casing hole section. Due to the fact that the surface casing will be run and landed through the riser, it will be necessary to lift the riser a minimum of 21.0” in order to clear the surface casing hanger. Ensure that the riser is fabricated to consider these lift and height requirements.

1. Examine the ***20” Nominal x 20” Riser Connector (Item R1).*** Verify the following:
   - bore is clean and free of debris
   - hex head set screws are in place and fully retracted from the bore
   - o-ring is properly installed and undamaged
   - connector is properly welded to 20” fabricated riser

2. Lightly lubricate the I.D. of the riser connector and O.D. of the landing ring with light grease.

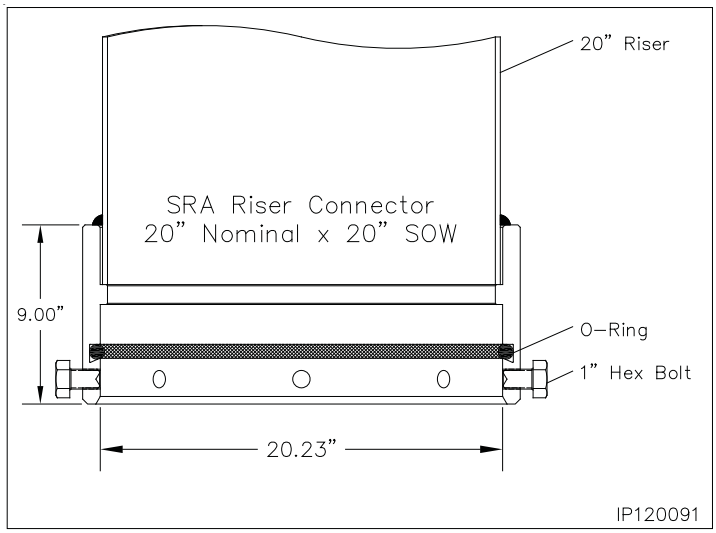
3. Slide the connector over the landing ring until the connector bottoms out on the landing ring.

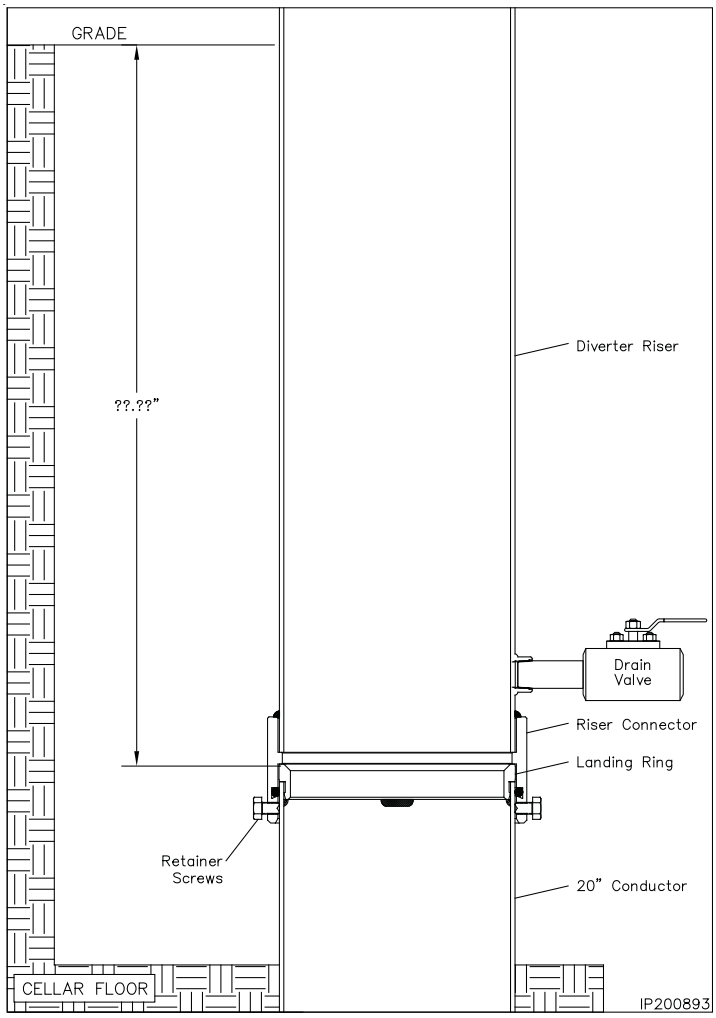
NOTE: In cold weather environments it is recommended to remove the o-ring from the connector and heat it on the floor board of the service vehicle or heat the O.D. of the connector with a rose bud to soften o-ring for easier installation.

4. Using a 1-5/8” socket, run in all 8 of the connector hex head set screws in an alternating cross fashion and torque to 100 ft-lbs.

5. Attach flow line and guide wires as required.

6. Drill out and condition the hole for the 13-3/8” surface casing.



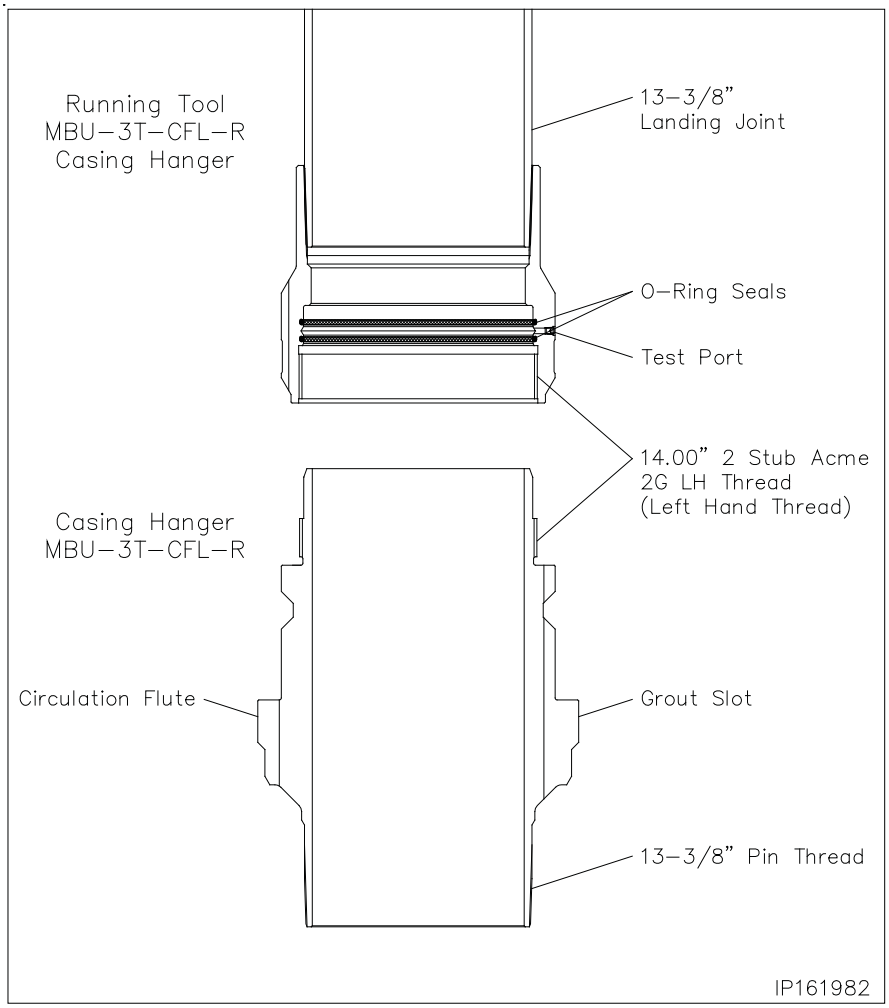


Stage 3 — Hang Off the 13-3/8" Casing

1. Examine the ***13-3/8" (68#) Buttress Pin Bottom x 14.000" 2 Stub Acme 2G LH Pin Top MBU-3T-CFL-R Casing Hanger (Item A2).*** Verify the following:
   - external threads are clean and in good condition
   - bore is free of debris
   - seal area is clean and undamaged
   - casing thread protector is in place

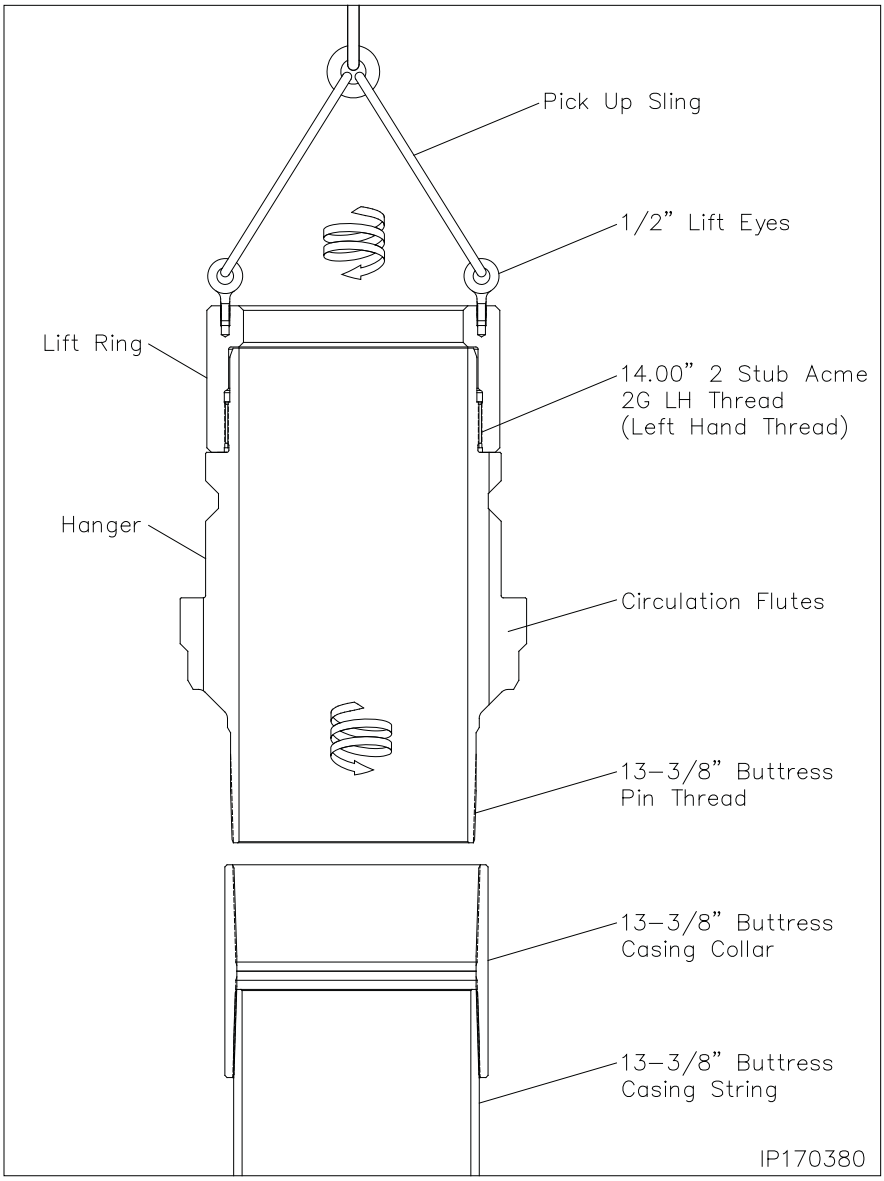
2. Examine the ***13-3/8" Box MBU-3T-CFL-R Casing Hanger Running Tool (Item ST2).*** Verify the following:
   - internal threads are clean and in good condition
   - bore is free of debris
   - o-rings are in place and undamaged

3. Make up a 13-3/8" landing joint in the top of the running tool and torque connection to thread manufacturer's maximum make up torque.



Stage 3 — Hang Off the 13-3/8” Casing

4. Examine the ***14.000” 2 Stub Acme LH Box Casing Hanger Lift Ring Assembly (Item ST1).*** Verify the following:
   - threads are clean and in good condition
   - 1/2” lifting eyes are in place and tightened securely
5. Liberally lubricate the mating threads of the lift ring and casing hanger.
6. Thread the lift ring onto the top of the casing hanger with counter clockwise rotation to a positive stop. Move the hanger to the rig floor.
7. Drill and condition the hole for the 13-3/8” casing.
8. Run the 13-3/8” casing as required and space out appropriately for the mandrel casing hanger.
9. Set the last joint of casing run in the floor slips.
10. Thoroughly clean and inspect the casing collar threads for and damage and repair or replace collar if necessary.
11. Remove the casing hanger pin thread protector.
12. Apply the appropriate thread lubricant the pin and box connection.
13. Attach a suitable lifting device to the hanger lift ring using the 3/4” lifting eyes and carefully lower the hanger into the casing collar.
14. Rotate the hanger by hand counter-clockwise to locate the thread start and then clockwise to a positive stop. Tighten securely with strap wrench.



Stage 3 — Hang Off the 13-3/8" Casing

15. Remove the lift ring with clockwise rotation and set aside.

16. Pick up the running tool/landing joint.

17. Thoroughly clean and lightly lubricate mating threads, seal areas and o-rings of the casing hanger and running tool with oil or a light grease.

18. Carefully lower the running tool over the hanger neck until the acme threads make contact.

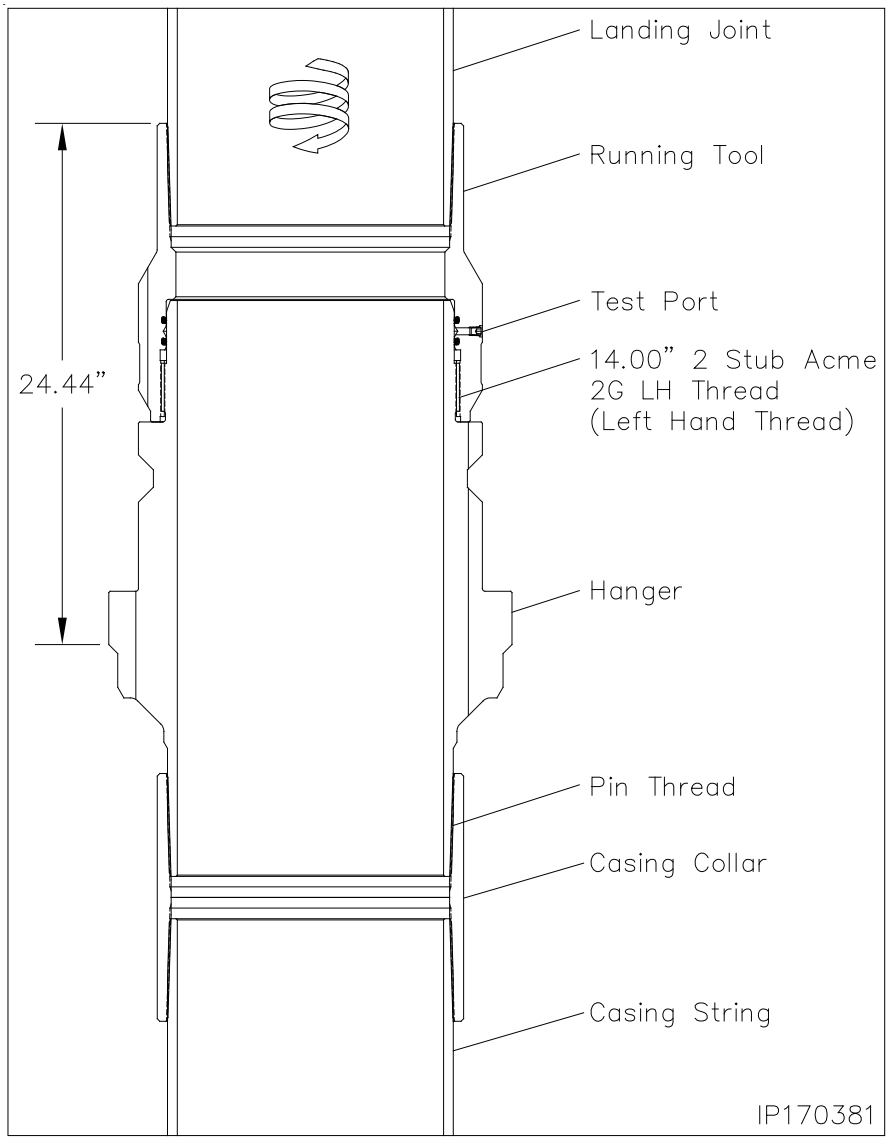
19. ***Using chain tongs only,*** rotate the running tool to the right to locate the tread start and then to the left to a positive stop. Approximately 4-1/2 turns.

CAUTION: Do Not apply torque to the hanger/tool connection.

20. Remove the 1/8" LP flush fitting Allen head pipe plug from the O.D. of the running tool and attach a test pump.

21. Apply hydraulic test pressure to ***5,000 psi*** and hold for 15 minutes or as required by drilling supervisor.

22. Upon completion of a successful test, bleed off pressure through the test pump and remove the pump. Reinstall the pipe plug in the open port and tighten securely.



Stage 3 — Hang Off the 13-3/8” Casing

23. Rotate the running tool by hand counter clockwise to align the circulation flutes of the tool with the drilled holes in the body of the casing hanger.

24. Install the split assembly ring on the casing hanger as indicated and secure with assembly bolts.

25. Examine the ***16” Nominal Torque Collar (Item ST3).*** Verify the following:
    - cap screws are in place and in good condition
    - upper and lower torque pins are in place and fully retracted

26. Install the 1” lifting eyes in two upper 1” tapped holes located 180° apart and 90° from the split in the collar.

27. Remove the 3/4” assembly cap screws and separate the tool in half.

28. Remove the low set of torque pins.

29. Using a suitable lifting device with weight rated slings, assemble the two halves of the torque collar around the casing hanger/running tool assembly and secure the collar halves with the 3/4” cap screws. Torque screws to approximately 100 ft-lbs.

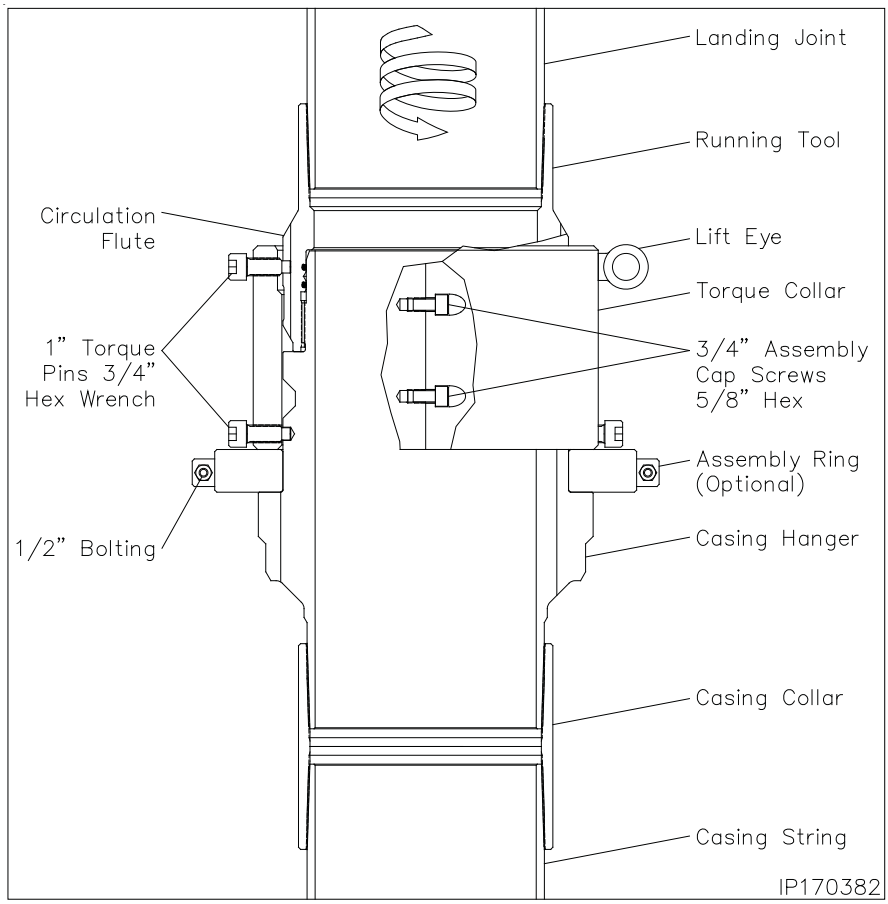
30. Remove the lifting eyes.

31. Align the lower tapped holes in the collar with the drilled holes in the hanger body.

32. Install the (4) lower torque pins and tighten securely.

33. Run in the (4) upper torque pins and tighten securely.

34. Engage the CRT tool to the landing joint and rotate the landing joint with casing hanger and running tool clockwise (right) until the optimum make up torque is achieved and the torque diamond is properly positioned.



35. Back off all (8) torque screws.

36. Remove two upper torque pins and install the lifting eyes.

37. Attach a suitable lifting device with weight rated slings to the torque collar halves and remove the 3/4” cap screws and separate the torque collar.

38. Set the assembly aside and remove the split assembly ring.

Stage 3 — Hang Off the 13-3/8” Casing

39. Calculate the total landing dimension by adding the RKB dimension and predetermined dimension, the location of the landing ring below grade.

40. Starting at the top of the 45° angle load shoulder of the casing hanger measure up the landing joint the calculated distance and place a paint mark on the joint. Mark **HANGER LANDED**.

41. Pick up the casing string and remove the floor slips and rotary bushings.

42. Carefully lower the hanger through the diverter and land it on the landing ring.

43. Slack off all weight and verify that the paint mark on the landing joint has aligned with the rig floor.

44. Place a vertical paint mark on the landing joint to verify if the casing string rotates during the cementing process.

45. Cement the casing as required.

NOTE: Returns may be taken through the circulation slots and out the diverter or out the top out nipple below the diverter.

46. With cement in place, bleed off all pressure and remove the cementing head.

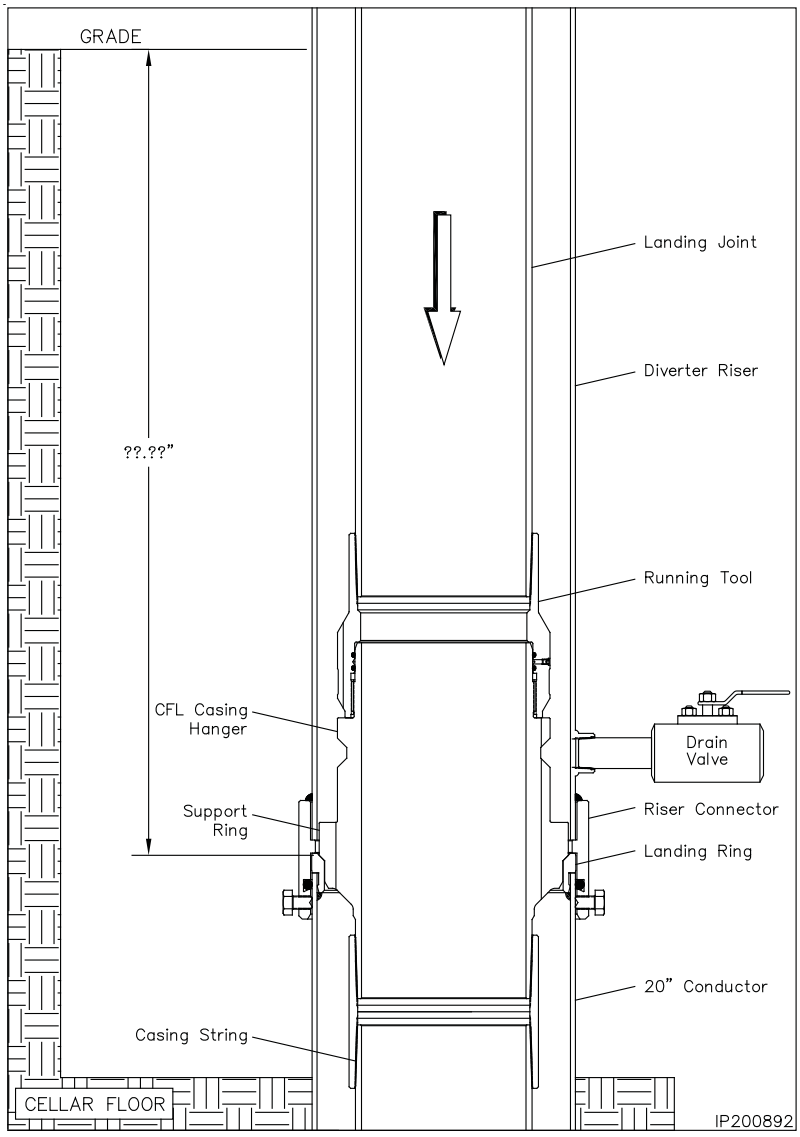
47. <u>Using chain tongs only, located 180° apart,</u> retrieve the running tool and landing joint by rotating the landing joint clockwise (right) approximately 4-1/2 turns or until the tool comes free of the hanger.

CAUTION: The rig floor tong may be used to break the connection but under no circumstances is the top drive to be used to rotate or remove the casing hanger running tool.

48. Attach a suitable lifting device to the diverter and remove the flow line and guide lines.

49. Using a 1-5/8” socket, fully retract the riser connector hex head set screws with left hand rotation.

50. Lift the riser a minimum of 21.0” to clear the casing hanger and then remove the riser from under the rig.



NOTE: If the running tool can not easily be removed, complete steps 48 through 50 with the exception of lifting the riser high enough to expose the running tool and landing joint.

51. Attach a back up tong to the casing hanger to resist right hand rotation.

52. Attach another tong to the running tool and apply right hand torque to the connection while rapping on the running tool with a sledge hammer to jar the connection.

53. Once friction bind is released, further rotate the landing joint 4-1/2 turns to remove the tool from the casing hanger.

54. Remove the diverter riser as previously outlined.

Stage 3 — Hang Off the 13-3/8” Casing

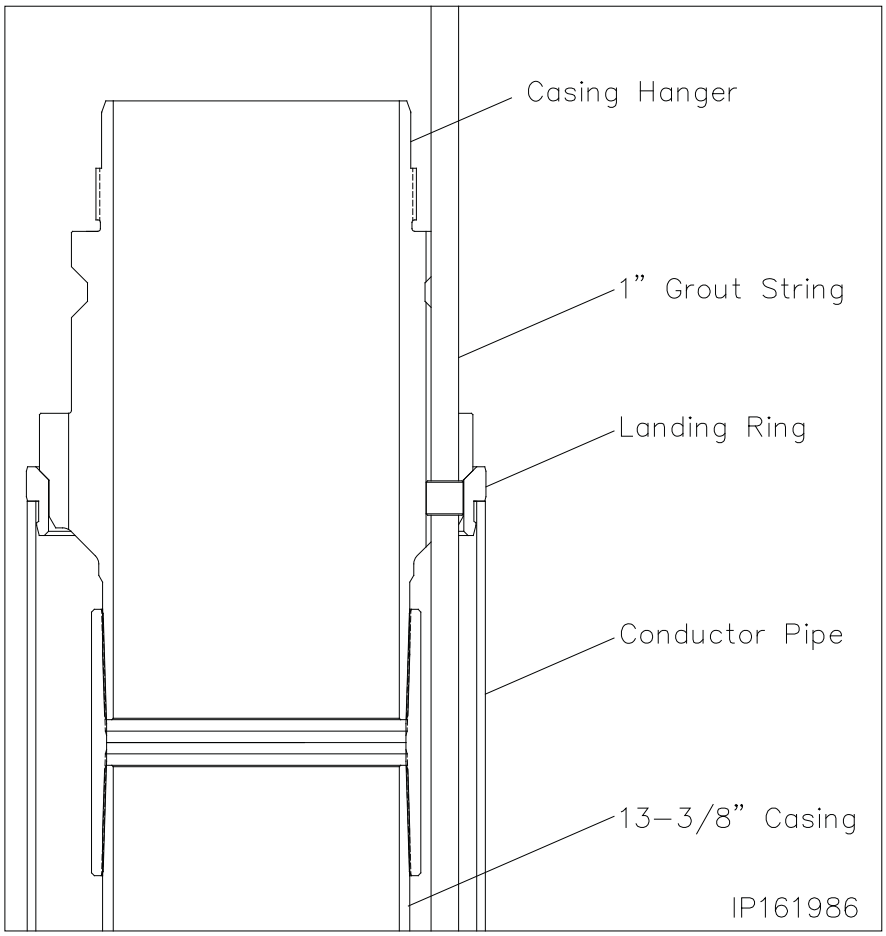
1. Using a 1-5/8” socket, fully retract the (8) riser connector hex head set screws with left hand rotation.

2. Lift the riser a minimum of 20.0” to clear the casing hanger and then remove the riser from under the rig.

In the event that the 13-3/8” surface casing cement requires topping off this can be accomplished through the 1-5/8” wide grout slots in the side of the casing hanger.

3. Carefully run the grout string through the grout slot and along side the 13-3/8” casing and top off the cement as required.

4. With top off complete remove the grout string.



Stage 4 — Install the MBU-4T-CFL-R-DBLO Housings

1. Using a high pressure water hose, thoroughly clean the top and neck of the CFL hanger, removing all old grease and debris.

2. Examine the ***13-5/8" 10M x 13-3/8 Double 'O' Bottom MBU-4T-CFL-R-DBLO Wellhead Assembly (Item A3 & A5)***. Verify the following:
   - Acme thread are clean and in good condition
   - bore and all internal seal areas are clean and undamaged
   - CFL lockring is in place and fully retracted
   - valves are intact and in good condition
   - o-ring seals are in place and in good condition

NOTE: If the threaded hub has been pre-installed in the shop, skip steps 3 through 10.

3. Examine the ***13-5/8" 10M x 21.750" 2 Stub Acme Threaded Hub (Item R2)***. Verify the following:
   - Acme thread are clean and in good condition
   - remove the (4) retainer set screws an place them in a safe place

4. Thoroughly clean and lightly lubricate the mating threads of the housing and the threaded hub with copper coat or never seize.

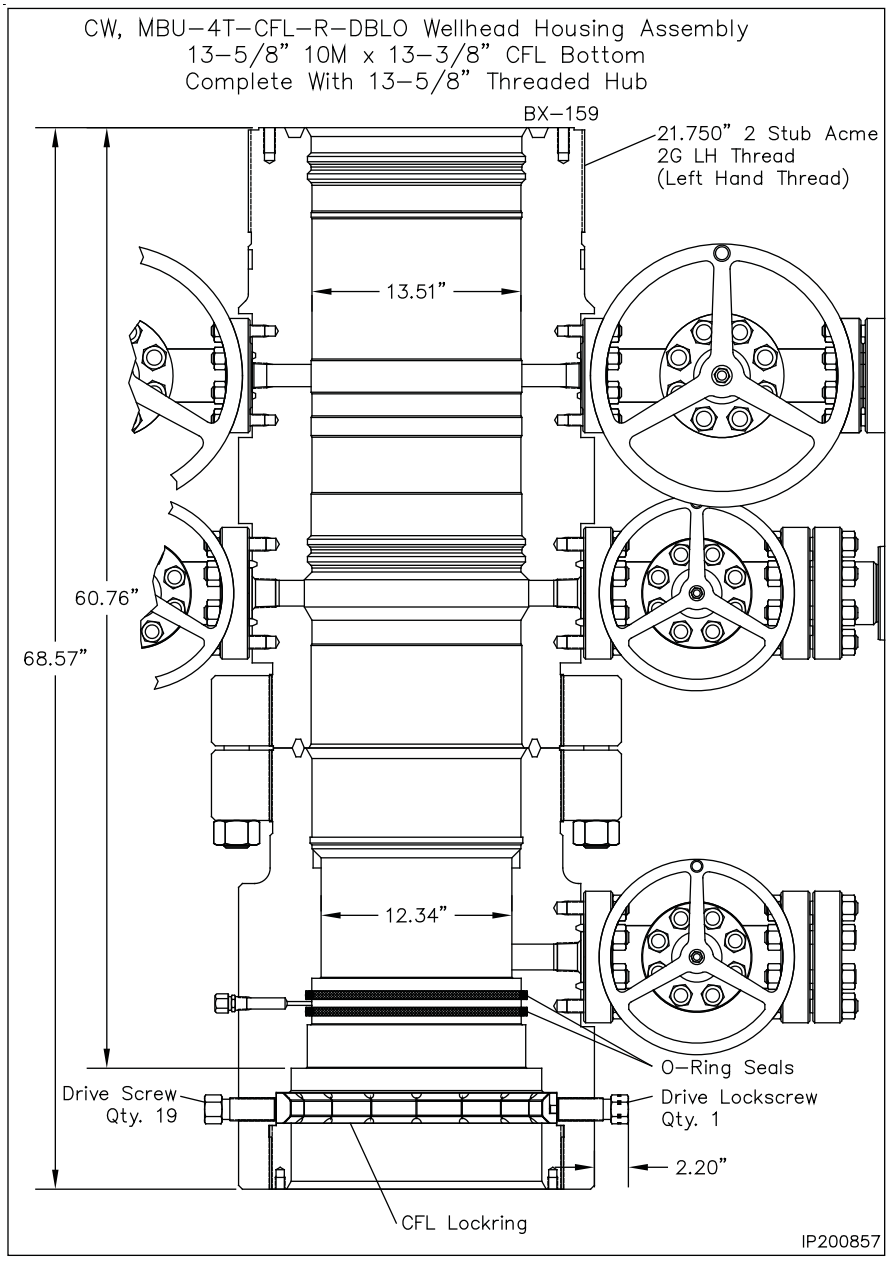
5. Pick up the hub and carefully thread it onto the top of the housing with counter clockwise rotation, until the top of the ring is approximately a 1/4" below the top of the housing.

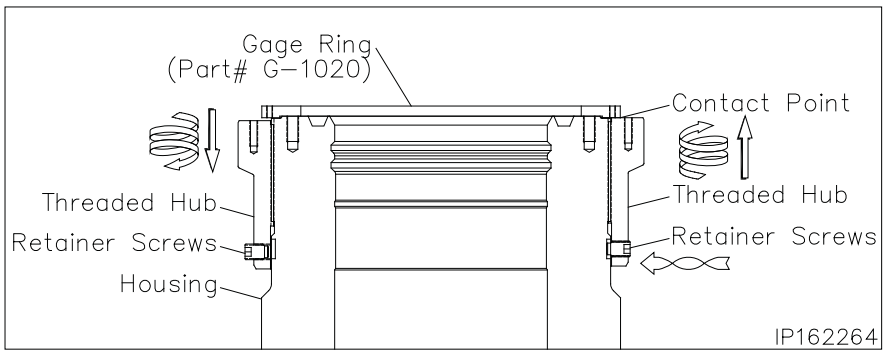
6. Position the hub gage ring on top of the housing with the counter bore down as indicated. Ensure the gage ring is level and straight.

7. Rotate the hub clockwise (UP) until it contacts the gage ring.

CAUTION: Do not off seat the gage ring.

8. Locate the retainer screw holes in the threaded hub.





Stage 4 — Install the MBU-4T-CFL-R-DBLO Housings

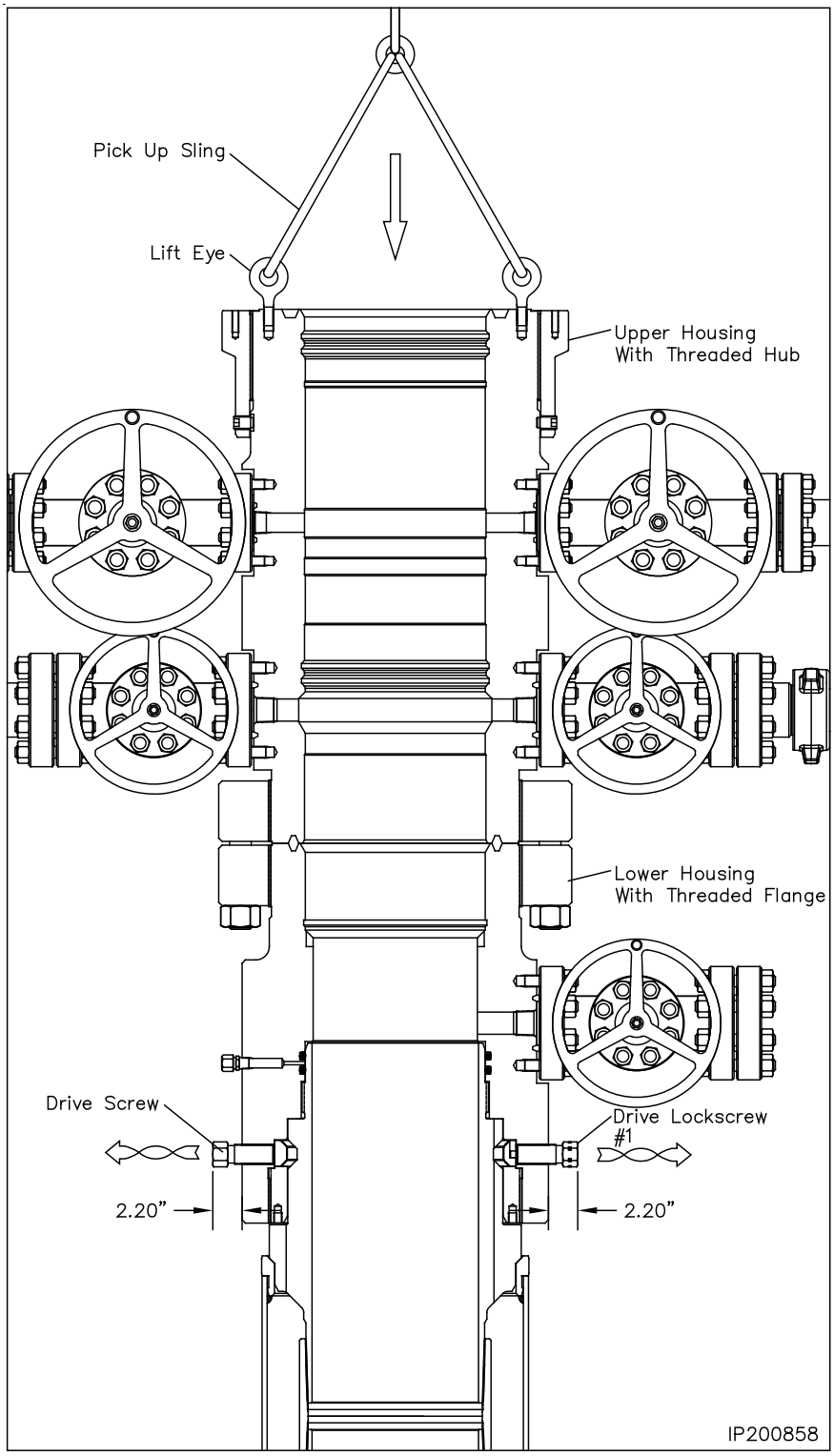
9. Rotate the hub up or down to align the holes in the hub with the notches in the housing.
10. Install the set screws and tighten securely. Remove gage ring.
11. Thoroughly clean and lightly lubricate the mating seal surfaces of the hanger neck and the wellhead housing with oil or light grease.
12. Ensure the lockring is heavily coated with grease or copper coat and fully retracted from the bore.
13. Verify that the drive lockscrew is engaged in the retainer groove of the lockring and that the lockring does not rotate.
14. Verify drive screws extend out 2.20” as indicated.

WARNING: Keep body clear of all pinch points and suspended loads.

15. Attach a four point lifting sling to the lifting eyes of the housing and suspend the wellhead assembly over the well bore.

CAUTION: Ensure all of the lockring drive screws extend out approximately 2.20” (Approximately 5 threads showing). Also ensure drive screw #1 does not extend more then 2.38”.

16. Align and level the wellhead assembly over the hanger neck, orienting the outlets so they will be compatible with the production equipment.
17. Carefully lower the assembly over the hanger and land it on the hanger neck.
18. Ensure the wellhead is correctly positioned. It can be rotated at this time to the right or left to attain proper alignment.



Stage 4 — Install the MBU-4T-CFL-R-DBLO Housings

Test Between the 'O-ring' Seals

1. Locate the "SEAL TEST" fitting on the lower O.D. of the housing and remove the fitting dust cap.

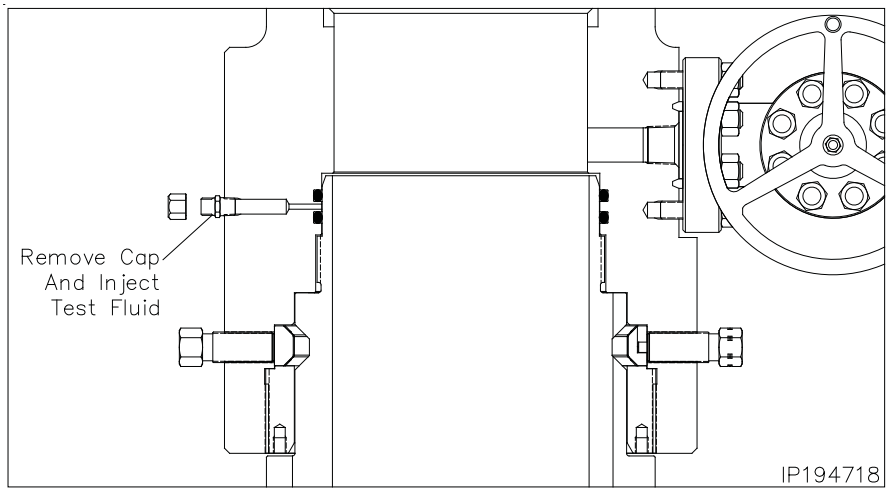
2. Attach a hydraulic test pump to the open fitting and inject test fluid between the 'o-ring' seals until a stable test pressure of ***5,000 psi*** is achieved**.** Hold the test pressure for 15 minutes or as required by drilling supervisor.

CAUTION: Do Not over pressurize!

3. If pressure drops one or both of the 'o-ring' seals may be leaking. Pick up the housing and replace the leaking o-ring seals.

4. Repeat steps 2 and 3 until a satisfactory test is achieved.

5. Bleed off test pressure, leaving the test manifold in place.



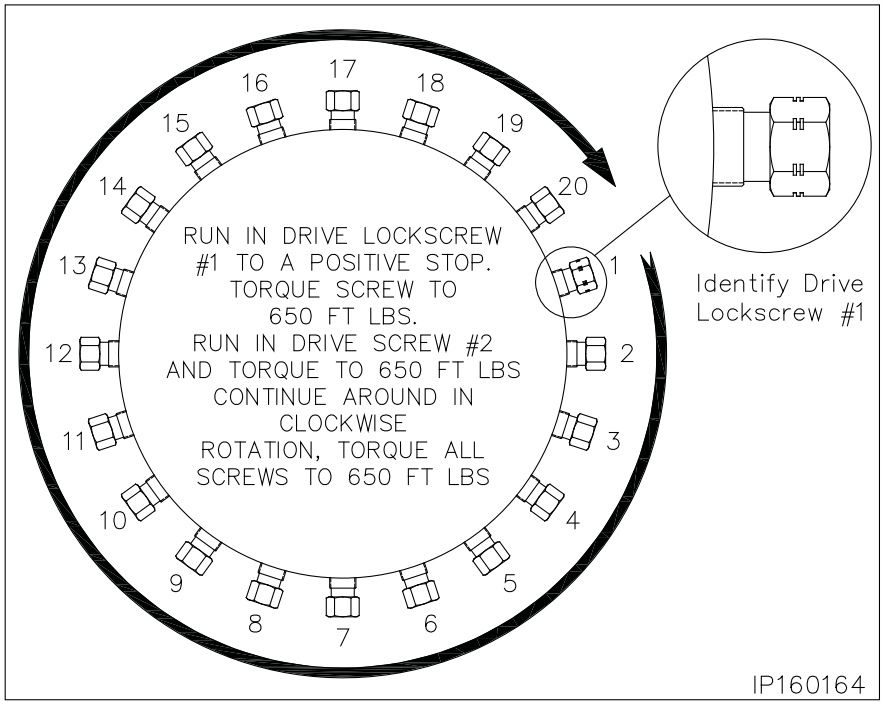
Stage 4 — Install the MBU-4T-CFL-R-DBLO Housings

Engaging the Lockring

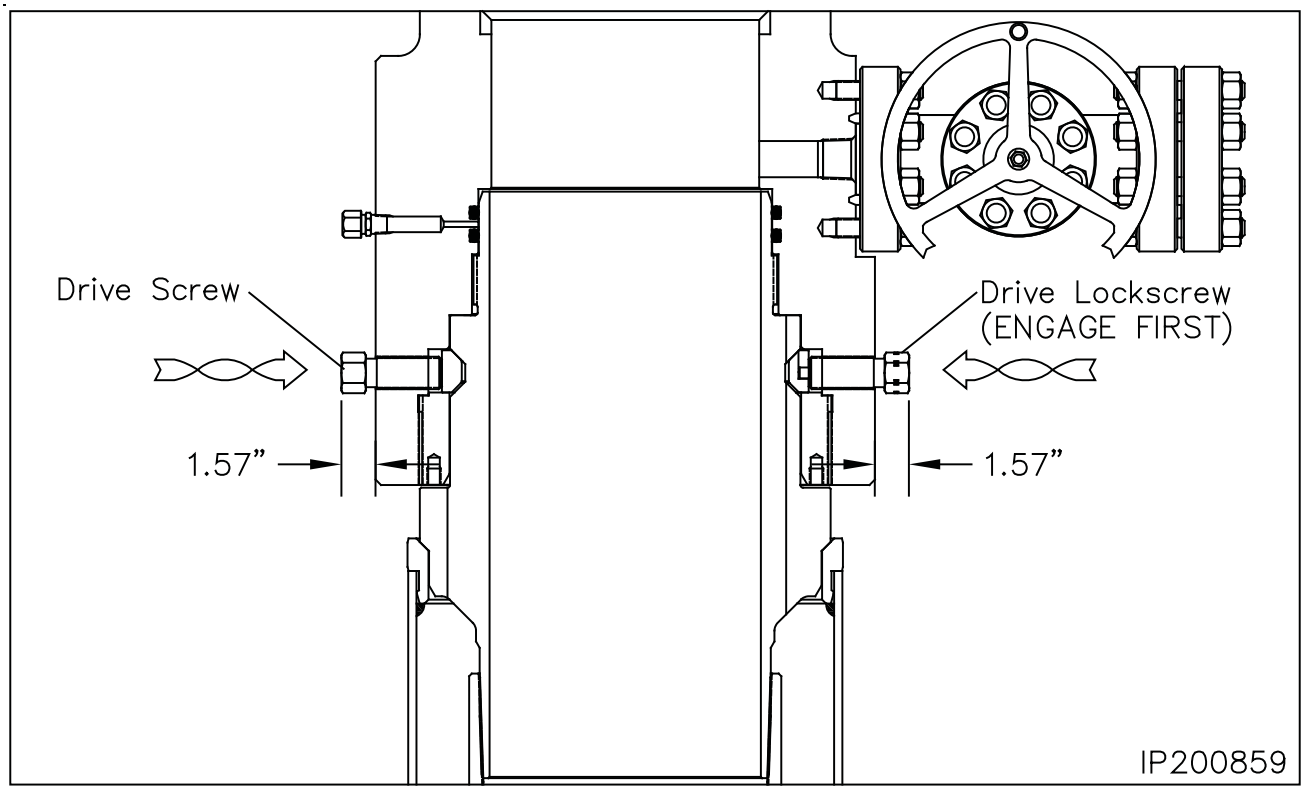
1. Locate the drive lockscrew as indicated in IP Dwg, IP160164 with the scribe marks on the hex and number 1 stamped on the body above the screw.
2. Using an 1-5/8" socket, run in the drive lockscrew to a positive stop and torque to 650 ft-lbs.
3. Locate the drive screw to the left marked 2 and fully run in that screw to a positive stop and torque to 650 ft-lbs.
4. Continue around the housing in a clockwise direction, running in and torquing each screw to 650 ft-lbs.

NOTE: When properly engaged the drive screws will protrude approximately 1.57" from the O.D. of the housing.

5. With lockring engagement confirmed, reattach the test pump and retest the housing seals as previously outline to confirm seal integrity.



6. Bleed off test pressure and remove the test pump and manifold. Install the dust cap on the open fitting.



Stage 5 — Install the 13-5/8” 10M Drilling Adapter

1. Examine the ***13-5/8” 10M Studded x 13-5/8” 10M Quick Connect Drilling Adapter (Item R3).*** Verify the following:
   - bores are clean and free of debris
   - ring grooves are clean and undamaged
   - (20) drive screws and clamp segments are properly installed and fully retracted
   - lifting eyes are installed and tightened securely

NOTE: Prior to installing the BOP/drilling adapter it is recommended to attain an accurate RKB dimension for future use to accurately land test plugs and casing hangers. This dimension is attained by dropping a tape measure from the rig floor to the top of the wellhead flange. Pull tape taut and record the dimension from the wellhead to the top of the rig floor or kelly bushings. Subtract 6” from this dimension (thickness of drilling adapter above the MBU-4T housing) and ensure this dimension is placed on the BOP board in the dog house and on the drillers daily report sheet.

2. Make up the drilling adapter to the bottom of the BOP stack using a new ***BX-159 Ring Gasket.***

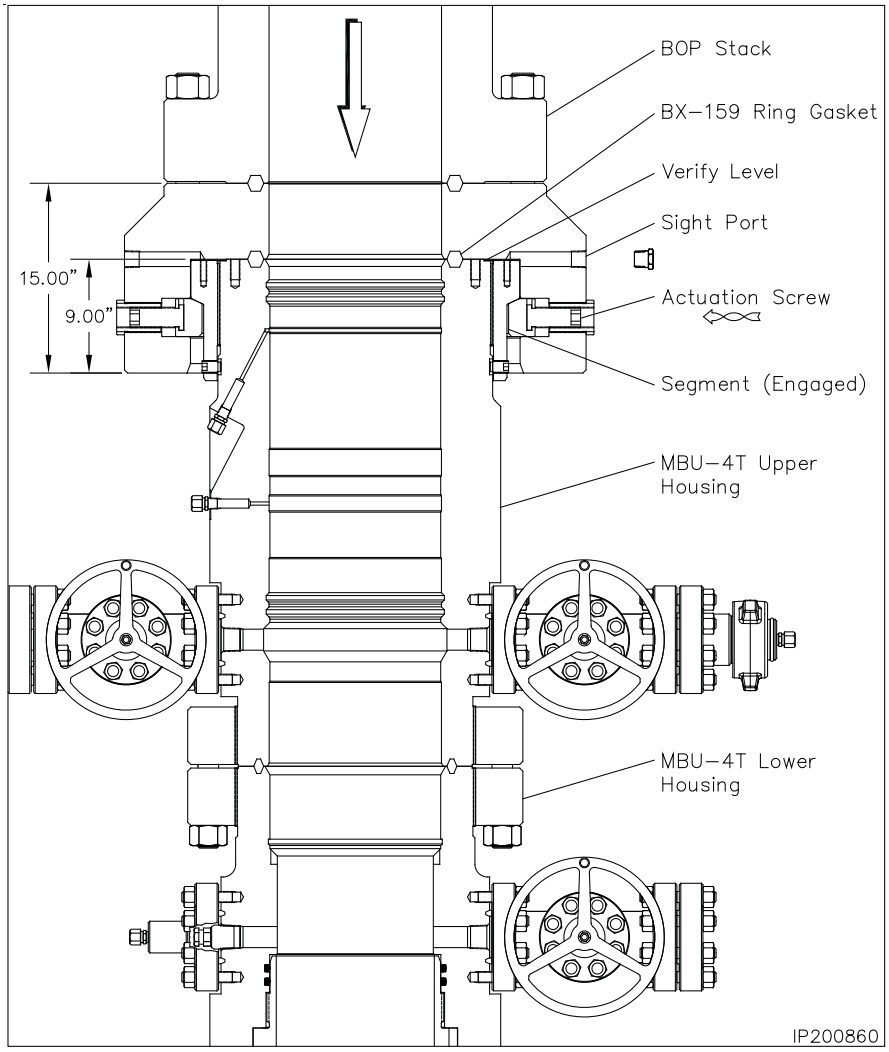
3. Thoroughly clean the threaded hub and ring groove of the MBU-4T housing and the mating clamp segments and ring groove of the drilling adapter.

4. Install a new ***BX-159 Ring Gasket*** into the ring groove of the MBU-4T housing.

WARNING: Keep body clear of all pinch points and suspended loads.

5. Pick up the BOP stack and carefully lower it over the top of the wellhead housing and land it on the ring gasket.

6. Remove the (4) 1” sight port pipe plugs and sight through each port to verify the drilling adapter and BOP is level and hub stand off is consistent.



7. Carefully run in all of the drive screws of the drilling adapter to contact point.

8. Ensure the assembly remains level, run in one actuation screw and torque to 100 ft-lbs.

9. Locate the screw 180° from the first and torque it to 100 ft-lbs.

10. Locate the screws 90° to the right and left and torque them to 100 ft-lbs.

11. Position the second 4 point sequence 90° from the first and torque each screw to 200 ft-lbs.

12. Run in all remaining screws to contact. Torque each screw to 400 ft-lbs.

13. Make one additional round until a stable torque of 650 ft-lbs on all (20) screws is achieved.

14. Sight through the 4 sight ports to confirm that the adapter and head are face to face on all sides and the BOP is level.

15. Reinstall the sight port plugs and tighten securely.

Stage 6 — Test the BOP Stack

Immediately after making up the BOP stack and periodically during the drilling of the well for the next casing string the BOP stack (connections and rams) must be tested.

5,000 PSI Test

1. Examine the ***13-5/8" Nominal x 4-1/2" IF CW MBU-3T Test Plug/ Retrieving Tool (Item ST4)***. Verify the following:
   - 1-1/4" VR plug and weep hole plug are in place and tightened securely
   - elastomer seal is in place and in good condition
   - retractable lift lugs are in place, clean, and free to move
   - drill pipe threads are clean and in good condition

2. Position the test plug with the elastomer seal down and the lift lugs up and make up the tool to a joint of drill pipe.

CAUTION: Ensure the lift lugs are up and the elastomer seal is down.

3. Remove the 1/2" NPT pipe plug from the weep hole if pressure is to be supplied through the drill pipe.

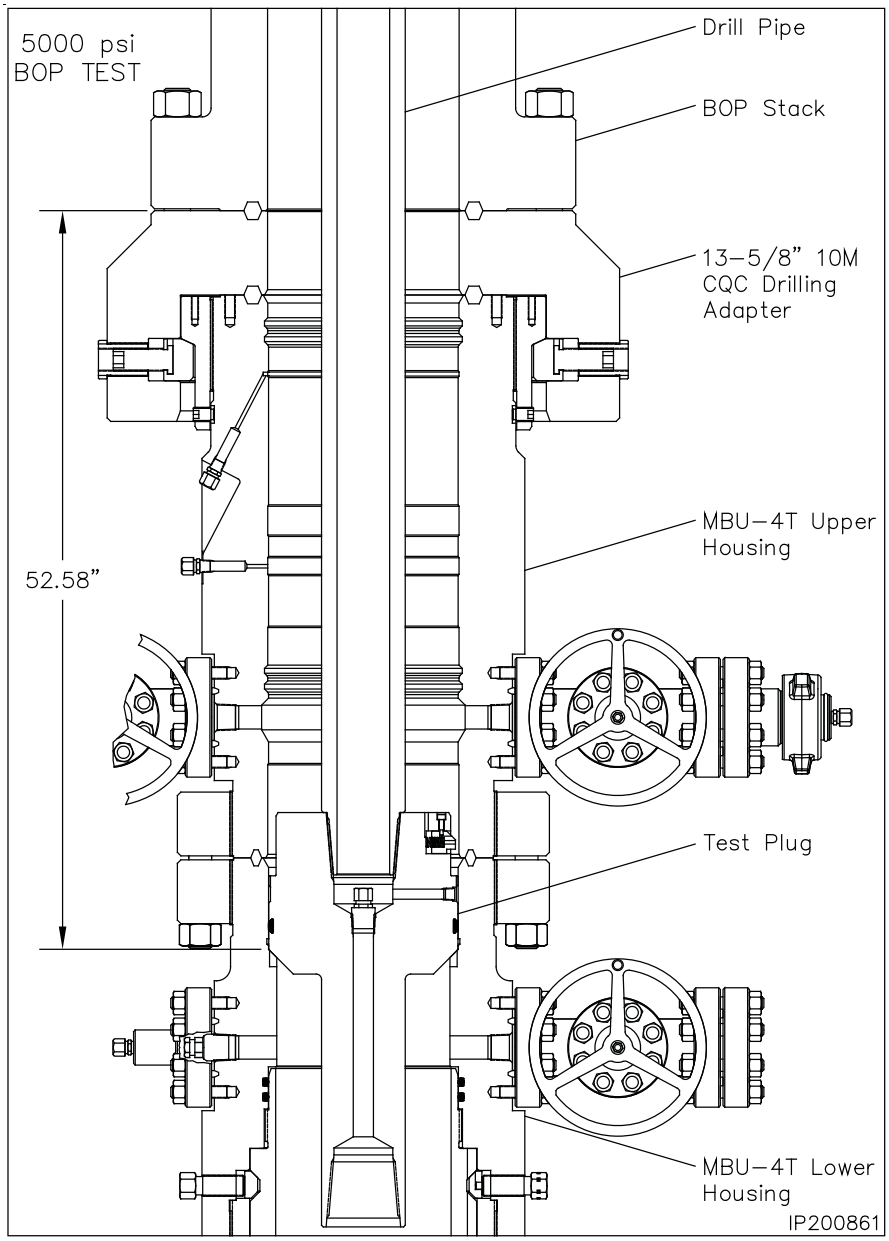
WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

4. Open the lower housing lower side outlet valve.

5. Lightly lubricate the test plug seal with oil or light grease.

6. Carefully lower the test plug through the BOP and land it on the load shoulder in the lower housing, 52.58" below the top of the drilling adapter.

7. Close the BOP rams on the pipe and test the BOP to 5,000 psi.



NOTE: Any leakage past the test plug will be clearly visible at the open side outlet valve.

8. After a satisfactory test is achieved, release the pressure and open the rams.

9. Remove as much fluid as possible from the BOP stack. Retrieve the test plug with a straight vertical lift.

Stage 6 — Test the BOP Stack

10,000 PSI Test

NOTE: The BOP dual test plug assembly will be shipped to location pre-assembled to ensure proper orientation.

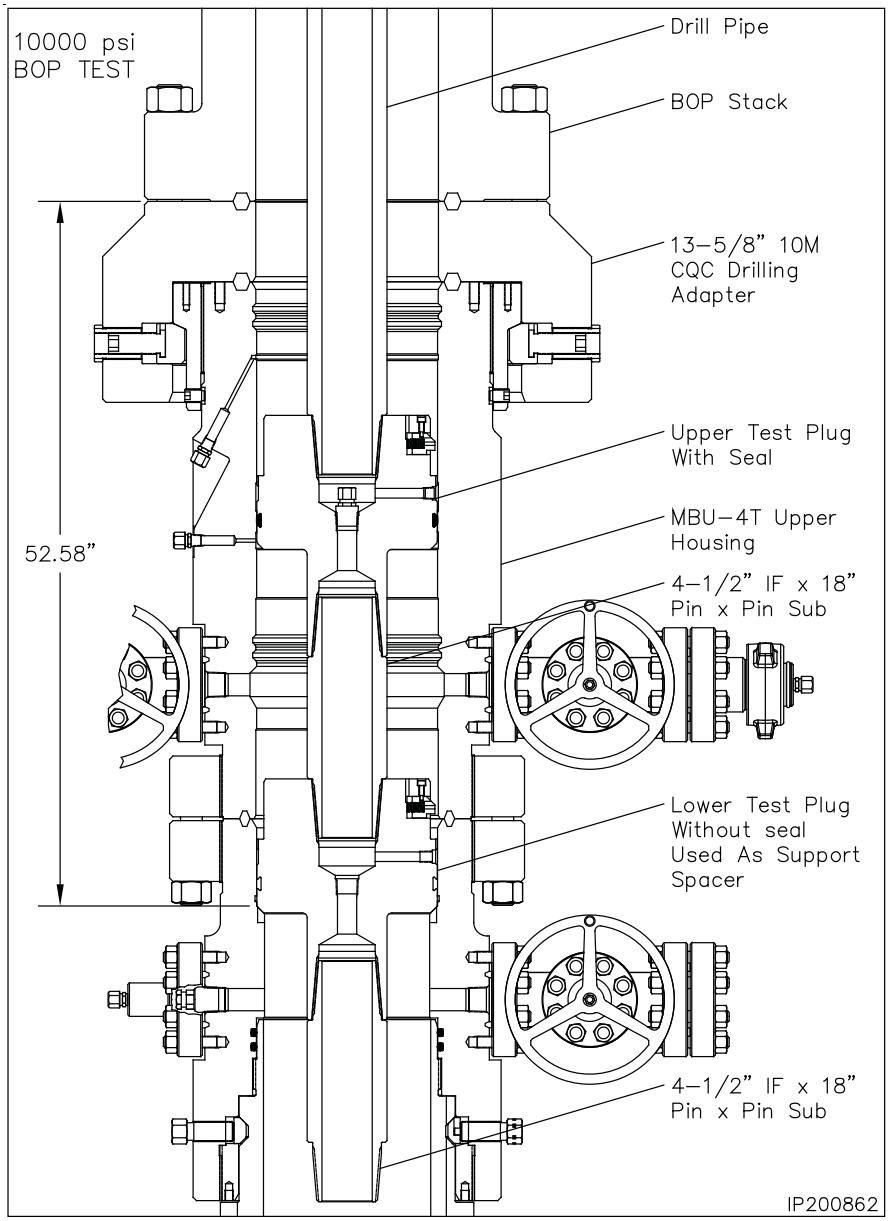
1. Examine the ***13-5/8" Nominal x 4-1/2" IF Dual Test Plug Assembly Consisting Of Two 13-5/8" x 4-1/2" IF Combination Tools And Two 4-1/2" IF x 18" Long Pin x Pin Drill Pipe Subs. (Item ST5)***. Verify the following:
   - 1-1/4" VR plug and weep hole plug are in place in upper tool body only and tightened securely
   - elastomer seal is in place on upper tool body only and in good condition
   - drill pipe threads are clean and in good condition
2. Position the assembly in the floor bushing with the pin end down.

CAUTION: Ensure the lift lugs are facing up.

3. Remove the 1/2" NPT pipe plug from the weep hole if pressure is to be supplied through the drill pipe.

WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

4. Open the upper housing lower side outlet valve.
5. Lightly lubricate the test plug seal with oil or light grease.
6. Carefully lower the test plug through the BOP and land lower plug on the load shoulder in the lower housing, 52.58" below the top of the drilling adapter.
7. Close the BOP rams on the pipe and test the BOP to 10,000 psi.



NOTE: Any leakage past the test plug will be clearly visible at the open side outlet valve.

CAUTION: When performing the BOP blind ram test it is highly recommended to suspend a stand of drill pipe below the test plug to ensure the plug stays in place while disconnecting it from the drill pipe.

8. After a satisfactory test is achieved, release the pressure and open the rams.
9. Remove as much fluid as possible from the BOP stack. Retrieve the test plug assembly with a straight vertical lift.
10. Close all open valves.
11. Repeat this procedure as required during the drilling of the hole section.

Stage 7 — Run the Lower Wear Bushing

CAUTION: Always use a wear bushing while drilling to protect the load shoulders from damage by the drill bit or rotating drill pipe. The wear bushing **must be retrieved** prior to running the casing.

1. Examine the ***13-5/8" Nominal MBU-4T-LWR Wear Bushing (Item ST6).*** Verify the following:
   - internal bore is clean and in good condition
   - trash and shear o-ring is in place and in good condition
   - paint anti-rotation lugs white and allow paint to dry

Run the Wear Bushing Before Drilling

2. Orient the ***13-5/8" Nominal x 4-1/2" IF (NC-50) CW Retrieving Tool (Item ST4)***. with lift lugs down.

3. Make up the retrieving tool to a joint of drill pipe.

4. Align the retractable lift lugs with the retrieval holes of the bushing and carefully lower the tool into the wear bushing until the lugs snap into place.

NOTE: If the lugs did not align with the holes, rotate the tool in either direction until they snap into place.

5. Apply a heavy coat of grease, not dope, to the O.D. of the bushing.

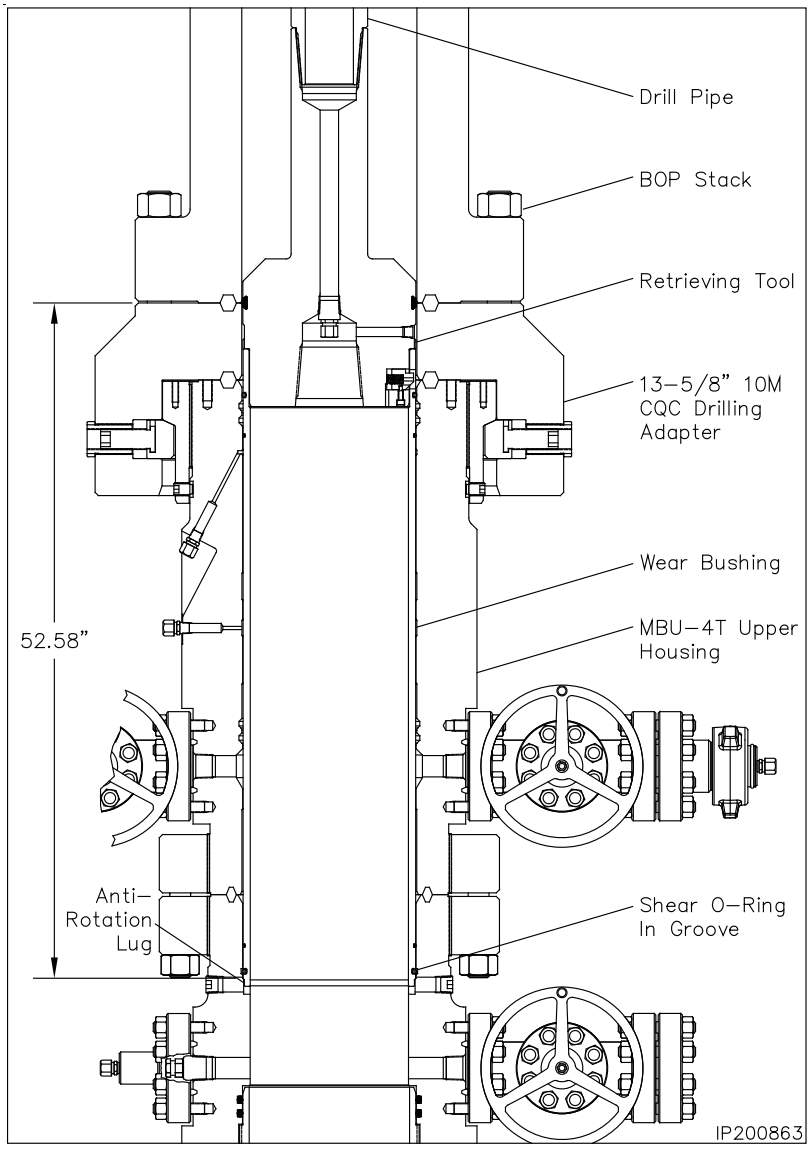
6. Slowly lower the tool/bushing assembly through the BOP stack and land it on the load shoulder in the housing, 52.58" below the top of the drilling adapter.

7. Rotate the drill pipe clockwise (right) to locate the stop lugs in their mating notches in the head. When properly aligned the bushing will drop an additional 1/2".

NOTE: The shear o-ring on bottom of the bushing will locate in a groove above the load shoulder in the head to act as a retaining device for the bushing.

8. Remove the tool from the wear bushing by rotating the drill pipe counter clockwise (left) 1/4 turn and lifting straight up.

9. Drill as required.



CAUTION: It is highly recommended to retrieve, clean, inspect, grease, and reset the wear bushing each time the hole is tripped during the drilling of the hole section.

Retrieve the Wear Bushing After Drilling

10. Make up the retrieving tool to the drill pipe.

11. Slowly lower the tool into the wear bushing.

12. Pick up and balance the riser weight and rotate the retrieving tool clockwise until a positive stop is felt. This indicates the lugs have snapped into the holes in the bushing.

13. Retrieve the wear bushing. Remove it and the retrieving tool from the drill string.

Stage 8 — Hang Off the 9-5/8" Casing

1. Examine the ***13-5/8" x 9-5/8" CW, TP4 Casing Hanger Running Tool (Item ST7).*** Verify the following:
   - internal bore and threads are clean and in good condition
   - o-ring seal is clean and in good condition
   - torque dogs are in place, in upper most position and retainer set screws are tightened securely

2. Make up a landing joint to the top of the running tool and torque connection to thread manufacturer's maximum make up torque.

3. Lay down the landing joint on the pipe rack.

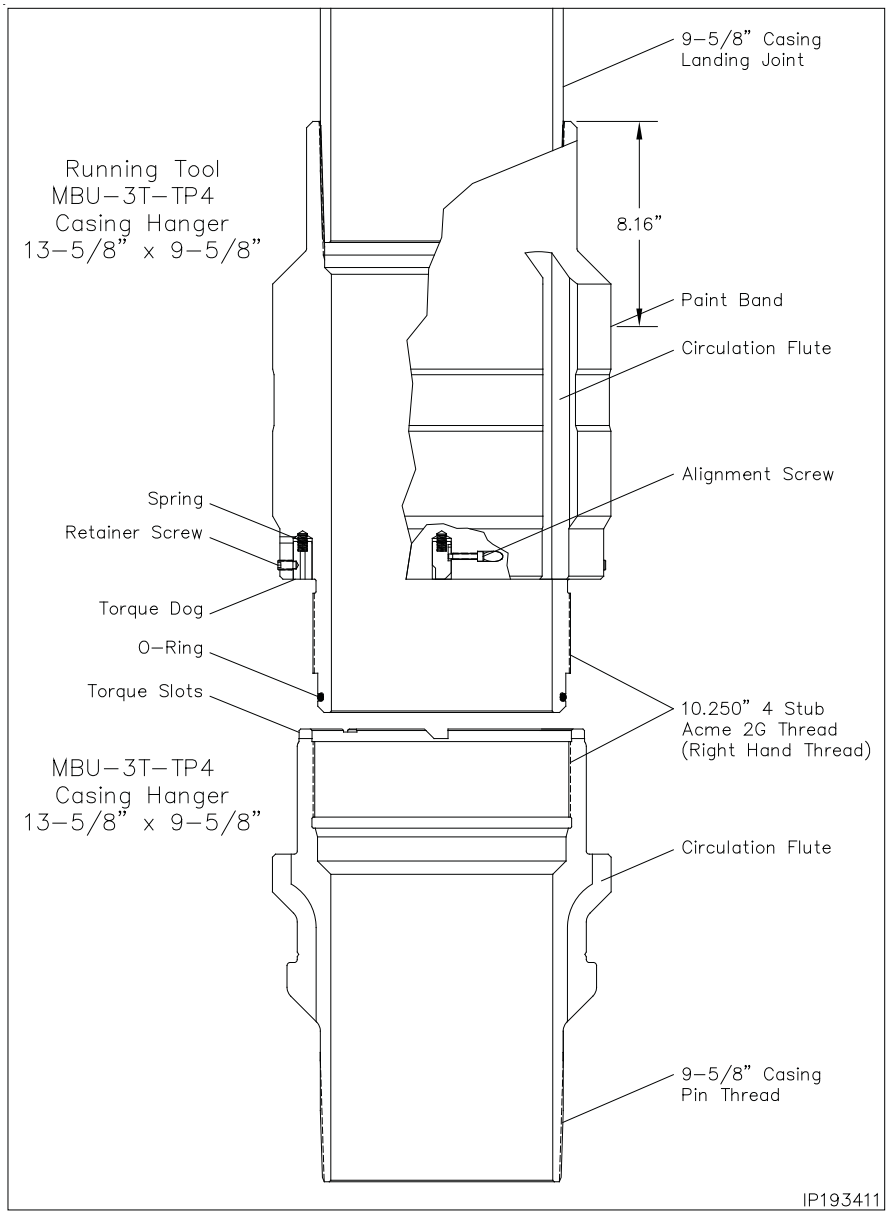
4. On the pipe rack, examine the ***13-5/8" x 9-5/8" CW, MBU-3T-LWR-TP4 Mandrel Casing Hanger (Item A22).*** Verify the following:
   - internal bore and threads are clean and in good condition
   - neck seal area is clean and undamaged
   - torque slots are clean and in good condition
   - pin threads are clean and in good condition. **Install thread protector**
   - place a white paint band around the running tool, 8.16" below the top of the running tool, as indicated and allow paint to dry

5. Liberally lubricate the mating threads, seal areas and o-ring of the hanger and running tool with oil or light grease.

6. ***Using chain tongs only,*** thread the running tool into the hanger, with right hand rotation, until it shoulders out on the hanger body.

CAUTION: Do Not apply torque to the hanger/tool connection.

CAUTION: If steps 1 through 6 were done prior to being shipped to location, the running tool should be backed off 1 turn and made back up to ensure it will back off freely.



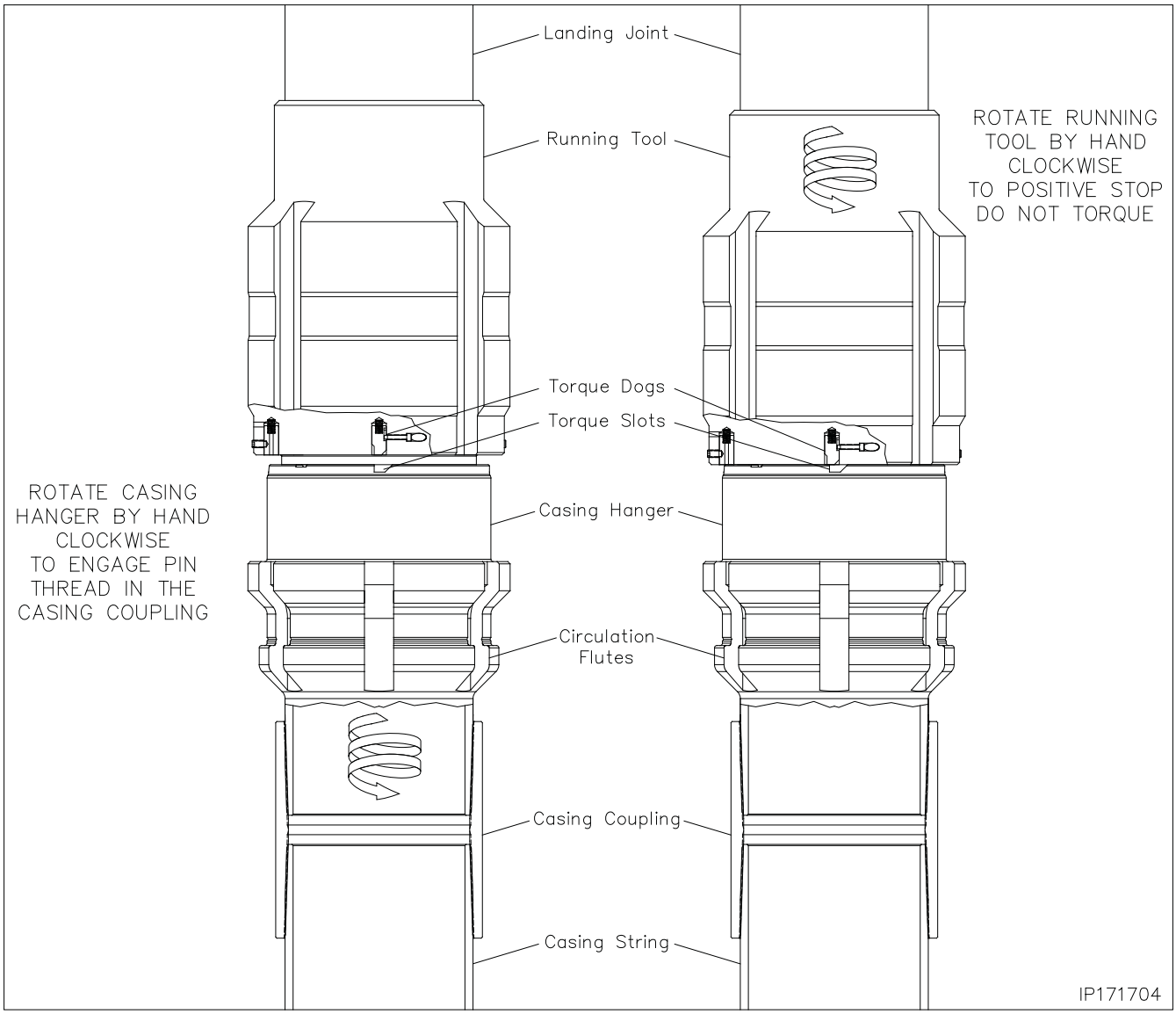
7. Calculate the total landing dimension by adding the previously determined RKB dimension and 52.58", the depth of the wellhead.

8. Starting at the top of the 45° angle load shoulder of the casing hanger, measure up the landing joint and place a paint mark on the joint. Mark **HANGER LANDED**.

9. Place a second mark 52" below the first and mark **STOP ROTATING**.

10. Run the 9-5/8" casing as required and space out appropriately for the mandrel casing hanger.

Stage 8 — Hang Off the 9-5/8” Casing



NOTE: If the 9-5/8” casing becomes stuck and the mandrel casing hanger cannot be landed, refer to **Stage 8A** for the emergency procedure.

11. Pick up the casing hanger/running tool joint assembly.
12. Remove the casing hanger thread protector and carefully thread the hanger into the last joint of casing ran. Rotate the hanger clockwise, by hand, to a positive stop.
13. Rotate the running tool clockwise by hand to a positive stop.

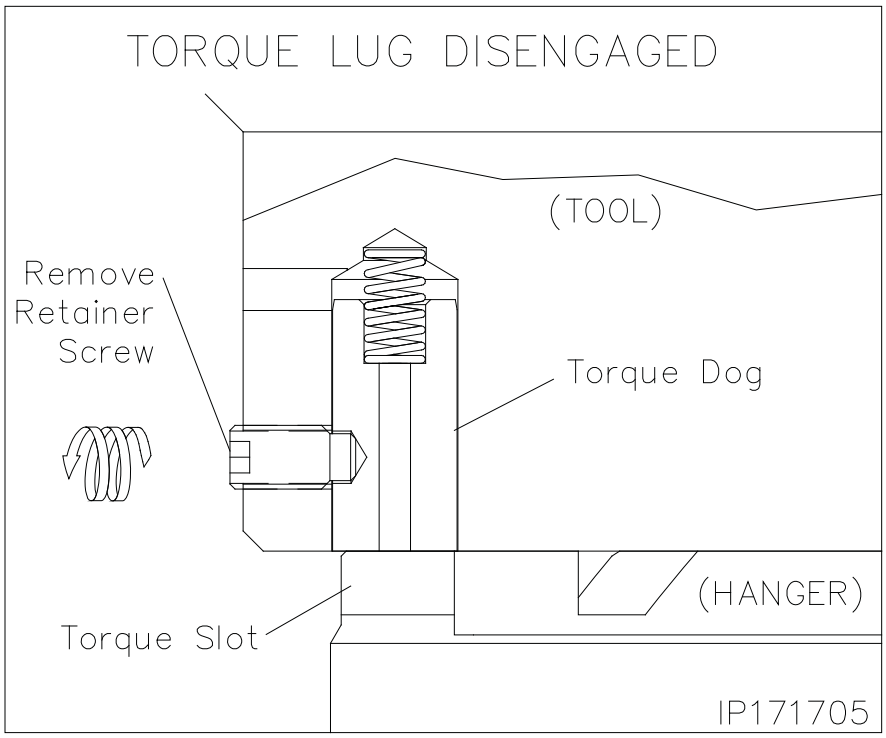
Stage 8 — Hang Off the 9-5/8” Casing

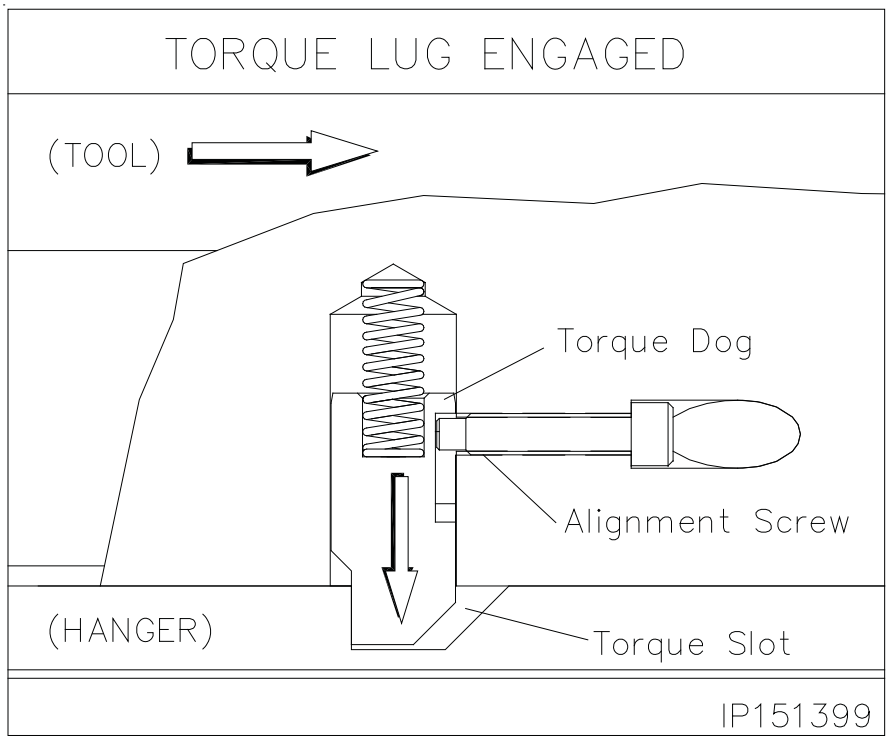
14. Locate the (4) 3/8” socket head set screws in the side of the hanger running tool and remove the screws. This will release the running tool torque dogs allowing them to move downward.

NOTE: Place the screws in a safe place to reinstall in the tool when the job is completed.

15. ***Using chain tongs only,*** rotate the running tool to the left to allow the torque dogs to engage the torque slots in the top of the hanger.

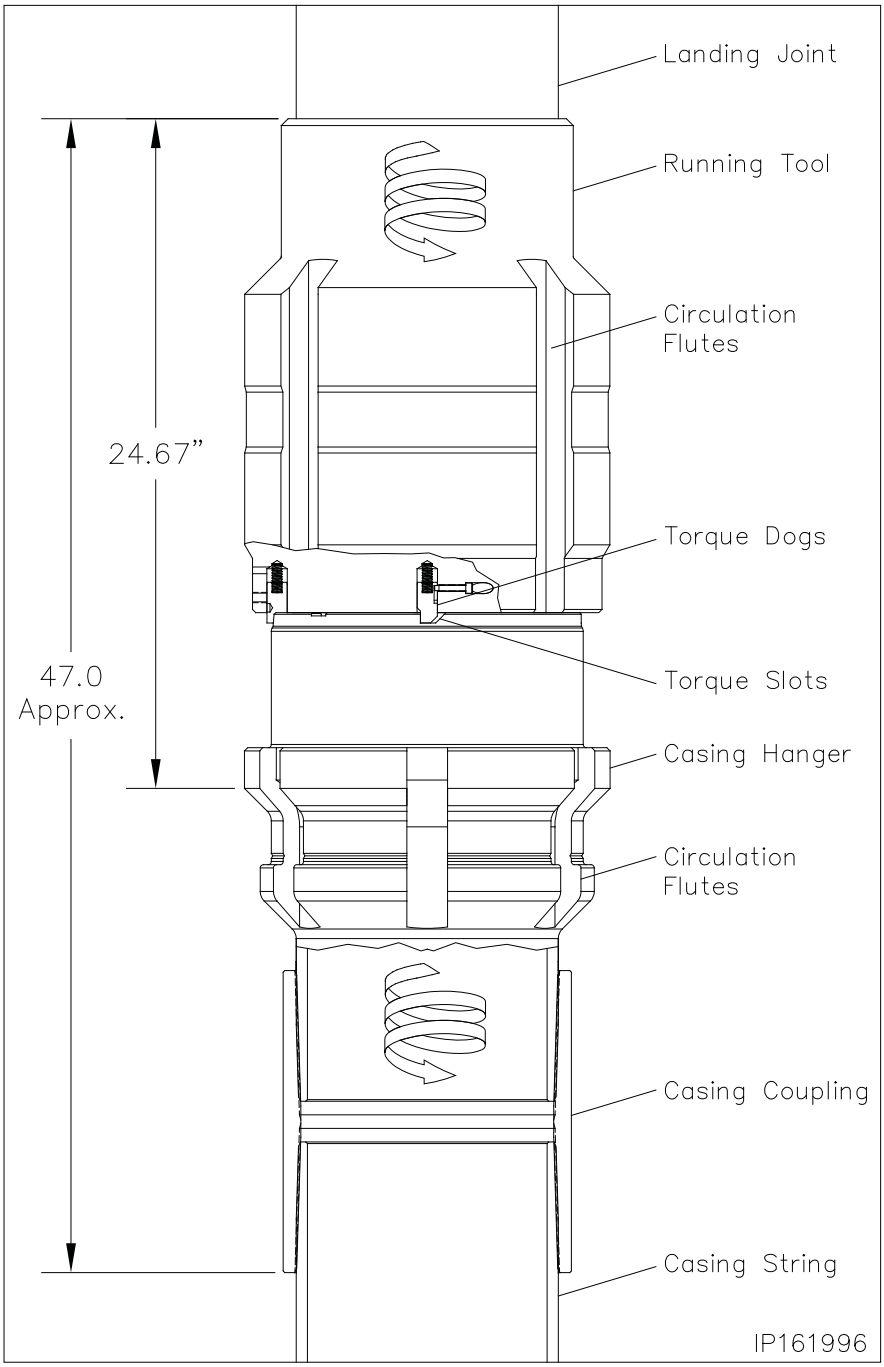
CAUTION: Do not rotate the running tool more than 1/4 turn to the left. Doing so will decrease the torque dog engagement.





Stage 8 — Hang Off the 9-5/8” Casing

16. Engage the CRT tool in the landing joint and torque the casing hanger in the casing string to thread manufacturer’s maximum make up torque.



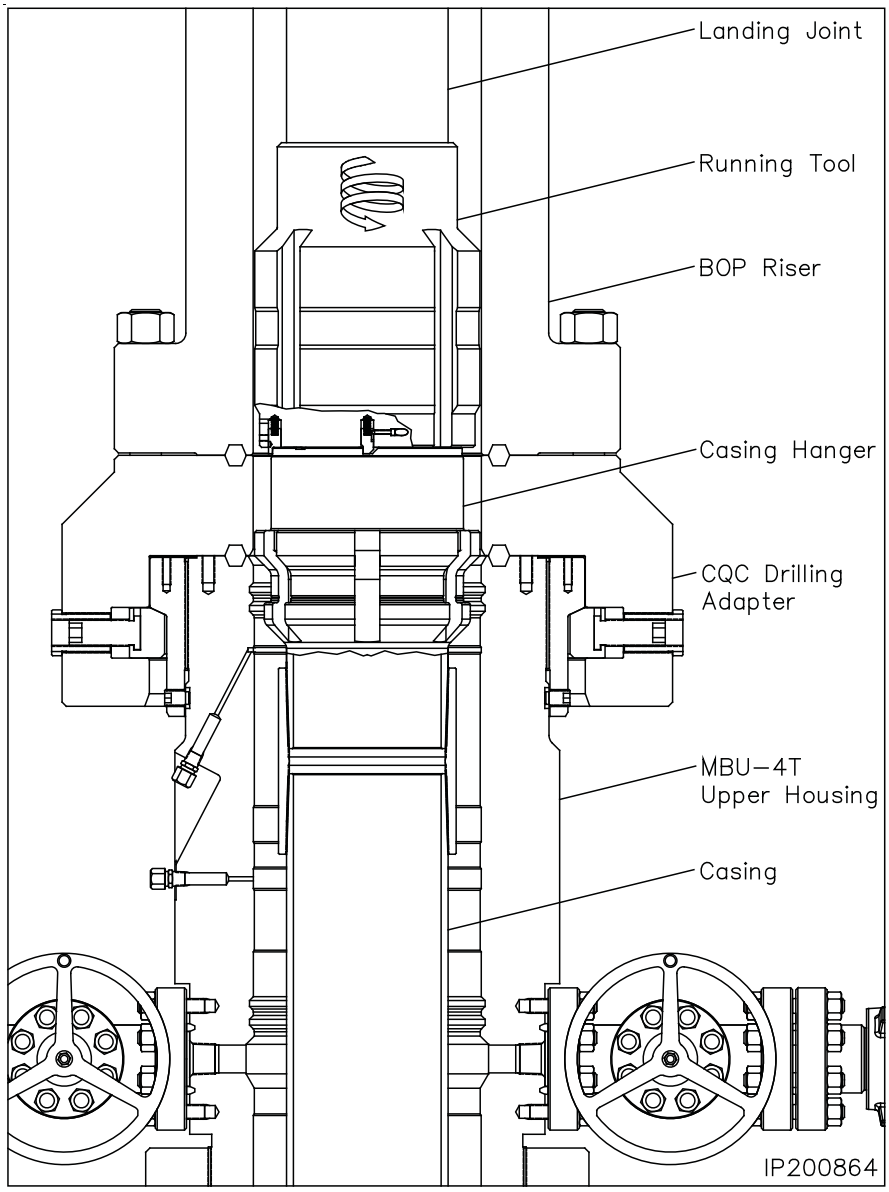
Stage 8 — Hang Off the 9-5/8” Casing

17. Pick up the casing string and remove the floor slips and rotary bushings.

18. Carefully lower the hanger completely through the BOP annular and then engage the top drive to allow the casing to be rotated clockwise.

19. While rotating the casing clockwise, carefully lower the casing string until the **STOP ROTATING** mark on the landing joint is level with the rig floor.

NOTE: The torque dogs have a maximum rated capacity. Please reference the **Recommended Service Tools** section in the BOM for maximum torque allowed.



Stage 8 — Hang Off the 9-5/8” Casing

CAUTION: Torque wrap can build in the casing string as it is rotated. Ensure the string comes to a neutral position, by allowing it to back off slowly counter clockwise, before the casing hanger is fully landed.

20. Cease rotation and continue carefully lowering the hanger through the wellhead and land it on the load shoulder in the lower MBU-4T housing, 52.58” below the top of the drilling adapter.

21. Slack off all weight on the casing and verify that the **HANGER LANDED** paint mark has aligned with the rig floor.

WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

22. Open the lower housing outlet valve and drain the BOP stack.

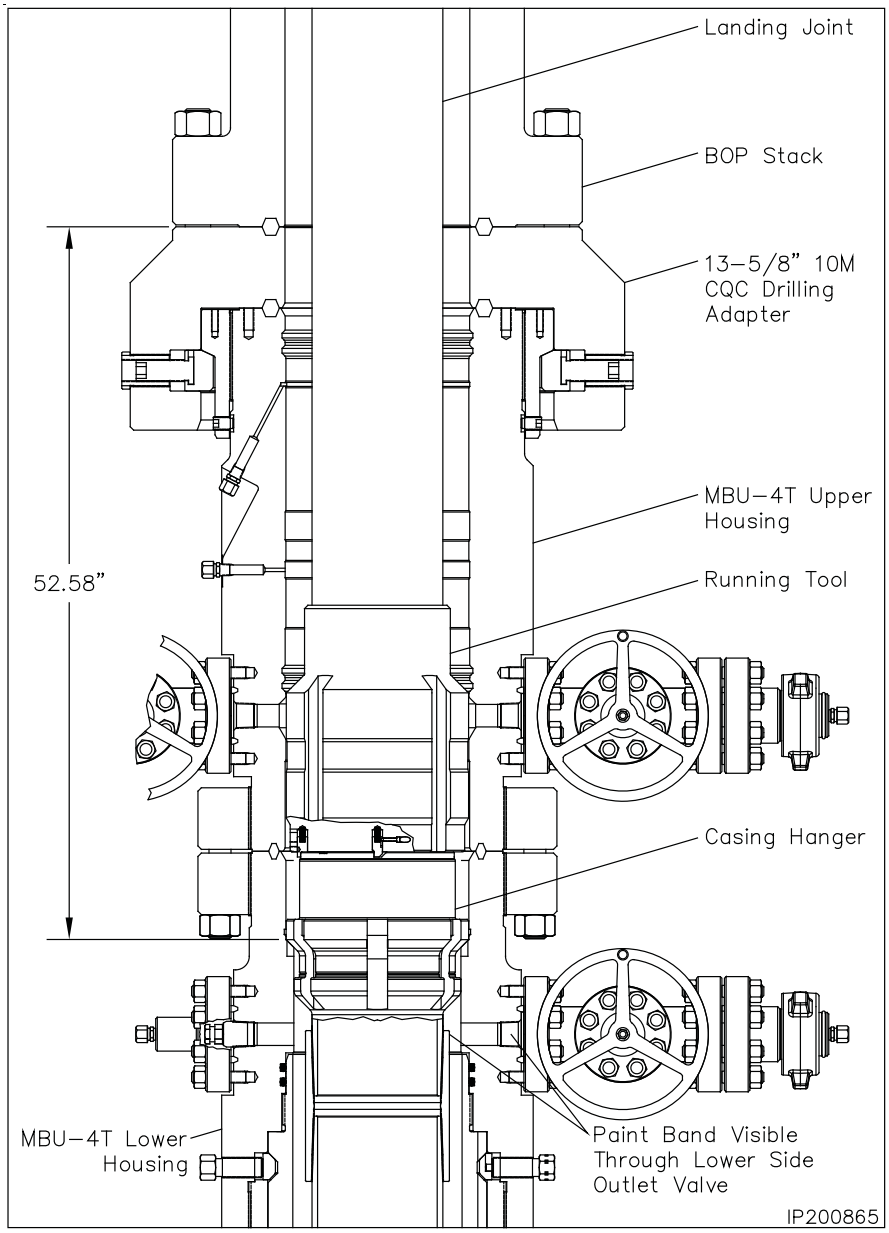
23. Open the upper housing lower outlet valve and sight through the valve bore to confirm the hanger is properly landed. The white paint band on the running tool will be clearly visible in the center of the open outlet valve.

24. Close the open valves and place a vertical paint mark on the landing joint to verify if the casing string rotates during the cementing process.

25. Cement the casing as required.

NOTE: Returns may be taken through the circulation slots and out the BOP or out the side outlets on the housing.

26. With cement in place, bleed off all pressure and remove the cementing head.



27. ***Using chain tongs only, located 180° apart,*** retrieve the running tool and landing joint by rotating the landing joint counter clockwise (left) approximately 13 turns or until the tool comes free of the hanger.

CAUTION: The rig floor tong may be used to break the connection but under no circumstances is the top drive to be used to rotate or remove the casing hanger running tool.

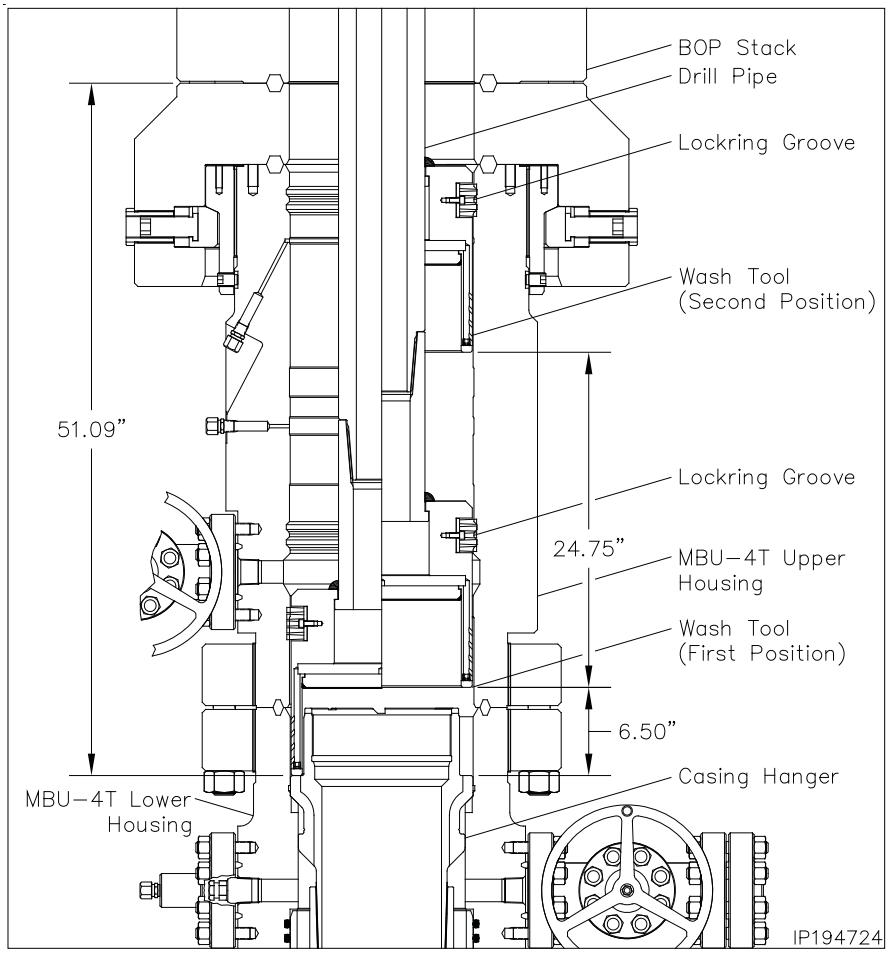
Stage 8 — Hang Off the 9-5/8” Casing

Running the 13-5/8” Wash Tool

1. Examine the ***13-5/8" x 4-1/2" IF Wash Tool (Item ST9).*** Verify the following:
   - drill pipe threads and bore are clean and in good condition
   - all ports are open and free of debris
   - brushes are securely attached and in good condition
2. Orient the wash tool with drill pipe box up. Make up a joint of drill pipe to the tool.
3. Carefully lower the wash tool through the BOP and land it on top of the 9-5/8" casing hanger, 51.09” below the top of the drilling adapter.
4. Place a paint mark on the drill pipe level with the rig floor.
5. Using chain tongs, rotate the tool clockwise (right) approximately 6 turns to loosen any debris that may be on top of the hanger flutes.

WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

6. Open the lower side outlet valve and drain the BOP stack.
7. Pick up on the tool approximately 1" and attach a high pressure water line or the top drive to the end of the drill pipe and pump water at approximately 25 SPM through the tool and up the BOP stack.
8. Pick up the tool 6.50” above its landing position and rotate the tool to brush the lower lockring groove free of debris.
9. Pick up the tool an additional 24.75” and rotate the tool to brush the upper lockring groove free of debris.



10. While flushing, raise and lower the tool the full length of the wellhead and BOP stack. The drill pipe should be slowly rotated (approximately 20 RPM) while raising and lowering to wash the inside of the housing and BOP stack to remove all caked on debris.
11. Once washing is complete, land the wash tool on the hanger flutes.
12. Shut down pumps and observe the returns at the open lower outlet for debris.
13. Reengage the pump and fully wash the inside of the wellhead and the entire BOP one additional cycle ensuring the stopping point is with the wash tool resting on top of the hanger flutes.

CAUTION: Observe the returns at the open outlet valve. If returns are not clean, continue flushing until they are.

14. Once the returns are clean and free of debris, retrieve the tool to the rig floor.
15. Using a bright light, sight through the bore of the BOP stack and observe the top of the hanger neck and flutes. Ensure there are no dark areas on top of the hanger flutes.

CAUTION: Continue washing until all debris is removed.

Stage 8A — Hang Off the 9-5/8" Casing (Emergency)

CAUTION: The following procedure should be followed **ONLY** if the 9-5/8" casing should become stuck in the hole. If the casing did not get stuck and is hung off with the mandrel casing hanger, skip this stage.

1. Cement the hole as required.

WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

2. Drain the BOP stack through the lower MBU-4T housing side outlet valve.

3. Separate the connection between the upper and lower MBU-4T housings.

WARNING: Keep body clear of all pinch points and suspended loads.

4. Pick up on the BOP and upper housing a minimum of 14" and secure with safety sling.

5. Washout bowl as required.

6. Examine the ***13-5/8" x 9-5/8" C21 Slip Casing Hanger (Item A22a).*** Verify the following:
   - slips and internal bore are clean and in good condition
   - all screws are in place

7. Remove the latch cap screw and open the hanger.

8. Place two boards on the MBU-4T lower housing flange against the casing to support the hanger.

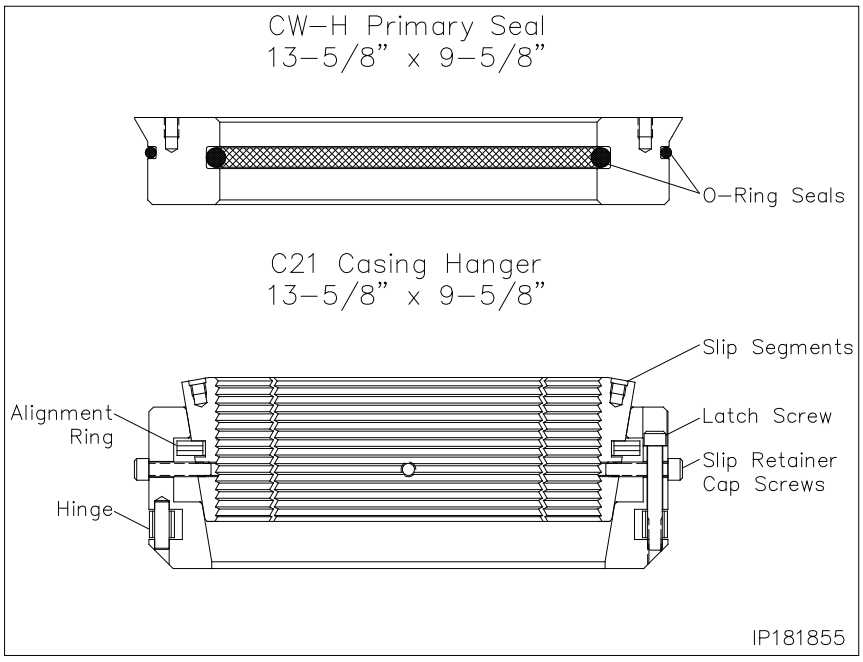
9. Pick up the hanger and place it around the casing and on top of the support boards and replace the latch screw.

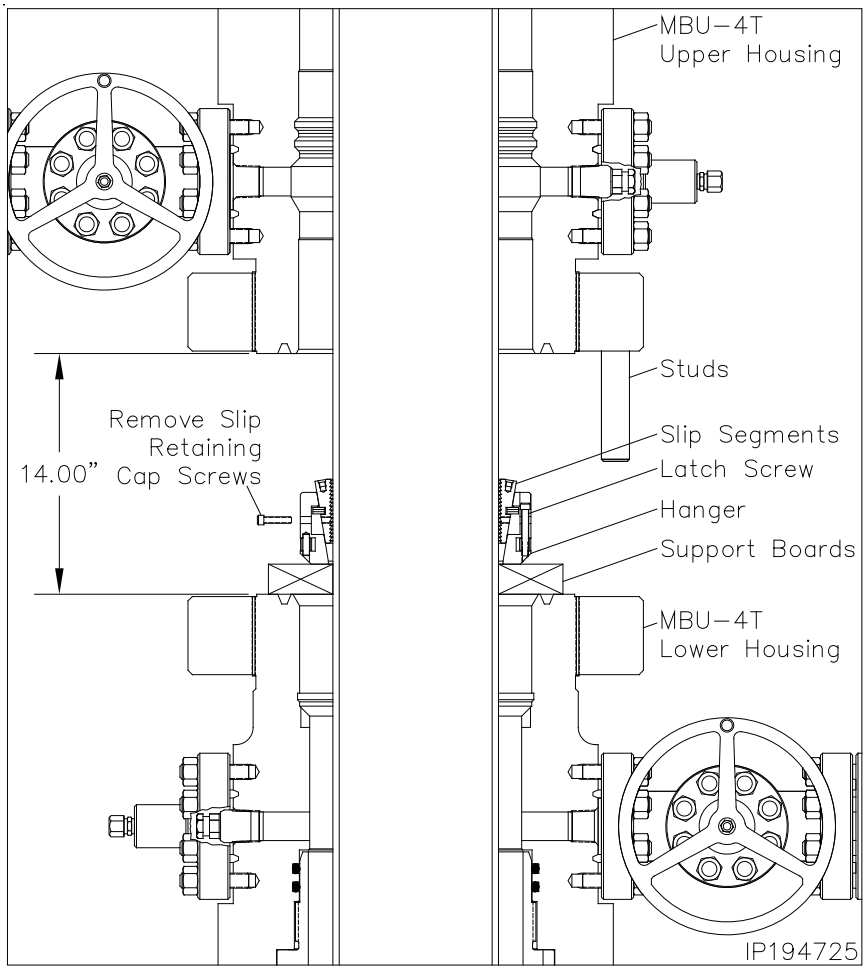
10. Prepare to lower the hanger into the housing bowl.

CAUTION: Do Not drop the casing hanger!

11. Grease the casing hanger body and remove the slip retaining screws.

12. Pull tension on the casing to the desired hanging weight.





Stage 8A — Hang Off the 9-5/8” Casing (Emergency)

13. Remove the boards and allow the hanger to slide into the bowl. When properly positioned the top of the hanger will be approximately 3.00” below the top of the flange.

14. Slack off the desired hanging weight.

NOTE: A sharp decrease on the weight indicator will signify that the hanger has taken weight. If this does not occur, pull tension again and slack off once more.

WARNING: Due to the potential fire hazard and the risk of loss of life and property, it is highly recommended to check the casing annulus and pipe bore for gases, with an approved sensing device, prior to cutting the casing. If gas is present, do not use an open flame torch to cut the casing. It will be necessary to use an air driven mechanical cutter which is spark free.

15. Rough cut the casing approximately 12” above the top flange and move the excess casing out of the way.

16. Set the upper housing back down and break the connection between the upper housing and the quick connect adapter.

17. Lift the BOP stack and remove the upper housing from the well bore.

18. Final cut the casing at 8.75” ± 1/8” above the top of the lower housing.

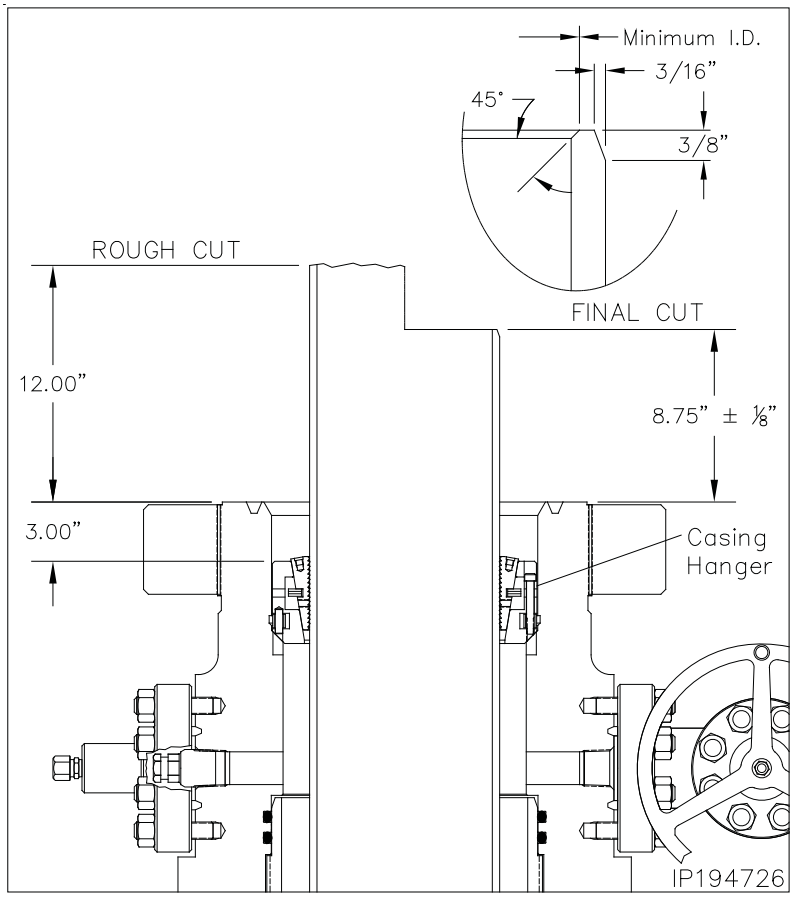
19. Grind the casing stub level, then place a 3/16” x 3/8” bevel on the O.D. and an I.D. chamfer to match the minimum bore of the housing to be installed.

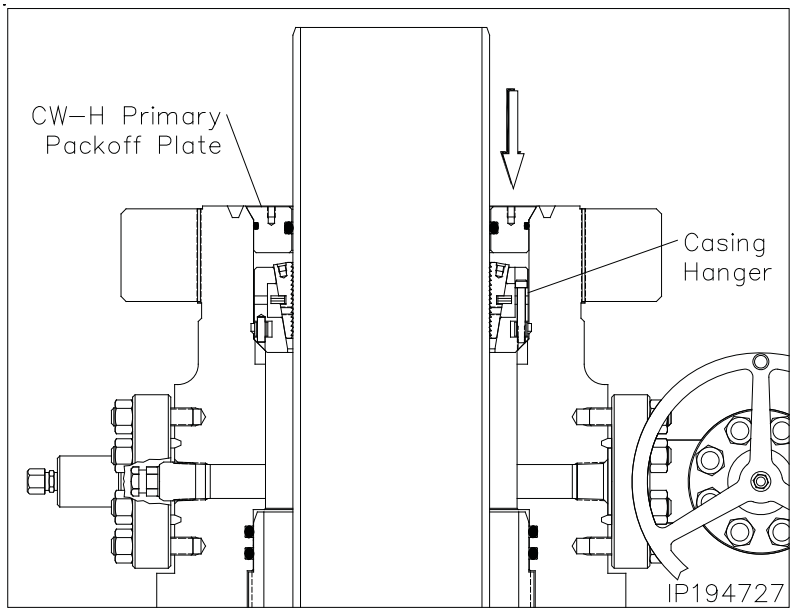
CAUTION: There must not be any rough edges on the casing or the seals of the packoff will be damaged.

20. Thoroughly clean the MBU-4T housing bowl, removing all cement and cutting debris.

21. Examine the ***13-5/8” x 9-5/8” CW-H Primary Packoff Plate (Item A23a)***. Verify the following:
    - o-ring seals are in place and in good condition

22. Lightly lubricate the primary seal plate o-ring seals with oil or a light grease.





23. Carefully slide the packoff plate over the casing stub and push it into the MBU-4T housing until the 30° tappers of the plate and housing come face to face.

Stage 8A — Hang Off the 9-5/8" Casing (Emergency)

1. Examine the ***13-5/8" 5M x 13-5/8" 10M MBU-4T-UPR Emergency Housing (Item A5a).*** Verify the following:
   - Acme threads are clean and in good condition
   - bore and all internal seal areas are clean and undamaged
   - 'HPS' seals are in place and in good condition
   - valves are intact and in good condition
   - studded threaded flange is installed on the bottom of the housing and is free to rotate
   - top threaded hub is installed and positioned with the I.D. threads level with the housing O.D. threads

NOTE: If the threaded hub has been pre-installed in the shop, skip steps 2 through 9.

2. Examine the ***13-5/8" 10M x 21.750" 4 Stub Acme Threaded Hub (Item R2)***. Verify the following:
   - Acme thread are clean and in good condition
   - remove the (4) retainer set screws an place them in a safe place

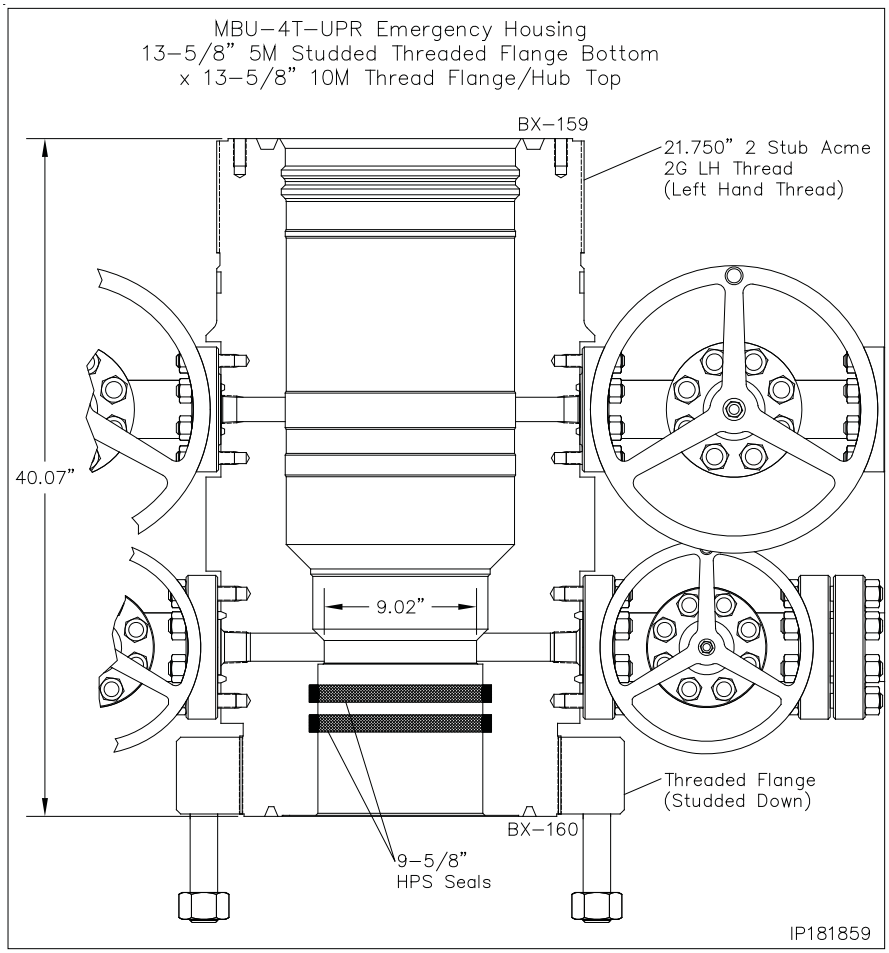
3. Thoroughly clean and lightly lubricate the mating threads of the housing and the threaded hub with copper coat or never seize.

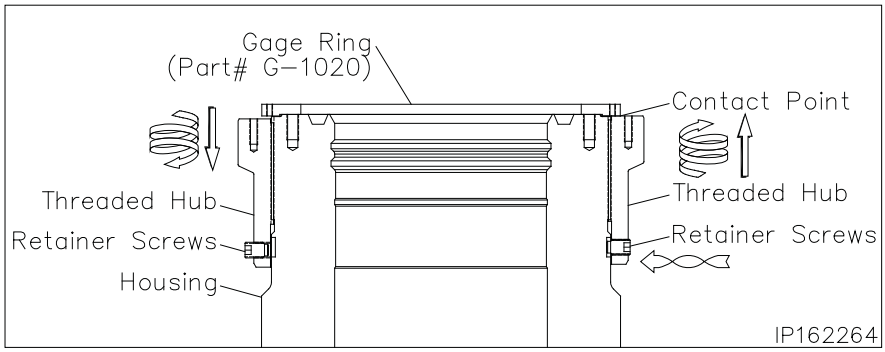
4. Pick up the hub and carefully thread it onto the top of the housing with counter clockwise rotation until the top of the ring is approximately a 1/4" below the top of the housing.

5. Position the hub gage ring on top of the housing with the counter bore down as indicated. Ensure the gage ring is level and straight.

6. Rotate the hub clockwise (UP) until it contacts the gage ring.

CAUTION: Do not off seat the gage ring.





7. Locate the retainer screw holes in the threaded hub.

8. Rotate the hub up or down to align the holes in the hub with the notches in the housing.

9. Install the set screws and tighten securely. (Do not Over Tighten)Remove gage ring.

NOTE: Using a yellow paint stick, paint the top of the housing where indicated for verifying level and adapter make up.

Stage 8A — Hang Off the 9-5/8” Casing (Emergency)

10. Attach a four point, properly rated, lifting sling to the lifting eyes of the housing and suspend the wellhead assembly over the well bore.

11. Thoroughly clean and lightly lubricate the ‘HPS’ seals of the upper housing with oil or light grease.

12. Thoroughly clean the mating ring grooves of the upper and lower housing removing all old grease and debris.

13. Install a new ***BX-160 Ring Gasket (Item A4)*** in the ring groove of the lower housing.

14. Position the threaded bottom flange with the I.D. thread of the flange level with the Acme thread of the upper housing.

WARNING: Keep body clear of all pinch points and suspended loads.

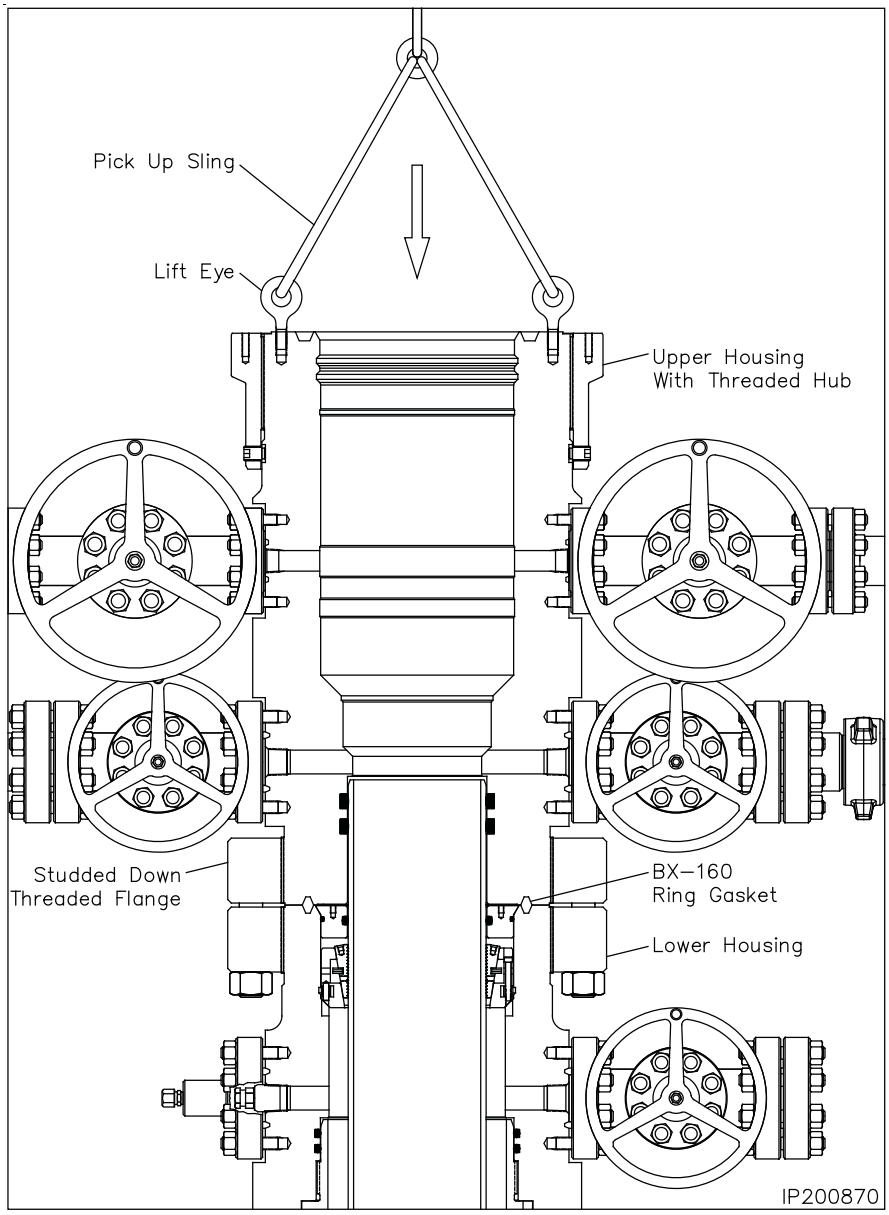
15. Orient the upper housing so the outlets are in the proper position, then two hole flange and remove all 1-5/8” nuts.

16. Carefully lower the assembly over the casing stub.

17. Align the studs with the bolt holes in the lower housing, then land the upper housing on the ring gasket.

18. Make up the flange connection with the threaded flange studs and nuts, tightening them in an alternating cross pattern until the housing connections come face to face and are level.

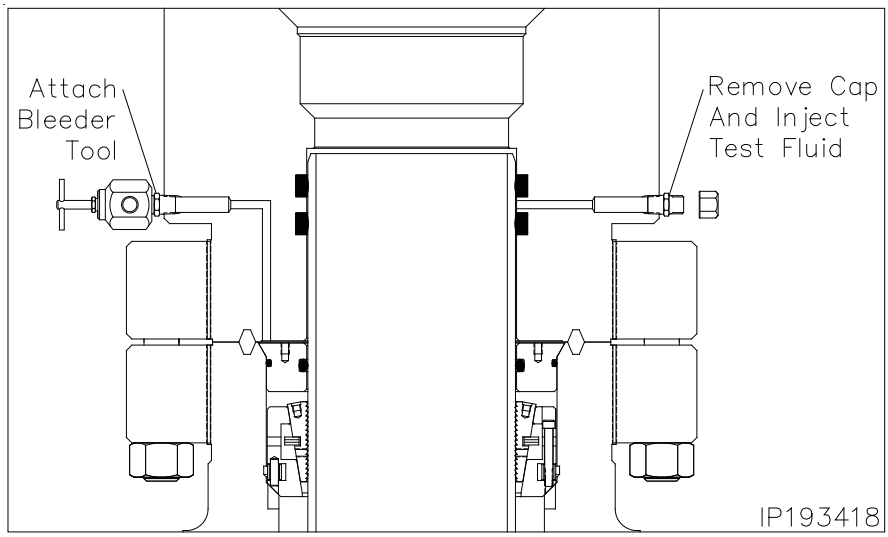
19. Remove the lifting eyes.



Stage 8A — Hang Off the 9-5/8” Casing (Emergency)

Seal Test

1. Locate the “SEAL TEST” fitting and one “FLANGE TEST” fitting on the upper housing lower body and remove the dust cap from both fittings.
2. Attach a bleeder tool to the open “FLANGE TEST” fitting and open the tool.
3. Attach a test pump to the “SEAL TEST” fitting and pump clean test fluid between the ‘HPS’ seals until a test pressure of ***5,000 psi or 80% of casing collapse — whichever is less.***
4. Hold the test pressure for 15 minutes or as required by drilling supervisor.
5. If pressure drops, a leak has developed. Bleed off test pressure and take the appropriate action in the adjacent table.
6. After a satisfactory test is achieved, bleed off pressure. Remove the test pump, drain test fluid and reinstall the dust cap on the open “SEAL TEST” fitting.

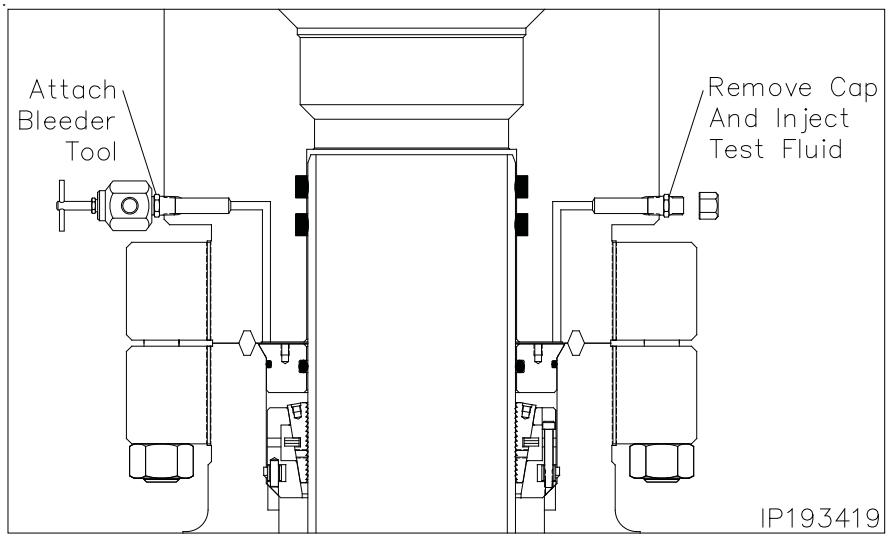


Seal Test	
Leak Location	**Appropriate Action**
Open bleeder tool - Lower ‘HPS’ seal is leaking	Remove upper housing and replace leaking seals. Re-land and retest seals
Into housing bore - Upper ‘HPS’ seal is leaking	

Stage 8A — Hang Off the 9-5/8" Casing (Emergency)

Flange Test

1. Locate the remaining "FLANGE TEST" fitting on the upper housing lower body and remove the dust cap from the fitting.
2. Attach a test pump to the open "FLANGE TEST" fitting and inject test fluid into the flange connection until a stable test pressure of ***5,000 psi or 80% of casing collapse - Whichever is less.***
3. Hold the test pressure for 15 minutes or as required by drilling supervisor.
4. If pressure drops a leak has developed. Take the appropriate action from the adjacent chart.
5. Repeat this procedure until a satisfactory test is achieved.
6. Once a satisfactory test is achieved, bleed off pressure. Remove the test pump and bleeder tool, drain all test fluid, and reinstall the dust caps.
7. Reinstall the BOP with the 13-5/8" 10M QCQ adapter.



Flange Test	
Leak Location	**Appropriate Action**
Between flanges - Ring gasket is leaking	Further tighten the flange connection
Into casing annulus - Primary seal o-rings are leaking	Remove upper housing and primary seal. Replace leaking seals. Reinstall the primary seal and upper housing and retest

Stage 9 — Install the MBU-4T Lower Mandrel Hanger Packoff

The following steps detail the installation of the MBU-4T lower packoff assembly for the mandrel hanger.

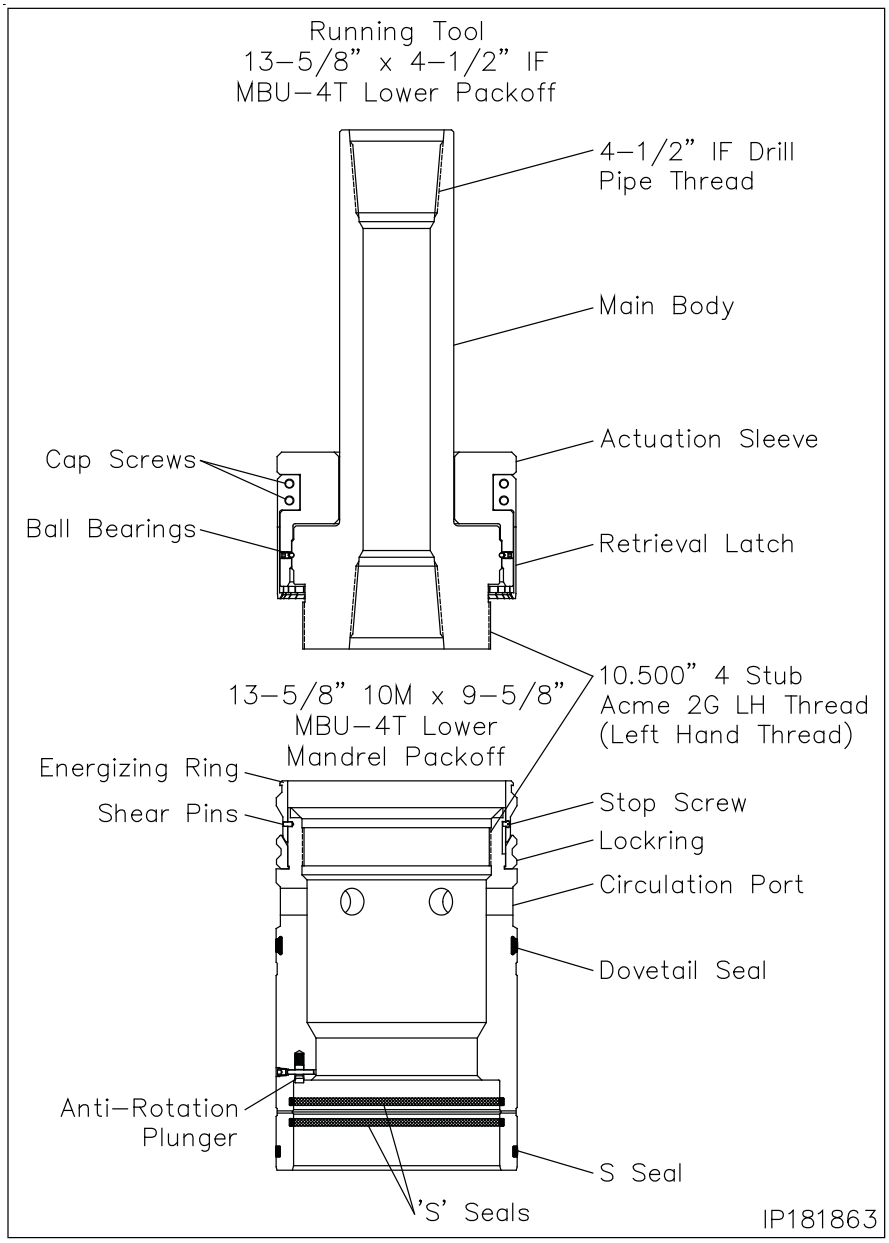
1. Examine the ***13-5/8" x 10.500" 4 Stub Acme 2G LH Box Top MBU-4T-LWR Mandrel Hanger Packoff Assembly (Item A23).*** Verify the following:
   - all elastomer seals are in place and undamaged
   - internal bore, and ports, are clean and in good condition
   - lockring is fully retracted
   - energizer ring is in its upper most position and retained with shear pins
   - guide screws are in place and back off 1/4 turn
   - anti-rotation plungers are in place, free to move

2. Inspect the I.D. and O.D. seals for any damage and replace as necessary.

3. Examine the ***13-5/8" Nominal x 10.500" 4 Stub Acme 2G LH, MBU-4T-LWR Packoff Running Tool (Item ST10).*** Verify the following:
   - Acme threads are clean and in good condition
   - retrieval latch is in position and retained with cap screws
   - actuation sleeve rotates freely

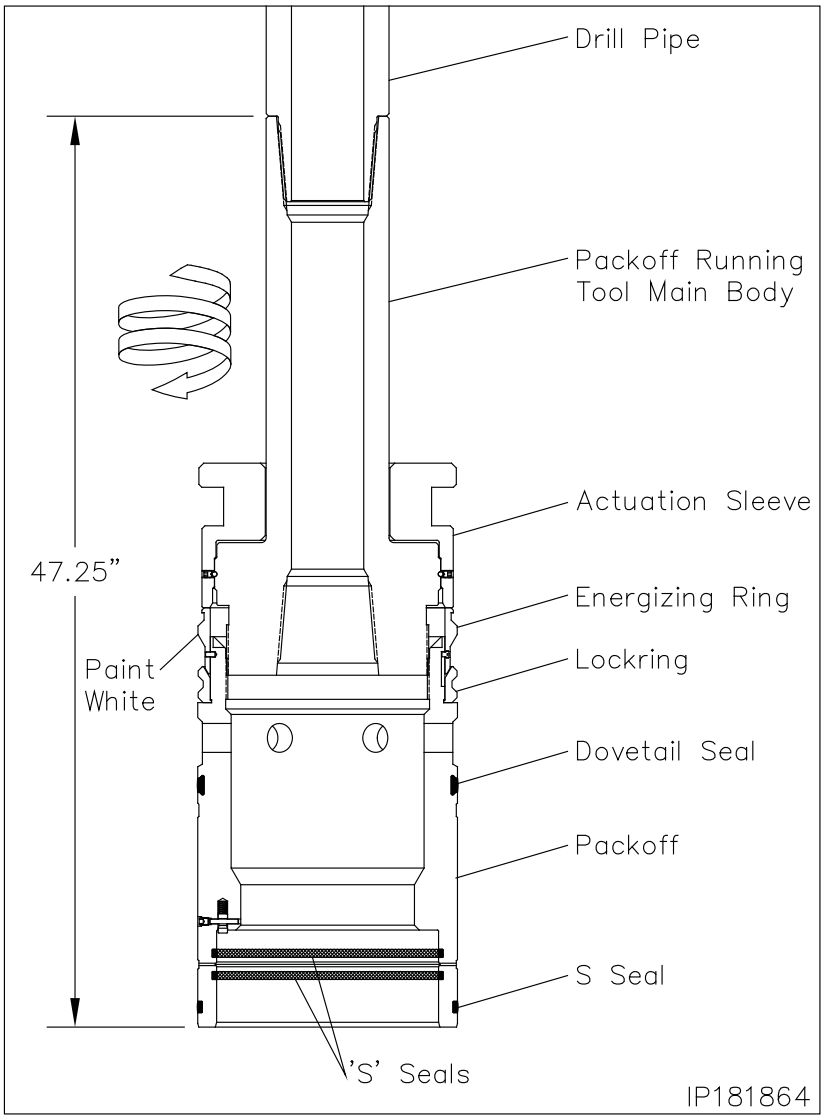
4. Remove the retrieval latch and set aside.

5. Make up the running tool to a 4-1/2" IF drill collar and tighten connection to thread manufacturer's optimum make up torque.



Stage 9 — Install the MBU-4T Lower Mandrel Hanger Packoff

6. Pick up the running tool with drill pipe landing joint and suspend it above the packoff.
7. Thoroughly clean and lightly lubricate the mating Acme threads of the running tool and packoff with oil or light grease.
8. Carefully lower the tool into the packoff and thread them together by first rotating the tool clockwise (RIGHT) to locate the thread start and then counter clockwise (LEFT) until the tool actuation sleeve makes contact with the packoff energizing ring. Approximately 4 turns.
9. Place a white paint band around the packoff energizing ring as indicated and allow paint to dry.
10. Pick up the assembly and thoroughly clean and lightly lubricate the packoff I.D. ‘S’ seals and the O.D. dovetail and ‘S’ seal with oil or light grease.



Stage 9 — Install the MBU-4T Lower Mandrel Hanger Packoff

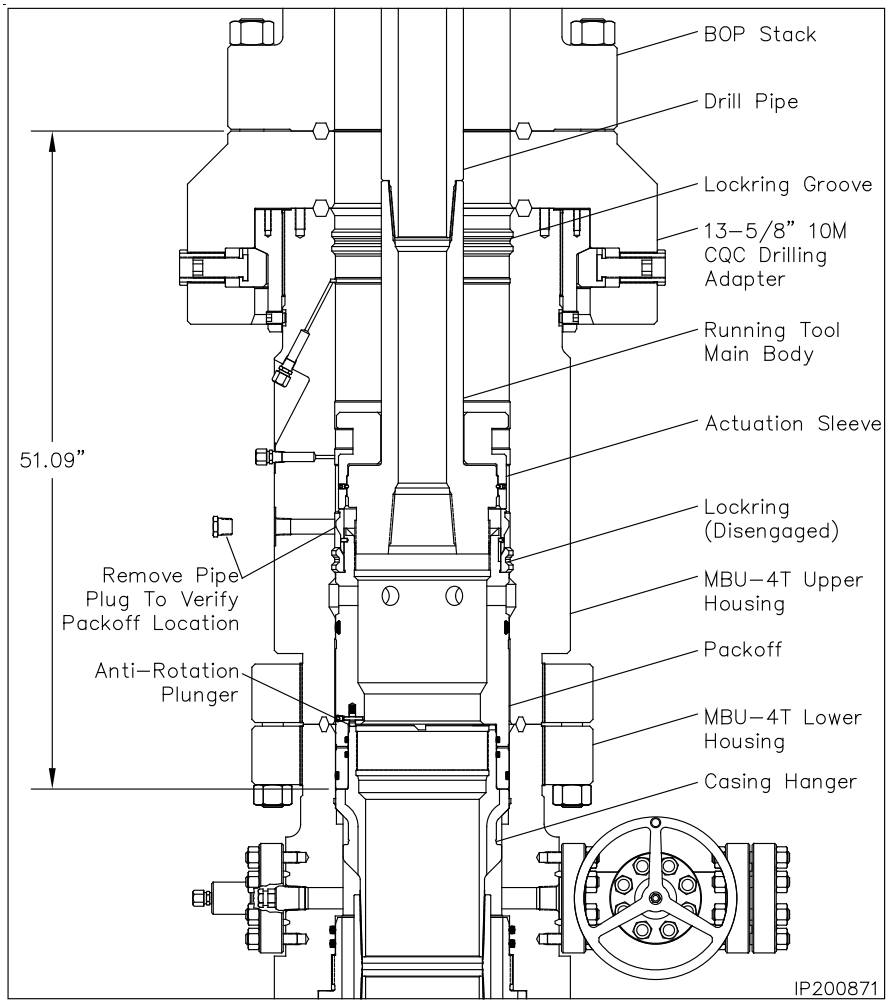
11. Calculate the landing dimension by taking the previously taken RKB dimension and adding 51.09” the depth of the wellhead.

Landing the Packoff

12. Remove the hole cover.
13. Measure up 5 foot from the bottom of the packoff and place a paint mark on the drill collar.
14. Pick up the packoff/running tool assembly and carefully lower the assembly through the BOP, marking the landing joint every five feet until the calculated dimension is reached.
15. Place a paint mark on the landing joint at that dimension and mark **LANDED**. Place an additional mark 1-1/2” above the first one and mark **ENGAGED**.
16. Continue lowering the packoff until it passes over the neck of the hanger and lands on the casing hanger flutes, 51.09” below the top of the drilling adapter.

WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

17. Open the upper housing lower side outlet valve.
18. Locate the lower 1” sight port pipe plug in the upper housing and remove the plug.
19. Look through the port to verify that the packoff is properly landed. The white painted energizing ring will be clearly visible in the center of the open port.
20. Reinstall the pipe plug and tighten securely.



Stage 9 — Install the MBU-4T Lower Mandrel Hanger Packoff

Seal Test

21. Locate the lower "SEAL TEST" fitting on the O.D. of the upper housing and remove the dust cap from the fitting.

22. Attach a test pump to the open fitting and pump clean test fluid between the seals until a stable test pressure of ***5,000 psi*** is achieved.

23. Hold the test pressure for 15 minutes or as required by drilling supervisor.

24. If a leak develops, bleed off test pressure. Remove the packoff from the wellhead and replace the leaking seals.

25. After a satisfactory test is achieved, bleed off the test pressure but leave the test manifold in place.

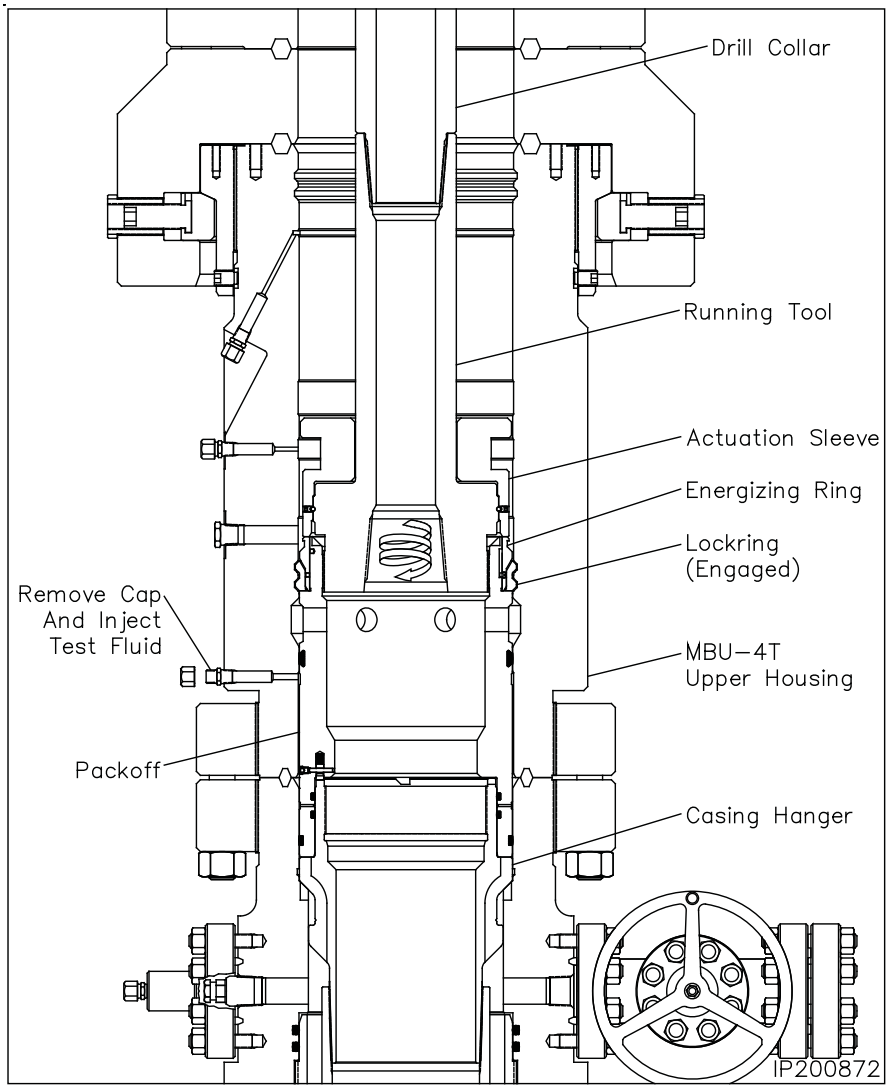
Engaging the Lockring

26. ***Using chain tongs only, located 180° apart***, slowly rotate the drill pipe counter clockwise until the anti-rotation plungers align with the slots in the top of the hanger. Expect torque of approximately 400 ft-lbs to rotate the packoff.

27. ***Using chain tongs only,*** rotate the landing joint approximately 6 to 6-1/2 turns counter clockwise to engage the packoff lockring in its mating groove in the bore of the MBU-4T upper housing.

NOTE: Approximately 800 to 900 ft-lbs of torque will be required to break over the shear pins in the packoff. The torque will drop off and then increase slightly when the energizing ring pushes the lockring out. A positive stop will be encountered when the lockring is fully engaged.

NOTE: When properly engaged the second paint mark on the landing joint will align with the rig floor. VERIFY PAINT MARKS.



CAUTION: It is imperative that the landing joint remain concentric with the well bore when rotating to engage the lockring. This can be accomplished with the use of the air hoist.

CAUTION: If the required turns to engage the lockring are not met or excessive torque is encountered, remove the packoff. First call local branch. If further assistance is required then call Houston Engineering.

28. Back off the landing joint/running tool approximately three turns. Using the top drive, exert a 40,000 lbs. pull on the landing joint. After satisfactory test, slack off all weight.

29. Reattach the test pump to the open test manifold and retest the packoff seals to ***5,000 psi***. This will also verify that the packoff is in place.

30. After satisfactory test is achieved, bleed off all test pressure. Remove test pump and reinstall the dust cap on the open fitting.

31. ***Using chain tongs only,*** rotate the landing joint clockwise until the tool comes free of the packoff (approximately 6 to 6-1/2 total turns) and then retrieve the tool with a straight vertical lift.

Stage 9 — Install the MBU-4T Lower Mandrel Hanger Packoff

In the event the packoff is required to be removed after the lockring is engaged, the following procedure is to be followed.

Retrieving the Packoff

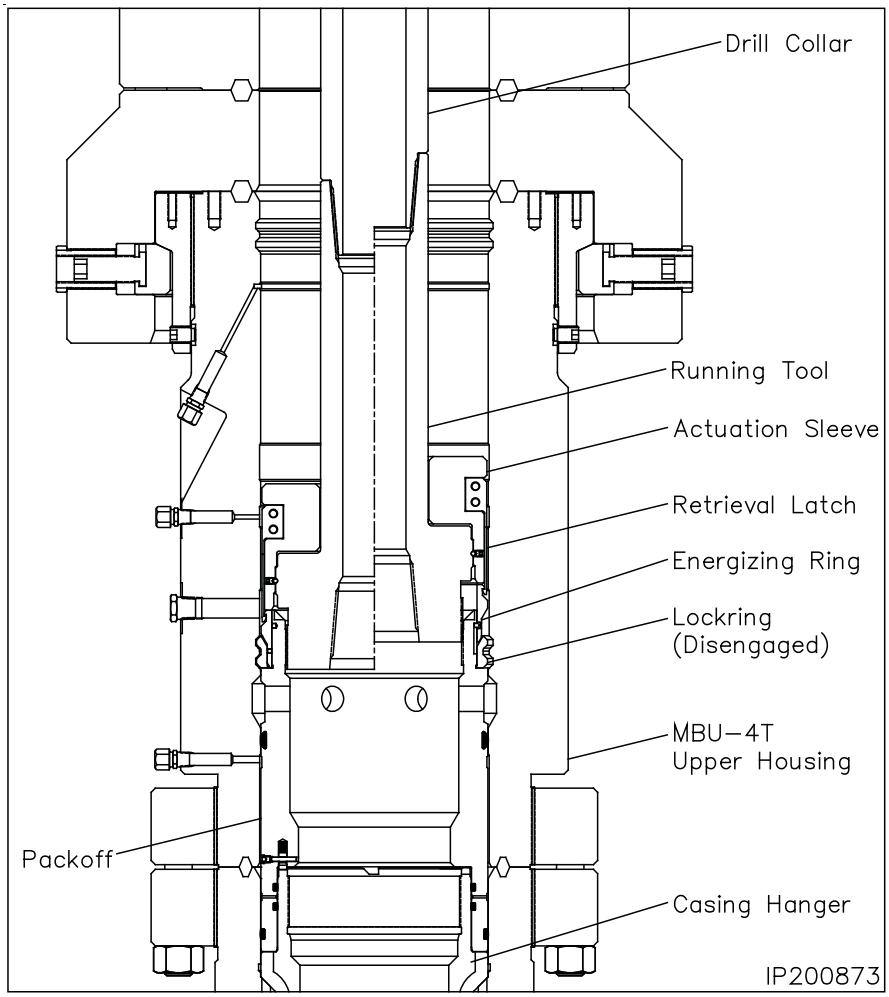
1. Position the retrieval latch so the latch finger extend from the bottom of the running tool body.
2. Reinstall the cap screws and tighten them securely.
3. Ensure the retrieval latch freely rotates on the running tool body.
4. Carefully lower the running tool through the BOP stack and into the packoff.
5. Rotate the drill pipe clockwise (Right) to locate the thread start and then counter clockwise (Left) (approximately 9 to 9-1/2 turns) to a positive stop.

NOTE: At this point the retrieval latches will have passed over the energizing ring and snapped into place.

6. Rotate the drill pipe clockwise (right) approximately 6 turns to a positive stop. The drill pipe should rise approximately 1-1/2”.

CAUTION: Do not exceed the 6 turns or the packoff may be seriously damaged.

7. Carefully pick up on the drill pipe and remove the packoff from the MBU-4T wellhead with a straight vertical lift.
8. Rotate the packoff 1 turn clockwise to relax the retrieval latch.
9. Remove the (4) 1/2” cap screws and remove the latch assembly.
10. Redress the packoff and reset as previously outlined.
11. Once the packoff is properly set, reinstall the retrieval latch on the tool.



Stage 10 — Test the BOP Stack

Immediately after making up the BOP stack and periodically during the drilling of the well for the next casing string the BOP stack (connections and rams) must be tested.

1. Examine the ***13-5/8" Nominal x 4-1/2" IF CW MBU-3T Test Plug/ Retrieving Tool (Item ST4)***. Verify the following:
   - 1-1/4" VR plug and weep hole plug are in place and tightened securely
   - elastomer seal is in place and in good condition
   - retractable lift lugs are in place, clean, and free to move
   - drill pipe threads are clean and in good condition

2. Position the test plug with the elastomer seal down and the lift lugs up and make up the tool to a joint of drill pipe.

CAUTION: Ensure the lift lugs are up and the elastomer seal is down.

3. Remove the 1/2" NPT pipe plug from the weep hole if pressure is to be supplied through the drill pipe.

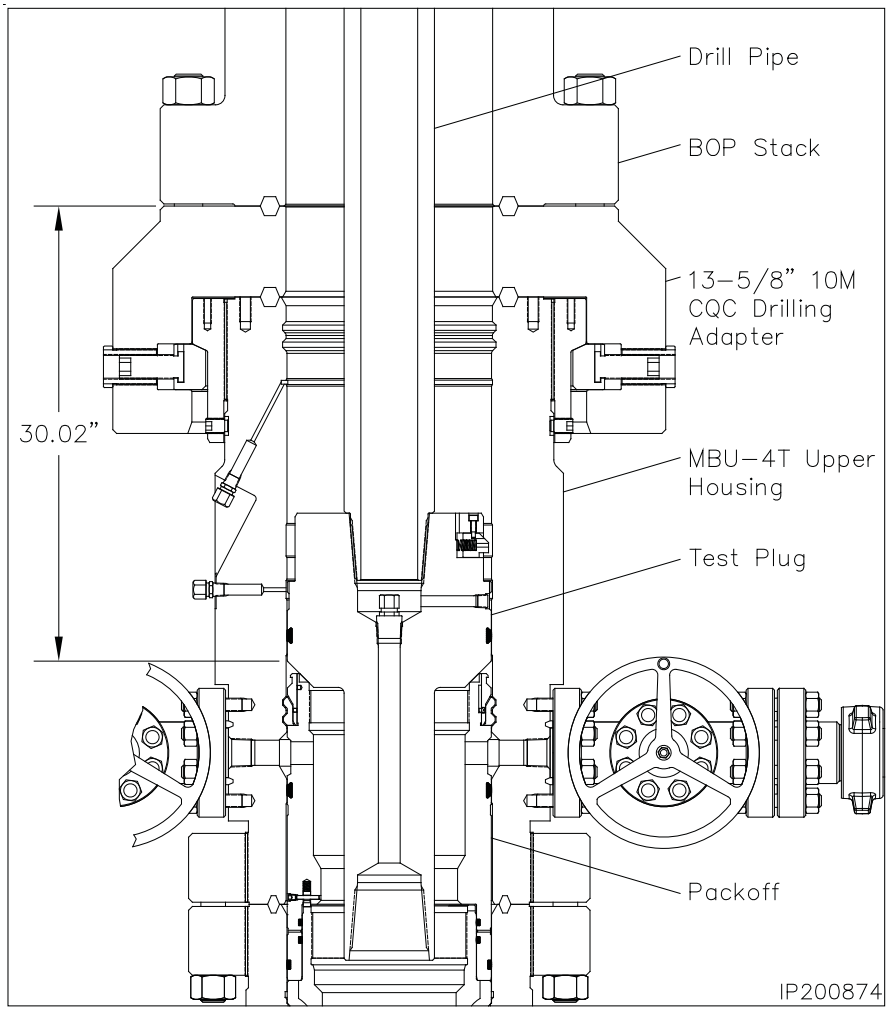
WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

4. Open the upper housing lower side outlet valve.

5. Lightly lubricate the test plug seal with oil or light grease.

6. Carefully lower the test plug through the BOP and land it on top of the 9-5/8" packoff or load shoulder in the emergency upper housing, 30.02" below the top of the drilling adapter.

7. Close the BOP rams on the pipe and test the BOP to 10,000 psi.



NOTE: Any leakage past the test plug will be clearly visible at the open side outlet valve.

8. After a satisfactory test is achieved, release the pressure and open the rams.

9. Remove as much fluid as possible from the BOP stack. Retrieve the test plug with a straight vertical lift.

CAUTION: When performing the BOP blind ram test it is highly recommended to suspend a stand of drill pipe below the test plug to ensure the plug stays in place while disconnecting it from the drill pipe.

10. Close all open valves.

11. Repeat this procedure as required during the drilling of the hole section.

Stage 11 — Run the Intermediate Wear Bushing

CAUTION: Always use a wear bushing while drilling to protect the load shoulders from damage by the drill bit or rotating drill pipe. The wear bushing **must be retrieved** prior to running the casing.

1. Examine the ***13-5/8" Nominal MBU-4T-MID Wear Bushing (Item ST11).*** Verify the following:
   - internal bore is clean and in good condition
   - trash and shear o-ring cord are in place and in good condition
   - anti-rotation plungers are in place, free to move

Run the Wear Bushing Before Drilling

2. Orient the ***13-5/8" Nominal x 4-1/2" IF CW Test Plug/Retrieving Tool (Item ST4)*** with drill pipe connection neck up.

3. Attach the retrieving tool to a joint of drill pipe.

4. Align the retractable lift lugs with the retrieval holes of the bushing and then carefully lower the tool into the wear bushing until the lugs snap into place.

NOTE: If the lugs did not align with the holes, rotate the tool in either direction until they snap into place.

5. Apply a heavy coat of grease, not dope, to the O.D. of the bushing.

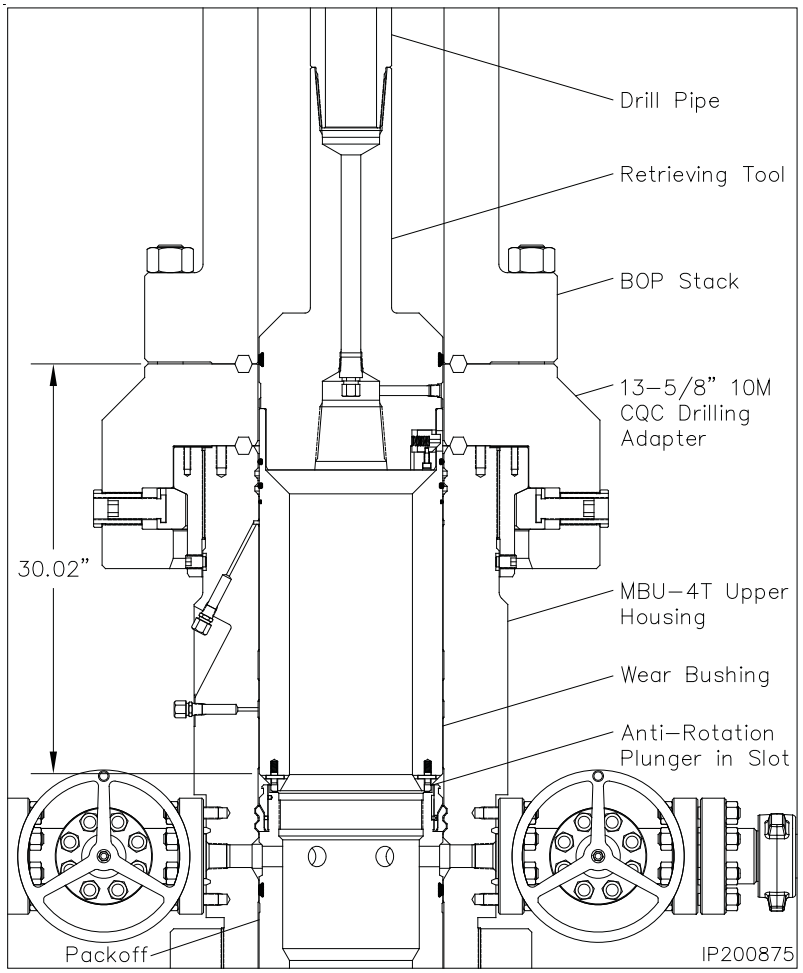
6. Slowly lower the tool/bushing assembly through the BOP stack and land it on top of the 9-5/8" packoff or emergency upper housing load shoulder, 30.02" below the top of the upper housing.

7. Rotate the drill pipe clockwise (right) to locate the anti-rotation plungers in their mating slots in the packoff or housing. When properly aligned the bushing will come to a positive stop.

NOTE: The shear o-ring on top of the bushing will locate in the upper lockring groove in the housing to act as a retaining device for the bushing.

8. Remove the tool from the wear bushing by rotating the drill pipe counter clockwise (left) 1/4 turn and lifting straight up.

9. Drill as required.



CAUTION: It is highly recommended to retrieve, clean, inspect, grease, and reset the wear bushing each time the hole is tripped during the drilling of the hole section.

Retrieve the Wear Bushing

10. Make up the retrieving tool to the drill pipe.

11. Slowly lower the tool into the wear bushing.

12. Pick up and balance the riser weight.

13. Rotate the retrieving tool counter clockwise two full turns to help clear the debris in the wear bushing windows. Then rotate clockwise until a positive stop is felt. This indicates the lugs have snapped into the holes in the bushing.

14. Retrieve the wear bushing. Remove it and the retrieving tool from the drill string.

Stage 12 — Hang Off the 7-5/8" Casing

1. Examine the ***13-5/8" x 7-5/8" CW, TP8 Casing Hanger Running Tool (Item ST12).*** Verify the following:
   - internal bore and threads are clean and in good condition
   - o-ring seal is clean and in good condition
   - torque dogs are in place, in upper most position and retainer hex head screws are tightened securely

2. Make up a landing joint to the top of the running tool and torque connection to thread manufacturer's maximum make up torque.

3. Lay down the landing joint on the pipe rack.

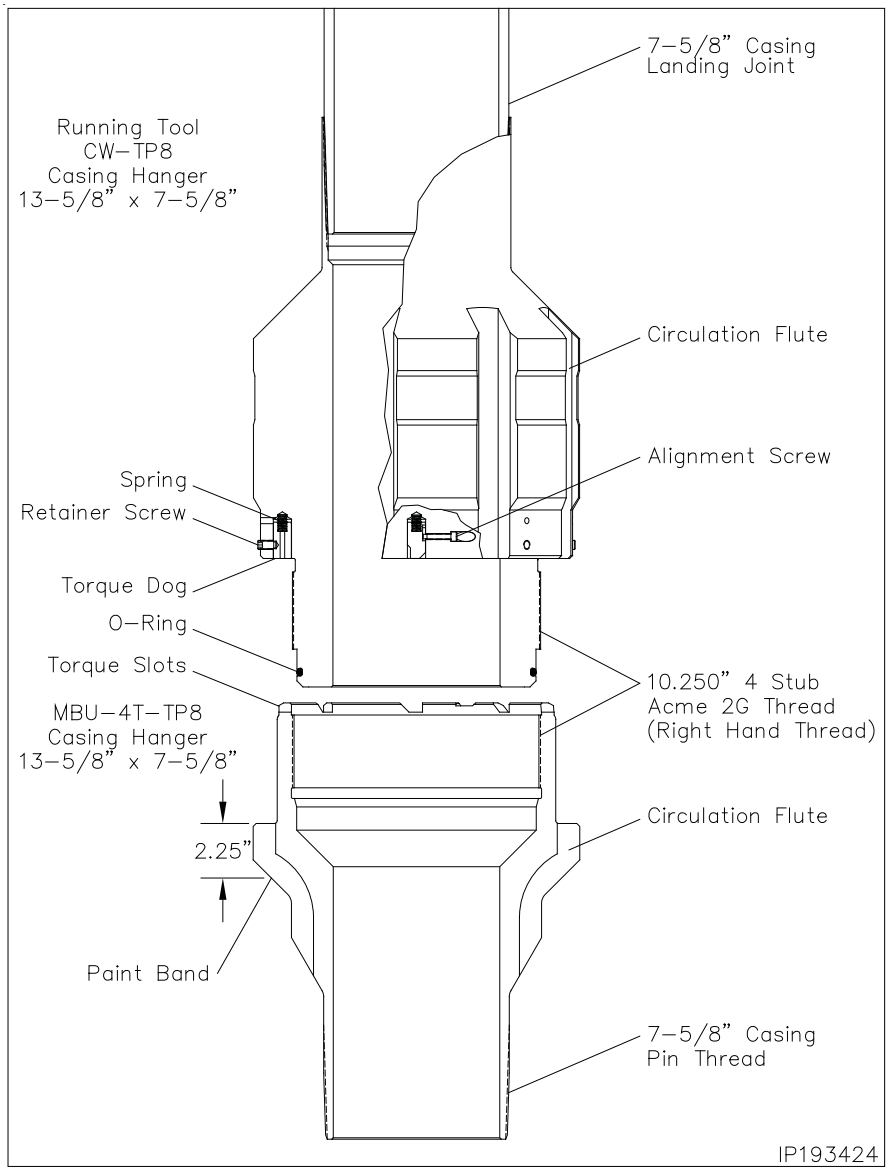
4. On the pipe rack, examine the ***13-5/8" x 7-5/8" CW, MBU-4T-MID-TP8 Mandrel Casing Hanger (Item A24).*** Verify the following:
   - internal bore and threads are clean and in good condition
   - neck seal area is clean and undamaged
   - torque slots are clean and in good condition
   - pin threads are clean and in good condition. **Install thread protector**
   - place a white band around the hanger as indicated and allow paint to dry

5. Liberally lubricate the mating threads, seal areas and o-ring of the hanger and running tool with an oil or light grease.

6. ***<u>Using chain tongs only</u>,*** thread the running tool into the hanger, with right hand rotation, until it shoulders out on the hanger body.

CAUTION: Do Not apply torque to the hanger/tool connection.

NOTE: If steps 1 through 6 were done prior to being shipped to location, the running tool should be backed off 1 turn and made back up to ensure it will back off freely.



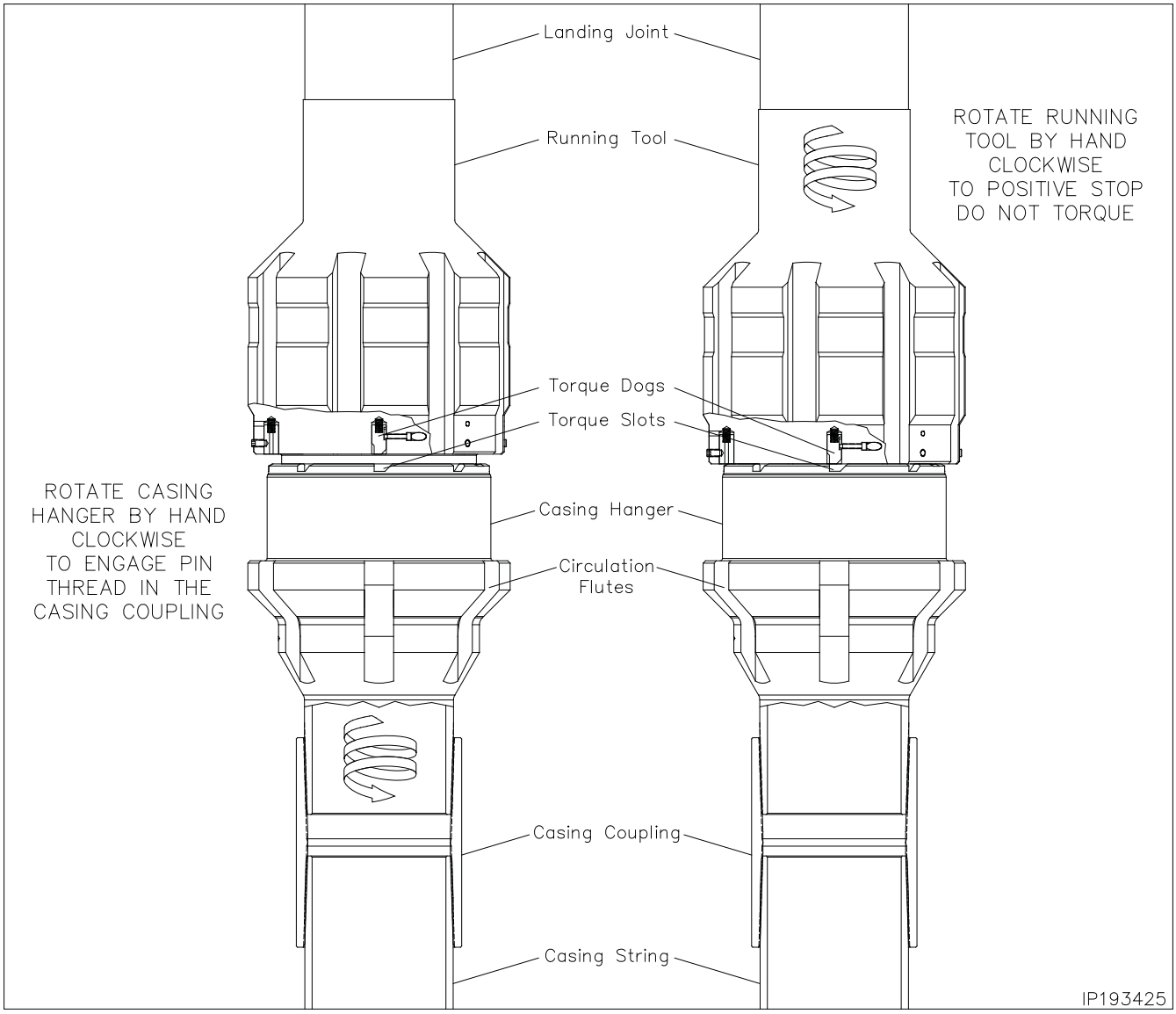
7. Calculate the total landing dimension by adding the previously determined RKB dimension and 30.00", the depth of the wellhead.

8. Starting at the top of the 45° angle load shoulder of the casing hanger measure up the landing joint and place a paint mark on the joint. Mark **HANGER LANDED**.

9. Place a second mark 30.00" below the first and mark **STOP ROTATING**.

10. Run the 7-5/8" casing as required and space out appropriately for the mandrel casing hanger.

Stage 12 — Hang Off the 7-5/8” Casing



NOTE: If the 7-5/8” casing becomes stuck and the mandrel casing hanger cannot be landed, refer to **Stage 12A** for the emergency slip casing hanger procedure.

11. Pick up the casing hanger/running tool joint assembly.
12. Remove the casing hanger thread protector and carefully thread the hanger into the last joint of casing. Rotate the hanger clockwise, by hand, to a positive stop.
13. Rotate the running tool clockwise by hand to a positive stop.

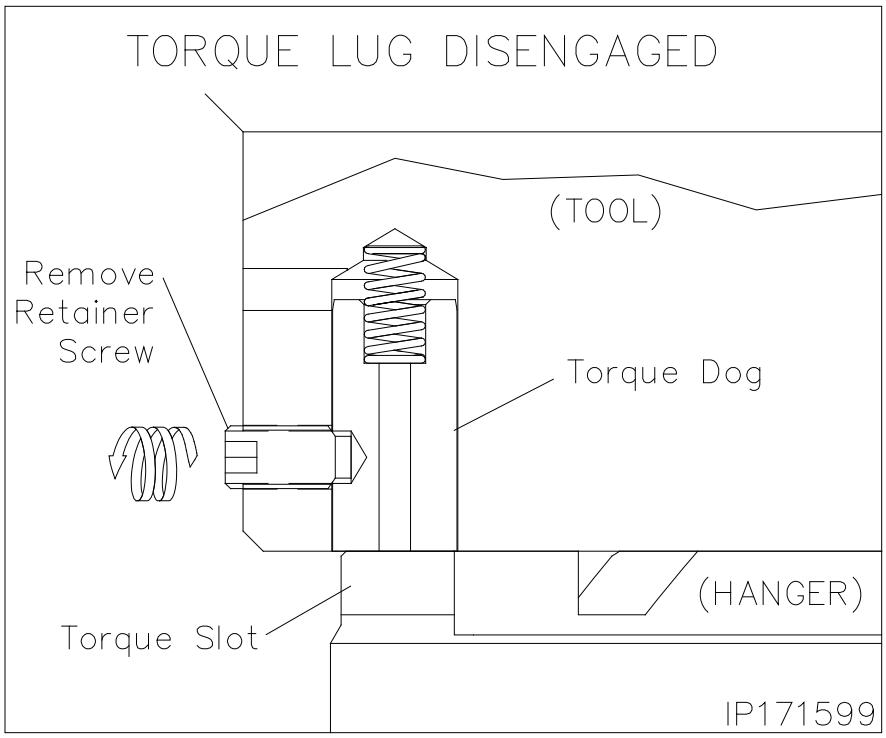
Stage 12 — Hang Off the 7-5/8” Casing

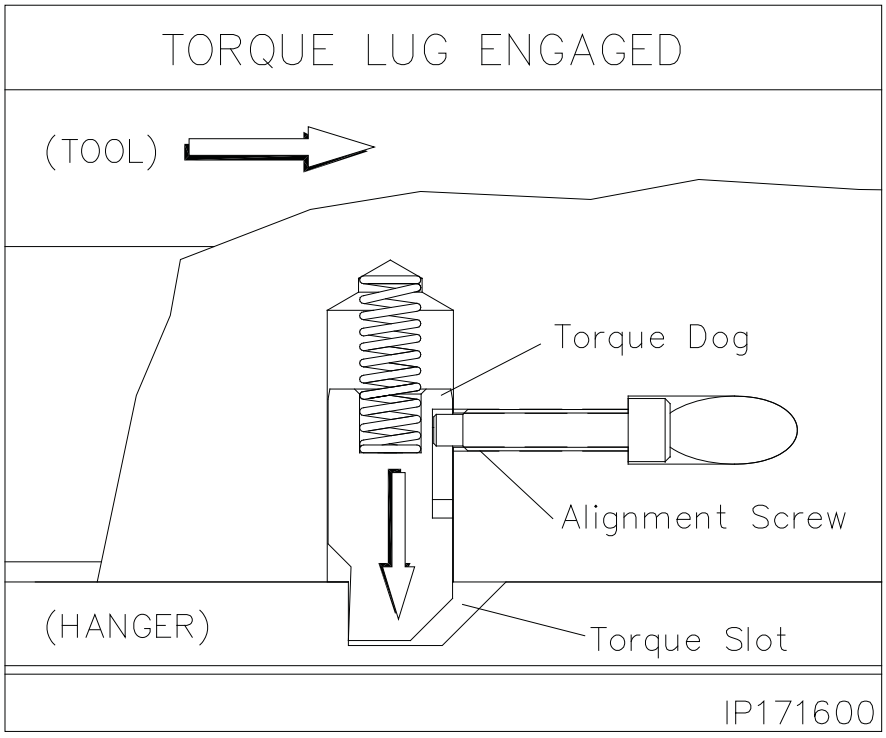
14. Locate the (8) socket head set screws in the side of the hanger running tool and completely remove the screws from the running tool. This will release the running tool torque dogs allowing them to move downward.

NOTE: Place the screws in a safe place to reinstall in the tool when the job is completed.

15. ***Using chain tongs only,*** rotate the running tool to the left to allow the torque dogs to engage the torque slots in the top of the hanger.

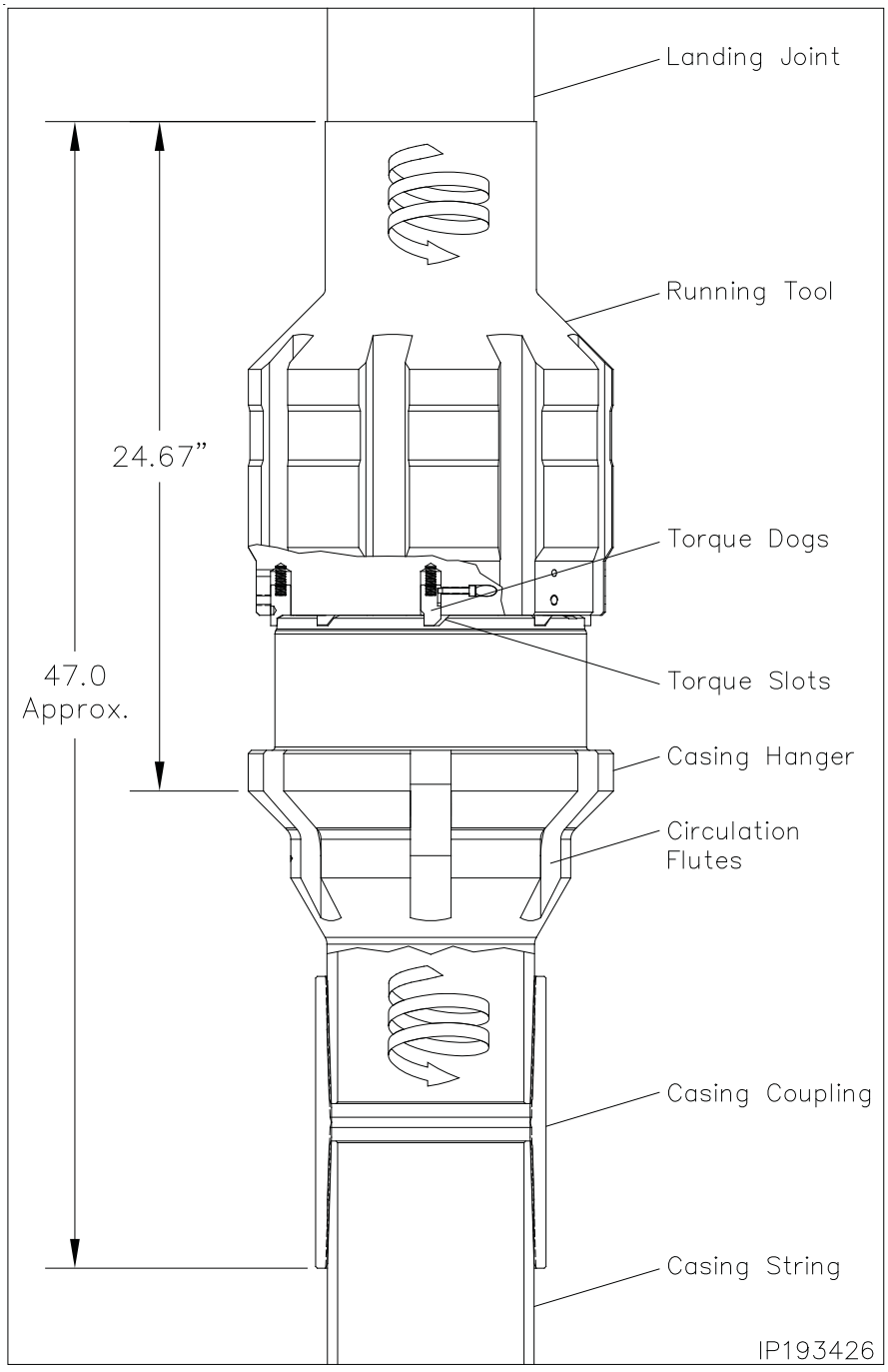
CAUTION: Do not rotate the running tool more than 1/4 turn to the left. Doing so will decrease the torque dog engagement.





Stage 12 — Hang Off the 7-5/8” Casing

16. Engage the CRT tool in the landing joint and torque the casing hanger in the casing string to thread manufacturer’s maximum make up torque.



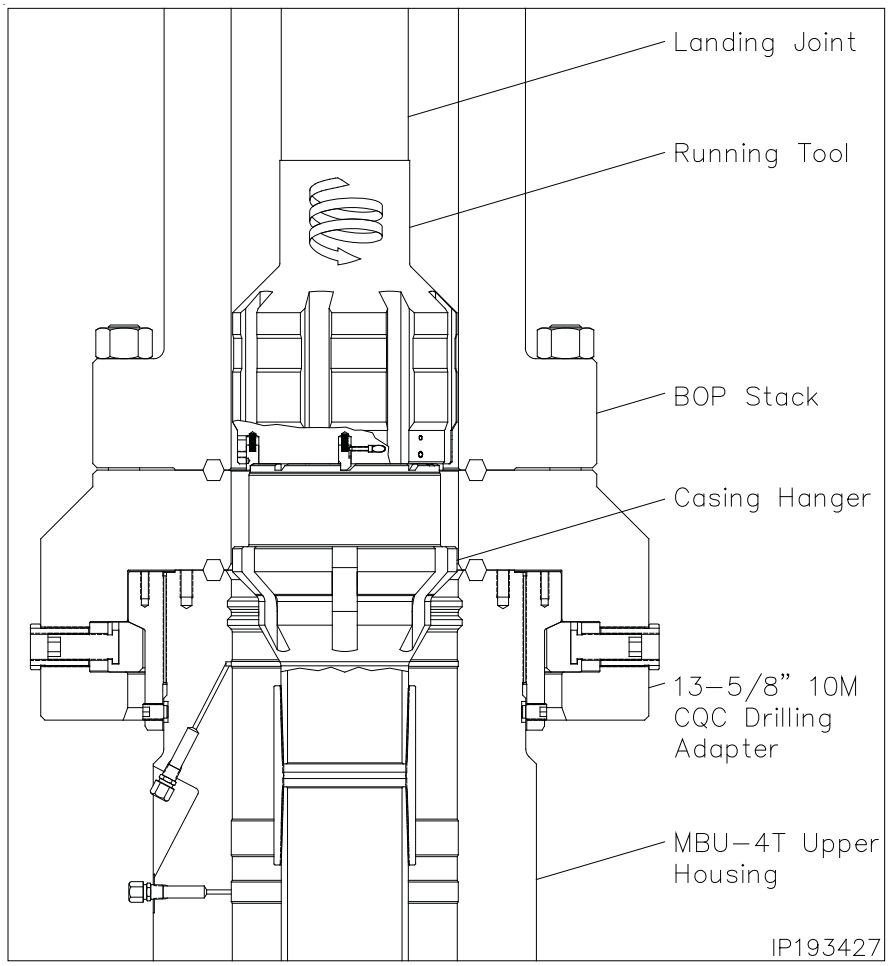
Stage 12 — Hang Off the 7-5/8” Casing

17. Pick up the casing string and remove the floor slips and rotary bushings.

18. Carefully lower the hanger completely through the BOP annular and then engage the top drive to allow the casing to be rotated clockwise.

19. While rotating the casing clockwise, carefully lower the casing string until the **STOP ROTATING** mark on the landing joint is level with the rig floor.

NOTE: The torque dogs have a maximum rated capacity. Please reference the **Recommended Service Tools** section in the BOM for maximum torque allowed.



Stage 12 — Hang Off the 7-5/8” Casing

CAUTION: Torque wrap can build in the casing string as it is rotated. Ensure the string comes to a neutral position, by allowing it to back off slowly counter clockwise, before the casing hanger is fully landed.

20. Cease rotation and continue carefully lowering the hanger through the wellhead and land it on top of the 9-5/8” MBU-4T packoff, 30.00” below the top of the drilling adapter.

21. Slack off all weight on the casing and verify that the **HANGER LANDED** paint mark has aligned with the rig floor.

WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

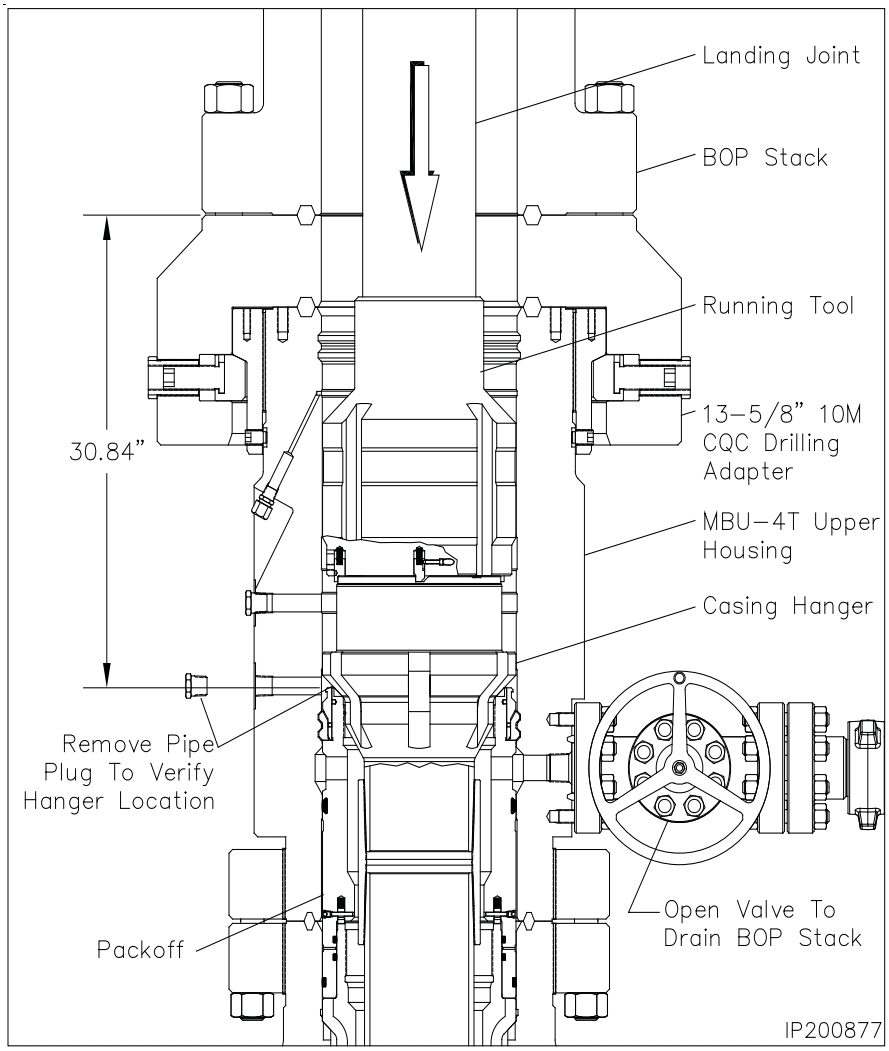
22. Open the lower outlet valve on the upper housing to drain the BOP stack.

23. Remove the lower 1” NPT sight port in the housing and look through the open port. The white paint mark on the casing hanger will be clearly visible.

24. Reinstall the pipe plug and tighten securely.

25. Close the open valve and place a vertical paint mark on the landing joint to verify if the casing string rotates during the cementing process.

26. Cement the casing as required.



NOTE: Returns may be taken through the circulation slots and out the BOP or out the side outlets on the housing.

27. With cement in place, bleed off all pressure and remove the cementing head.

28. ***Using chain tongs only, located 180° apart,*** retrieve the running tool and landing joint by rotating the landing joint counter clockwise (left) approximately 15 turns or until the tool comes free of the hanger.

CAUTION: The rig floor tong may be used to break the connection but under no circumstances is the top drive to be used to rotate or remove the casing hanger running tool.

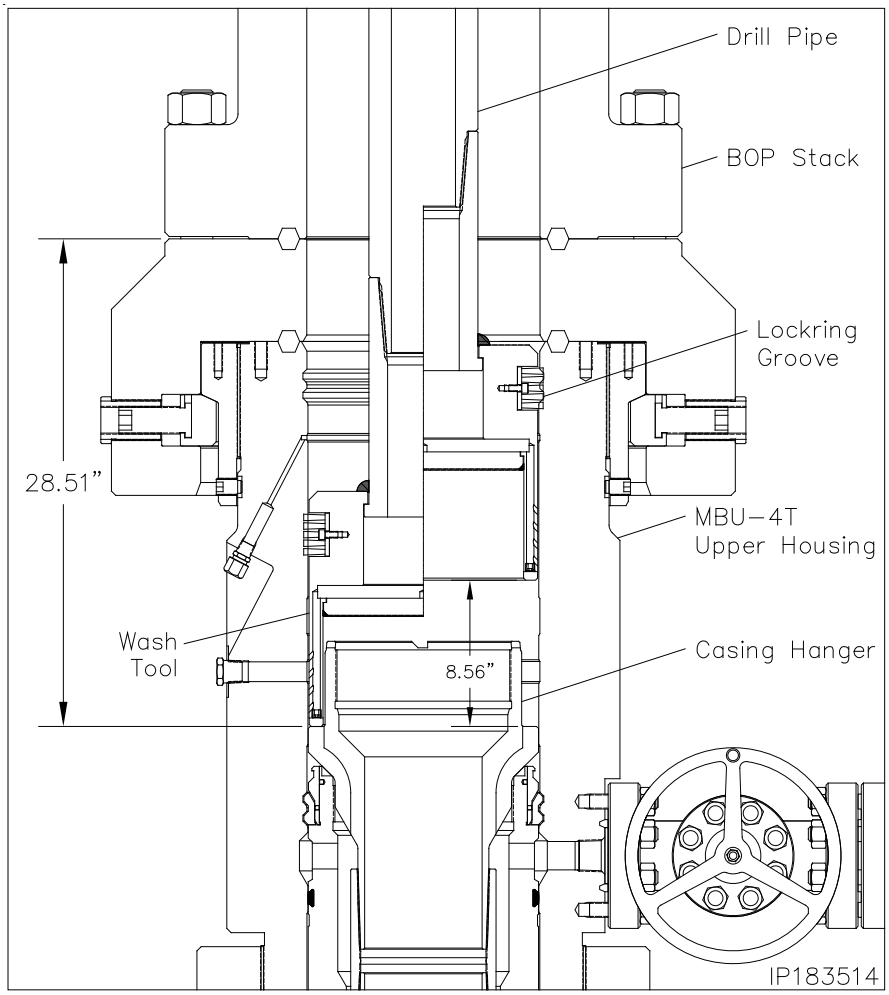
Stage 12 — Hang Off the 7-5/8” Casing

Running the 13-5/8” Wash Tool

1. Examine the ***13-5/8" x 4-1/2" IF Wash Tool (Item ST9).*** Verify the following:
   - drill pipe threads and bore are clean and in good condition
   - all ports are open and free of debris
   - brushes are securely attached and in good condition
2. Orient the wash tool with drill pipe box up. Make up a joint of drill pipe to the tool.
3. Carefully lower the wash tool through the BOP and land it on top of the 7-5/8" casing hanger, 28.51” below the top of the drilling adapter.
4. Place a paint mark on the drill pipe level with the rig floor.
5. Using chain tongs, rotate the tool clockwise (right) approximately 6 turns to loosen any debris that may be on top of the hanger flutes.

WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

6. Open the lower side outlet valve and drain the BOP stack.
7. Pick up on the tool approximately 1" and attach a high pressure water line or the top drive to the end of the drill pipe and pump water at approximately 25 SPM through the tool and up the BOP stack.
8. Pick up the tool 8.56” total, above its landing position and rotate the tool to brush the lockring groove free of debris.
9. While flushing, raise and lower the tool the full length of the wellhead and BOP stack. The drill pipe should be slowly rotated (approximately 20 RPM) while raising and lowering to wash the inside of the housing and BOP stack to remove all caked on debris.
10. Once washing is complete, land the wash tool on the hanger flutes.



11. Shut down pumps and observe the returns at the open lower outlet for debris.
12. Reengage the pump and fully wash the inside of the wellhead and the entire BOP one additional cycle ensuring the stopping point is with the wash tool resting on top of the hanger flutes.

CAUTION: Observe the returns at the open outlet valve. If returns are not clean, continue flushing until they are.

13. Once the returns are clean and free of debris, retrieve the tool to the rig floor.
14. Using a bright light, sight through the bore of the BOP stack and observe the top of the hanger neck and flutes. Ensure that there are no dark areas on top of the hanger flutes.

CAUTION: Continue washing until all debris is removed.

Stage 12A — Hang Off the 7-5/8" Casing (Emergency)

1. Cement the hole as required.

WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

2. Drain the BOP stack through the housing lower side outlet valve.

3. Locate the actuation screws on the O.D. of the drilling adapter.

4. Using a hex drive, fully retract the actuation screws until they are slightly over flush with the gland nuts.

WARNING: Keep body clear of all pinch points and suspended loads.

5. Pick up on the BOP stack a minimum of 12" above the housing and secure with safety slings.

6. Washout bowl as required.

7. Examine the ***13-5/8" x 7-5/8" MBU-4T-MID Slip Casing Hanger (Item A24a).*** Verify the following:
   - slips and internal bore are clean and in good condition
   - all screws are in place

8. There are four latch screws located in the side of the casing hanger body. Using a 5/16" Allen wrench, remove the four latch screws located 180° apart and separate the hanger into two halves.

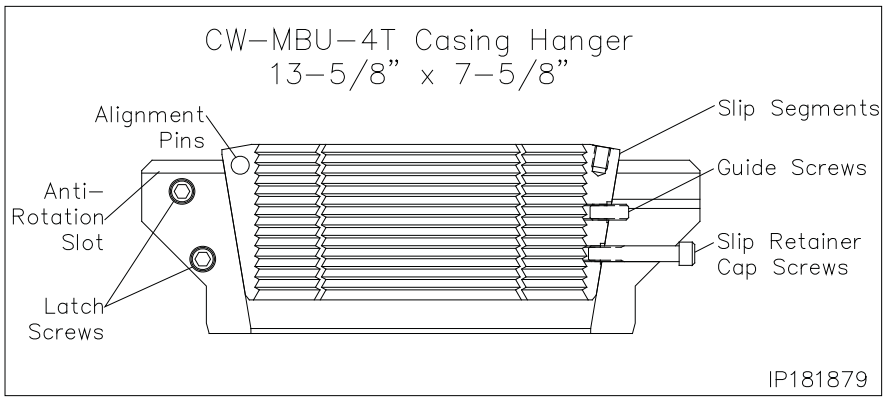
9. Place two boards on the lower adapter against the casing to support the hanger.

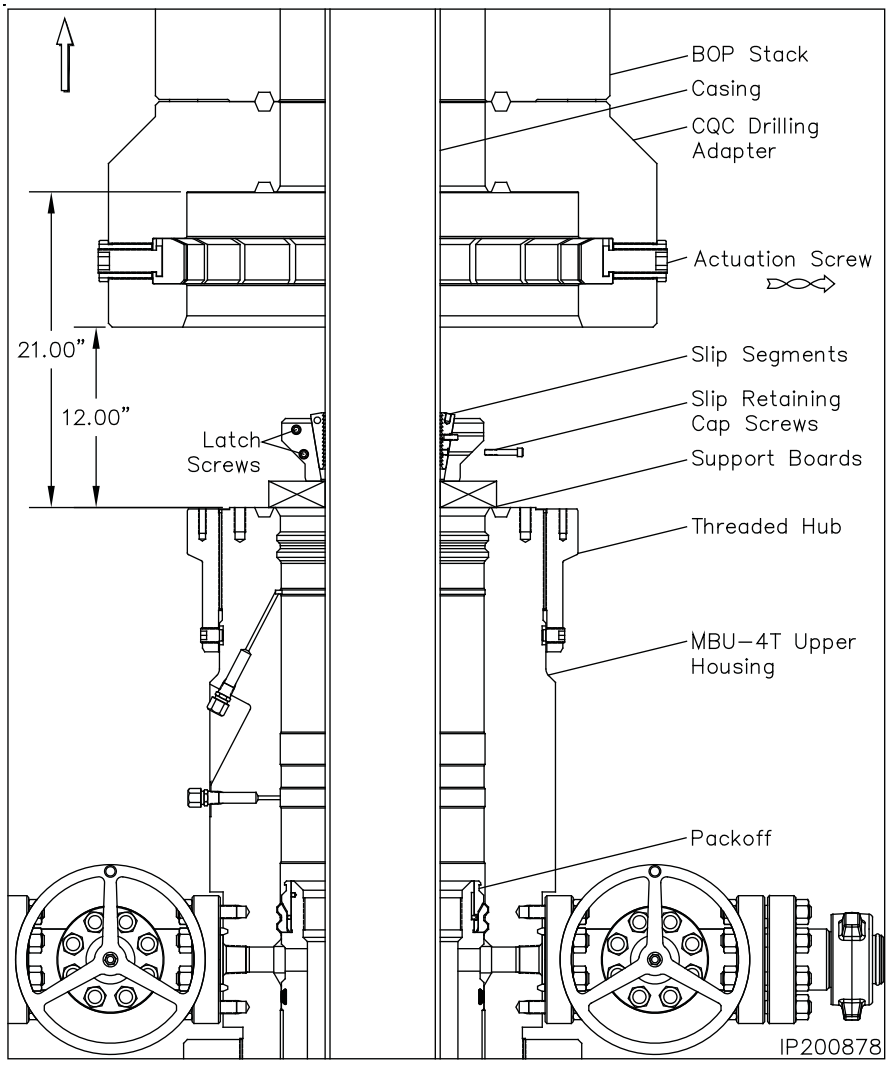
10. Pick up one half of the hanger and place it around the casing and on top of the boards.

11. Pick up the second hanger half and place it around the casing adjacent the first half.

12. Slide the two hanger halves together ensuring the slip alignment pins properly engage the opposing hanger half.

13. Reinstall the latch screws and tighten securely.





14. Prepare to lower the hanger into the housing bowl.

CAUTION: Do Not drop the casing hanger!

Stage 12A — Hang Off the 7-5/8” Casing (Emergency)

15. Grease the casing hanger body and remove the slip retaining screws.

16. Pull tension on the casing to the desired hanging weight

17. Remove the boards and allow the hanger to slide into the housing bowl. When properly positioned the top of the hanger will be approximately 22.56” below the top of the housing.

18. Slack off the desired hanging weight.

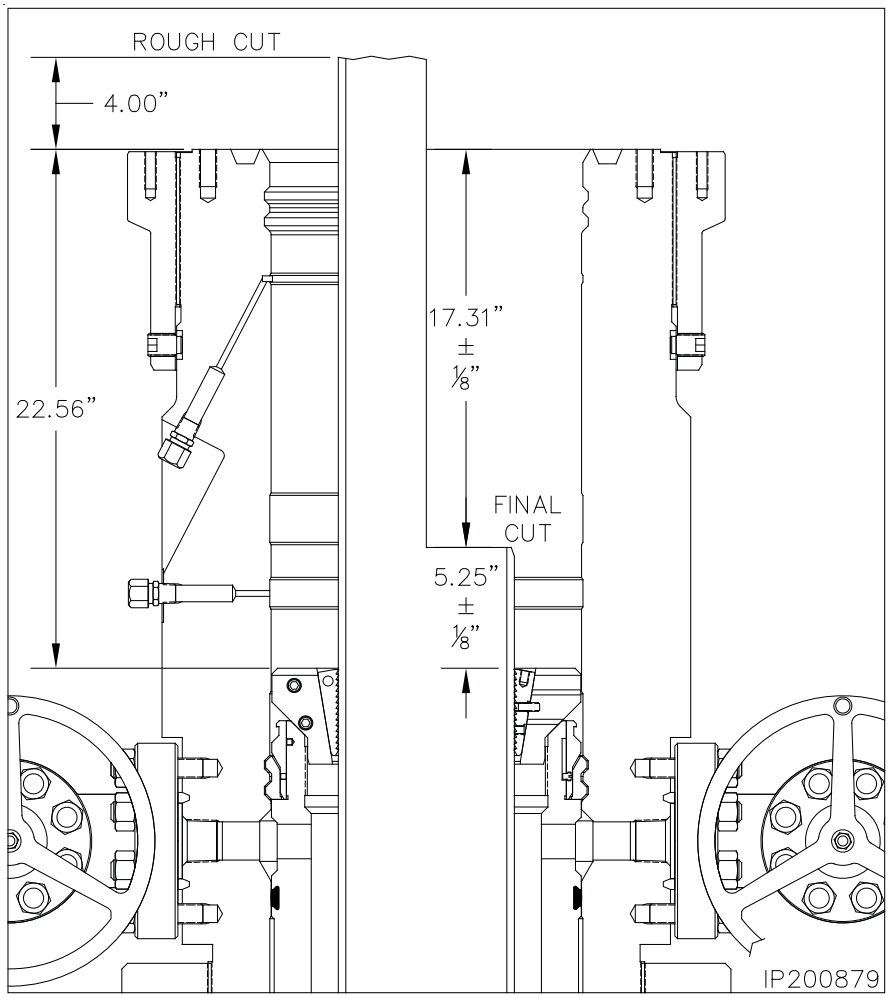
NOTE: A sharp decrease on the weight indicator will signify that the hanger has taken weight. If this does not occur, pull tension again and slack off once more.

WARNING: Due to the potential fire hazard and the risk of loss of life and property, it is highly recommended to check the casing annulus and pipe bore for gases, with an approved sensing device, prior to cutting the casing. If gas is present, do not use an open flame torch to cut the casing. It will be necessary to use an air driven mechanical cutter which is spark free.

19. Rough cut the casing approximately 4” above the top of the housing and move the excess casing out of the way.

20. Using the internal casing cutter, final cut the casing at 17.31” ± 1/8” below the top of the lower adapter or 5.25” ± 1/8” above the hanger body.

21. Remove the internal casing cutter assembly and reconfigure the assembly to bevel the casing. Reinstall the cutter assembly and then place a 3/16” x 3/8” bevel on the O.D. and an I.D. chamfer to match the minimum bore of the packoff to be installed.



CAUTION: There must not be any rough edges on the casing or the seals of the packoff will be damaged.

22. Thoroughly clean the housing bowl, removing all cement and cutting debris.

Stage 13 — Install the MBU-3T Mandrel Hanger Packoff

The following steps detail the installation of the MBU-3T nested packoff assembly for the mandrel hanger. If the casing was landed using the emergency slip hanger, skip this stage and proceed with **Stage 13A** for installing the emergency MBU-3T nested packoff.

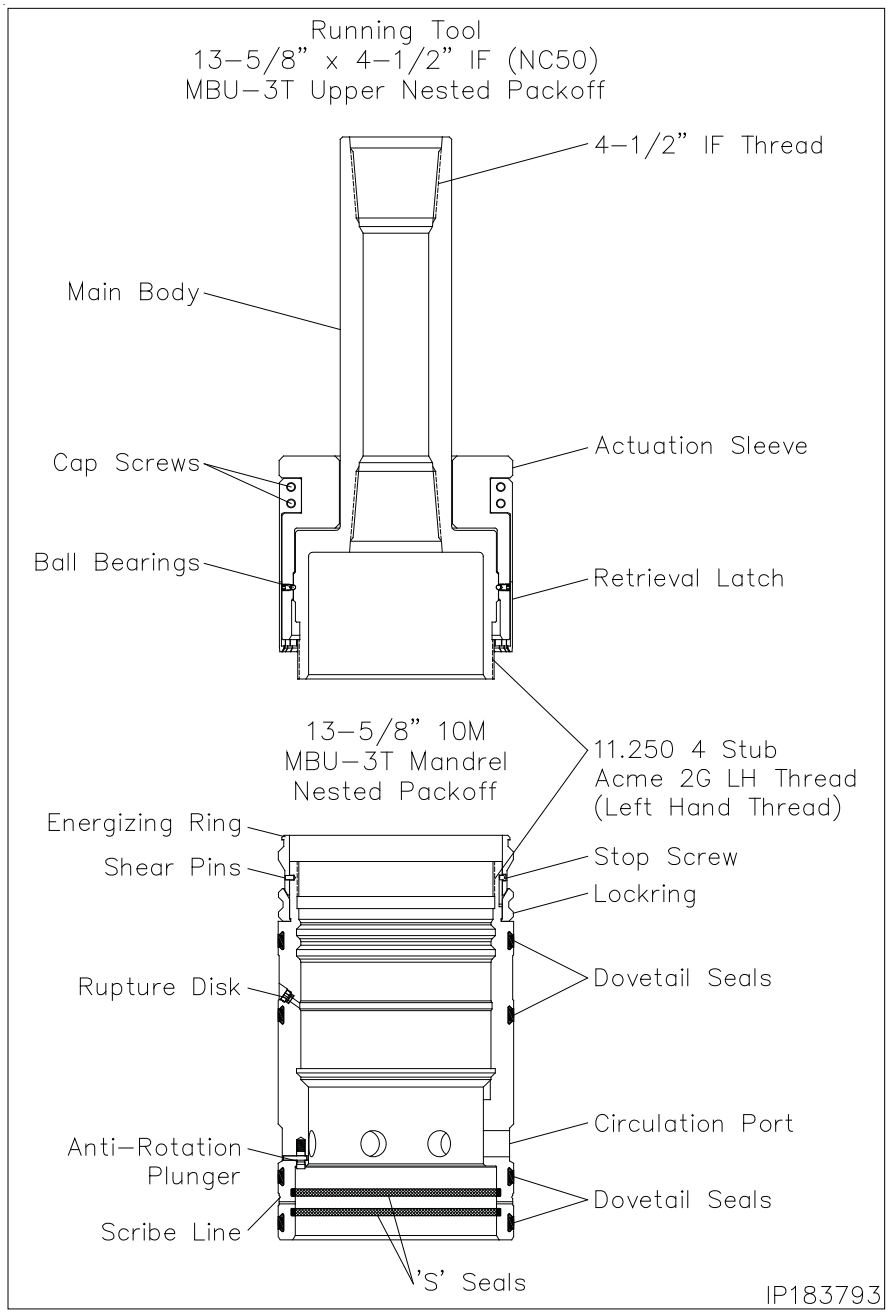
1. Examine the ***13-5/8" x 11.250" 4 Stub Acme 2G LH Box Top MBU-3T Mandrel Hanger Nested Packoff Assembly (Item A25).*** Verify the following:
   - all elastomer seals are in place and undamaged
   - internal bore, and ports, are clean and in good condition
   - lockring is fully retracted
   - rupture disk is in place and tightened securely
   - energizer ring is in its upper most position and retained with shear pins
   - guide screws are in place and back off 1/4 turn
   - anti-rotation plungers are in place, free to move

2. Locate the 5/16" scribe mark between the lower dovetail seals of the packoff and paint only the scribe mark white. Allow the paint to dry.

3. Inspect the I.D. and O.D. seals for any damage and replace as necessary.

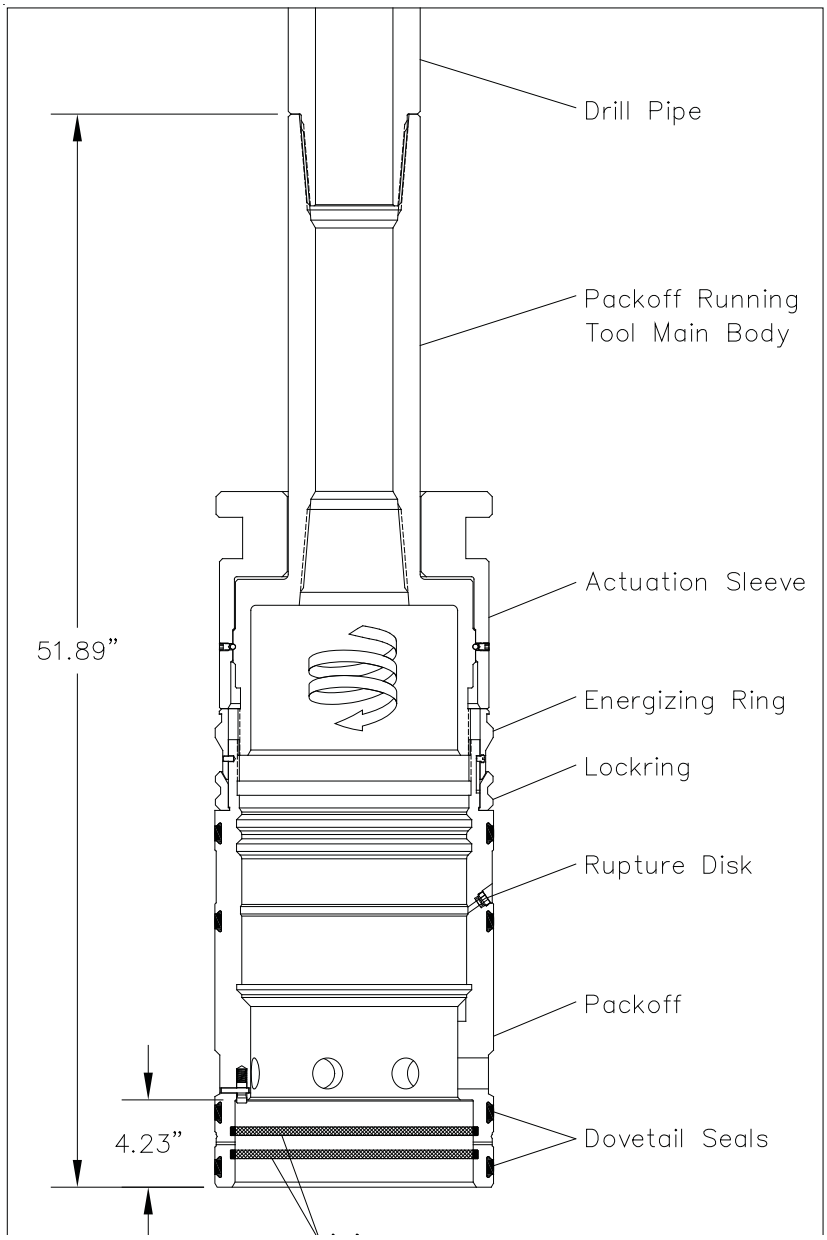
4. Examine the ***13-5/8" Nominal x 11.250" 4 Stub Acme 2G LH, MBU-3T-UPR Nested Packoff Running Tool (Item ST13).*** Verify the following:
   - Acme threads are clean and in good condition
   - retrieval latch is in position and retained with cap screws
   - actuation sleeve rotates freely
   - seal sleeve is removed

NOTE: Alternate tool may also be used.



Stage 13 — Install the MBU-3T Mandrel Hanger Packoff

5. Remove the retrieval latch and set aside.
6. Make up the running tool to 4-1/2" IF (NC-50) drill collar and torque the connection to optimum make up torque.
7. Pick up the running tool assembly with drill pipe landing joint and suspend it above the packoff.
8. Carefully lower the tool into the packoff and thread them together by first rotating the tool clockwise (RIGHT) to locate the thread start and then counter clockwise (LEFT) approximately 3 turns until the tool actuation sleeve makes contact with the packoff energizing ring.
9. Pick up the assembly and thoroughly clean and lightly lubricate the packoff I.D. 'S' seals and the O.D. dovetail seals with oil or light grease.
10. Locate the upper and lower "SEAL TEST" fittings on the O.D. of the housing and remove the dust cap from the fittings.
11. Attach a test pump to both fittings and pump clean test fluid thru the fittings and ports to dislodge any old grease and trapped debris.
12. Remove the test pumps and reinstall the fitting dust caps.



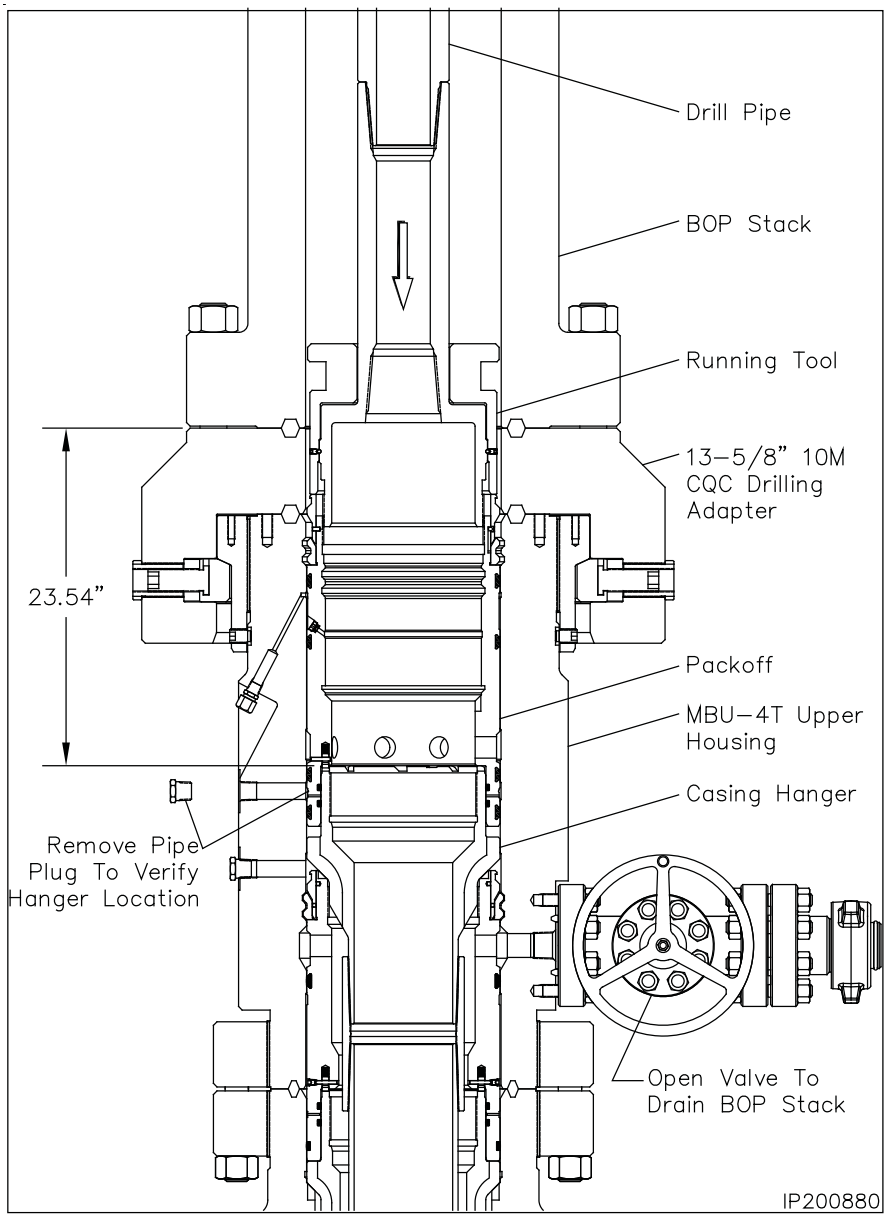
Stage 13 — Install the MBU-3T Mandrel Hanger Packoff

Landing the Packoff

13. Remove the hole cover.
14. Place a paint mark on the packoff 4.23” from the bottom.
15. Measure up 5 foot from that mark and place a paint mark on the drill pipe.
16. Pick up the packoff/running tool assembly and carefully lower the assembly through the BOP, marking the landing joint every five feet, until the calculated dimension is reached.
17. Place a paint mark on the landing joint at the dimension and mark **LANDED**. Place an additional mark 1-1/2” above the first one and mark **ENGAGED**.
18. Continue lowering the packoff until it passes over the neck of the hanger and lands on the casing hanger neck, 23.54” below the top of the drilling adapter.

WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

19. Open the lower outlet valve on the upper housing to drain the BOP stack.
20. Locate the upper 1” sight port pipe plug and remove the plug.
21. Look through the port to verify that the packoff is properly landed. The white painted scribe mark on the packoff will be clearly visible in the center of the open port.
22. Reinstall the pipe plug and tighten securely.



Stage 13 — Install the MBU-3T Mandrel Hanger Packoff

Seal Tests

23. Locate the upper and lower “SEAL TEST” fittings on the O.D. of the upper housing and remove the dust caps from the fittings.

24. Attach a test pump to the open lower fitting and pump clean test fluid between the seals until a stable test pressure of ***5,000 psi*** is achieved.

25. Hold the test pressure for 15 minutes or as required by drilling supervisor.

26. If a leak develops, bleed off test pressure. Remove the packoff from the wellhead and replace the leaking seals.

27. Repeat steps 20 through 22 for the remaining upper fitting and test the upper seals to ***10,000 psi***.

28. After satisfactory tests are achieved, bleed off the test pressure but leave the test manifolds in place.

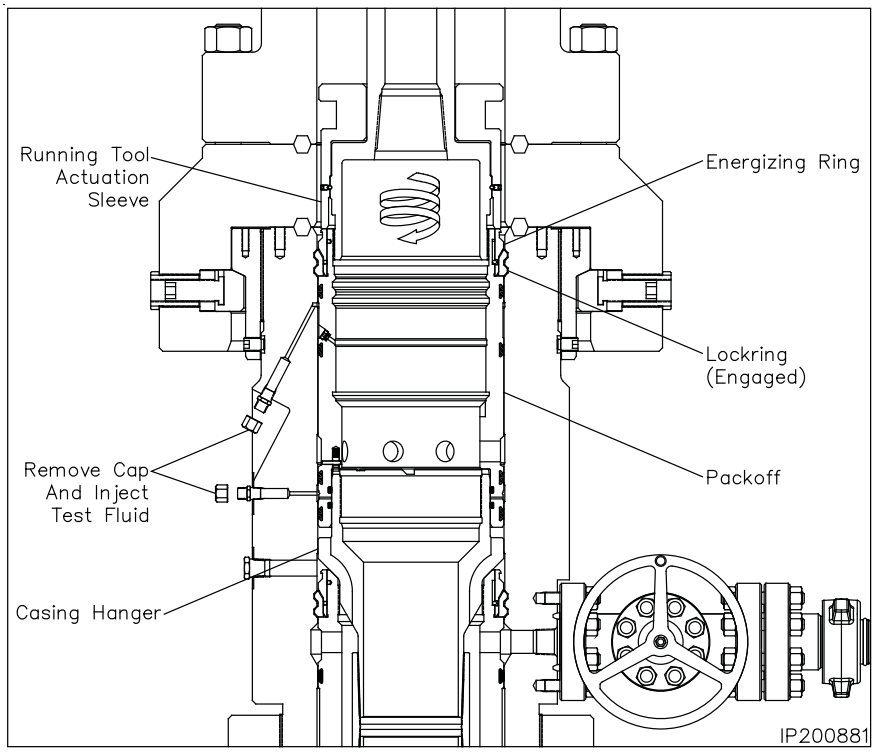
Engaging the Lockring

29. ***Using chain tongs only, located 180° apart***, slowly rotate the drill pipe counter clockwise until the anti-rotation plungers align with the slots in the top of the hanger. Expect torque of approximately 400 ft-lbs to rotate the packoff.

30. ***Using chain tongs only,*** rotate the landing joint approximately 6 to 6-1/2 turns counter clockwise to engage the packoff lockring in its mating groove in the bore of the MBU-4T upper housing.

NOTE: Approximately 800 to 900 ft-lbs of torque will be required to break over the shear pins in the packoff. The torque will drop off and then increase slightly when the energizing ring pushes the lockring out. A positive stop will be encountered when the lockring is fully engaged.

NOTE: When properly engaged the second paint mark on the landing joint will align with the rig floor. VERIFY PAINT MARKS.



CAUTION: It is imperative that the landing joint remain concentric with the well bore when rotating to engage the lockring. This can be accomplished with the use of the air hoist.

CAUTION: If the required turns to engage the lockring are not met or excessive torque is encountered, remove the packoff. First call local branch. If further assistance is required then call Houston Engineering.

31. Back off the landing joint/running tool approximately three turns. Using the top drive, exert a 40,000 lbs. pull on the landing joint. After satisfactory test, slack off all weight.

32. Reattach the test pump to the open test manifolds and retest the packoff seals as previously outlined. This will also verify that the packoff is in place.

33. After satisfactory tests are achieved, remove test pump and manifold from the lower fitting and reinstall the dust cap on the lower fitting.

34. Using the test pump, increase the injection pressure on the upper test fitting to ***11,500 psi*** to burst the rupture disk in the packoff. This will open the test port passage for the upper packoff.

35. Remove test pump and attach a grease gun to the open upper fitting.

36. Pump grease thru the fitting and port until it flows into the ID of the packoff.

37. Remove the grease gun and reinstall the dust cap on the open fittings.

38. ***Using chain tongs only,*** rotate the landing joint clockwise until the tool comes free of the packoff (approximately 9 to 9-1/2 total turns) and then retrieve the tool with a straight vertical lift.

Stage 13 — Install the MBU-3T Mandrel Hanger Packoff

In the event the packoff is required to be removed after the lockring is engaged the following procedure is to be followed.

Retrieving the Packoff

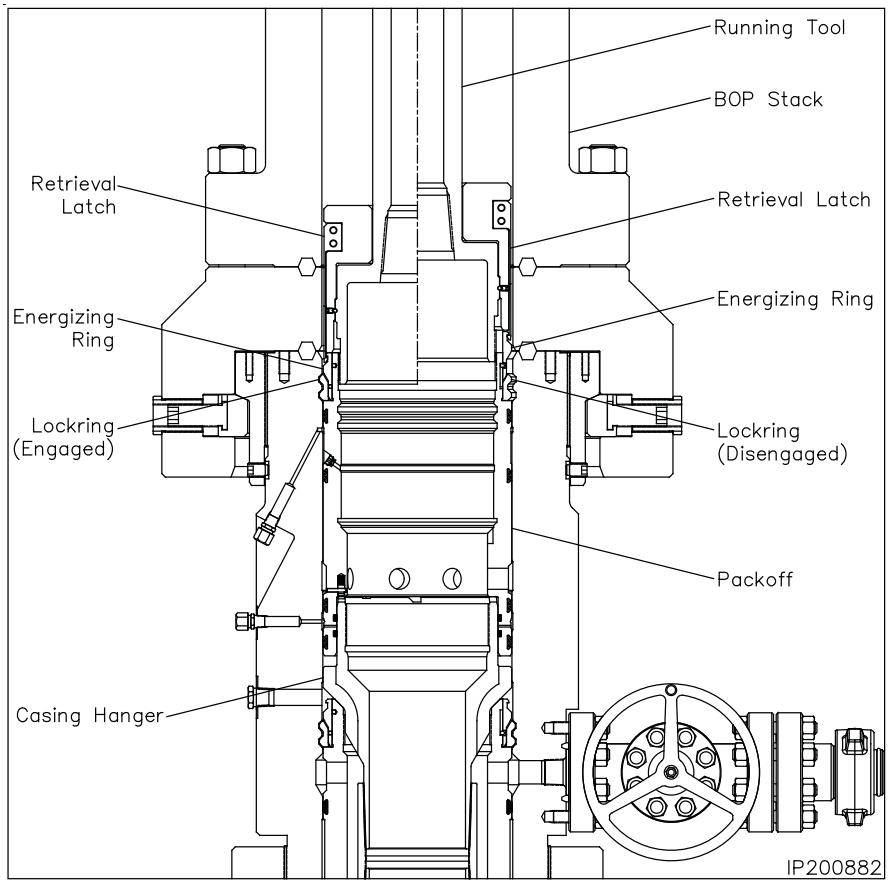
1. Position the retrieval latch so the latch fingers extend from the bottom of the running tool body.
2. Reinstall the cap screws and tighten them securely.
3. Ensure the retrieval latch freely rotates on the running tool body.
4. Carefully lower the running tool through the BOP stack and into the packoff.
5. Rotate the drill pipe clockwise (Right) to locate the thread start and then counter clockwise (Left) (approximately 9 to 9-1/2 turns) to a positive stop.

NOTE: At this point the retrieval latches will have passed over the energizing ring and snapped into place.

6. Rotate the drill pipe clockwise (right) approximately 6 turns to a positive stop. The drill pipe should rise approximately 1-1/2”.

CAUTION: Do not exceed the 6 turns or the packoff may be seriously damaged.

7. Carefully pick up on the drill pipe and remove the packoff from the MBU-4T wellhead with a straight vertical lift.
8. Rotate the packoff 1 turn clockwise to relax the retrieval latch.
9. Remove the (4) 1/2” cap screws and remove the latch assembly.
10. Redress the packoff and reset as previously outlined.
11. Once the packoff is properly set, reinstall the retrieval latch on the tool.



Stage 13A — Install the 7-5/8” Emergency Packoff

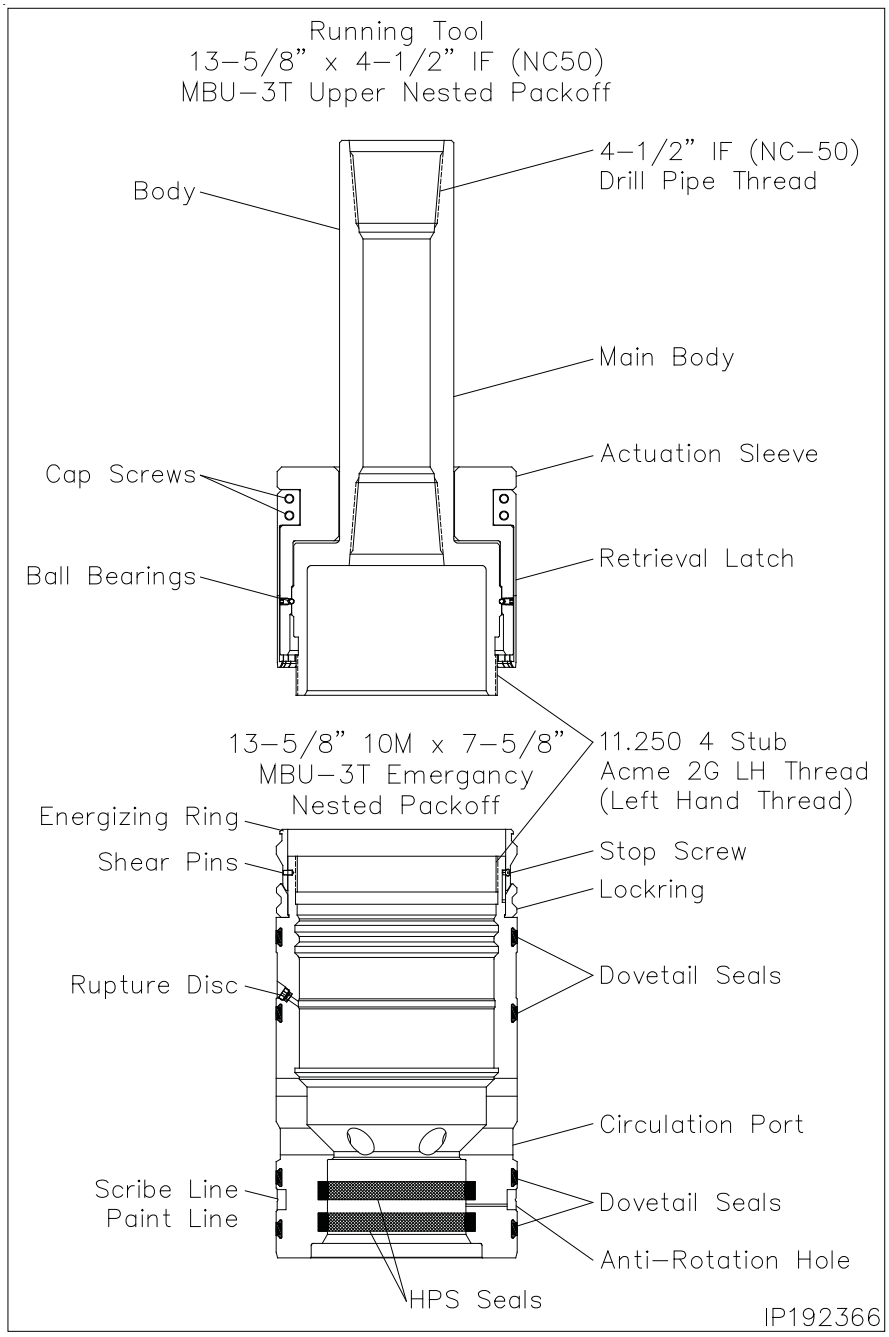
NOTE: Only use this stage if the 7-5/8” casing becomes stuck and the mandrel casing hanger cannot be landed. If the mandrel hanger has been set then skip this stage.

1. Examine the ***13-5/8” 10M x 7-5/8” x 11.250” 4 Stub Acme 2G LH Box Top MBU-3T Emergency Nested Packoff Assembly (Item A25a).*** Verify the following:
   - all elastomer seals are in place and undamaged
   - internal bore, and ports, are clean and in good condition
   - lockring is fully retracted
   - rupture disc is in place and tightened securely
   - energizer ring is in its upper most position and retained with shear pins
   - guide screws are in place and back off 1/4 turn
   - paint scribe line white and allow paint to dry

2. Inspect the I.D. and O.D. seals for any damage and replace as necessary.

3. Examine the ***13-5/8” Nominal x 11.250” 4 Stub Acme 2G LH, MBU-3T Nested Packoff Running Tool (Item ST13).*** Verify the following:
   - Acme threads are clean and in good condition
   - retrieval latch is in position and retained with cap screws
   - actuation sleeve rotates freely
   - seal sleeve is removed

NOTE: Alternate tool may also be used.

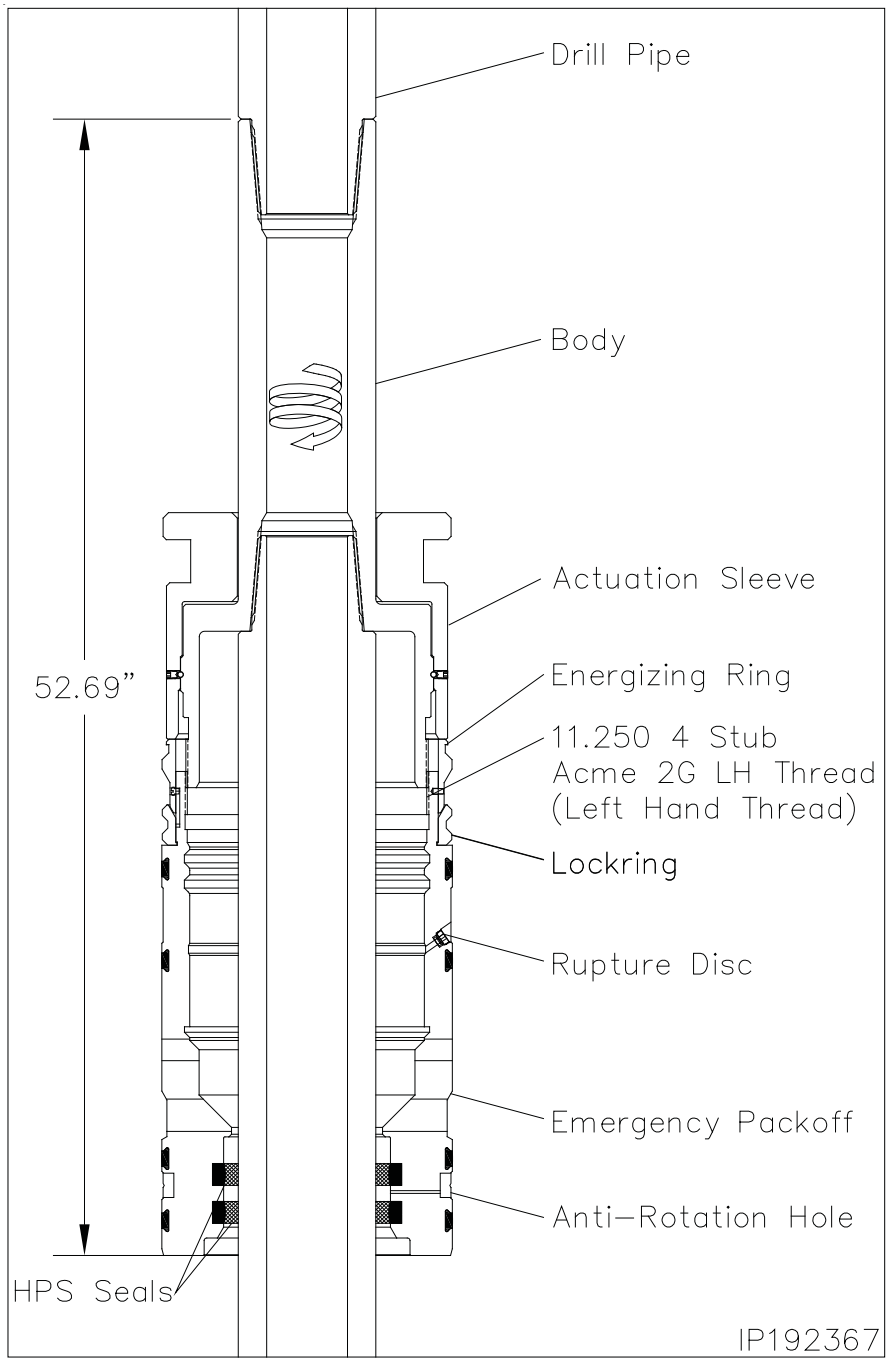


Stage 13A — Install the 7-5/8” Emergency Packoff

4. Remove the retrieval latch and set aside.
5. Make up a joint 4-1/2” IF (NC-50) drill pipe to the top of the running tool and tighten connection to thread manufacturer’s maximum make up torque.
6. Run in the hole with two stands of drill pipe and set in floor slips.
7. Pick up the packoff and carefully pass it over the drill pipe and set it on top of the floor slips.
8. Pick up the running tool with landing joint and make up the running tool to the drill pipe in the floor slips using the appropriate length pin x pin sub.
9. Pick up the packoff and thread it onto the running tool with clockwise (Right) rotation until the energizing ring makes contact with the actuation sleeve of the tool. (Approximately 4 turns).

CAUTION: Ensure the rupture disc is in place and tightened securely.

10. Thoroughly clean and lightly lubricate the packoff I.D. ‘HPS’ seals and the O.D. dovetail seals with oil or light grease.



Stage 13A — Install the 7-5/8” Emergency Packoff

11. Locate the upper and lower “SEAL TEST” fittings on the O.D. of the housing and remove the dust cap from the fittings.

12. Attach a test pump to both fittings and pump clean test fluid thru the fittings and ports to dislodge any old grease and trapped debris.

13. Remove the test pumps and reinstall the fitting dust caps.

Landing the Packoff

14. Pick up the drill string and remove the floor slips.

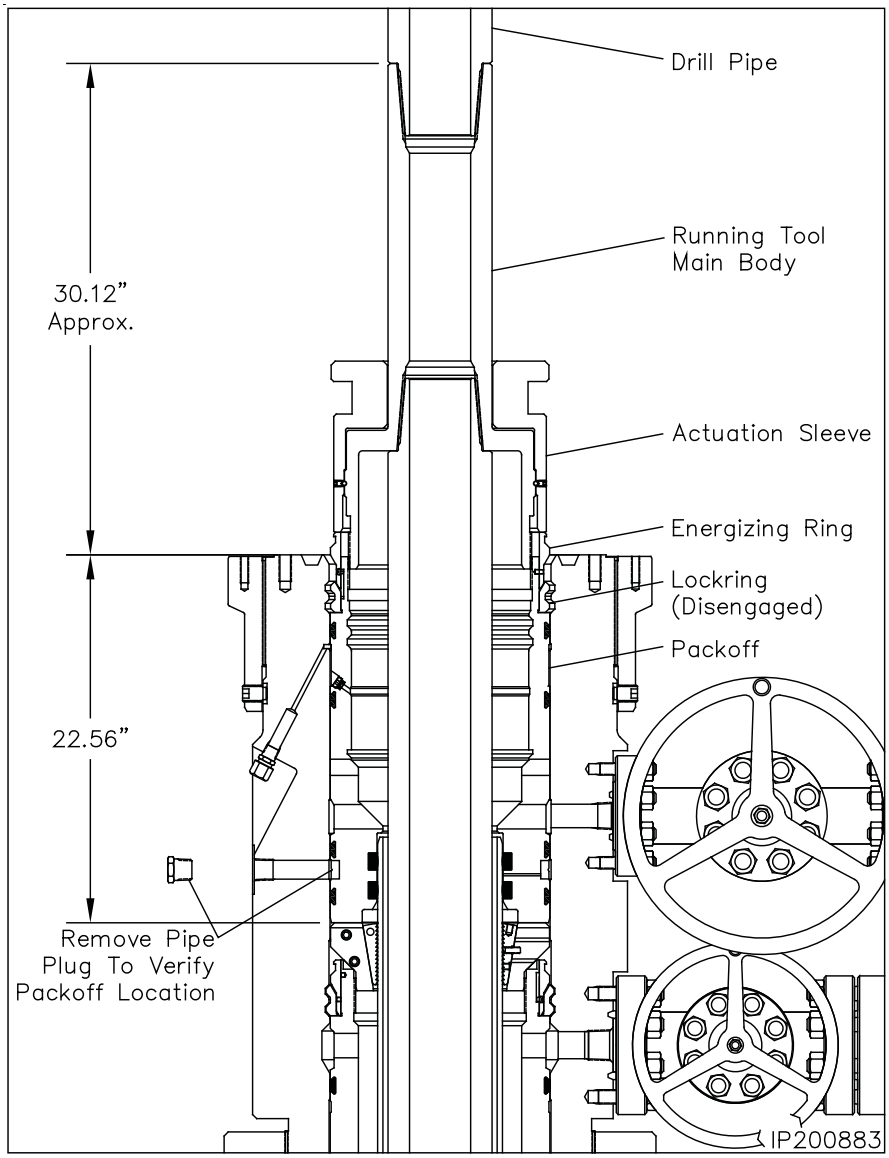
15. Carefully lower the packoff through the rig floor and position it just above the housing.

16. Carefully lower the packoff into the housing until it lands on top of the slip hanger.

NOTE: When properly positioned the top of the running tool will be approximately 30.12” above the top of the MBU-4T housing.

17. Remove the upper 1” LP pipe plug from the sight port to verify the packoff is properly landed. The 5/16” scribe line should be clearly visible in the center of the port.

18. With landing verified, reinstall the pipe plug and tighten securely.



Stage 13A — Install the 7-5/8” Emergency Packoff

Seal Test

19. Locate the upper and lower “SEAL TEST” fittings on the O.D. of the housing and remove the dust caps from the fittings.

20. Attach a test pump to the open lower fitting and pump clean test fluid between the seals until a stable test pressure of ***5,000 psi or 80% of casing collapse — whichever is less*** is achieved.

21. Hold the test pressure for 15 minutes or as required by drilling supervisor.

22. If a leak develops, bleed off test pressure, remove the packoff from the wellhead and replace the leaking seals.

23. After satisfactory test is achieved, bleed off the test pressure but leave the test manifold in place.

24. Repeat steps 17 through 20 for the remaining upper fitting and test upper seals to ***10,000 psi***.

Engaging the Lockring

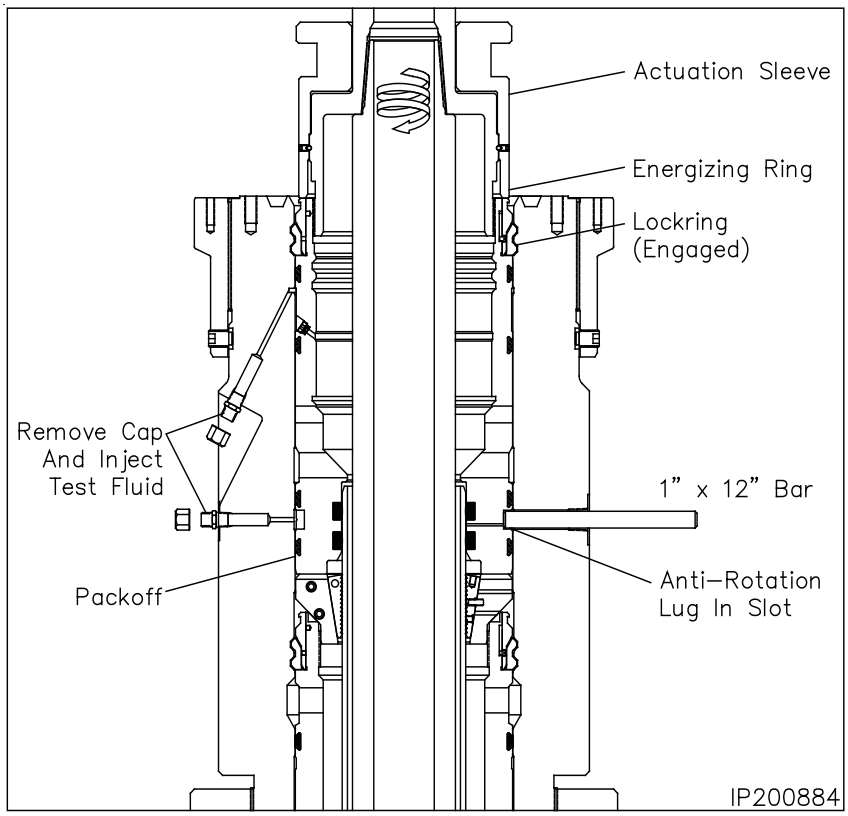
25. Remove the 1” sight port pipe plug and set aside.

26. Pass a 1” O.D. bar through the open port and hold inward pressure on the bar.

27. ***<u>Using chain tongs only</u>***, rotate the landing joint approximately 6 to 6-1/2 turns counter clockwise (Left) to engage the packoff lockring in its mating groove in the bore of the MBU-4T housing.

NOTE: Approximately 800 to 900 ft-lbs of torque will be required to break over the shear pins in the packoff. The torque will drop off and then increase slightly when the energizing ring pushes the lockring out. A positive stop will be encountered when the lockring is fully engaged.

CAUTION: It is imperative that the drill pipe landing joint remain concentric with the well bore when rotating to engage the lockring. This can be accomplished with the use of the air hoist.



CAUTION: If the required turns to engage the lockring are not met or excessive torque is encountered, remove the packoff. First call local branch. If further assistance is required then call Houston Engineering.

28. Remove the 1” bar from the sight port and reinstall the pipe plug in the port.

29. Back off the landing joint/running tool approximately three turns. Using the top drive, exert a 40,000 lbs. pull on the landing joint. After satisfactory test, slack off all weight.

30. Reattach the test pump to the upper and lower test fittings and retest seals as previously outlined.

31. After a satisfactory test is achieved, increase the injection pressure in the upper test port to ***11,500 psi*** to burst the rupture disc in the packoff. This will open the test port passage for the upper packoff.

32. Remove test pump and attach a grease gun to the open upper fitting.

33. Pump grease thru the fitting and port until it flows into the ID of the packoff.

34. Remove the grease gun and reinstall the dust cap on the open fittings.

35. ***<u>Using chain tongs only</u>***, rotate the landing joint clockwise until the tool comes free of the packoff (approximately 6 to 6-1/2 total turns) and then retrieve the tool with a straight vertical lift.

36. Reinstall and nipple up the BOP stack.

Stage 14 — Test the BOP Stack

Immediately after making up the BOP stack and periodically during the drilling of the well for the next casing string the BOP stack (connections and rams) must be tested.

1. Examine the ***11" Nominal x 4-1/2" IF CW, MBU-3T Inner Test Plug (Item ST14)***. Verify the following:
   - 1-1/4" VR plug and weep hole plug are in place and tightened securely
   - elastomer seals are in place and in good condition
   - drill pipe threads are clean and in good condition

2. Position the test plug with the long tong neck down and make up the tool to a joint of drill pipe.

3. Remove the 1/2" NPT pipe plug from the weep hole if pressure is to be supplied through the drill pipe.

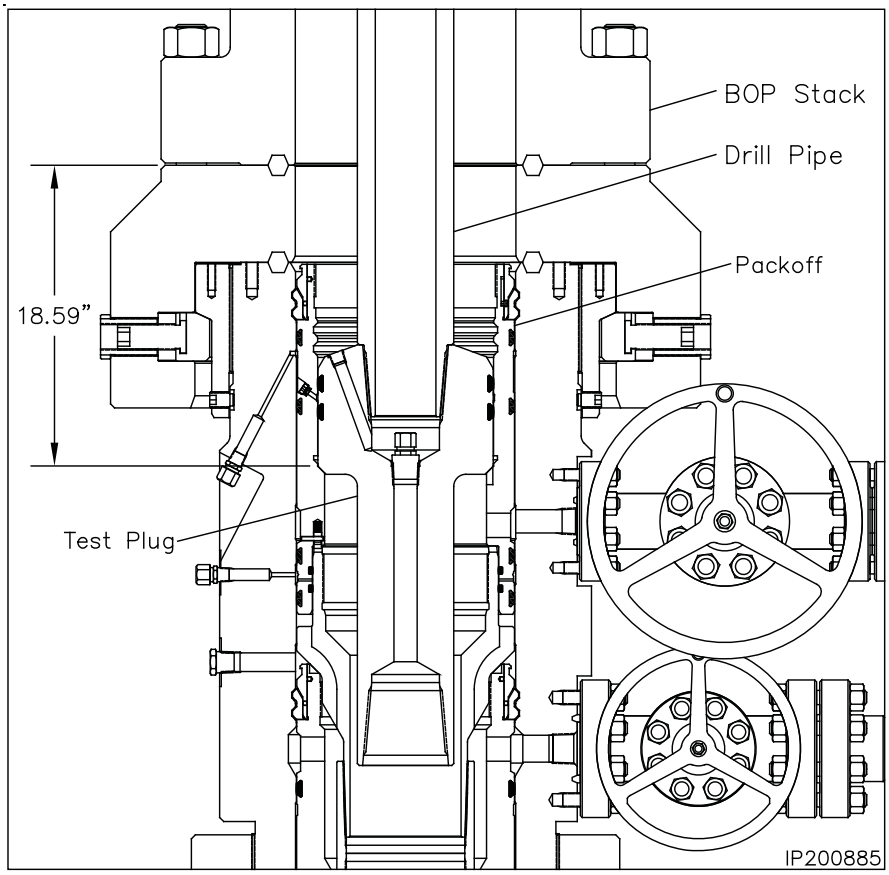
WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

4. Open the housing upper side outlet valve.

5. Lightly lubricate the test plug seal with oil or light grease.

6. Carefully lower the test plug through the BOP and land it on the load shoulder in the packoff, 18.59" below the top of the drilling adapter.

7. Close the BOP rams on the pipe and test the BOP to ***10,000 psi***.



NOTE: Any leakage past the test plug will be clearly visible at the open side outlet valve.

8. After a satisfactory test is achieved, release the pressure and open the rams.

9. Remove as much fluid as possible from the BOP stack. Retrieve the test plug with a straight vertical lift.

CAUTION: When performing the BOP blind ram test it is highly recommended to suspend a stand of drill pipe below the test plug to ensure the plug stays in place while disconnecting from it with the drill pipe.

10. Close all open valves.

11. Repeat this procedure as required during the drilling of the hole section.

Stage 15 — Run the Upper Wear Bushing

CAUTION: Always use a wear bushing while drilling to protect the load shoulders from damage by the drill bit or rotating drill pipe. The wear bushing **must be retrieved** prior to running the casing.

1. Examine the ***13-5/8" x 11" x 7.00" I.D. MBU-3T-UPR Wear Bushing (Item ST15).*** Verify the following:
   - internal bore is clean and in good condition
   - o-ring is in place and in good condition
   - shear o-ring cord is in place and in good condition

Run the Wear Bushing Before Drilling

2. Orient the ***13-5/8" Nominal x 4-1/2" IF (NC-50) CW Retrieving Tool (Item ST4)*** with drill pipe connection neck up.

3. Attach the retrieving tool to a joint of drill pipe.

CAUTION: Ensure the lift lugs are facing down.

4. Align the retractable lift lugs with the retrieval holes of the bushing and carefully lower the tool into the wear bushing until the lugs snap into place.

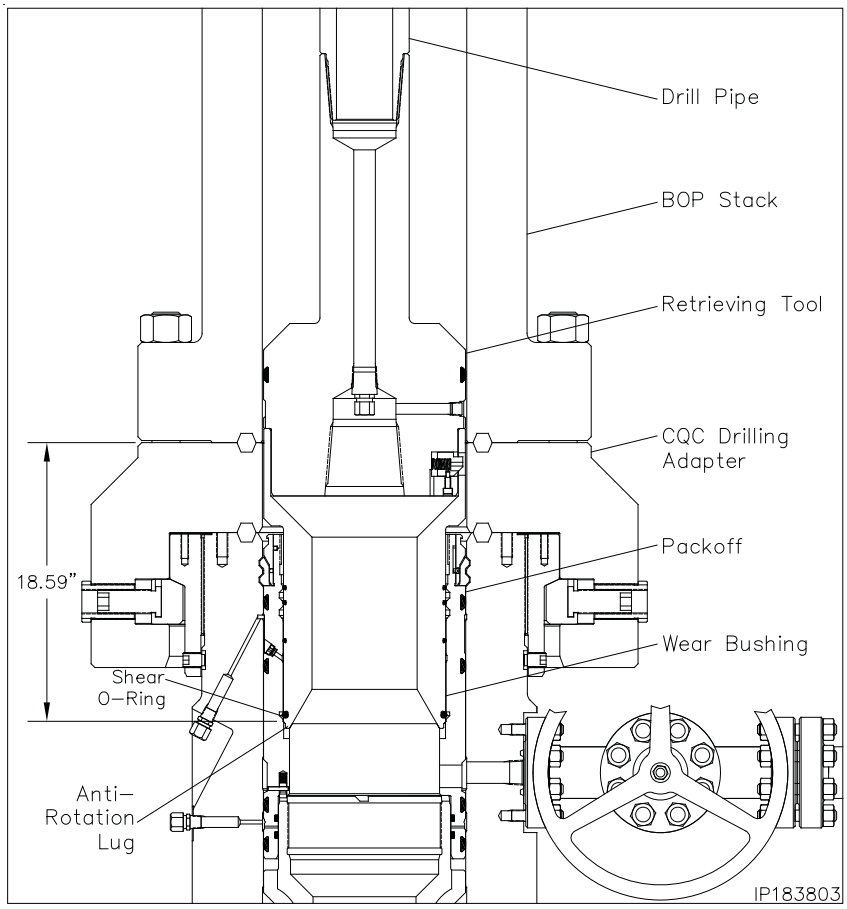
NOTE: If the lugs did not align with the holes, rotate the tool in either direction until they snap into place.

5. Apply a heavy coat of grease, not dope, to the O.D. of the bushing.

6. Ensure the BOP stack is drained and free of any debris from previous test.

7. Slowly lower the tool/bushing assembly through the BOP stack and land it on the load shoulder in the packoff, 18.59" below the top of the drilling adapter.

8. Rotate the drill pipe clockwise (right) to locate the stop lugs in their mating notches in the head. When properly aligned the bushing will drop an additional 1/2".



NOTE: The shear o-ring on bottom of the bushing will locate in a groove above the load shoulder in the packoff to act as a retaining device for the bushing.

9. Remove the tool from the wear bushing by rotating the drill pipe counter clockwise (left) 1/4 turn and lifting straight up.

10. Drill as required.

CAUTION: It is highly recommended to retrieve, clean, inspect, grease, and reset the wear bushing each time the hole is tripped during the drilling of the hole section.

Retrieve the Wear Bushing After Drilling

11. Make up the retrieving tool to the drill pipe.

12. Slowly lower the tool into the wear bushing.

13. Rotate the retrieving tool clockwise until a positive stop is felt. This indicates the lugs have snapped into the holes in the bushing.

14. Retrieve the wear bushing. Remove it and the retrieving tool from the drill string.

Stage 16 — Hang Off the 5-1/2" Casing

1. Examine the ***11" x 5-1/2" CW-CTH-TP8 Casing Hanger Running Tool (Item ST16).*** Verify the following:
   - internal bore and threads are clean and in good condition
   - o-ring seal is clean and in good condition
   - torque dogs are in place, in upper most position and retainer set head screws are tightened securely

2. Make up a landing joint to the top of the Running Tool and torque connection to thread manufacturer's maximum make up torque.

3. Lay down the landing joint on the pipe rack.

4. On the pipe rack, examine the ***11" x 5-1/2" CW-MBU-3T-TP8 Mandrel Casing Hanger (Item A26).*** Verify the following:
   - internal bore and threads are clean and in good condition
   - neck seal area is clean and undamaged
   - torque slots are clean and in good condition
   - pin threads are clean and in good condition. **Install thread protector**

   .

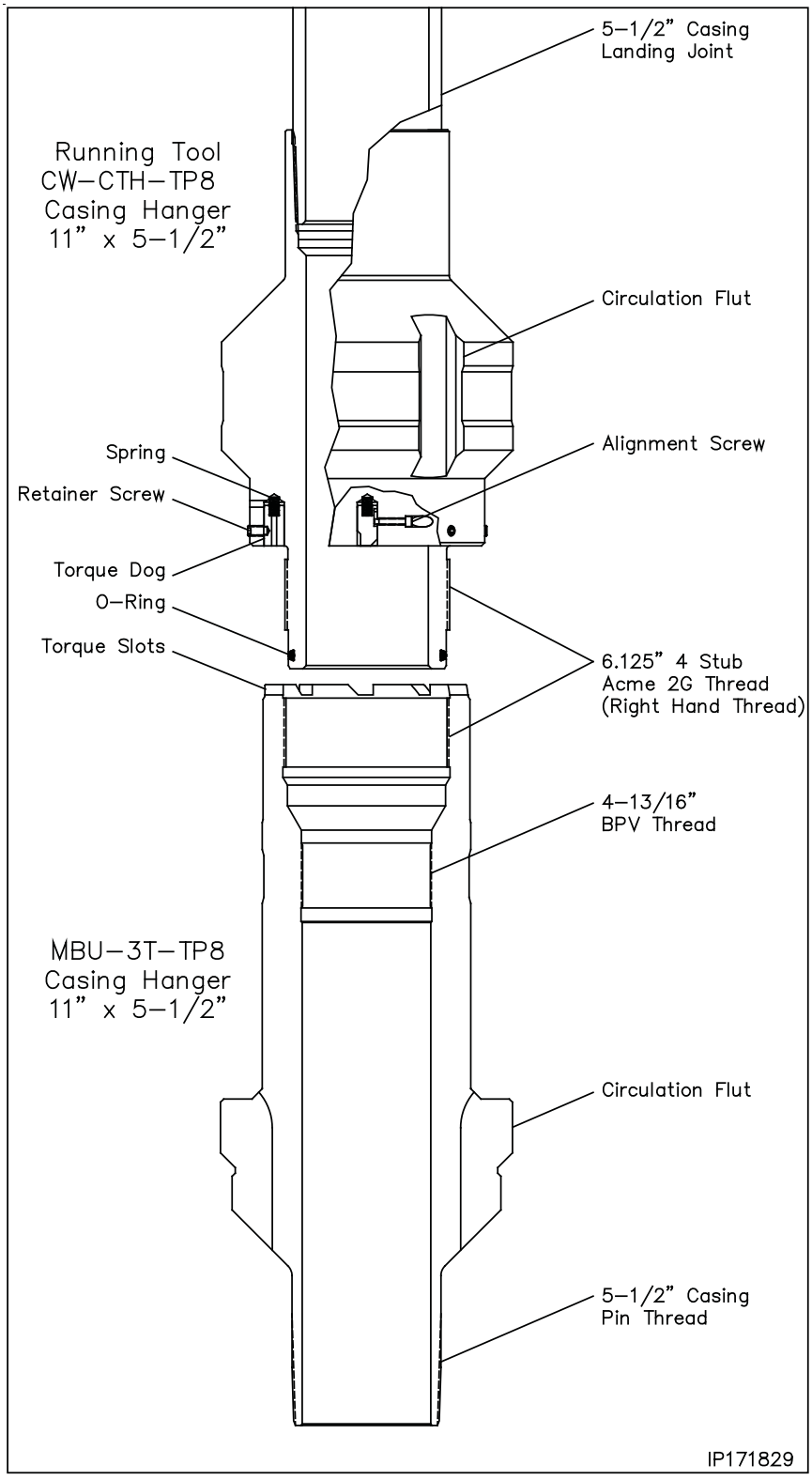
5. Liberally lubricate the mating threads, seal areas and o-ring of the hanger and running tool with a oil or light grease.

6. ***Using chain tongs only,*** thread the Running Tool into the hanger, with right hand rotation, until it shoulders out on the Hanger body.

CAUTION: Do Not apply torque to the Hanger/Tool connection.

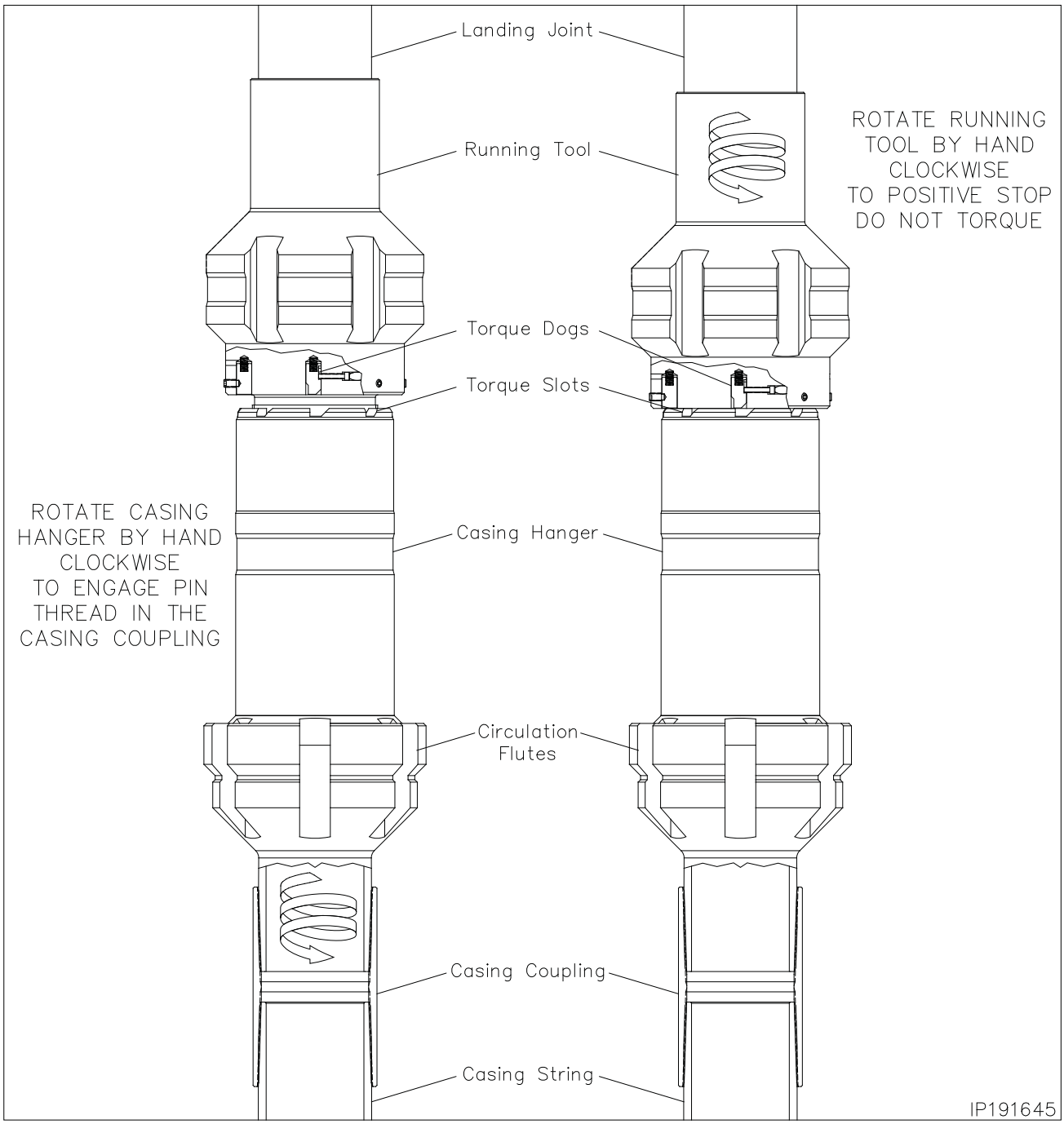
NOTE: If steps 1 through 6 were done prior to being shipped to location, the running tool should be backed off 1 turn and made back up to ensure it will back off freely.

7. Calculate the total landing dimension by adding the previously determined RKB dimension and 18.59", the depth of the wellhead.



8. Starting at the top of the 45° angle load shoulder of the casing hanger measure up the landing joint and place a paint mark on the joint. Mark **HANGER LANDED**.

Stage 16 — Hang Off the 5-1/2" Casing



9. Place a second mark 18.00" below the first and mark **STOP ROTATING**.

10. Run the 5-1/2" casing as required and space out appropriately for the mandrel casing hanger.

NOTE: If the 5-1/2" casing becomes stuck and the mandrel casing hanger cannot be landed, Refer to **Stage 16B** for the emergency slip casing hanger procedure.

11. Pick up the casing hanger/running tool joint assembly.

12. Remove the casing hanger thread protector and carefully thread the hanger into the last joint of casing ran. Rotate the hanger clockwise, by hand, to a positive stop.

13. Rotate the running tool clockwise by hand to a positive stop.

Stage 16 — Hang Off the 5-1/2" Casing

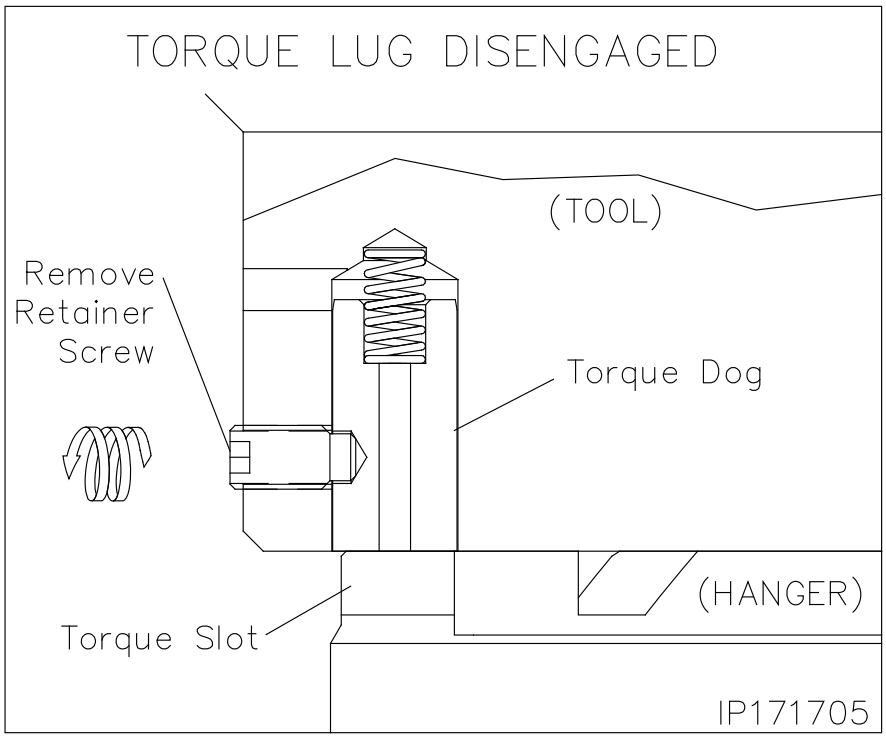
14. Locate the (8) 3/8" socket head set screws in the side of the hanger running tool and remove the screws.

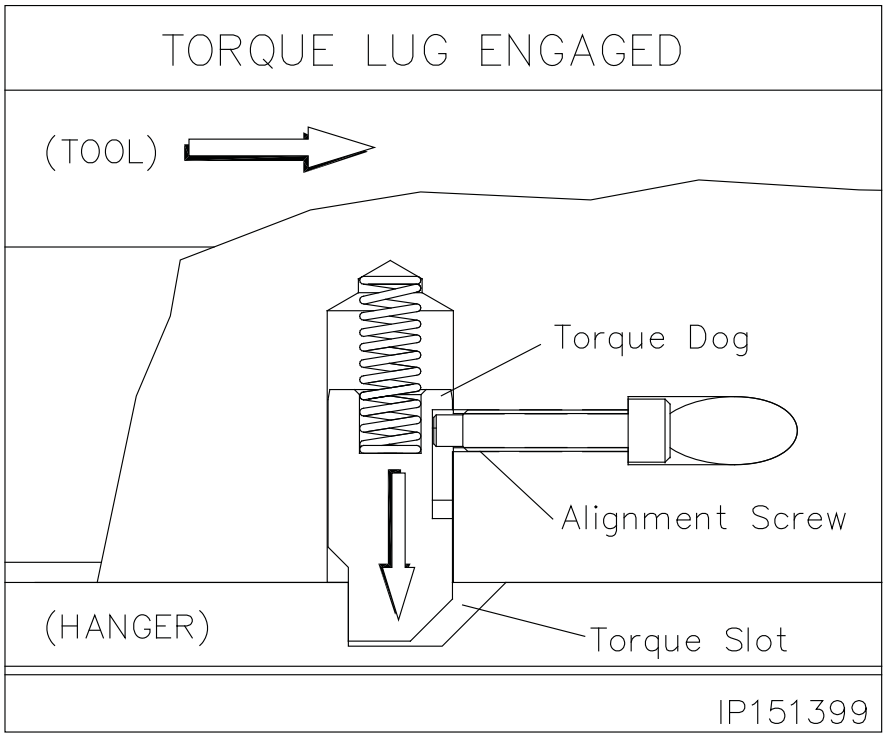
CAUTION: Place the screws in a safe place to reinstall in the tool when the job is completed.

NOTE: This will release the running tool torque dogs allowing them to move downward.

15. Using only chain tongs, rotate the running tool to the left to allow the torque dogs to engage the torque slots in the top of the hanger.

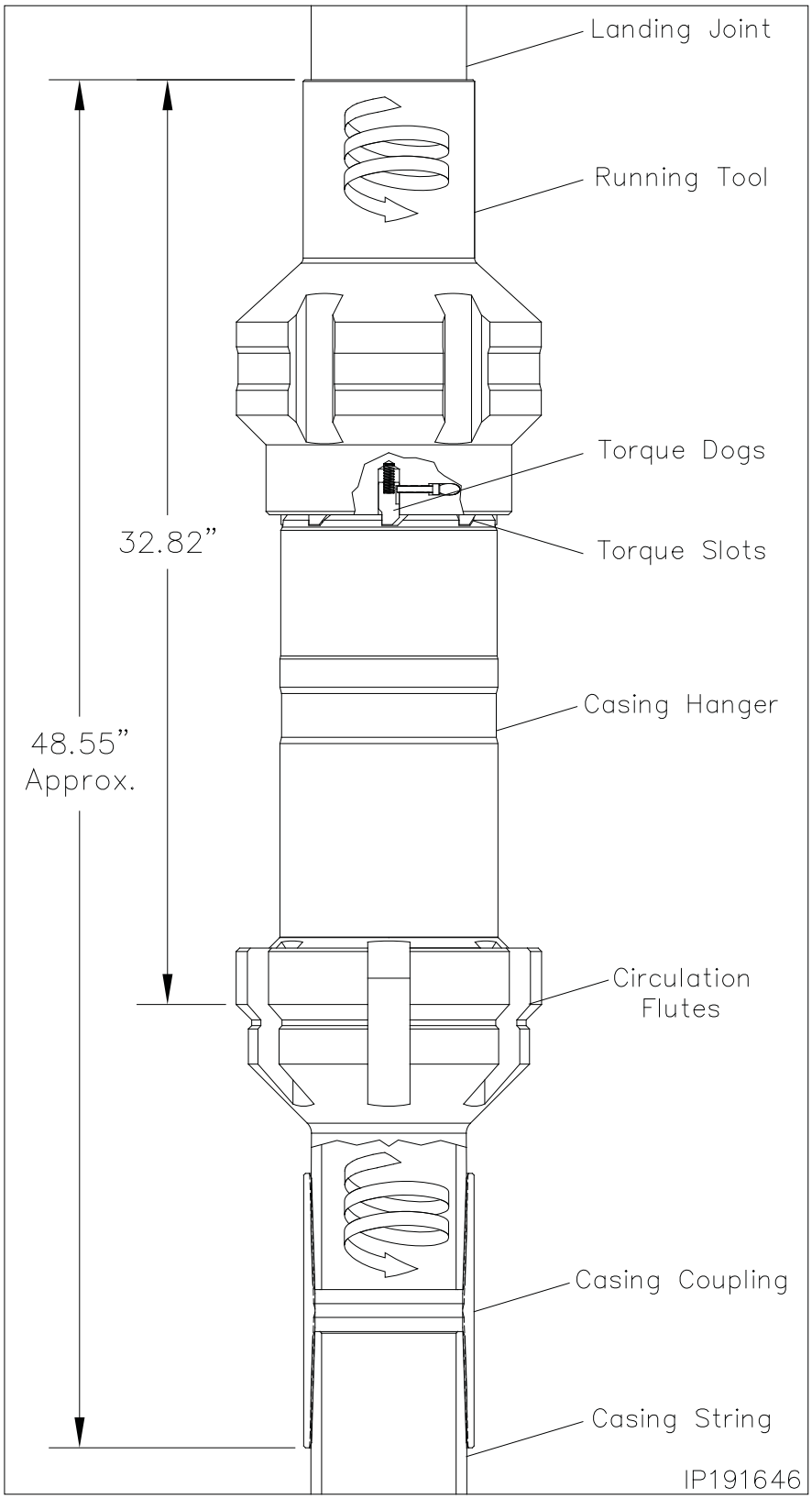
CAUTION: Do not rotate the running tool more than 1/4 turn to the left. Doing so will decrease the torque dog engagement





Stage 16 — Hang Off the 5-1/2” Casing

16. Engage the CRT tool on the landing joint and torque the casing hanger in the casing string to thread manufacturer’s maximum make up torque.



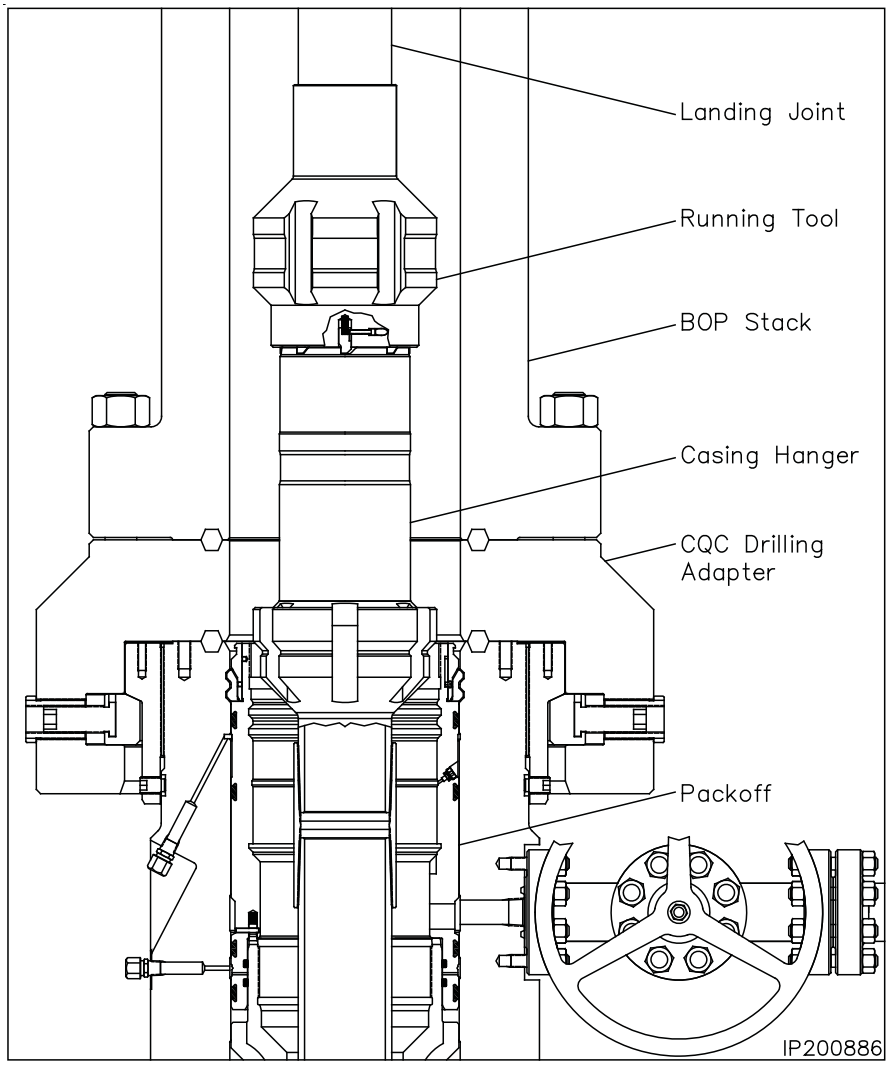
Stage 16 — Hang Off the 5-1/2” Casing

17. Pick up the casing string and remove the floor slips and rotary bushings.

18. Carefully lower the hanger completely through the BOP annular and then engage the top drive to allow the casing to be rotated clockwise.

19. While rotating the casing clockwise, carefully lower the casing string until the **STOP ROTATING** mark on the landing joint is level with the rig floor.

NOTE: The torque dogs have a maximum rated capacity. Please reference the **Recommended Service Tools** section in the BOM for maximum torque allowed.



Stage 16 — Hang Off the 5-1/2” Casing

CAUTION: Torque wrap can build in the casing string as it is rotated. Ensure the string comes to a neutral position, by allowing it to back off slowly counter clockwise, before the casing hanger is fully landed.

20. Cease rotation and continue carefully lowering the hanger through the wellhead and land it on the load shoulder in the MBU-3T nested packoff, 18.59” below the top of the drilling adapter.

21. Slack off all weight on the casing and verify that the **HANGER LANDED** paint mark has aligned with the rig floor.

22. Place a vertical paint mark on the landing joint to verify if the casing string rotates during the cementing process.

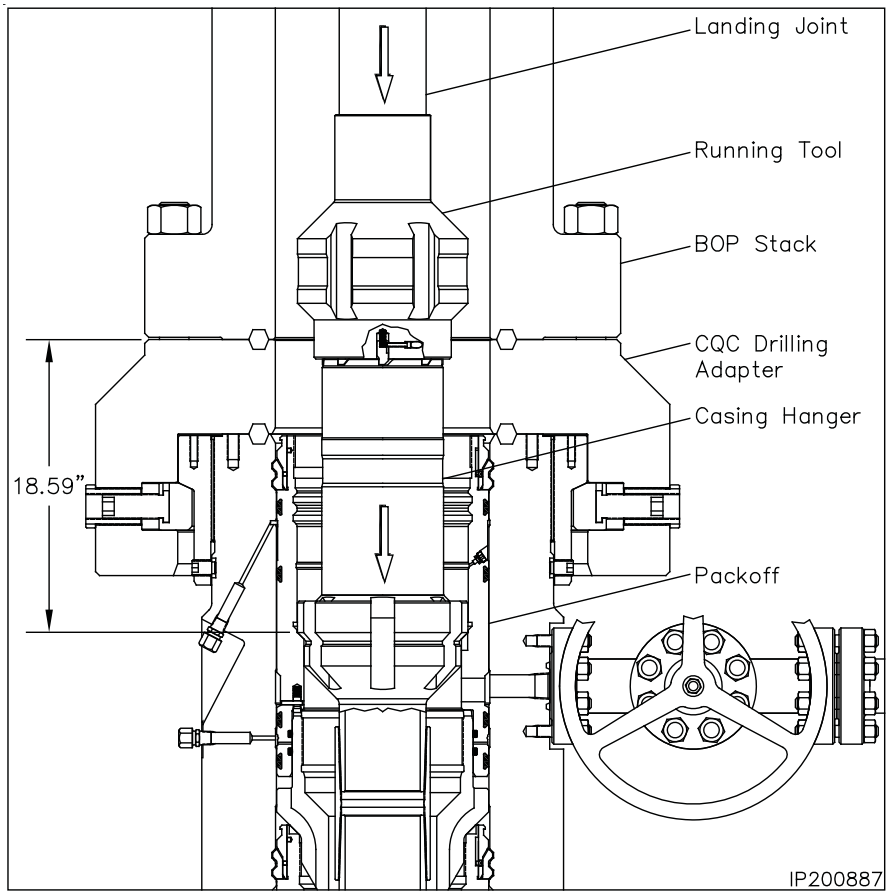
23. Cement the casing as required.

NOTE: Returns may be taken through the circulation slots and out the BOP or out the side outlets on the housing.

24. With cement in place, bleed off all pressure and remove the cementing head.

25. ***Using Chain Tongs Only located 180° apart,*** retrieve the Running Tool and landing joint by rotating the landing joint counter clockwise (left) approximately 13 turns or until the tool comes free of the hanger.

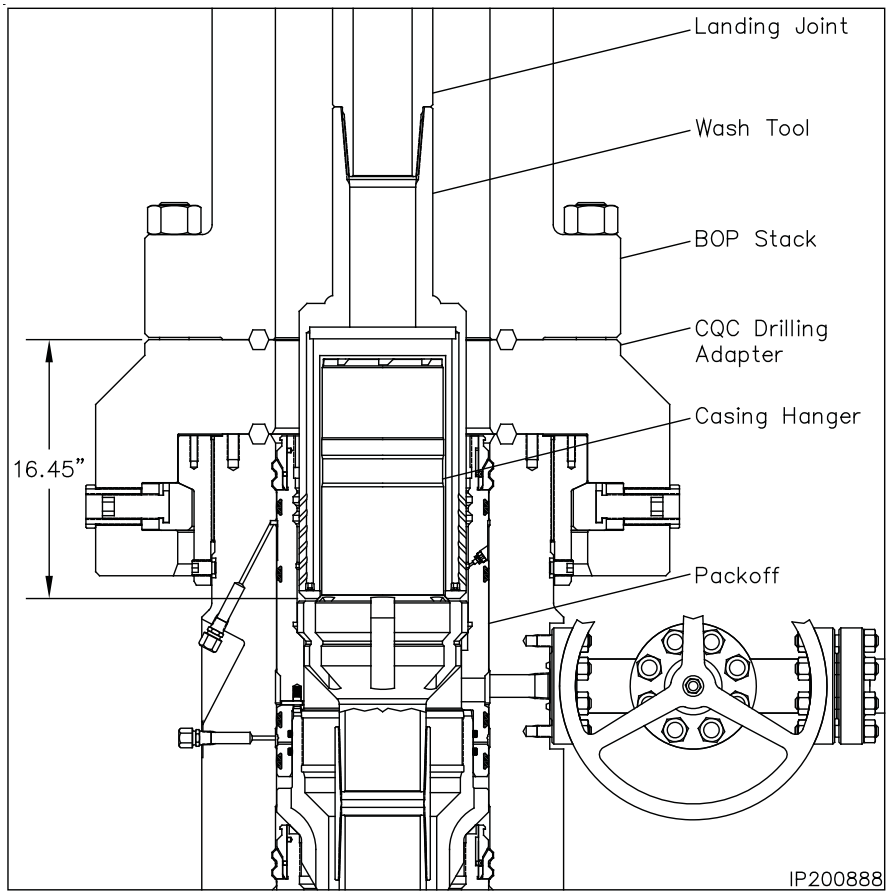
CAUTION: The rig floor tong may be used to break the connection but **under no circumstances is the top drive to be used to rotate or remove the casing hanger running tool.**



Stage 16 — Hang Off the 5-1/2” Casing

Running the 11” Wash Tool

1. Examine the ***11” x 4-1/2” IF (NC-50) Wash Tool (Item ST18).*** Verify the following:
   - drill pipe threads and bore are clean and in good condition
   - all ports are open and free of debris
2. Orient the Wash Tool with drill pipe box up. Make up a joint of drill pipe to the tool.
3. Carefully lower the Wash Tool through the BOP and land it on top of the 5-1/2” casing hanger, 16.45” below the top of the drilling adapter.
4. Place a paint mark on the drill pipe level with the rig floor.
5. Using chain tongs, rotate the tool clockwise (right) approximately 6 turns to loosen any debris that may be on top of the hanger flutes.
6. Open the upper side outlet valve and drain the BOP stack.
7. Pick up on the tool approximately 1” and attach a high pressure water line or the top drive to the end of the drill pipe and pump water at approximately 25 SPM through the tool and up the BOP stack.
8. While flushing, raise and lower the tool the full length of the wellhead and BOP stack. The drill pipe should be slowly rotated (approximately 20 RPM) while raising and lowering to wash the inside of the housing and BOP stack to remove all caked on debris.
9. Once washing is complete, land the wash tool on the hanger flutes.
10. Shut down pumps and observe the returns at the open lower outlet for debris.



11. Reengage the pump and fully wash the inside of the wellhead and the entire BOP one additional cycle ensuring the stopping point is with the wash tool resting on top of the hanger flutes.

NOTE: Observe the returns at the open outlet valve. If returns are not clean, continue flushing until they are.

12. Once the returns are clean and free of debris, retrieve the tool to the rig floor.
13. Using a bright light, sight through the bore of the BOP stack and observe the top of the hanger neck and flutes. Ensure that there are no dark areas on top of the painted flutes of the hanger.

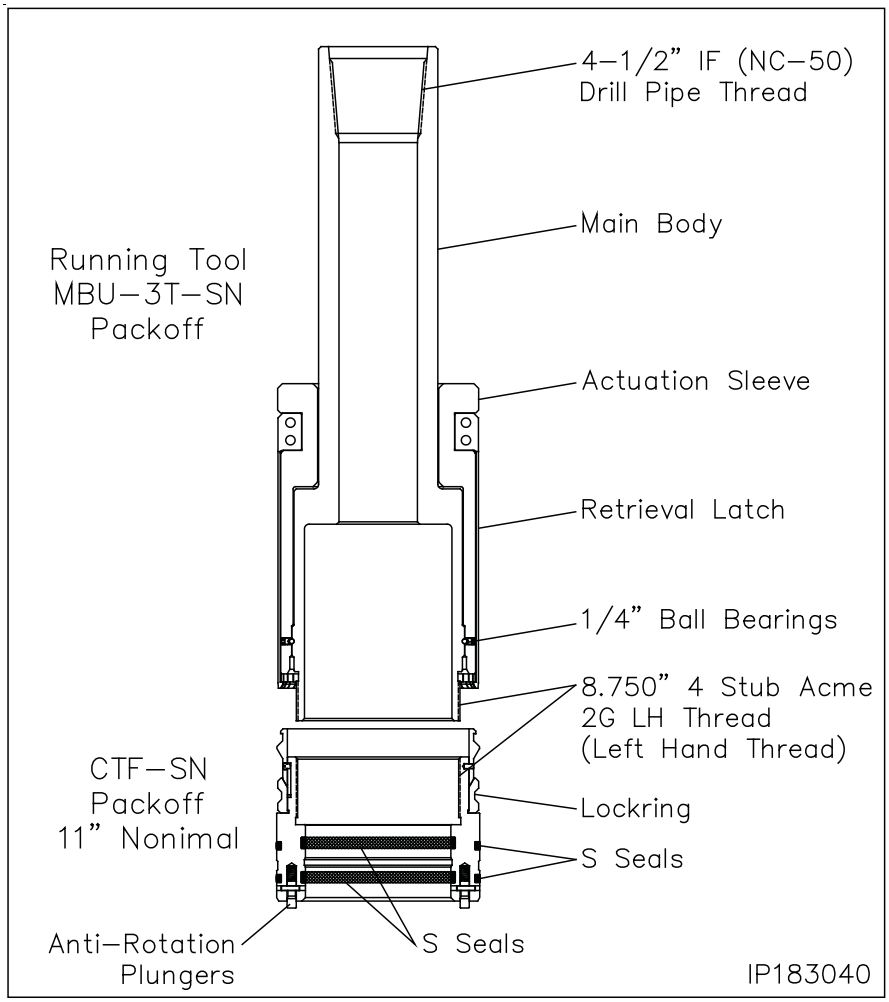
CAUTION: Continue washing until all debris is removed.

Stage 16A — Install the MBU-3T Packoff

1. Examine the ***11" Nominal x 4-1/2" IF (NC-50) x 8.750" 4 Stub Acme 2G LH Pin Bottom MBU-3T-SN Mandrel Packoff Running Tool (Item ST19).*** Verify the following:
   - Acme threads are clean and in good condition
   - actuation sleeve is in place and rotates freely
   - retrieval latch is removed and stored is safe place

2. Make up the running tool to 4-1/2" drill pipe and torque the connection to optimum make up torque.

3. Examine the ***11" Nominal x 7-5/8" x 8.750" 4 Stub Acme 2G LH box top CTF/MBU-3T Packoff Assembly (Item A27).*** Verify the following:
   - all elastomer seals are in place and undamaged
   - internal bore, and ports, are clean and in good condition
   - lockring is fully retracted
   - energizer ring is in its upper most position and retained with shear pins
   - anti-rotation plungers are in place, free to move



Stage 16A — Install the MBU-3T Packoff

4. Thoroughly clean and lightly lubricate the mating acme threads of the running tool and packoff with oil or light grease.

5. Pick up the Running Tool Assembly with landing joint and suspend it above the packoff.

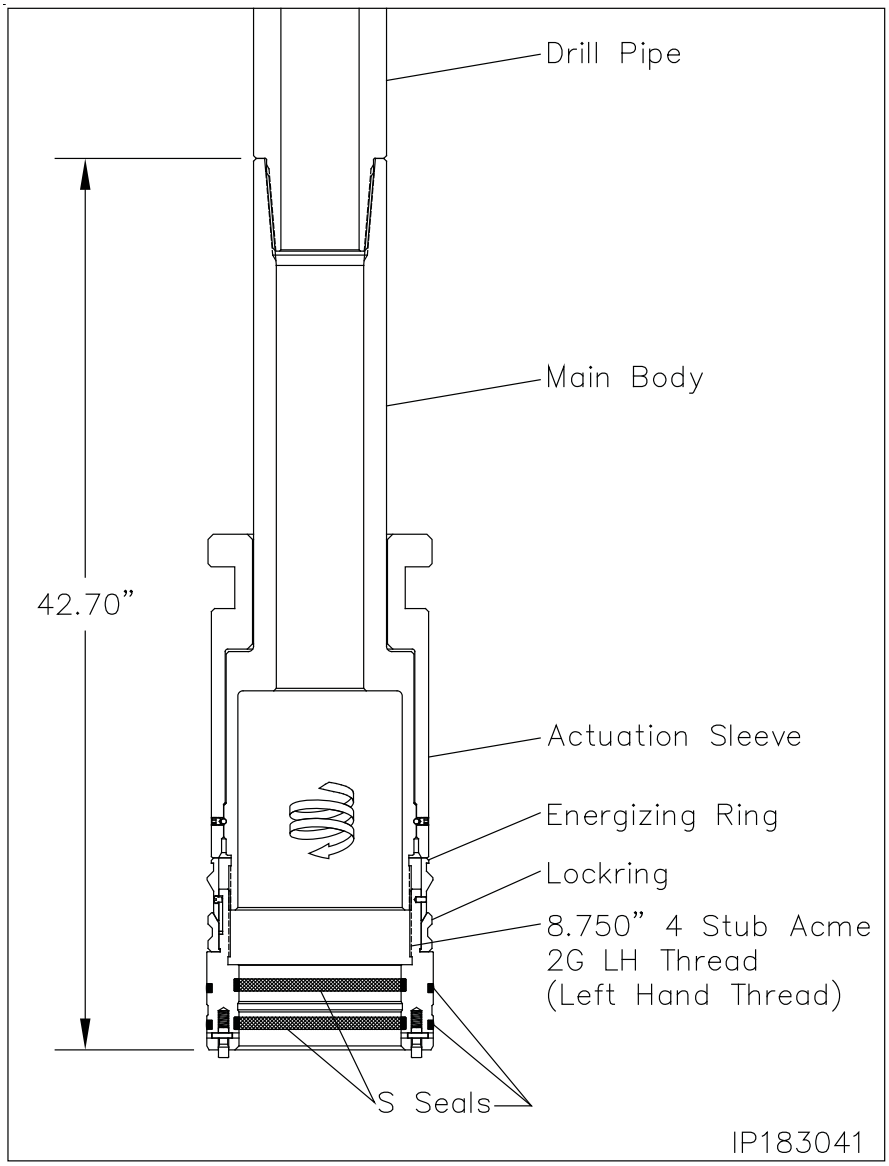
6. Carefully lower the tool into the packoff and thread them together by first rotating the tool clockwise (RIGHT) to locate the thread start and then counter clockwise (LEFT) approximately 3 turns until the tool actuation sleeve makes contact with the packoff Energizing Ring.

7. Pick up the assembly and thoroughly clean and lightly lubricate the packoff ID and OD S seals with oil or light grease.

8. Locate the upper and lower “SEAL TEST” fittings on the O.D. of the housing and remove the dust cap from the fittings.

9. Attach a test pump to both fittings and pump clean test fluid thru the fittings and ports to dislodge any old grease and trapped debris.

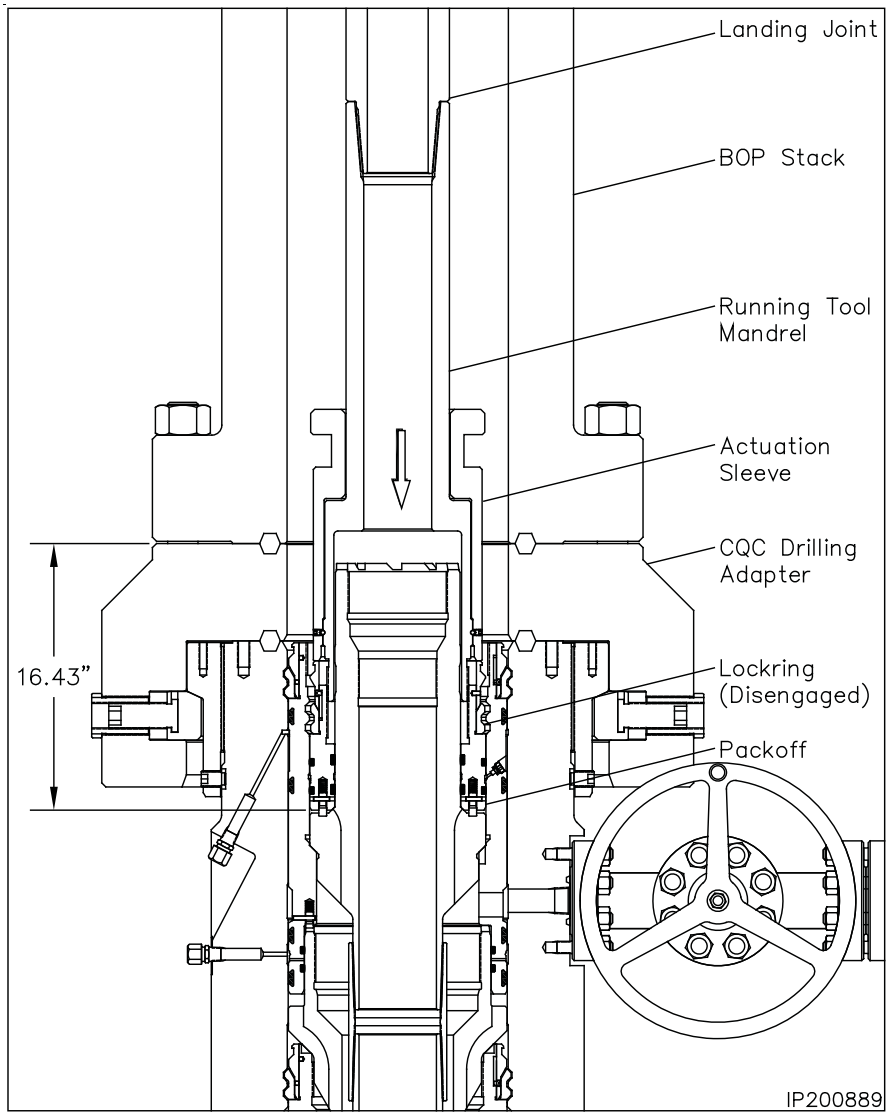
10. Remove the test pumps and reinstall the fitting dust caps.



Stage 16A — Install the MBU-3T Packoff

Landing the Packoff

11. Calculate the total landing dimension by taking the determined landing dimension of the 5-1/2" mandrel casing hanger and subtracting 2-1/8"
12. Remove the hole cover.
13. Measure up 5 feet from the bottom of the packoff and place a paint mark on the drill pipe landing joint.
14. Pick up the packoff/running tool assembly and carefully lower the assembly through the BOP marking the landing joint every five feet until you reach the calculated dimension.
15. Place a paint mark on the drill pipe at that dimension and mark land off. Place an additional mark 1-1/2" above the first one and mark engaged.
16. Continue lowering the packoff until it passes over the neck of the hanger and lands on top of the casing hanger load shoulder, 16.43" below the top of the drilling adapter.



Stage 16A — Install the MBU-3T Packoff

Seal Test

17. Locate the upper "SEAL TEST" fitting on the upper OD of the housing and remove the dust cap from the fitting.

18. Attach a test pump with manifold to the open fitting and pump clean test fluid between the packoff seals until a stable test pressure of 10,000 psi is achieved.

NOTE: It may be required to pressure up and bleed off test pressure several times to evacuate all air from the test area in order to attain a stable test pressure.

19. Hold test pressure for 15 minutes.

20. If pressure drops a leak has developed, remove the packoff and replace leaking seals.

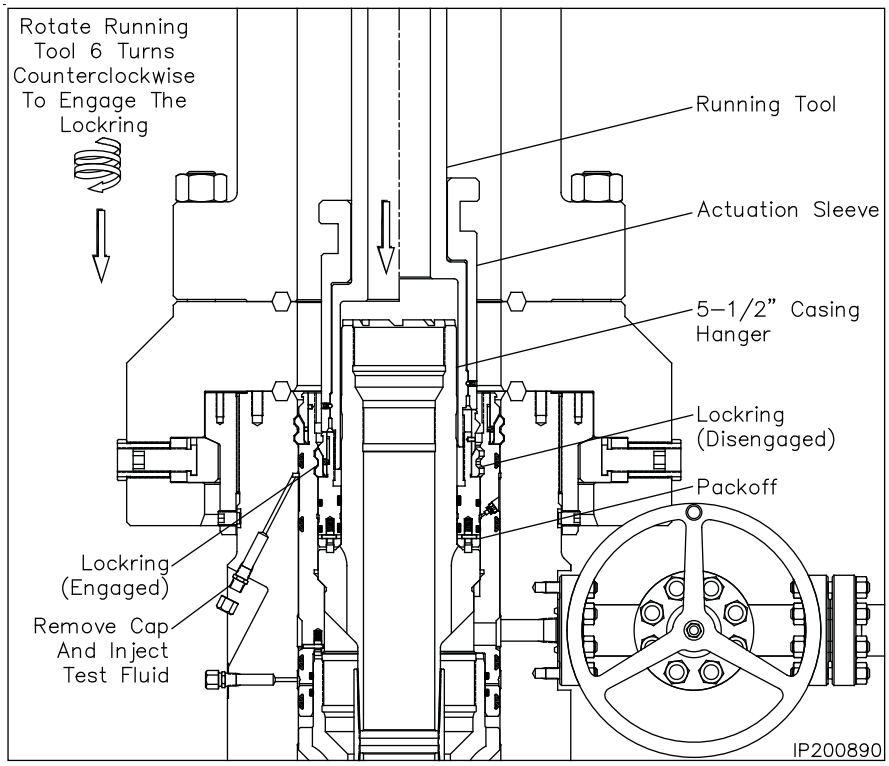
21. After a satisfactory test is achieved, bleed off test pressure, remove test pump and manifold and reinstall the dust cap on the open fitting.

Engaging the Lockring

22. Using chain tongs only located 180° apart, slowly rotate the packoff assembly counter clockwise (left) until the anti-rotation plunger aligns with one of the circulation flutes of the hanger. Expect torque of approximately 400 ft lbs. to rotate the packoff.

23. Using only chain tongs, rotate the landing joint approximately 6 turns counter clockwise to engage the packoff lockring in its mating groove in the bore of the MBU-3T nested packoff.

NOTE: Approximately 800 to 900 ft. lbs. of torque will be required to break over the shear pins in the packoff. The torque will drop off and then increase slightly when the energizing ring pushes the lockring out. A positive stop will be encountered when the lockring is fully engaged.



NOTE: When properly engaged the second paint mark on the drill pipe will align with the rig floor.

CAUTION: It is imperative that the drill pipe landing joint remain concentric with the well bore when rotating to engage the lockring. This can be accomplished with the use of the air hoist.

CAUTION: If the required turns to engage the lockring are not achieved or excessive torque is encountered, remove the packoff and first call the local branch and then Houston Engineering.

24. Back off the landing joint/running tool approximately 3 turns. Using the drill pipe elevators, exert a 40,000 lbs. pull on the landing joint.

25. Reattach the test pump to the open test manifold and retest the packoff seals to 10,000 psi for 15 minutes. This will also verify that the packoff is in place.

26. After satisfactory test is achieved, bleed off all test pressure, remove test pump and reinstall the dust cap on the open fitting.

27. Using only chain tongs, rotate the landing joint clockwise (right) until the tool comes free of the packoff (approximately 9 turns) and then retrieve the tool with a straight vertical lift.

28. Using a dry rod with sliding sleeve tool, set the ***4-13/16" BPV (Item ST21)*** in the bore of the hanger. Ensure that the BPV makes a minimum of 6 turns before final make up and break out. Nipple down and remove the BOP stack.

Stage 16A — Install the MBU-3T Packoff

In the event the packoff is required to be removed after the lockring is engaged the following procedure is to be followed.

Retrieving the Packoff

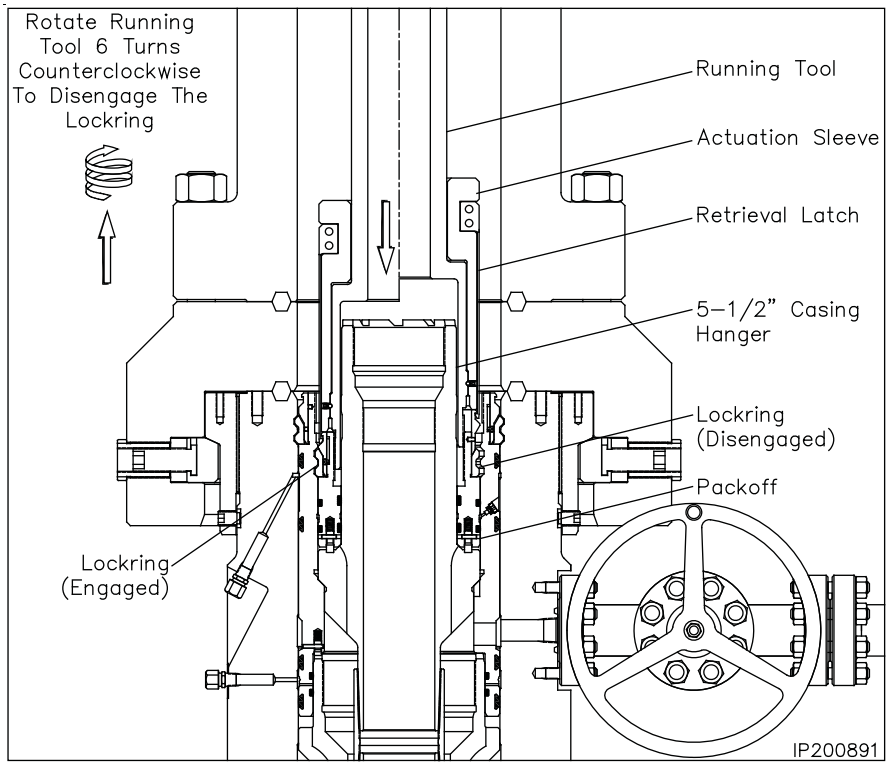
1. Locate the retrieval latch assembly with (4) 3/8" cap screws
2. Install the retrieval latch onto the running tool with the latch fingers facing down and install the cap screws and tighten them securely.
3. Ensure the retrieval latch freely rotates on the running tool actuation sleeve.
4. Carefully lower the running tool through the BOP stack and tag the top of the top of the packoff assembly.
5. Carefully rotate the drill pipe clockwise to locate the thread start and then counter clockwise (left) approximately 12 turns to a positive stop.

NOTE: At this point the retrieval latches will have passed over the energizing ring and snapped into place.

6. Rotate the drill pipe clockwise (right) approximately 6-1/2 turns to a positive stop. The drill pipe should rise approximately 1-1/2".

CAUTION: Do not exceed the 6-1/2 turns or the packoff may be seriously damaged.

7. Carefully pick up on the drill pipe and remove the packoff from the wellhead with a straight vertical lift.
8. Redress the packoff and reset as previously outlined.



Stage 16B — Hang Off the 5-1/2" Casing (Emergency)

NOTE: The following procedure should be followed **ONLY** if the 5-1/2" casing should become stuck in the hole. If the casing did not get stuck and is hung off with the Mandrel Casing Hanger, skip this stage.

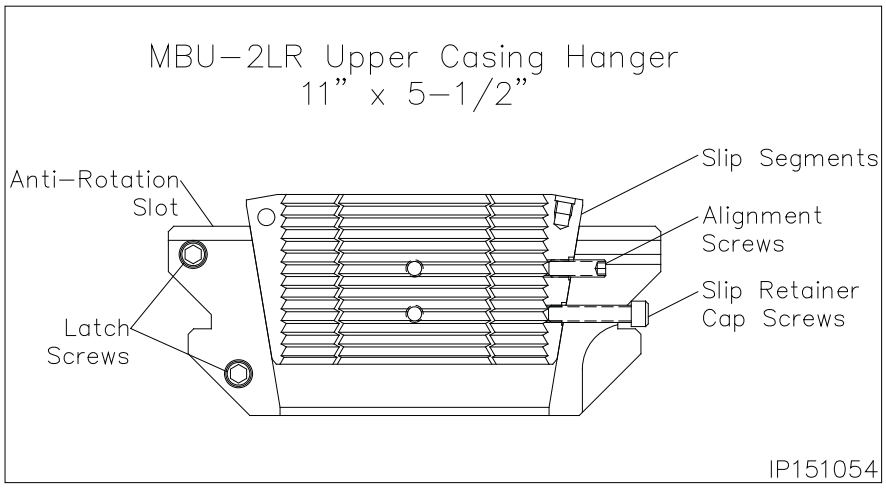
1. Cement the hole as required.

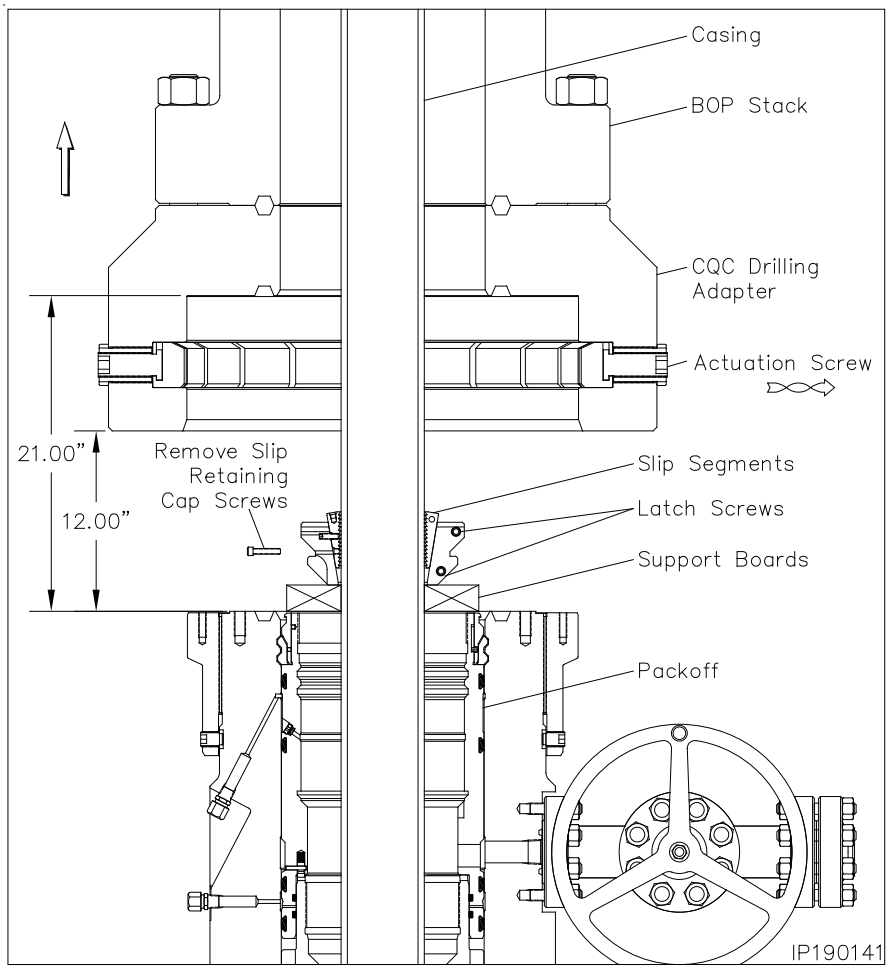
WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

2. Drain the BOP stack through the housing upper side outlet valve.
3. Locate the actuation screws on the O.D. of the drilling adapter.
4. Using a hex drive, fully retract the actuation screws until they are slightly over flush with the gland nuts.

WARNING: Keep body clear of all pinch points and suspended loads.

5. Pick up on the BOP stack a minimum of 12" above the housing and secure with safety slings.
6. Washout bowl as required.
7. Examine the ***11" x 5-1/2" MBU-2LR/3T Upper Slip Casing Hanger (Item A26).*** Verify the following:
   - slips and internal bore are clean and in good condition
   - all screws are in place
8. Remove the latch cap screws and separate the hanger into two halves.
9. Place two boards on the housing flange against the casing to support the hanger.
10. Pick up one half of the hanger and place it around the casing, on top of the support boards.
11. Place the second half adjacent the first and install the latch screws and tighten securely.
12. Prepare to lower the hanger into the housing bowl.





Stage 16B — Hang Off the 5-1/2” Casing (Emergency)

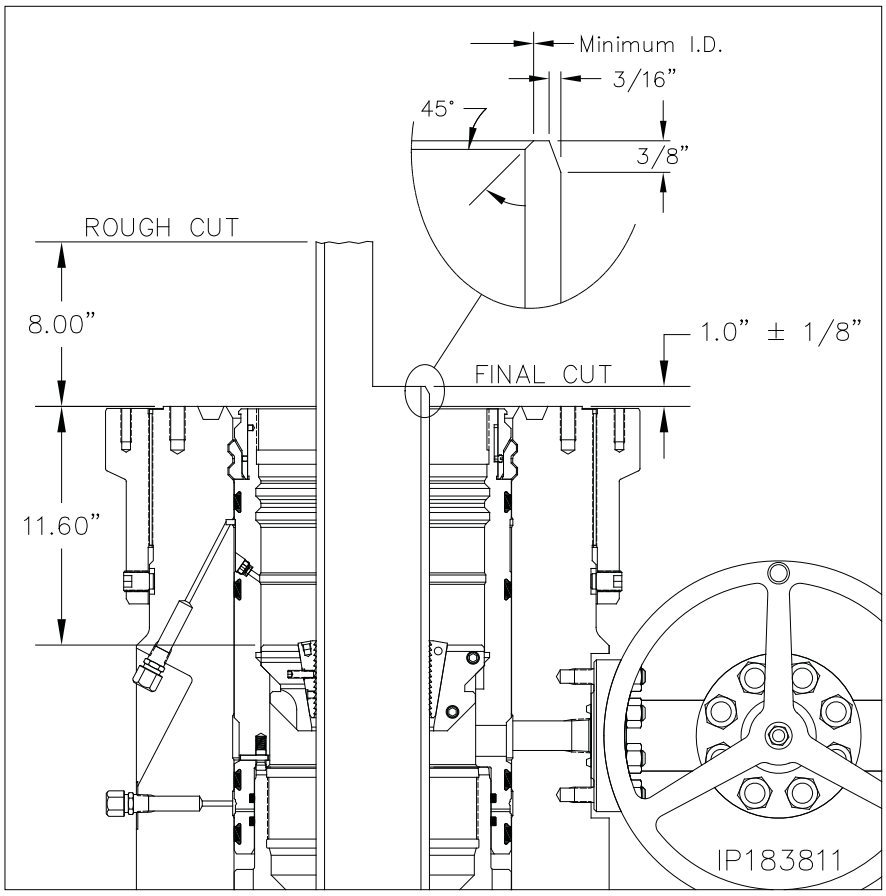
CAUTION: Do Not drop the casing hanger!

13. Grease the casing hanger body and remove the slip retaining screws.
14. Pull tension on the casing to the desired hanging weight.
15. Remove the boards and allow the hanger to slide into the packoff bowl. When properly positioned the top of the hanger will be approximately 11.60” below the top of the housing.
16. Slack off the desired hanging weight.

NOTE: A sharp decrease on the weight indicator will signify that the hanger has taken weight. If this does not occur, pull tension again and slack off once more.

WARNING: Due to the potential fire hazard and the risk of loss of life and property, it is highly recommended to check the casing annulus and pipe bore for gases, with an approved sensing device, prior to cutting the casing. If gas is present, do not use an open flame torch to cut the casing. It will be necessary to use an air driven mechanical cutter which is spark free.

17. Rough cut the casing approximately 8” above the top flange and move the excess casing out of the way.
18. Final cut the casing at 1” ± 1/8” above the top of the housing.



19. Grind the casing stub level and then place a 3/16” x 3/8” bevel on the O.D. and an I.D. chamfer to match the minimum bore of the packoff to be installed.

CAUTION: There must not be any rough edges on the casing or the seals of the packoff will be damaged.

20. Thoroughly clean the housing bowl, removing all cement and cutting debris.
21. Place a straight edge on top of the slip bowl and in line with the center of one of the anti-rotation notches.
22. Ensure the straight edge is vertical and then place a paint mark on top of the housing in line with the notch in the slip bowl.

Stage 16B — Hang Off the 5-1/2" Casing (Emergency)

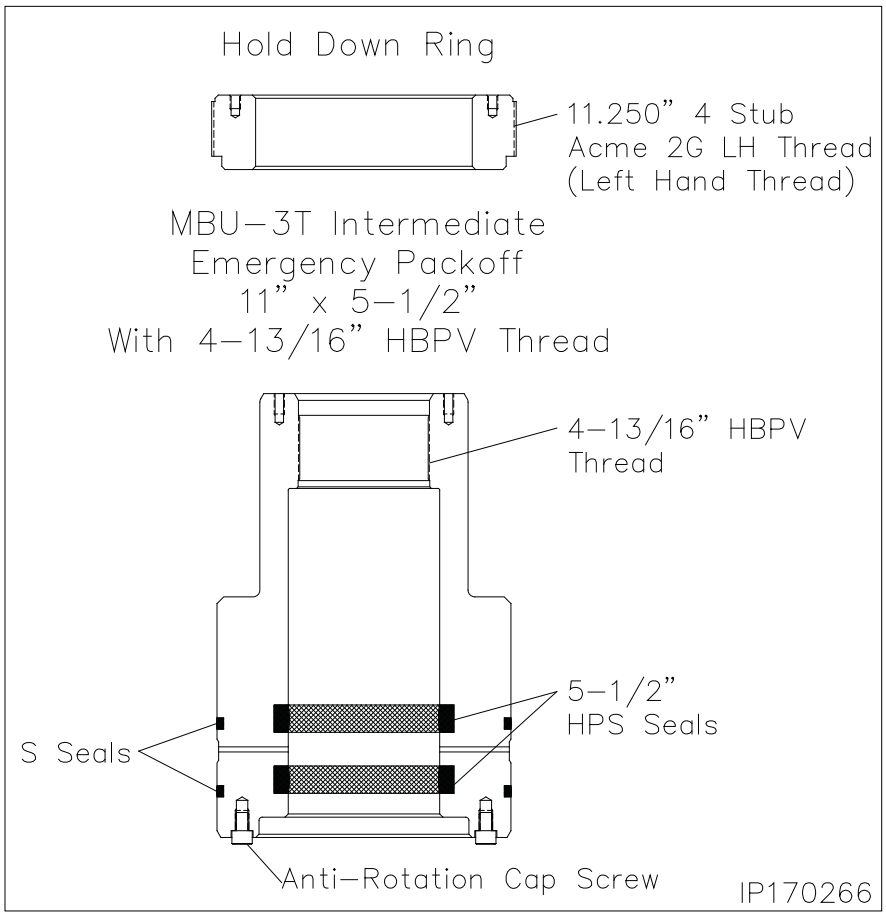
Install the Emergency Packoff

1. Examine the ***11" x 5-1/2" x 4-13/16" H BPV Thread MBU-3T Nested Emergency Packoff (Item A27)***. Verify the following:
   - bore and internal seal area are clean and in good condition
   - I.D. and O.D. seals are in place and in good condition
   - I.D. BPV threads are clean and in good condition
2. Thoroughly clean the I.D. and O.D. of the packoff removing all old grease and debris.
3. Carefully inspect the seals for any damage and replace if necessary.
4. Using a straight edge positioned vertically and centered on the anti-rotation cap screw on the bottom of the packoff, place a white paint mark up the side of the packoff in line with the cap screw.

NOTE: The line will be used to guide the packoff anti-rotation lug into its mating notch in the slip bowl.

5. Thoroughly clean and lightly lubricate the I.D. and O.D. seals of the packoff with oil or light grease.

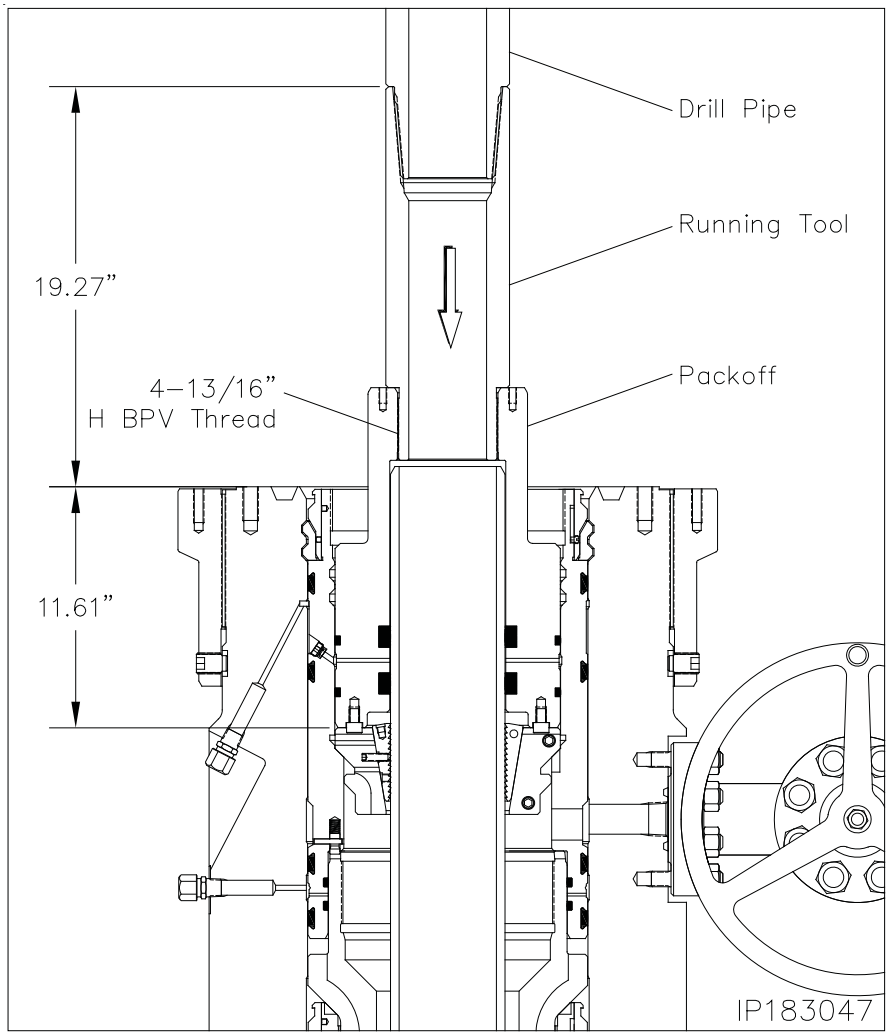
CAUTION: Before running packoff, locate the upper "SEAL TEST" fitting on the O.D. of the housing and remove the dust cap from the fitting. Attach a test pump to the open fitting and pump clean test fluid between the seals to insure the rupture disc has been ruptured, and the port is open.



Stage 16B — Hang Off the 5-1/2” Casing (Emergency)

6. Examine the ***4-1/2” IF (NC-50) x 4-13/16” H BPV Thread Emergency Packoff Running Tool (Item ST20)***. Verify the following:
   - bore and threads are clean and in good condition
7. Make up the running tool to a joint of drill pipe.
8. Lightly lubricate the mating threads of the tool and the packoff with oil or a light grease.
9. Thread the running tool into the top of the packoff with left hand rotation to a positive stop.
10. Pick up the packoff with running tool and position it over the casing stub.
11. Align the anti-rotation cap screws with the mating slots in the top of the slip bowl. Use the marks on the housing and packoff body to keep the packoff properly aligned.
12. Carefully lower the packoff over the casing stub and push it into the packoff bowl until it bottoms out on the slip hanger body.

CAUTION: When properly positioned, the main body of the packoff will be 2.72” below the top of the housing flange as indicated.



Stage 16B — Hang Off the 5-1/2” Casing (Emergency)

Seal Test

13. Locate the upper “SEAL TEST” fitting on the O.D. of the housing and remove the dust cap from the fitting.

14. Attach a test pump to the open fitting and pump clean test fluid between the seals until a stable test pressure of ***10,000 psi or 80% of casing collapse — whichever is less*** is attained.

15. Hold the test pressure for 15 minutes or as required by drilling supervisor.

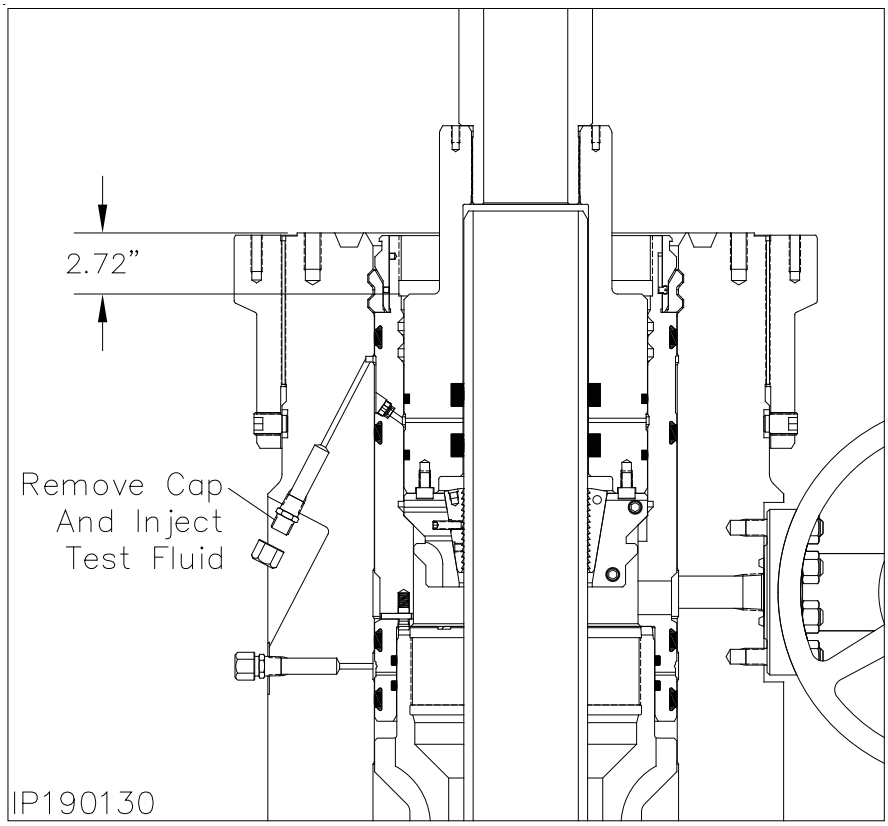
16. If a leak develops, bleed off test pressure, remove the packoff from the wellhead and replace the leaking seals.

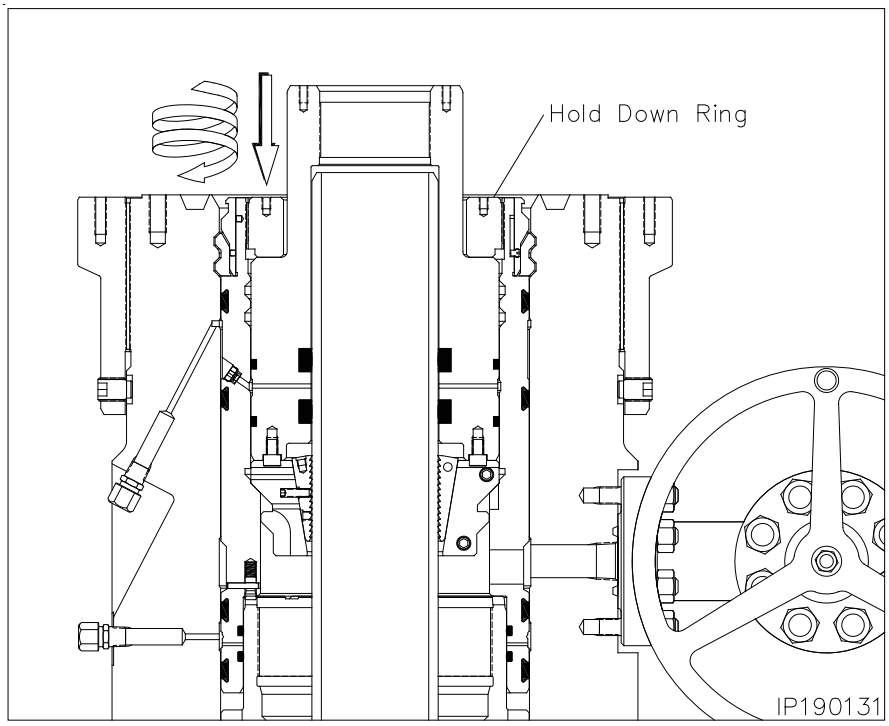
17. After satisfactory test is achieved, bleed off test pressure, remove test pump and reinstall the dust cap on the open fitting.

18. Thoroughly clean and lightly lubricate the mating Acme threads of the MBU-3T 7-5/8” packoff and the packoff ***Hold Down Ring (Item A27b)***.

19. Thread the ring into the 7-5/8” packoff with counter clockwise rotation to a positive stop on top of the 5-1/2” nested packoff body.

20. Using a dry rod with sliding sleeve tool, set the ***4-13/16” One Way H BPV (Item ST21)*** in the bore of the packoff. Ensure the BPV makes a minimum of 6 turns before final make up and break out.



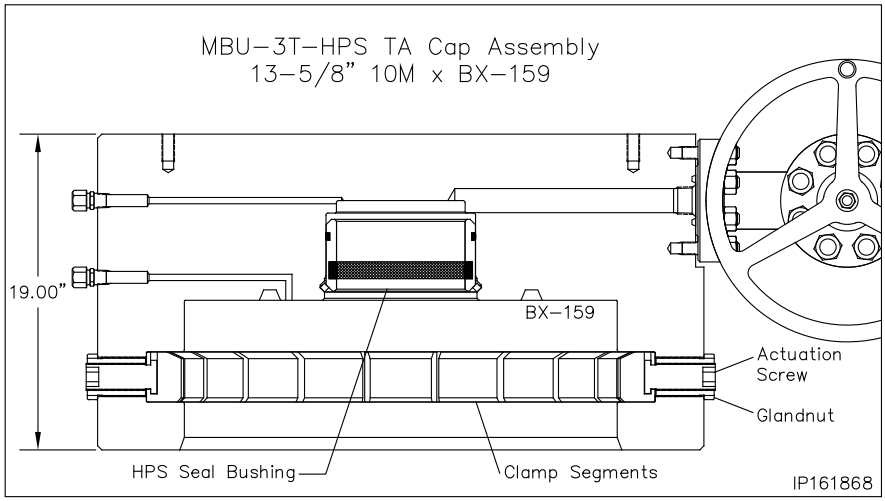


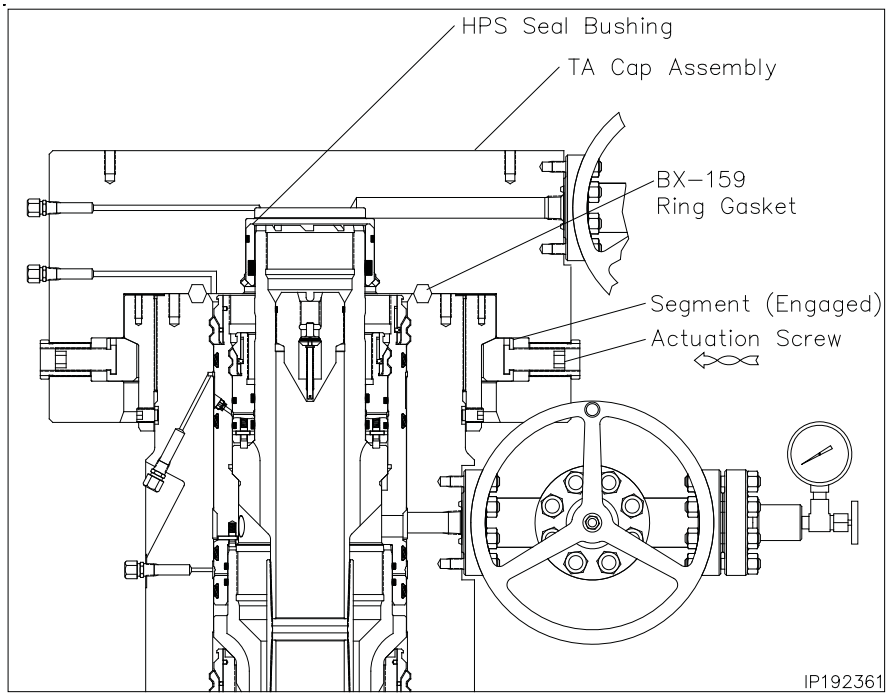
Stage 17 — Install the Quick Connect TA Cap Assembly

1. Examine the ***13-5/8" 10M Quick Connect TA Cap Assembly (Item R4).*** Verify the following:
   - bore is clean and free of debris
   - ring groove is clean and undamaged
   - (20) drive screws and clamp segments are properly installed and fully retracted
   - ***7-5/8" HPS seal bushing (Item R5)*** is in place and properly retained with the square snap wire
2. Thoroughly clean the top of the MBU-4T housing, threaded hub, and the mating seal surfaces of the TA cap.
3. Install a new ***BX-159 Ring Gasket*** into the ring groove of the housing.
4. Install the lifting eyes in the top of the TA cap.

WARNING: Keep body clear of all pinch points and suspended loads.

5. Using a suitable lifting device with weight rated slings, pick up the TA cap assembly and carefully lower it over the packoff neck and land it on the ring gasket.
6. Ensure the TA cap is level and then carefully run in all of the drive screws of the TA cap to contact point.
7. Ensure the assembly remains level, run in one actuation screw and torque to 100 ft-lbs.
8. Locate the screw 180° from the first and torque to 100 ft-lbs.
9. Locate the screws 90° to the right and left and torque to 100 ft-lbs.
10. Position the second 4 point sequence 90° from the first and torque each screw to 200 ft-lbs.



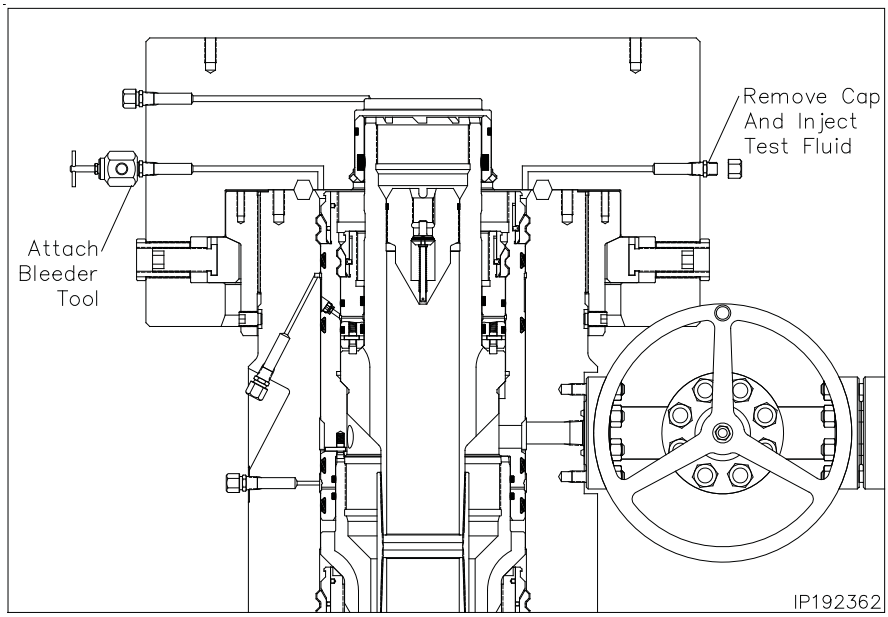


11. Run in all remaining screws to contact. Torque each screw to 400 ft-lbs.
12. Make one additional round until a stable torque of 650 ft-lbs on all (20) screws is achieved.

Stage 17 — Install the Quick Connect TA Cap Assembly

Connection Test

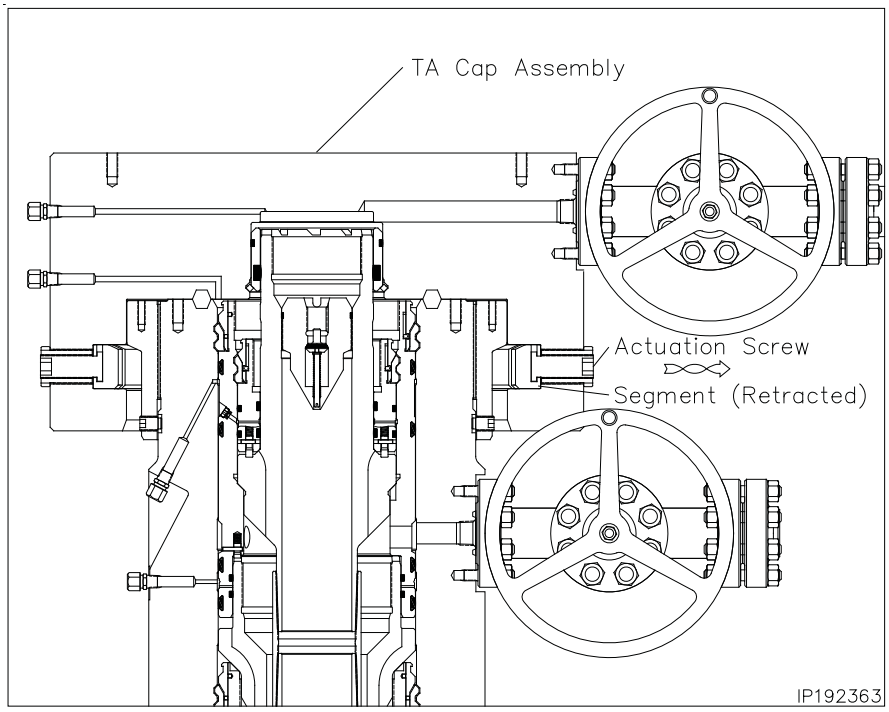
1. Open the TA cap ball valve and the housing upper side outlet valve to monitor leakage.
2. Locate the two test fittings marked “FLG TEST” and remove the dust caps from the fittings.
3. Attach a bleeder tool to one of the open fitting and open the tool.
4. Attach a test pump to the remaining open fitting and pump clean test fluid into the void area until a continuous stream flows from the open bleeder tool.
5. Close the tool and continue pumping fluid until a stable test pressure of ***10,000 psi***.
6. Hold the test pressure for 15 minutes or as required by drilling supervisor.
7. After a satisfactory test is achieved, bleed off the test pressure, drain the fluid, remove the bleeder tool and re-install the dust cap on the open fittings.
8. Close all open valves.

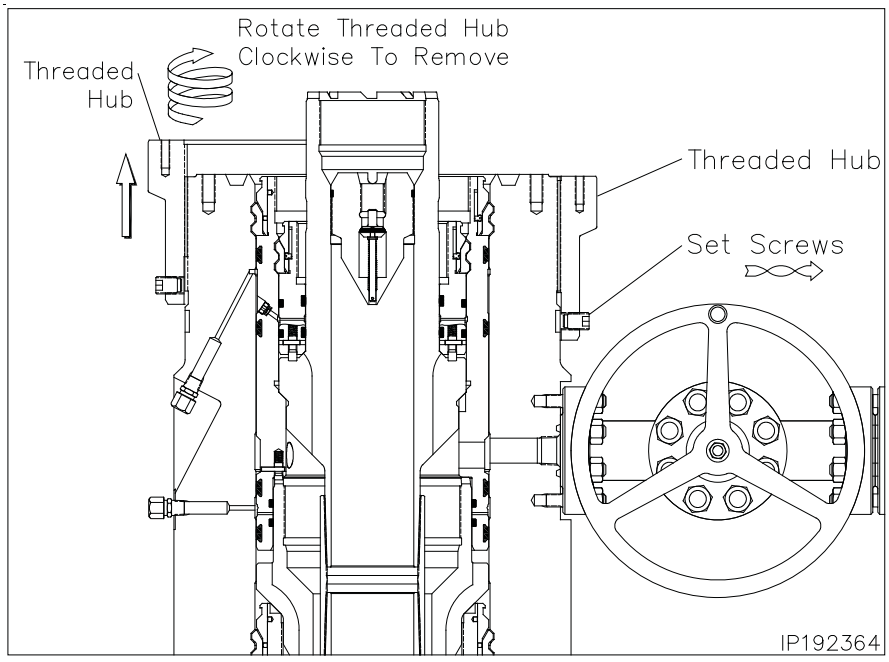


Stage 18 — Remove the TA Cap Assembly

WARNING: Confirm with Drilling Supervisor that well bore conditions are safe.

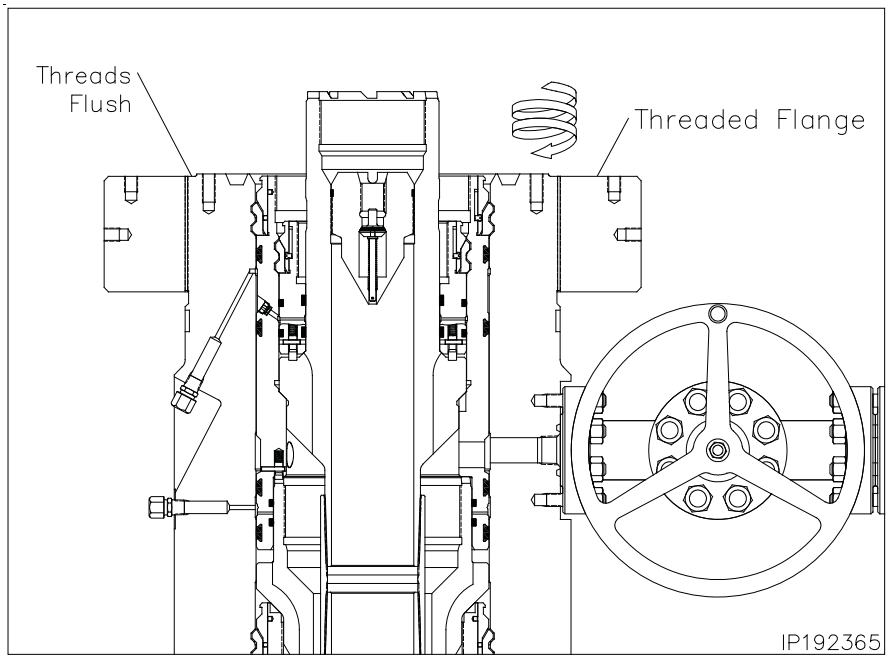
1. Open the ball valve on the TA cap to check for trapped pressure.
2. Locate the actuation screws on the O.D. of the TA cap assembly.
3. Using a hex drive, fully retract the actuation screws until they are slightly over flush with the gland nuts.
4. Install lifting eyes with pick up sling to the top of the TA cap and lift the cap free of the wellhead.
5. Remove the threaded hub set screws.
6. Remove the threaded hub from the top of the housing with clockwise rotation.





Stage 18 — Remove the TA Cap Assembly

1. Examine the ***13-5/8" 10M Threaded Flange (Item A6)***. Verify the following:
   - Acme thread are clean and in good condition
2. Thoroughly clean and lightly lubricate the mating threads of the housing and the threaded flange with copper coat or never seize.
3. Pick up the flange and carefully thread it onto the top of the housing with counter clockwise rotation until the top of the flange is level with the top of the Acme thread of the housing.
4. Rotate the flange in either direction to two hole.
5. Prepare to install the tubing head.



Stage 19 — Installing the Tubing Head

1. Examine the ***13-5/8" 10M x 7-1/16" 15M CTH-DBLHPS Tubing Head (Item B1).*** Verify the following:
   - seal area and bore are clean and in good condition
   - *'HPS' seals* are in place and in good condition
   - all peripheral equipment is intact and undamaged
   - all lockscrews are in place and fully retracted

2. Clean the mating ring grooves of the housing and tubing head assembly.

3. Lightly lubricate the I.D. 'HPS' seals and the packoff neck with a light grease.

CAUTION: Excessive grease may prevent a good seal from forming!

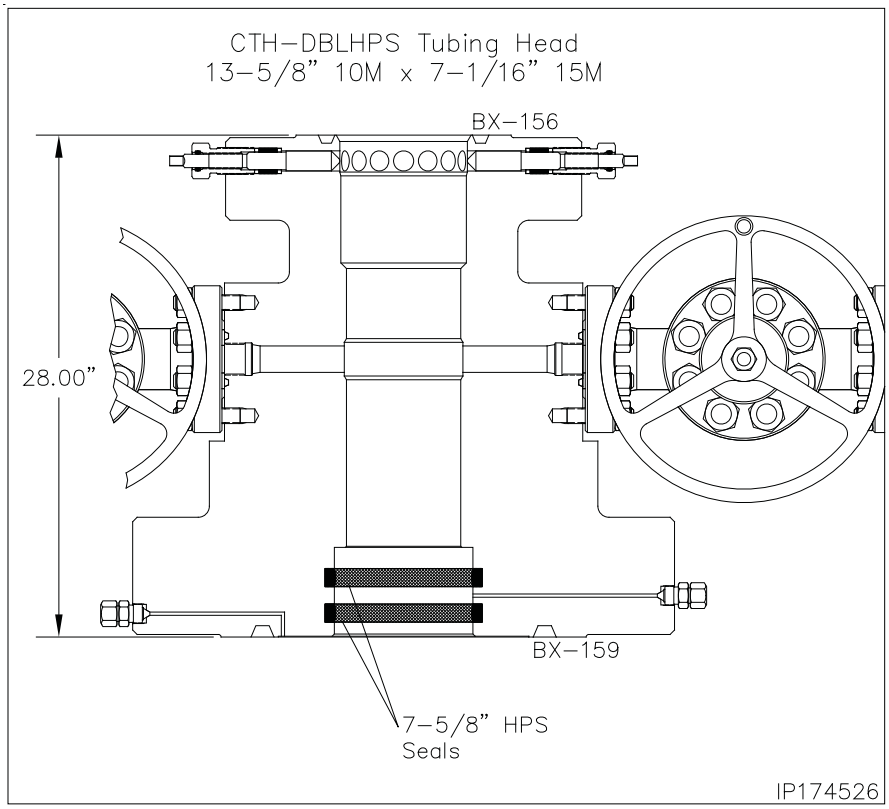
4. Install a new ***BX-159 Ring Gasket (Item B12)*** in the ring groove of the MBU-4T housing.

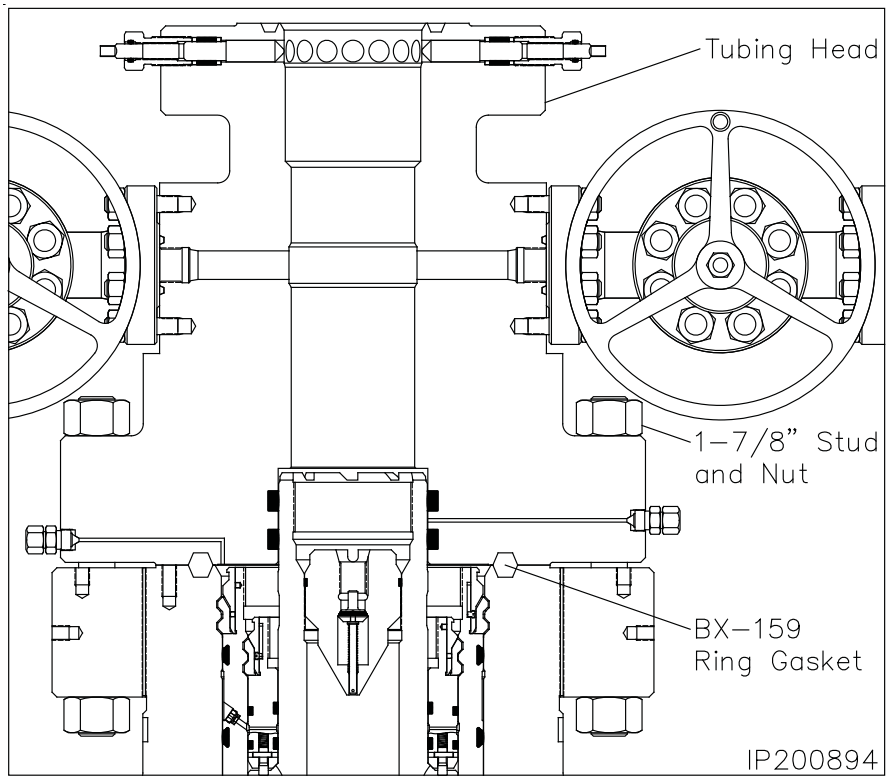
WARNING: Keep body clear of all pinch points and suspended loads.

5. Orient the tubing head so the outlets are in the proper position and then carefully lower the tubing head over the packoff neck and land it on the ring gasket.

CAUTION: Do Not damage the 'HPS' seal elements or their sealing ability will be impaired!

6. Make up the flange connection using the appropriate size ***Studs and Nuts (Item B13)***, tightening them in an alternating cross pattern.

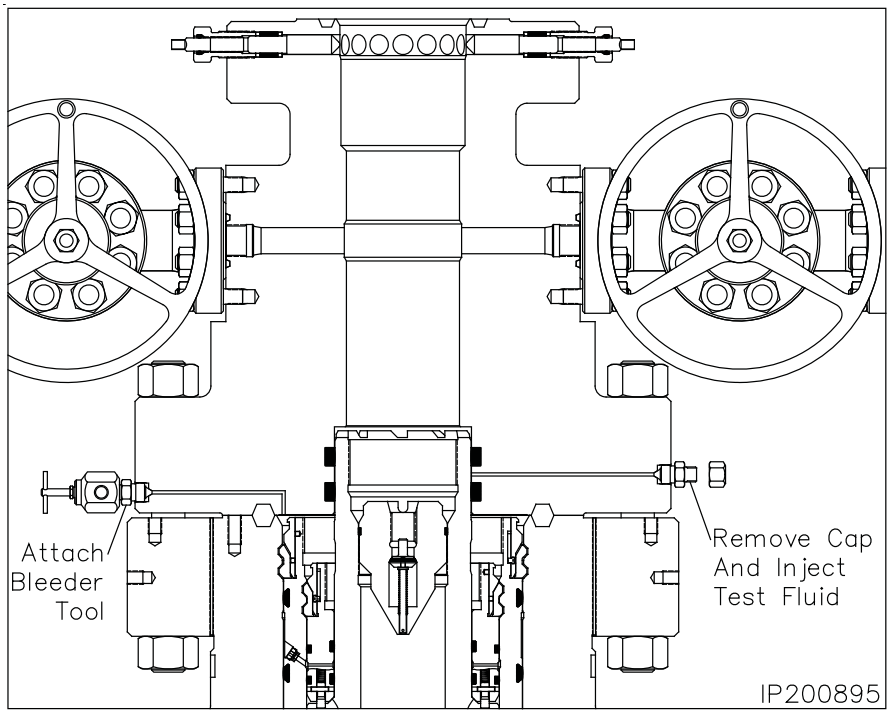




Stage 19 — Installing the Tubing Head

Seal Test

1. Locate the “SEAL TEST” fitting and one “FLG TEST” fitting on the tubing head lower flange and remove the dust cap from both fittings.
2. Attach a bleeder tool to the open “FLG TEST” fitting and open the tool.
3. Attach a test pump to the “SEAL TEST” fitting and pump clean test fluid between the ‘HPS’ seals until a test pressure of ***15,000 psi.***
4. Hold the test pressure for 15 minutes or as required by drilling supervisor.
5. If pressure drops, a leak has developed. Bleed off test pressure and take the appropriate action in the adjacent table.
6. After a satisfactory test is achieved, carefully bleed off all test pressure and remove the test pump and bleeder tool.
7. Reinstall the dust cap on the open “SEAL TEST” fitting.

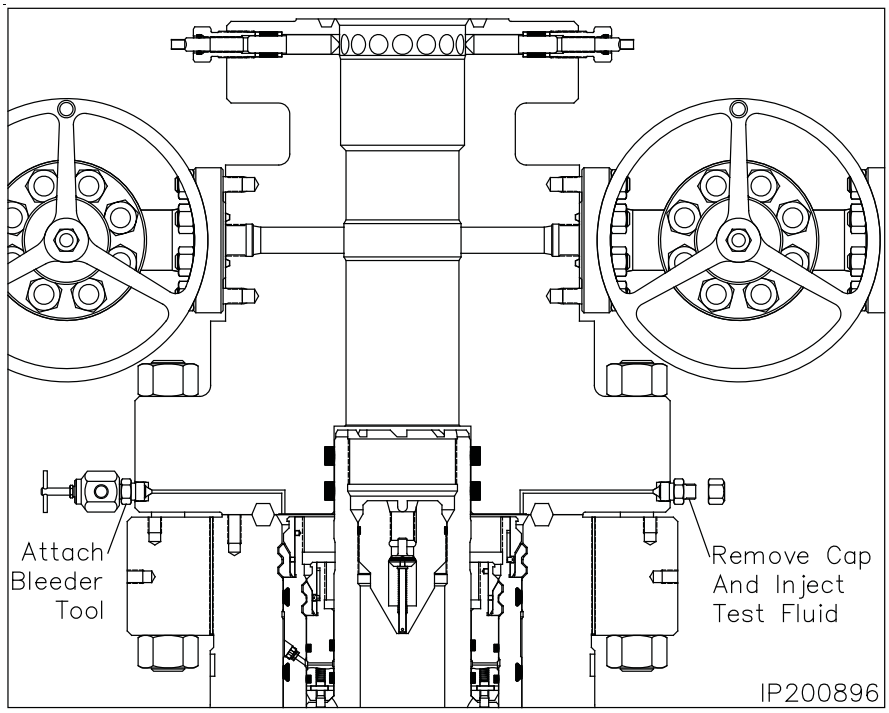


Seal Test	
Leak Location	**Appropriate Action**
Open bleeder tool - Lower ‘HPS’ seal is leaking	Remove tubing head and replace leaking seals. Re-land and retest seals
From open tubing head outlet valve - Upper ‘HPS’ seal is leaking	

Stage 19 — Installing the Tubing Head

Flange Test

1. Locate the remaining “FLG TEST” fitting on the tubing head lower flange and remove the dust cap from the fitting.
2. Attach a test pump to the open “FLG TEST” fitting and inject test fluid into the flange connection until a continuous stream flows from the opposite “FLG TEST” bleeder tool.
3. Close the bleeder tool and continue pumping test fluid to ***10,000 psi.***
4. Hold the test pressure for 15 minutes or as required by drilling supervisor.
5. If pressure drops a leak has developed. Take the appropriate action from the adjacent chart.
6. Repeat this procedure until a satisfactory test is achieved.
7. Once a satisfactory test is achieved, carefully bleed off all test pressure and remove the test pump and bleeder tool.
8. Reinstall the dust caps on the open fittings.



Flange Test	
Leak Location	**Appropriate Action**
Between flanges - Ring gasket is leaking	Further tighten the flange connection

Section 2 — Offline Cementing the 7-5/8” Casing String

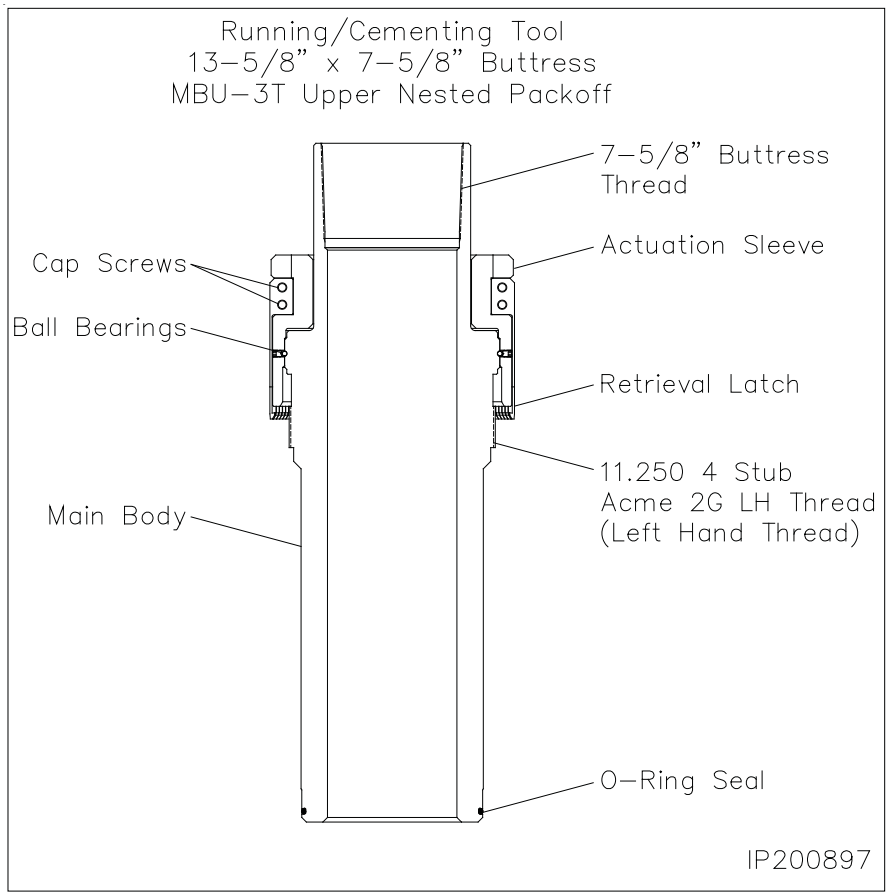
Stage 1 — Cement 7-5/8” Casing String

1. Examine the ***13-5/8” x 7-5/8” Buttress x 11.250” 4 Stub Acme 2G LH, MBU-3T Nested Packoff Running/Cementing Tool (Item R6).*** Verify the following:
   - Acme threads are clean and in good condition
   - retrieval latch is in position and retained with cap screws
   - O-ring seal is in place and in good condition

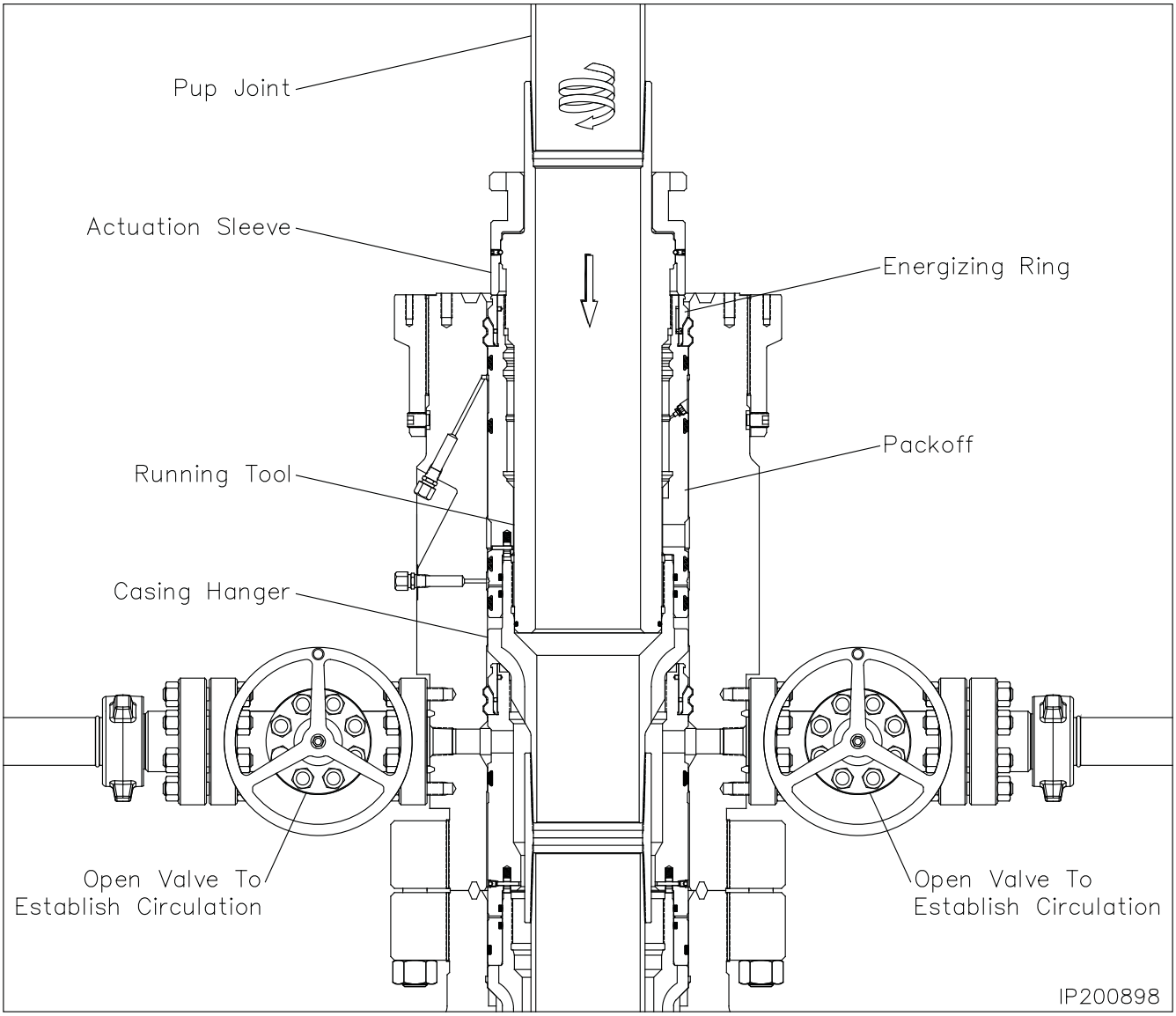
2. Remove the retrieval latch and set aside.

3. Make up the running tool to a 7-5/8” Buttress pup joint and torque connection to thread manufacturer’s optimum make up torque.

4. Pick up the Running Tool with pup joint and suspend it above the packoff.



Stage 1 — Cement 7-5/8” Casing String



5. Carefully lower the tool into the packoff and thread them together by first rotating the tool clockwise (RIGHT) to locate the thread start and then counter clockwise (LEFT) until the tool actuation sleeve makes contact with the packoff Energizing Ring. Approximately 8 to 9 turns.
6. Install cement head adapter and cement head.
7. Rig up return lines to the lower outlets of the MBU-4T upper housing.
8. Establish circulation and cement casing as required.
9. With cement in place bleed off cementing pressure and close the side outlet valves.
10. Remove the cement head and adapter from the 7-5/8” pup joint.
11. Using only chain tongs, remove the running/cementing tool with clockwise rotation. Approximately 8 to 9 turns and retrieve the tool with a straight vertical lift.
12. Install TA cap as required

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State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
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CONDITIONS

Action 11997

CONDITIONS OF APPROVAL

Operator:	OGRID:	Action Number:	Action Type:
FRANKLIN MOUNTAIN ENERGY LLC 44 Cook Street Suite 1000 Denver, CO80206	373910	11997	C-103A

OCD Reviewer	Condition
pkautz	None