Form 3160-5
(June 2015)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018

OCD Artesia

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on page 2

5. Lease Serial No.
NMNM25953

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

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

8. Well Name and No.
KYLE 34 FEDERAL COM 5H

2. Name of Operator
BC OPERATING INC
Contact: SARAH PRESLEY
E-Mail: spresley@bcoperating.com

9. API Well No.
30-015-43295-00-X1

3a. Address
MIDLAND, TX 79710

3b. Phone No. (include area code)
Ph: 432.684.9696

10. Field and Pool or Exploratory Area
WILLOW LAKE-BONE SPRING, SE

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 34 T24S R28E SESE 225FSL 990FEL
32.167025 N Lat, 104.069194 W Lon

11. County or Parish, State
EDDY COUNTY, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change to Original APD
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

BC OPERATING, INC. RESPECTFULLY REQUESTS TO RETURN THE SUBJECT WELL BACK TO THE ORIGINAL DESIGN APPROVED ON JULY 28, 2015.

NM OIL CONSERVATION
ARTESIA DISTRICT
OCT 30 2017
RECEIVED

BC 11-7-17
Accepted for record - NMOCD

OCD Artesia

14. I hereby certify that the foregoing is true and correct.
Electronic Submission #378546 verified by the BLM Well Information System
For BC OPERATING INC, sent to the Carlsbad
Committed to AFMSS for processing by DEBORAH MCKINNEY on 06/13/2017 (17DLM2015SE)

Name *(Printed/Typed)* SARAH PRESLEY — Title REGULATORY ANALYST

Signature (Electronic Submission) — Date 06/09/2017

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By ZOTA STEVENS — Title PETROLEUM ENGINEER — Date 10/24/2017

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office Carlsbad

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

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
30-015-43295	98220	PURPLE SAGE; WOLFCAMP (GAS)

[4] Property Code	[5] Property Name	[6] Well Number
	KYLE 34 FEDERAL	5H

[7] OGRID No.	[8] Operator Name	[9] Elevation
160825	B.C. OPERATING, INC.	2994

[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
P	34	T24S	R28E		225	SOUTH	990	EAST	EDDY

[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
A	34	T24S	R28E		330	NORTH	990	EAST	EDDY

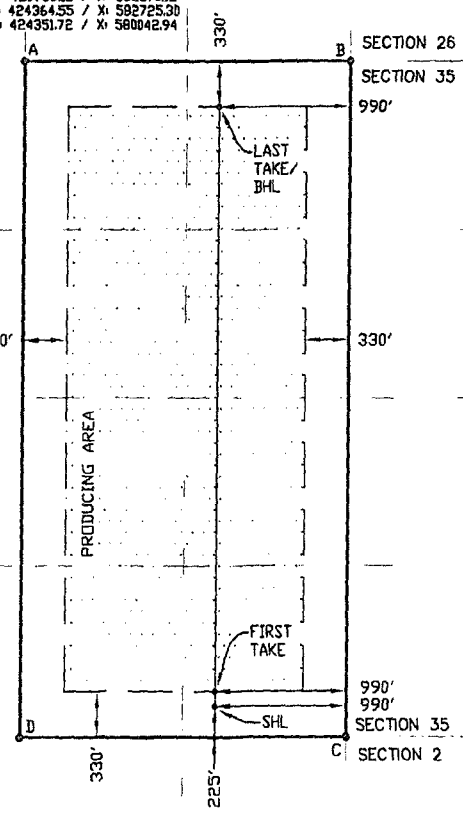
[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320.00			

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]

CORNER COORDINATES
NAD 83, SPCS NM EAST
A - Y: 429780.74 / X: 621190.24
B - Y: 429793.49 / X: 623853.93
C - Y: 424422.82 / X: 623909.23
D - Y: 424409.95 / X: 621226.81

CORNER COORDINATES
NAD 27, SPCS NM EAST
A - Y: 429722.40 / X: 580006.48
B - Y: 429735.12 / X: 582670.12
C - Y: 424364.55 / X: 582725.30
D - Y: 424351.72 / X: 580042.94



BOTTOM HOLE LOCATION
330' FNL 990' FEL, SECTION 34
NAD 83, SPCS NM EAST
Y:429458.76 / X:622867.32
LAT:32.18038538N / LON:104.06980694W
NAD 27, SPCS NM EAST
Y:429400.41 / X:581683.52
LAT:32.18026320N / LON:104.06931615W

LAST TAKE POINT
330' FNL 990' FEL, SECTION 34
NAD 83, SPCS NM EAST
Y:429458.76 / X:622867.32
LAT:32.18038538N / LON:104.06980694W
NAD 27, SPCS NM EAST
Y:429400.41 / X:581683.52
LAT:32.18026320N / LON:104.06931615W

FIRST TAKE POINT
330' FSL 990' FEL, SECTION 34
NAD 83, SPCS NM EAST
Y:424748.06 / X:622915.83
LAT:32.16743579N / LON:104.06968747W
NAD 27, SPCS NM EAST
Y:424689.80 / X:581731.93
LAT:32.16731345N / LON:104.06919708W

SURFACE HOLE LOCATION
225' FSL 990' FEL, SECTION 34
NAD 83, SPCS NM EAST
Y:424643.00' / X:622917.10'
LAT:32.16714699N / LON:104.06968420W
NAD 27, SPCS NM EAST
Y:424584.74' / X:581733.20'
LAT:32.16702465N / LON:104.06919382W

[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.

Signature — Date: 4.27.17

SARAH PRESLEY
Printed Name

SPRESLEY@BCOPERATING.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.

APRIL 12, 2017
Date of Survey

Signature and Seal of Professional Surveyor

LLOYD P. SHORT
NEW MEXICO
21653
PROFESSIONAL SURVEYOR

Certificate Number LLOYD P. SHORT 21653

DRILLING AND OPERATIONS PLAN
NADEL AND GUSSMAN PERMIAN, L.L.C.
KYLE 34 FEDERAL #5H

Surface: 225' FSL & 990' FEL, UL P
BHL: 330' FNL & 990' FEL, UL A
Sec 34, T-24-S, R-28-E
Eddy County, New Mexico

1. Geological Surface Formation: **Permian and Quaternary Alluvium.**
2. Horizontal Oil well. No pilot hole, total depth 15,186', depth to Fresh Water 200'. **Elevation 2993'**

3. TOPS OF IMPORTANT GEOLOGICAL MARKERS: TVD

Rustler	surface
Top Salt	1774'
BX (base salt)	2311'
Delaware Mountain Group	2510'
Bell Canyon	2633'
Cherry Canyon	3470'
Brushy Canyon	5036'
Bone Springs Ls	6270'
Avalon Shale	6597'
1st Bone Springs Sand	7226'
2nd Bone Springs Sand	8000'
3rd Bone Spring Sand	9170'
Wolfcamp	9450'
Wolfcamp Horizontal Target	**10,575'**

4. **Estimated Depth of Anticipated/Possible Water, Oil or Gas:**

Rustler/Castile	0-200'	Fresh Water from WAIDS database
Bell Canyon	2633	Oil, gas and water
Brushy Canyon	5036	Oil, gas and water
Bone Springs	6270	Oil, gas and water
Wolfcamp	9450	Oil, gas and water

No other formations are expected to yield oil, gas or fresh water in measurable volumes. The surface fresh water will be protected by setting 13 3/8" casing at 400' and circulating cement back to surface, all other intervals will be isolated by the 9 5/8 intermediate and 7" production casing.

5. Proposed Casing Program

HOLE SIZE	CASING SIZE	WT./GRADE	THREAD/COLLAR	SETTING DEPTH	TOP CEMENT
Conductor	20"	94# H-40	8rd STC	40'	Surface**
17.5"	13 3/8" (new)	48# H-40	8rd STC	400'	Surface**
12.25"	9 5/8" (new)	36# J-55	8rd LTC	2,600'	Surface**
8.75"	7" (new)	26# P-110	8rd BTC	10,500'	Surface**
*6.125"	4 1/2" (new)	13.5# P-110	8rd LTC	10,000'-15,100'	liner top**

*start 6.125" hole at end of curve 10,500' md, 4.5" casing set with liner hanger.

** When running casing keep liquid filled and void of air

MINIMUM SAFETY FACTORS: **BURST 1.125** **COLLAPSE 1.125** **TENSION 1.8**

ALL CASING WILL BE NEW API APPROVED

CEMENT PROGRAM-ALL CEMENT BLENDS WILL BE TESTED TO BLM MINIMUM REQUIREMENTS.

A. **13 3/8"** **SURFACE** CEMENT TO SURFACE **100% EXCESS OVER CALCULATED**

450 SACKS CLASS "C"+2%CACL+.25# CELLO-FLAKE+.25% DEFOAMER, 14.8 PPG, 1.35 YIELD, 6.34 GAL/SK

B. **9 5/8"** **INTERMEDIATE** CEMENT TO SURFACE **75% EXCESS LEAD, 50% TAIL**

LEAD 600 SACKS CLASS "C" 35/65 +6% BENTONITE+5% SALT+.25% DEFOAMER 12.8 PPG, 1.9 YIELD, 11.2 GAL/SK

TAIL 200 SACKS CLASS "C" + .25% DEFOAMER, 14.8 PPG, 1.33 YIELD, 6.34 GAL/SK

C. **7"** **PRODUCTION** CEMENT TO SURFACE **50% EXCESS OVER CALCULATED.**

LEAD 800 SACKS CLASS C 50/50 +10% BENTONITE +.15% C-20 RETARDER +3# STAR SEAL +.3% C-12 FLUID LOSS+3% SALT+.25% DEFOAMER, 11.8 PPG, 2.37 YIELD, 13.52 GL/SK

TAIL 250 SACKS CLASS "H" +.5% FL-10+.2%C-20, 15.6 PPG, 1.2 YIELD, 5.5 GAL/SK

D. **4.5" PRODUCTION LINER** CEMENT TO LINER TOP **50% EXCESS OVER CALCULATED**

TAIL SLURRY: 750 SACKS PVL ACIDSOLID +30% CALCIUM CARBONATE, +5%PF174, +.7% PF606 + .2% PF153 +.4% PF813 + .4 PPS PF46, 13.0 PPG 1.87 YIELD 9.517 GALLONS/SACK MIX WATER

SPECIFICATIONS FOR PRESSURE CONTROL EQUIPMENT: (EXHIBIT #5)

A 2000# WP Annular will be installed after running the 13-3/8" casing. A 5,000# WP Double Ram BOP and 5,000 annular will be installed after running the 9-5/8" and 7" casing. Pressure test will be conducted prior to drilling out under all casing strings. BOP controls will be installed prior to drilling under surface casing and will remain in use until completion of drilling operations. BOP's will be inspected and operated as recommended in Onshore Order #2. A Kelly cock and a sub equipped with a full opening valve sized to fit the drill pipe and collars will be available on the rig floor in the open position when the Kelly is not in use. 7" and 9-5/8" BOP will be tested to 5000# and the annular to 2500# with a third party testing company before drilling below each shoe. If operations last more than 30 days from 1st test, will test again as per BLM Onshore Oil and Gas order #2.

MUD PROGRAM:

Spud and drill 17 ½" surface hole with **fresh water (8.4 to 8.7 ppg)** to a depth of approx 400'. Control lost circulation with paper and LCM pills. Viscosity 28-55, no fluid loss control. Fresh water gel sweeps.

Drill 12 ¼" hole from 400' to 2,600' with **Brine (10.0 ppg).** Control lost circulation with paper and LCM pills. Viscosity 28-36, no fluid loss control. Salt water gel sweeps.

Drill 8 ¾" production hole from 2,600' to 10,500' **cut brine (8.8 to 10.0 ppg)**. Control lost circulation with paper and LCM pills. Clean hole with salt water sweeps as necessary. System properties: viscosity 28-32, fluid loss <30 ml/30min.

Drill 6 1/8" horizontal production hole from 10,500'-15,100' with **Brine water (10.5-12.8 ppg)**, control filtrate and increase viscosity with Xanthan gum and Poly Anionic Cellulose. System Properties funnel viscosity 35-50 seconds, fluid loss <10 ml/30min, chlorides 150k.

All necessary mud products for weight addition and fluid loss control will be on location at all times. Mud program subject to change due to hole conditions.

Mud monitoring system: Mud will be maintained and checked daily for mud weight, viscosity, API water loss, pH, etc. Additional electronic monitoring will include a pit volume totalizer to monitor mud volume in active system, pump rate, and mud return flow percentage. H2S monitors and alarms will be located on rig floor, shale shakers, and mud tanks (see rig plat). Gas chromatograph with monitor hydrocarbon gas content of mud from 2,600' to TD. Third party corrosion company will utilize H2S/oxygen scavengers to monitor for corrosion and limit damage to tubulars.

Auxiliary Equipment

A. A Kelly cock will be in the drill string at all times.

B. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor at all times

C. Hydrogen Sulfide detection equipment will be in operation after drilling out the 13 3/8" casing shoe until the 4 ½" liner is run and set and rigging down operations have begun.

TESTING, LOGGING & CORING PROGRAM:

a. Testing: No DST's will be conducted.
b. Mud logging will take place from 2,600ft to TD 10ft samples
c. Gyro survey will be run at KOP of 10,086'
d. MWD (directional surveys) and LWD (gamma) surveys will be taken from KOP (10,086') to TD 14,935ft
e. Cased hole CBL/Gamma

POTENTIAL HAZARDS:

No significant hazards are expected, Pressure gradient of .50 psi/ft. Normal temperature gradient is expected. Anticipated pressure 5287 psi at 10,575 ft. Expected temperature at 10,575 TVD is 160 deg F. Lost circulation may occur, no H_2S is expected, but the operator will utilize a 3rd party H_2S monitoring package from 400' to TD. No losses or H2s occurred in the Kyle Federal #1 or #2H. If H2S is encountered the operator will comply with the provisions of onshore oil and gas order no 6. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well.

ANTICIPATED STARTING DATE & DURATION:

Nadel & Gussman Permian, LLC anticipates drilling operations to begin around February 1, 2015 and completed in approximately 45 days. An additional 15 days will be needed for completion activities. Road and location construction will begin after the BLM has approved the APD.

Jason Goss, Drilling Engineer Date
Nadel & Gussman Permian, LLC

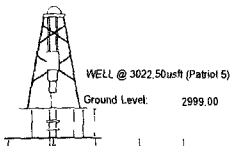
Nadel and Gussman Permian, LLC

Project: Eddy County, New Mexico (NAD27)
Site: Kyle 34 Federal
Well: 5H
Wellbore: Wellbore #1 Job # 1411545
Design: Plan #1 08-19-14
Rig: Patriot 5

PHOENIX TECHNOLOGY SERVICES

Azimuths to Grid North
True North: -0.14°
Magnetic North: 7.28°

Magnetic Field
Strength: 48213.7nT
Dip Angle: 59.97°
Date: 08/18/2014
Model: IGRF2010_14



WELL DETAILS

Ground Level: 2999.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	424584.80	581733.20	32° 10' 1.28931 N	104° 4' 9.09770 W

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
2	10097.50	0.00	0.00	10097.50	0.00	0.00	0.00	0.00	0.00		KOP: Start Build 12.00°/100'
3	10847.50	90.00	2.15	10574.96	477.13	17.91	12.00	2.15	477.03		LP at 90° Inc, Start Turn 3.00°/100'
4	10938.75	90.00	359.41	10574.97	568.36	19.16	3.00	-90.01	568.26		Hold 359.41° Azm
5	15186.31	90.00	359.41	10575.00	4815.70	-24.40	0.00	0.00	4815.76	BHL Kyle 34 Fed 5H	TD at 15186.31

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
BHL Kyle 34 Fed 5H	10575.00	4815.70	-24.40	429400.50	581708.80	32° 10' 48.94779 N	104° 4' 9.24405 W	Point

CASING DETAILS

No casing data is available

LEGEND

Plan #1 08-19-14

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001

Local Origin: Well 5H, Grid North

Latitude: 32° 10' 1.28931 N
Longitude: 104° 4' 9.09770 W

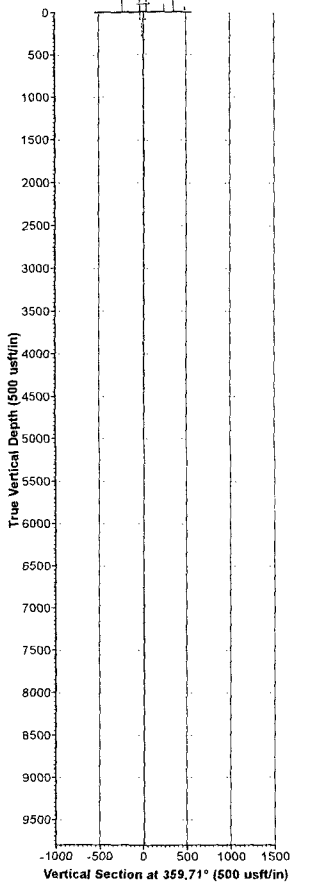
Grid East: 581733.20
Grid North: 424584.80
Scale Factor: 1.000

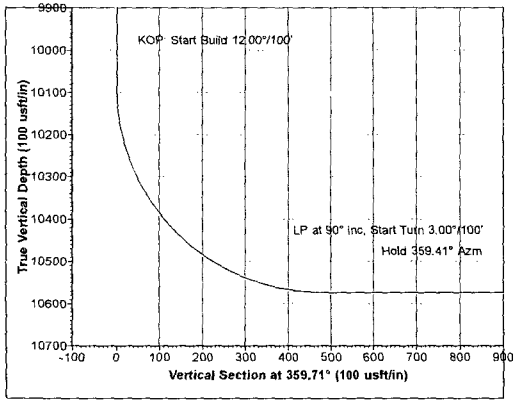
Geomagnetic Model: IGRF2010_14
Sample Date: 18-Aug-14
Magnetic Declination: 7.42°
Dip Angle from Horizontal: 59.97°
Magnetic Field Strength: 48214

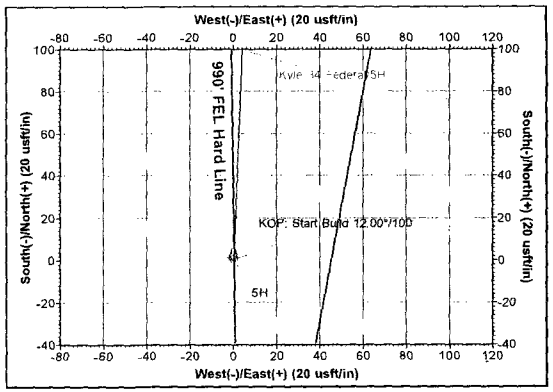
To convert a Magnetic Direction to a Grid Direction, Add 7.28
To convert a Magnetic Direction to a True Direction, Add 7.42° East
To convert a True Direction to a Grid Direction, Subtract 0.14°

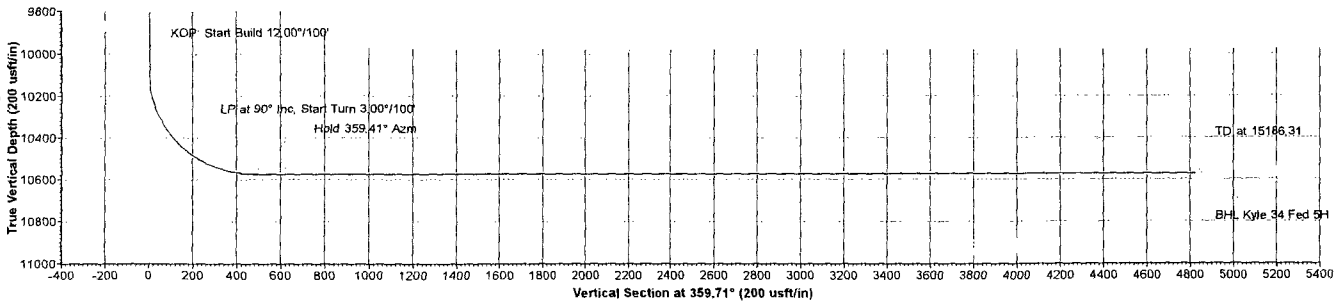
FORMATION TOP DETAILS

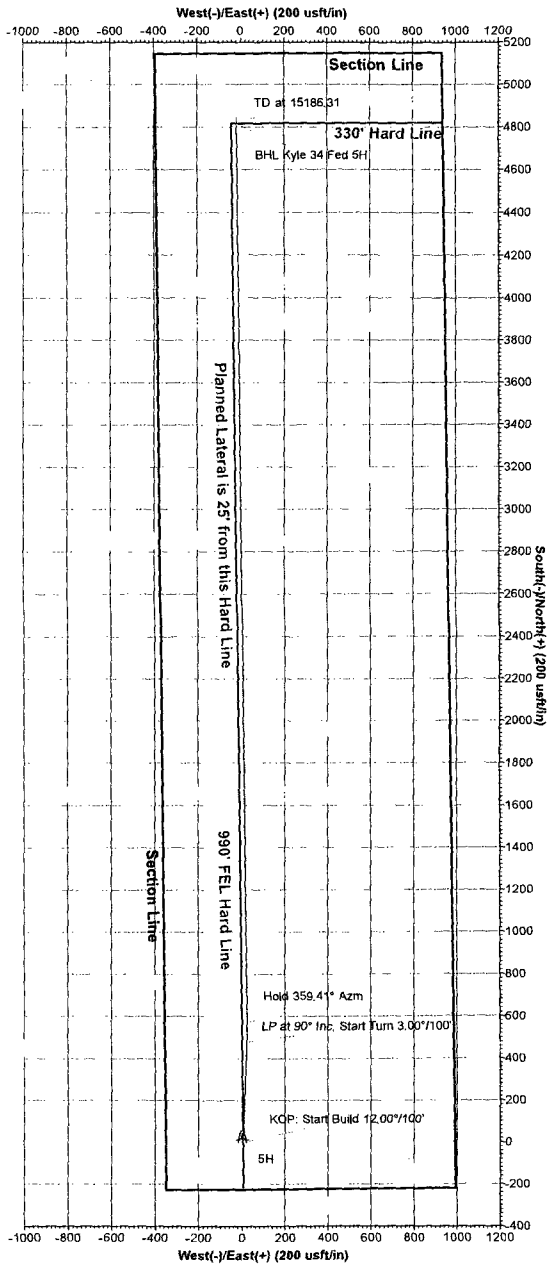
No formation data is available











Created By: Justin Andoe Date: 10:01, August 19 2014

Nadel and Gussman Permian, LLC

Eddy County, New Mexico (NAD27)
Kyle 34 Federal
5H

Wellbore #1 Job # 1411545

Plan: Plan #1 08-19-14

Standard Planning Report

19 August, 2014

PHOENIX
TECHNOLOGY SERVICES

Database:	Compass 5000 GCR DB	**Local Co-ordinate Reference:**	Well 5H
Company:	Nadel and Gussman Permian, LLC	**TVD Reference:**	WELL @ 3022.50usft (Patriot 5)
Project:	Eddy County, New Mexico (NAD27)	**MD Reference:**	WELL @ 3022.50usft (Patriot 5)
Site:	Kyle 34 Federal	**North Reference:**	Grid
Well:	5H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1 Job # 1411545		
Design:	Plan #1 08-19-14		

Project	Eddy County, New Mexico (NAD27)		
Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Kyle 34 Federal				
Site Position:		**Northing:**	424,669.90 usft	**Latitude:**	32° 10' 2.22727 N
From:	Map	**Easting:**	577,690.20 usft	**Longitude:**	104° 4' 56.13216 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.13 °

Well	5H					
Well Position	**+N/-S**	-85.10 usft	**Northing:**	424,584.80 usft	**Latitude:**	32° 10' 1.28931 N
	+E/-W	4,043.00 usft	**Easting:**	581,733.20 usft	**Longitude:**	104° 4' 9.09770 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	0.00 usft	**Ground Level:**	2,999.00 usft

Wellbore	Wellbore #1 Job # 1411545				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010_14	08/18/14	7.42	59.97	48,214

Design	Plan #1 08-19-14				
Audit Notes:					
Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.00	0.00	0.00	359.71	

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	
10,097.50	0.00	0.00	10,097.50	0.00	0.00	0.00	0.00	0.00	0.00	
10,847.50	90.00	2.15	10,574.97	477.13	17.91	12.00	12.00	0.00	2.15	
10,938.75	90.00	359.41	10,574.97	568.36	19.16	3.00	0.00	-3.00	-90.01	
15,186.31	90.00	359.41	10,575.00	4,815.70	-24.40	0.00	0.00	0.00	0.00	BHL Kyle 34 Fed 5H

Database:	Compass 5000 GCR DB	**Local Co-ordinate Reference:**	Well 5H
Company:	Nadel and Gussman Permian, LLC	**TVD Reference:**	WELL @ 3022.50usft (Patriot 5)
Project:	Eddy County, New Mexico (NAD27)	**MD Reference:**	WELL @ 3022.50usft (Patriot 5)
Site:	Kyle 34 Federal	**North Reference:**	Grid
Well:	5H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1 Job # 1411545		
Design:	Plan #1 08-19-14		

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
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
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00

Database:	Compass 5000 GCR DB	**Local Co-ordinate Reference:**	Well 5H
Company:	Nadel and Gussman Permian, LLC	**TVD Reference:**	WELL @ 3022.50usft (Patriot 5)
Project:	Eddy County, New Mexico (NAD27)	**MD Reference:**	WELL @ 3022.50usft (Patriot 5)
Site:	Kyle 34 Federal	**North Reference:**	Grid
Well:	5H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1 Job # 1411545		
Design:	Plan #1 08-19-14		

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)
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,600.00	0.00	0.00	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,700.00	0.00	0.00	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,800.00	0.00	0.00	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,900.00	0.00	0.00	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	7,000.00	0.00	0.00	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,100.00	0.00	0.00	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,200.00	0.00	0.00	0.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,300.00	0.00	0.00	0.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,400.00	0.00	0.00	0.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,500.00	0.00	0.00	0.00	0.00	0.00	0.00
7,600.00	0.00	0.00	7,600.00	0.00	0.00	0.00	0.00	0.00	0.00
7,700.00	0.00	0.00	7,700.00	0.00	0.00	0.00	0.00	0.00	0.00
7,800.00	0.00	0.00	7,800.00	0.00	0.00	0.00	0.00	0.00	0.00
7,900.00	0.00	0.00	7,900.00	0.00	0.00	0.00	0.00	0.00	0.00
8,000.00	0.00	0.00	8,000.00	0.00	0.00	0.00	0.00	0.00	0.00
8,100.00	0.00	0.00	8,100.00	0.00	0.00	0.00	0.00	0.00	0.00
8,200.00	0.00	0.00	8,200.00	0.00	0.00	0.00	0.00	0.00	0.00
8,300.00	0.00	0.00	8,300.00	0.00	0.00	0.00	0.00	0.00	0.00
8,400.00	0.00	0.00	8,400.00	0.00	0.00	0.00	0.00	0.00	0.00
8,500.00	0.00	0.00	8,500.00	0.00	0.00	0.00	0.00	0.00	0.00
8,600.00	0.00	0.00	8,600.00	0.00	0.00	0.00	0.00	0.00	0.00
8,700.00	0.00	0.00	8,700.00	0.00	0.00	0.00	0.00	0.00	0.00
8,800.00	0.00	0.00	8,800.00	0.00	0.00	0.00	0.00	0.00	0.00
8,900.00	0.00	0.00	8,900.00	0.00	0.00	0.00	0.00	0.00	0.00
9,000.00	0.00	0.00	9,000.00	0.00	0.00	0.00	0.00	0.00	0.00
9,100.00	0.00	0.00	9,100.00	0.00	0.00	0.00	0.00	0.00	0.00
9,200.00	0.00	0.00	9,200.00	0.00	0.00	0.00	0.00	0.00	0.00
9,300.00	0.00	0.00	9,300.00	0.00	0.00	0.00	0.00	0.00	0.00
9,400.00	0.00	0.00	9,400.00	0.00	0.00	0.00	0.00	0.00	0.00
9,500.00	0.00	0.00	9,500.00	0.00	0.00	0.00	0.00	0.00	0.00
9,600.00	0.00	0.00	9,600.00	0.00	0.00	0.00	0.00	0.00	0.00
9,700.00	0.00	0.00	9,700.00	0.00	0.00	0.00	0.00	0.00	0.00
9,800.00	0.00	0.00	9,800.00	0.00	0.00	0.00	0.00	0.00	0.00
9,900.00	0.00	0.00	9,900.00	0.00	0.00	0.00	0.00	0.00	0.00
10,000.00	0.00	0.00	10,000.00	0.00	0.00	0.00	0.00	0.00	0.00
10,097.50	0.00	0.00	10,097.50	0.00	0.00	0.00	0.00	0.00	0.00
KOP: Start Build 12.00°/100'									
10,100.00	0.30	2.15	10,100.00	0.01	0.00	0.01	12.00	12.00	0.00
10,125.00	3.30	2.15	10,124.99	0.79	0.03	0.79	12.00	12.00	0.00
10,150.00	6.30	2.15	10,149.89	2.88	0.11	2.88	12.00	12.00	0.00
10,175.00	9.30	2.15	10,174.66	6.27	0.24	6.27	12.00	12.00	0.00

Database:	Compass 5000 GCR DB	**Local Co-ordinate Reference:**	Well 5H
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Project:	Eddy County, New Mexico (NAD27)	**MD Reference:**	WELL @ 3022.50usft (Patriot 5)
Site:	Kyle 34 Federal	**North Reference:**	Grid
Well:	5H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1 Job # 1411545		
Design:	Plan #1 08-19-14		

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)
10,200.00	12.30	2.15	10,199.21	10.95	0.41	10.95	12.00	12.00	0.00
10,225.00	15.30	2.15	10,223.49	16.91	0.63	16.91	12.00	12.00	0.00
10,250.00	18.30	2.15	10,247.42	24.13	0.91	24.13	12.00	12.00	0.00
10,275.00	21.30	2.15	10,270.94	32.59	1.22	32.59	12.00	12.00	0.00
10,300.00	24.30	2.15	10,293.98	42.27	1.59	42.26	12.00	12.00	0.00
10,325.00	27.30	2.15	10,316.49	53.14	2.00	53.13	12.00	12.00	0.00
10,350.00	30.30	2.15	10,338.39	65.18	2.45	65.16	12.00	12.00	0.00
10,375.00	33.30	2.15	10,359.64	78.34	2.94	78.33	12.00	12.00	0.00
10,400.00	36.30	2.15	10,380.17	92.60	3.48	92.58	12.00	12.00	0.00
10,425.00	39.30	2.15	10,399.92	107.91	4.05	107.89	12.00	12.00	0.00
10,450.00	42.30	2.15	10,418.84	124.23	4.66	124.20	12.00	12.00	0.00
10,475.00	45.30	2.15	10,436.88	141.52	5.31	141.49	12.00	12.00	0.00
10,500.00	48.30	2.15	10,453.99	159.73	6.00	159.70	12.00	12.00	0.00
10,525.00	51.30	2.15	10,470.13	178.81	6.71	178.77	12.00	12.00	0.00
10,550.00	54.30	2.15	10,485.24	198.70	7.46	198.66	12.00	12.00	0.00
10,575.00	57.30	2.15	10,499.29	219.36	8.24	219.32	12.00	12.00	0.00
10,600.00	60.30	2.15	10,512.24	240.73	9.04	240.68	12.00	12.00	0.00
10,625.00	63.30	2.15	10,524.05	262.75	9.86	262.69	12.00	12.00	0.00
10,650.00	66.30	2.15	10,534.70	285.35	10.71	285.29	12.00	12.00	0.00
10,675.00	69.30	2.15	10,544.14	308.48	11.58	308.41	12.00	12.00	0.00
10,700.00	72.30	2.15	10,552.36	332.07	12.47	332.00	12.00	12.00	0.00
10,725.00	75.30	2.15	10,559.34	356.05	13.37	355.98	12.00	12.00	0.00
10,750.00	78.30	2.15	10,565.04	380.37	14.28	380.30	12.00	12.00	0.00
10,775.00	81.30	2.15	10,569.47	404.96	15.20	404.88	12.00	12.00	0.00
10,800.00	84.30	2.15	10,572.60	429.74	16.13	429.65	12.00	12.00	0.00
10,825.00	87.30	2.15	10,574.44	454.65	17.07	454.56	12.00	12.00	0.00
10,847.50	90.00	2.15	10,574.97	477 13	17.91	477.03	12.00	12.00	0.00
LP at 90° Inc, Start Turn 3.00°/100'									
10,900.00	90.00	0.58	10,574.97	529.61	19.16	529.51	3.00	0.00	-3.00
10,938.75	90.00	359.41	10,574.97	568.36	19.16	568.26	3.00	0.00	-3.00
Hold 359.41° Azm									
11,000.00	90.00	359.41	10,574.97	629.61	18.53	629.51	0.00	0.00	0.00
11,100.00	90.00	359.41	10,574.97	729.60	17.50	729.51	0.00	0.00	0.00
11,200.00	90.00	359.41	10,574.97	829.60	16.48	829.50	0.00	0.00	0.00
11,300.00	90.00	359.41	10,574.97	929.59	15.45	929.50	0.00	0.00	0.00
11,400.00	90.00	359.41	10,574.97	1,029.59	14.43	1,029.50	0.00	0.00	0.00
11,500.00	90.00	359.41	10,574.97	1,129.58	13.40	1,129.50	0.00	0.00	0.00
11,600.00	90.00	359.41	10,574.97	1,229.58	12.38	1,229.50	0.00	0.00	0.00
11,700.00	90.00	359.41	10,574.97	1,329.57	11.35	1,329.50	0.00	0.00	0.00
11,800.00	90.00	359.41	10,574.97	1,429.57	10.32	1,429.50	0.00	0.00	0.00
11,900.00	90.00	359.41	10,574.97	1,529.56	9.30	1,529.49	0.00	0.00	0.00
12,000.00	90.00	359.41	10,574.97	1,629.56	8.27	1,629.49	0.00	0.00	0.00
12,100.00	90.00	359.41	10,574.97	1 729.55	7.25	1,729.49	0.00	0.00	0.00
12,200.00	90.00	359.41	10,574.98	1,829.55	6.22	1,829.49	0.00	0.00	0.00
12,300.00	90.00	359.41	10,574.98	1,929.54	5.20	1,929.49	0.00	0.00	0.00
12,400.00	90.00	359.41	10,574.98	2,029.53	4.17	2,029.49	0.00	0.00	0.00
12,500.00	90.00	359.41	10,574.98	2,129.53	3.15	2,129.49	0.00	0.00	0.00
12,600.00	90.00	359.41	10,574.98	2,229.52	2.12	2,229.48	0.00	0.00	0.00
12,700.00	90.00	359.41	10,574.98	2,329.52	1.10	2,329.48	0.00	0.00	0.00
12,800.00	90.00	359.41	10,574.98	2,429.51	0.07	2,429.48	0.00	0.00	0.00
12,900.00	90.00	359.41	10,574.98	2,529.51	-0.96	2,529.48	0.00	0.00	0.00
13,000.00	90.00	359.41	10,574.98	2,629.50	-1.98	2,629.48	0.00	0.00	0.00
13,100.00	90.00	359.41	10,574.98	2,729.50	-3.01	2,729.48	0.00	0.00	0.00
13,200.00	90.00	359.41	10,574.98	2,829.49	-4.03	2,829.48	0.00	0.00	0.00

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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)
13,300.00	90.00	359.41	10,574.98	2,929.49	-5.06	2,929.48	0.00	0.00	0.00
13,400.00	90.00	359.41	10,574.99	3,029.48	-6.08	3,029.47	0.00	0.00	0.00
13,500.00	90.00	359.41	10,574.99	3,129.48	-7.11	3,129.47	0.00	0.00	0.00
13,600.00	90.00	359.41	10,574.99	3,229.47	-8.13	3,229.47	0.00	0.00	0.00
13,700.00	90.00	359.41	10,574.99	3,329.47	-9.16	3,329.47	0.00	0.00	0.00
13,800.00	90.00	359.41	10,574.99	3,429.46	-10.18	3,429.47	0.00	0.00	0.00
13,900.00	90.00	359.41	10,574.99	3,529.46	-11.21	3,529.47	0.00	0.00	0.00
14,000.00	90.00	359.41	10,574.99	3,629.45	-12.23	3,629.47	0.00	0.00	0.00
14,100.00	90.00	359.41	10,574.99	3,729.45	-13.26	3,729.46	0.00	0.00	0.00
14,200.00	90.00	359.41	10,574.99	3,829.44	-14.29	3,829.46	0.00	0.00	0.00
14,300.00	90.00	359.41	10,574.99	3,929.43	-15.31	3,929.46	0.00	0.00	0.00
14,400.00	90.00	359.41	10,574.99	4,029.43	-16.34	4,029.46	0.00	0.00	0.00
14,500.00	90.00	359.41	10,574.99	4,129.42	-17.36	4,129.46	0.00	0.00	0.00
14,600.00	90.00	359.41	10,575.00	4,229.42	-18.39	4,229.46	0.00	0.00	0.00
14,700.00	90.00	359.41	10,575.00	4,329.41	-19.41	4,329.46	0.00	0.00	0.00
14,800.00	90.00	359.41	10,575.00	4,429.41	-20.44	4,429.46	0.00	0.00	0.00
14,900.00	90.00	359.41	10,575.00	4,529.40	-21.46	4,529.45	0.00	0.00	0.00
15,000.00	90.00	359.41	10,575.00	4,629.40	-22.49	4,629.45	0.00	0.00	0.00
15,100.00	90.00	359.41	10,575.00	4,729.39	-23.51	4,729.45	0.00	0.00	0.00
15,186.31	90.00	359.41	10,575.00	4,815.70	-24.40	4,815.76	0.00	0.00	0.00
TD at 15186.31									

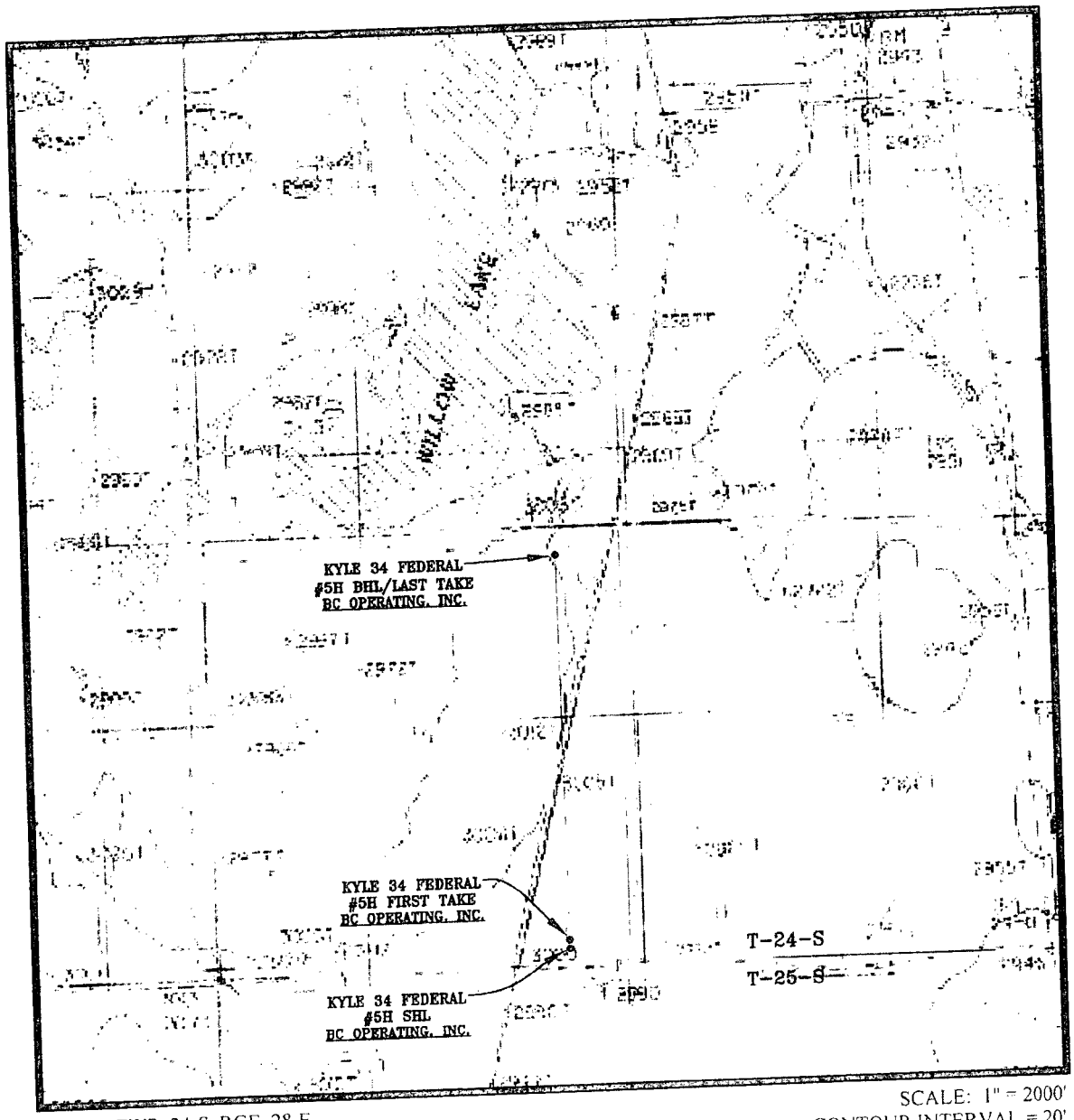
Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
BHL Kyle 34 Fed 5H - plan hits target center - Point	0.00	0.00	10,575.00	4,815.70	-24.40	429,400.50	581,708.80	32° 10' 48.94779 N	104° 4' 9.24405 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
10,097.50	10,097.50	0.00	0.00	KOP: Start Build 12.00°/100'
10,847.50	10,574.97	477.13	17.91	LP at 90° Inc, Start Turn 3.00°/100'
10,938.75	10,574.97	568.36	19.16	Hold 359.41° Azm
15,186.31	10,575.00	4,815.70	-24.40	TD at 15186.31

LOCATION VERIFICATION MAP

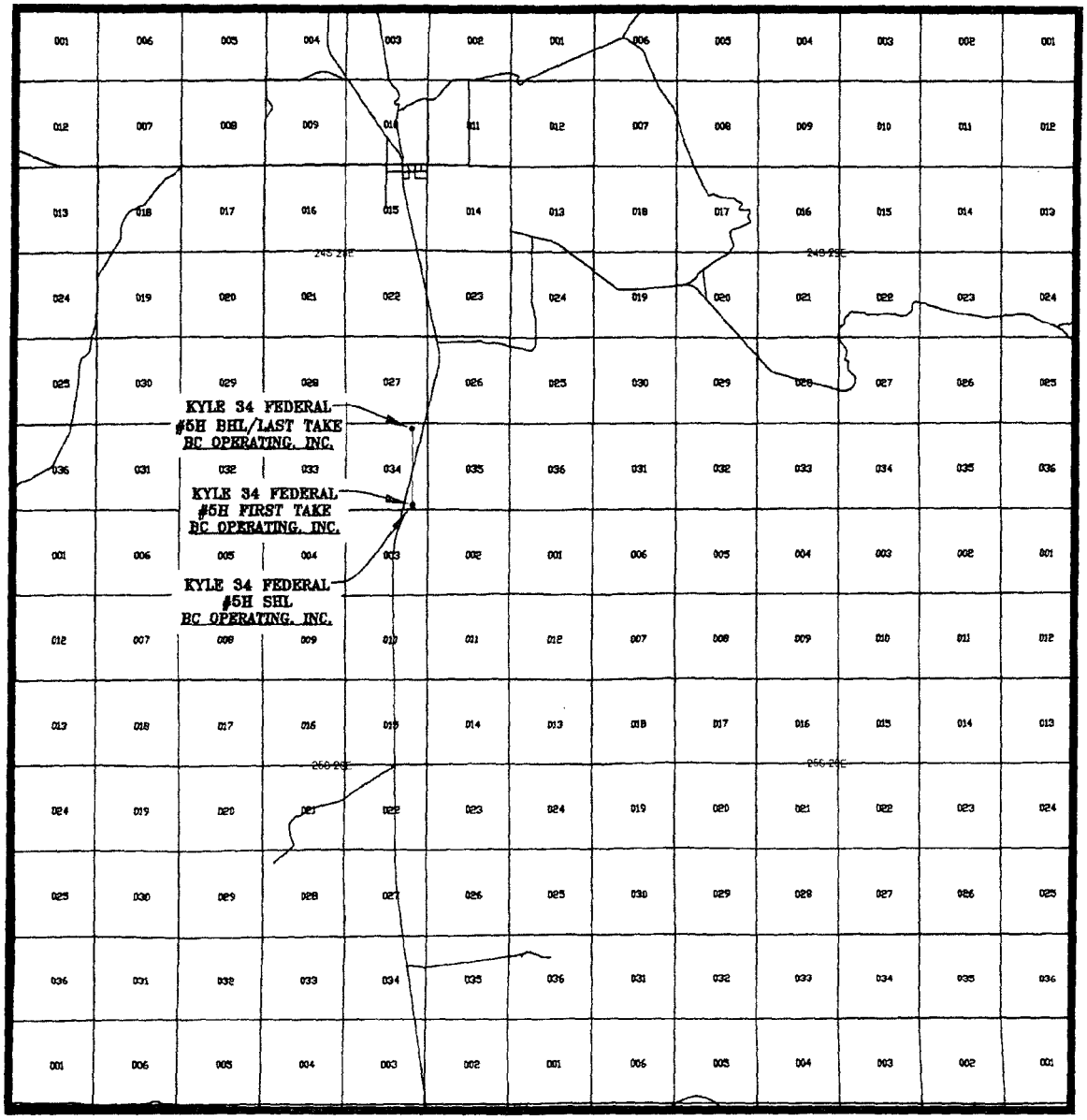


SCALE: 1" = 2000'
CONTOUR INTERVAL = 20'

SEC. 34 TWP. 24-S RGE. 28-E
SURVEY: N.M.P.M.
COUNTY: EDDY
DESCRIPTION: 225' FSL & 990' FEL
ELEVATION: 2994'
OPERATOR: B.C. OPERATING, INC.
LEASE: KYLE 34 FEDERAL
U.S.G.S. TOPOGRAPHIC MAP: MALAGA, N.M.

PREPARED BY:
R-SQUARED GLOBAL, LLC
1309 LOUISVILLE AVENUE, MONROE, LA 71201
318-323-6900 OFFICE
JOB No. R3681-01

VICINITY MAP



SEC. 34 TWP. 24-S RGE. 28-E
SURVEY: N.M.P.M.
COUNTY: EDDY
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ELEVATION: 2994'
OPERATOR: B.C. OPERATING, INC.
LEASE: KYLE 34 FEDERAL
U.S.G.S. TOPOGRAPHIC MAP: MALAGA, N.M.

SCALE: 1" = 2 MILES

PREPARED BY:
R-SQUARED GLOBAL, LLC
1309 LOUISVILLE AVENUE, MONROE, LA 71201
318-323-6900 OFFICE
JOB No. R3681-01

Cactus Wellhead

Installation Procedure Prepared For:

Marathon Oil Company

20" x 13-3/8" x 9-5/8" x 7" 10M Multi-Bowl Wellhead
13-5/8" 5M MBU-3T-CFL-R-DBLO Wellhead Housing
And 13-3/8" x 9-5/8" & 7" Mandrel Hangers
CTH-DBLHPS Tubing Head

Publication # IP0588

June, 2017

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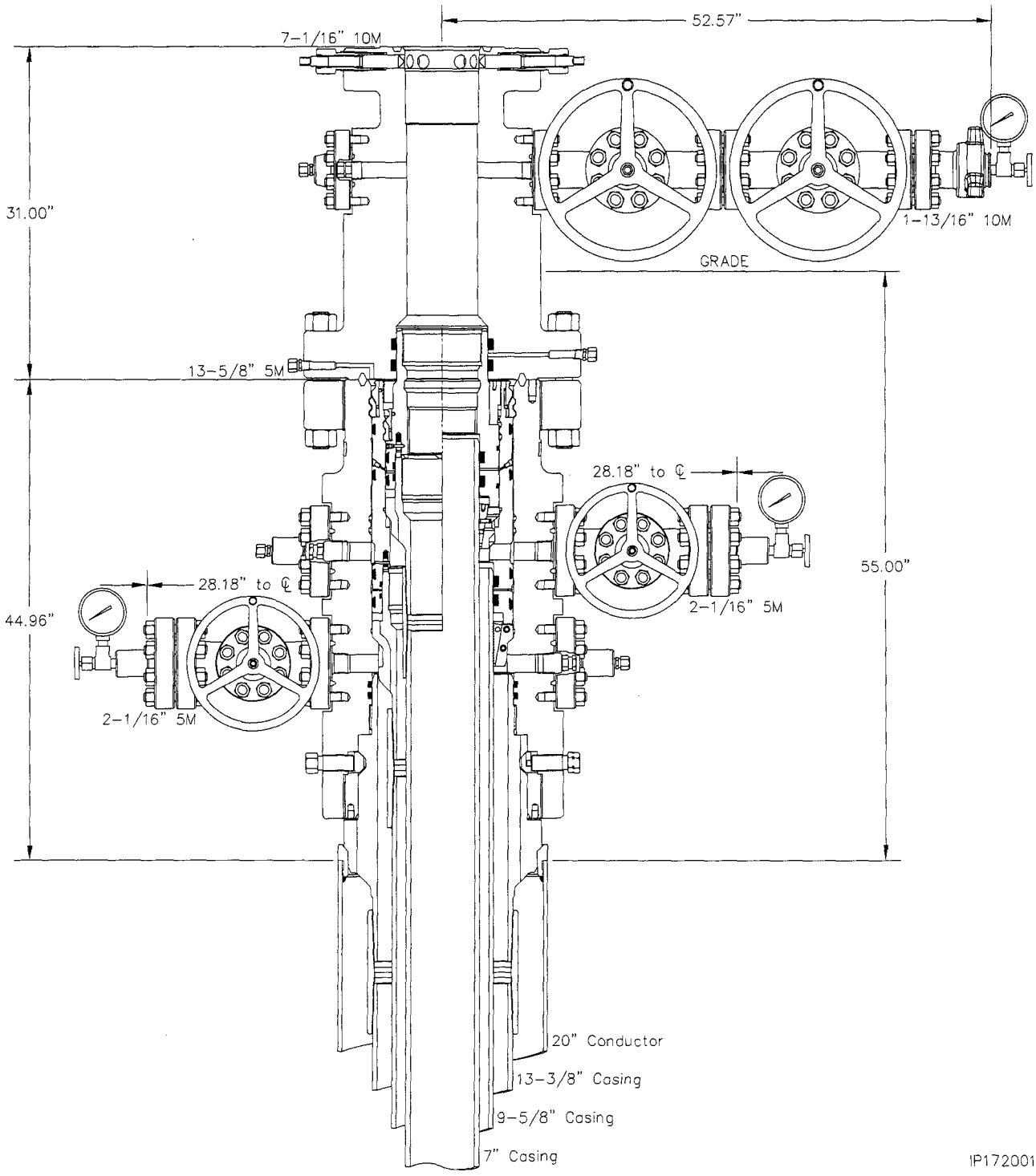
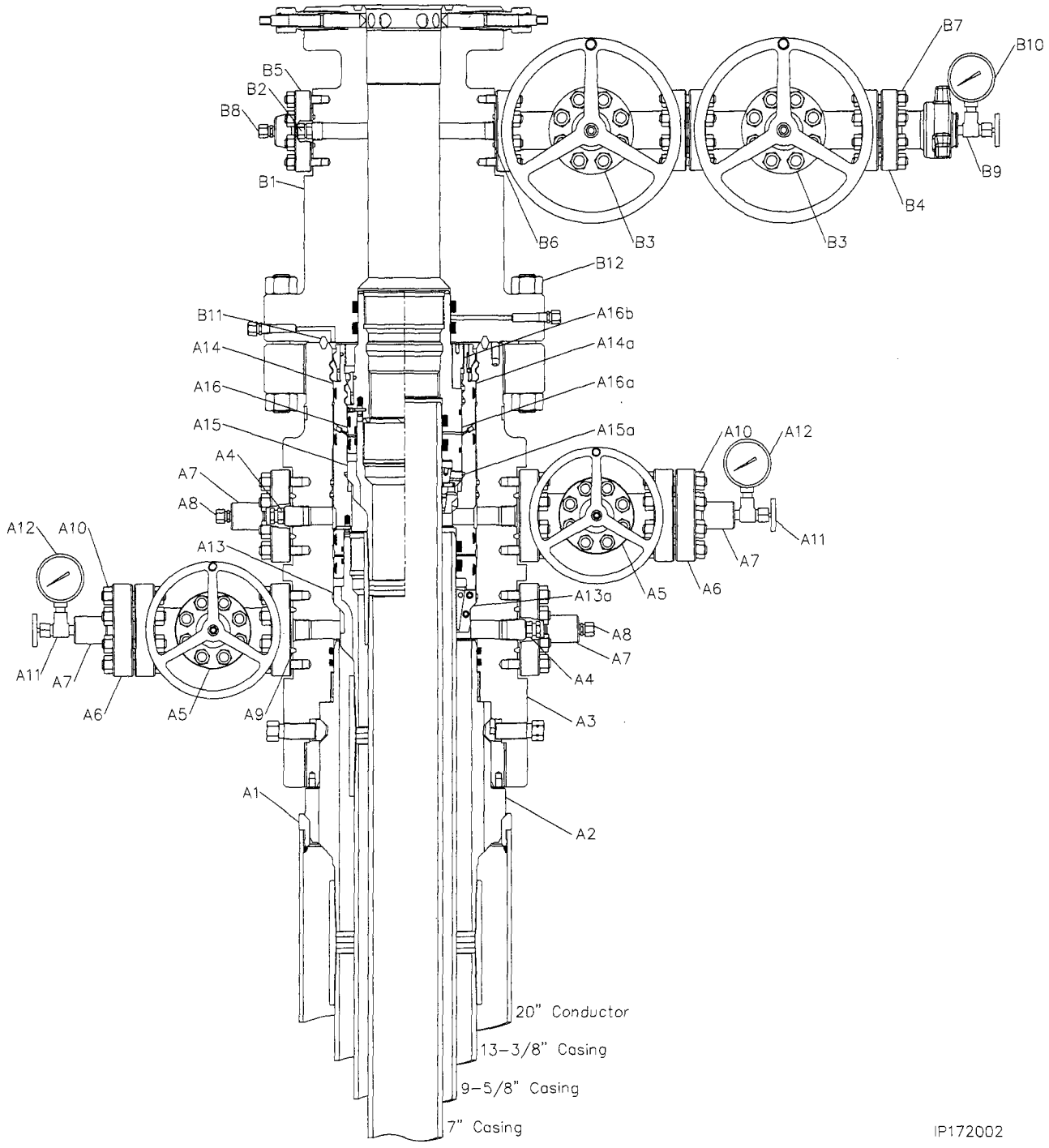
System Drawing



Bill of Materials



MBU-3T HOUSING ASSEMBLY

Item	Qty	Description
A1	1	Landing Ring, CW, 20" SOW x 20.06" O.D. x 18.13" I.D. Part # 116444
A2	1	Casing Hanger, CW, MBU-3T-CFL-R, 13-3/8", 13-3/8" (54.5#) Buttress Pin x 14.000" 2 Stub Acme 2G LH Pin Top, 12.489" Minimum Bore, 6A-U-AA-1-1 Part # 118174
A3	1	Housing, CW, MBU-3T-CFL-R-DBLO, 13-3/8", 13-5/8" 5M, With Two 2-1/16" 5M Studded Upper & Lower Outlets, 6A-PU-AA-1-2 Part # 118173
A4	2	VR Plug, CW, 1-1/2" (1.900) Sharp Vee x 1-1/4" Hex, 6A-DD-NL Part # VR2
A5	2	Gate Valve, CW1, 2-1/16" 3/5M, Flanged End, Handwheel Operated, AA/DD-NL Trim, (6A-LU-AA/DD-NL-1-2) Part # 610003
A6	4	Companion Flange, CW, 2-1/16" 5M x 2" Line Pipe, 6A-KU-EE-NL-1 Part # 200002
A7	4	Bull Plug, CW, 2" Line Pipe x 1/2" Line Pipe, 6A-DD-NL Part # BP2T
A8	2	Fitting, Grease, Vented Cap, 1/2" NPT, With Electroless Nickle Coating Nace, K-Monel Ball, Inconel X-750 Spring Part # 100048
A9	6	Ring Gasket, R-24, 2-1/16" 3/5M Part # R24
A10	16	Stud, All-Thread With Two Nuts, Black, 7/8" x 6-1/2" Long, B7/2H Part # 780067
A11	2	Needle Valve, MFA, 1/2" NPT 10M Service Part # NVA
A12	2	Pressure Gauge, 5M, 4-1/2" Face, Liquid Filled, 1/2" NPT Part # PG5M
A13	1	Casing Hanger, CW, MBU-3T LWR-TP, 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-3T HOUSING ASSEMBLY

Item	Qty	Description
A14	1	Packoff, CW, MBU-3T, Mandrel, 13-5/8" Nested x 11" With 11.250" 4 Stub Acme 2G LH Box Top, 1/8" NPT Test Ports, 6A-U-AA-1-1 Part # 117152
A15	1	Casing Hanger, CW, CTF-TP6, Fluted, 11" x 7" (29#) Buttress Pin Bottom x 7.750" 4 Stub Acme 2G RH Box Top, With 6.179 Minimum Bore, Special For Rotating Casing String, 6A-U-AA-1-2 Part # 118842
A16	1	Packoff, CW, MBU-3T-SN, 8-5/8" Nested, 11" x 9.00" With 7.500" 4 Stub Acme LH Box Top, With 6-3/4" LR BPV Prep & 6.270" Minimum Bore, 10,000 PSI Max WP, 6A-U-AA-1-2 Part # 117179

EMERGENCY EQUIPMENT

Item	Qty	Description
A13a	1	Casing Hanger, CW, MBU-3T-LWR, Emergency, 13-5/8" x 9-5/8", 6A-PU-DD-NL-3-1 Part # 116998
A14a	1	Packoff, CW, MBU-3T, Emergency, 13-5/8" Nested x 11" x 9-5/8" With 11.250" 4 Stub Acme 2G LH Box Top, 1/8" NPT Test Ports, 6A-U-AA-1-1 Part # 117184
A15a	1	Casing Hanger, CW, MBU-3T/ MBU-LR, Upper, 11" x 7", 6A-PU-DD-3-1 Part # 112193
A16a	1	Packoff, CW, MBU-3T-SN, 8-5/8" Emergency, Nested, 11" x 7" With 8-5/8" Seal Neck, 7.500" 4 Stub Acme 2G LH Box Top, With 6-3/4" LR BPV Prep & 6.270" Minimum Bore, Arranged For Hold Down Ring, 6A-U-AA-1-2 Part # 118436
A16b	1	Hold Down Ring, For C9 Casing Hanger, 11" x 7" Through 4-1/2", & MBU-3T, Inner, Emergency Packoff, Arranged For 13-5/8" MBU-3T Packoff, 11.250" 4 Stub Acme 2G LH Thread x 9.06" ID x 4.12" Long With 2.25" Thread Length Part # 117942

TUBING HEAD ASSEMBLY

Item	Qty	Description
B1	1	Tubing Head, CW, CTH-DBLHPS, 8-5/8", 13-5/8" 5M x 7-1/16" 10M, With Two 1-13/16" 10M Studded Outlets, 31" Long, Round Bar, 17-4PH Lockscrews, 6A-PU-EE-0,5-1-1 Part # 119829
B2	1	VR Plug, CW, 1-1/4" (1.660") Line Pipe x 1-1/4" Hex, 6A-DD-NL Part # VR1
B3	2	Gate Valve, AOZE, FC, 1-13/16" 10M, Flanged End, Handwheel Operated, EE-0,5 Trim, (6A-LU-EE-0,5-3-1) Part # 103188
B4	1	Adapter, CFH, 1-13/16" 10M x 2" Figure 1502 x 1/2" NPT, Nace Service, 6A-PU-EE-NL-1-1 Part # 105943
B5	1	Blind Flange, 1-13/16" 10M x 1/2" Line Pipe Recessed For VR Plug, 6A-PU-EE-NL-1 Part # 190018
B6	4	Ring Gasket, BX-151, 1-13/16" 10M Part # BX151
B7	16	Stud, All-Thread With Two Nuts, Black, 3/4" x 5-1/2" Long, B7/2H Part # 780080
B8	1	Fitting, Grease, Vented Cap, 1/2" NPT, With Electroless Nickle Coating Nace, K-Monel Ball, Inconel X-750 Spring Part # 100048
B9	1	Needle Valve, MFA, 1/2" NPT 10M Service Part # NVA
B10	1	Pressure Gauge, 10M, 4-1/2" Face, Liquid Filled, 1/2" NPT Part # PG10M
B11	1	Ring Gasket, BX-160, 13-5/8" 5M Part # BX160
B12	16	Stud, All-Thread With Two Nuts, Black, 1-5/8" x 12-3/4" Long, B7/2H Part # 780087

RECOMMENDED SERVICE TOOLS

Item	Qty	Description
ST1	1	Casing Hanger Lift Ring, CFL-R, With 14.000" 2 Stub Acme 2G LH 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 LH Box Bottom Landing Thread, 12.60" Minimum Bore Part # 118176
ST3	1	Torque Collar, CW, Casing Hanger, MBU-3T-CFL-R, For 16" Neck Part # 118178
ST4	1	Test Plug/Retrieving Tool, CW, 13-5/8" x 4-1/2" IF (NC50) Box Bottom & Top, 1-1/2" Sharp Vee Bypass & Spring Loaded Lift Dogs Part # 800002
ST5	1	Wear Bushing, CW, MBU-2LR, MBS2-UPR & MBU-3T-R, 2 Stage, Lower, 13-5/8" x 12.35" I.D. x 44.6" Long With O-Ring & Anti-Rotation Lugs Part # 114120
ST6	1	Casing Hanger Running Tool, CW, MBU-3T-LR-TP, 13-5/8" x 9-5/8" Buttress Box Top x 10.250" 4 Stub Acme 2G RH Pin Bottom, Max Load Capacity 1,000K, Max Torque 18,000 FT-LBS, Special For Rotating Casing String Part # 117769
ST7	1	Torque Collar, CW, For Use With Running Tool, TP, 10.250" 4 Stub Acme 2G RH Pin Bottom, Arranged For 11.50" O.D. x 5.00" Long Box Hanger Neck, Maximum Torque 36,000 FT-LBS Part # 103374
ST8	1	Wash Tool, CW, MBU-LR, & MBS2, Fluted, 13-5/8" x 4-1/2" IF (NC50) Box Top Threads, With Brushes Part # 106277
ST9	1	Packoff Running Tool, CW, MBU-3T UPR, 13-5/8" Nested, With 11.250" 4 Stub Acme 2G LH Pin Bottom x 4-1/2" IF (NC50) Box Top With Seal Sleeve & Ball Bearings Part # 117310

RECOMMENDED SERVICE TOOLS

Item	Qty	Description
ST10	1	Test Plug, CW, MBU-2LR(3T) Inner, 11" x 4-1/2" IF (NC50) Box Bottom & Top, 1-1/4" LP Bypass Part # 108848
ST11	1	Wear Bushing, CW, MBU-3T-UPR, Intermediate, 13-5/8" x 11" x 9.00" I.D. x 37.0" Long, With O-Ring & Anti-Rotation Lugs, Arranged For 13-5/8" Retrieving Tool Part # 118432
ST12	1	Casing Hanger Running Tool, CW, MB-TP6, 7.750" 4 Stub Acme RH Pin Bottom x 7" Buttress Box Top, With 6.445" Minimum Bore & Max Torque 25,000 FT-LBS, Specical For Rotating Casing String Part # 109206
ST13	1	Wash Tool, CW, Casing Hanger, MBU-LR/MBS(2), Fluted, 11" x 4-1/2" IF (NC50) Box Top Threads, Fabricated Part # 103066
ST14	1	Packoff Running Tool, CW, MBU-3T, 13-5/8" x 11' x 7.500" 4 Stub Acme 2G LH Pin Bottom x 4-1/2" IF (NC50) Box Top, With Ball Bearings Part # 117177
ST15	1	Packoff, CW, MBU-3T-R, 13-5/8" x 11" x 8-5/8" With 11.250" 4 Stub Acme 2G LH Box Top, 6A-U-AA-1-1 Part # 118438
ST16	1	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 Top, With Ball Bearings Part # 116996
ST17	1	Test Plug/Retrieving Tool, CW, 11" x 3-1/2" IF (NC38) Box Bottom & Top, 1-1/4" LP Bypass & Spring Loaded Lift Dogs Part # 102388
ST18	1	Wear Bushing, CW, MBU-3T-R, Upper, 13-5/8" x 11" x 6.25" I.D. x 16.5" Long Arranged For 13-5/8" Retrieving Tool Part # 118434
ST19	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

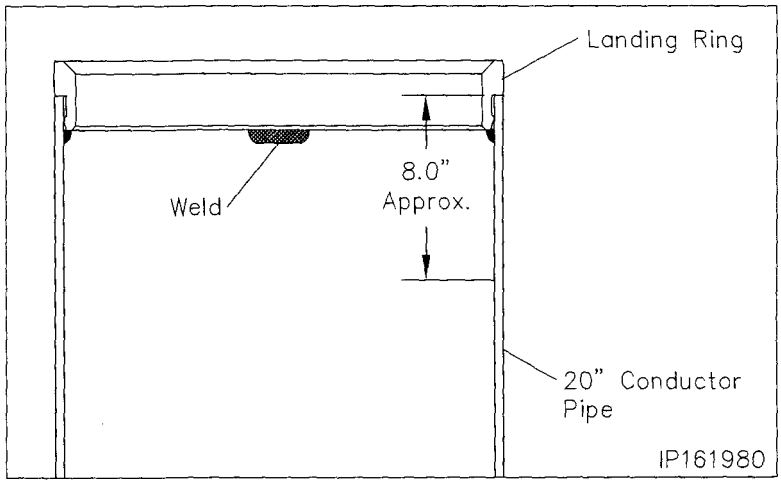
RENTAL EQUIPMENT

Item	Qty	Description
R1	1	Threaded Hub, CW, MBU-3T, 13-5/8" 5M With 19.000" 2 Stub Acme 2G LH Box Thread Part # 117268
R2	1	Drilling Adapter, CW, MBU-3T-R, 13-5/8" 5M Quick Connect Bottom x 13-5/8" 10M Studded Top, With Two 1-13/16" 10M Studded Outlets, Temp Rating PU, Includes One 1-13/16" 10M Hand Wheel Operated Gate Valve Part # 119601
R3	1	TA Cap, CW, DBLHPS, 8-5/8", 13-5/8" 5M Studded, For 5.75" Cutoff, With One 2" Line Pipe & 1/2" Line Pipe Ports Part # 112335

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 55.0" below grade. Grind stub level with the horizon and place an 1/8" x 1/8" bevel on the ID and OD of the stub.
3. 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
4. Using a wire brush, thoroughly clean the top 6" of the conductor pipe stub, inside and outside, removing all loose rust and scale.
5. Using a pair of ID callipers, measure the ID of the 20" pipe stub in two opposing positions.
6. Using the OD caliper, measure the OD of the landing ring grind nib.
7. Using a disc grinder, grind the OD of the nib until its dimension is slightly smaller then the ID of the pipe.
8. Pick up the landing ring and carefully push it into the pipe stub until the stub contacts the stop shoulder on the OD of the ring as shown.

Tack weld the bottom of the ring to the ID of the pipe in four equally spaced places. Tacks should be approximately 2" long.



Stage 2 — Install the Diverter (Reference Only)

The Diverter Riser is designed to carry the drilling fluids to the reserve pit during the drilling of the surface casing hole section. Due 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 ST19)*** . 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 ID of the Riser Connector and OD of the landing ring with light grease.

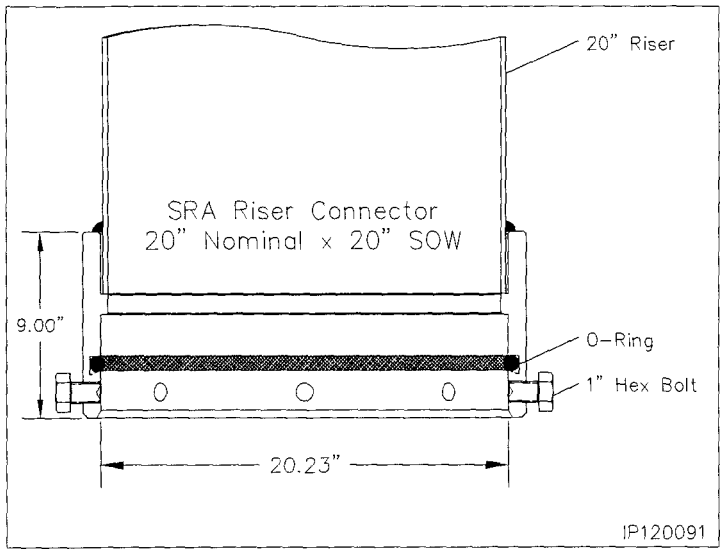
3. Slide the connector over the landing ring until the connector bottoms out on the landing ring.

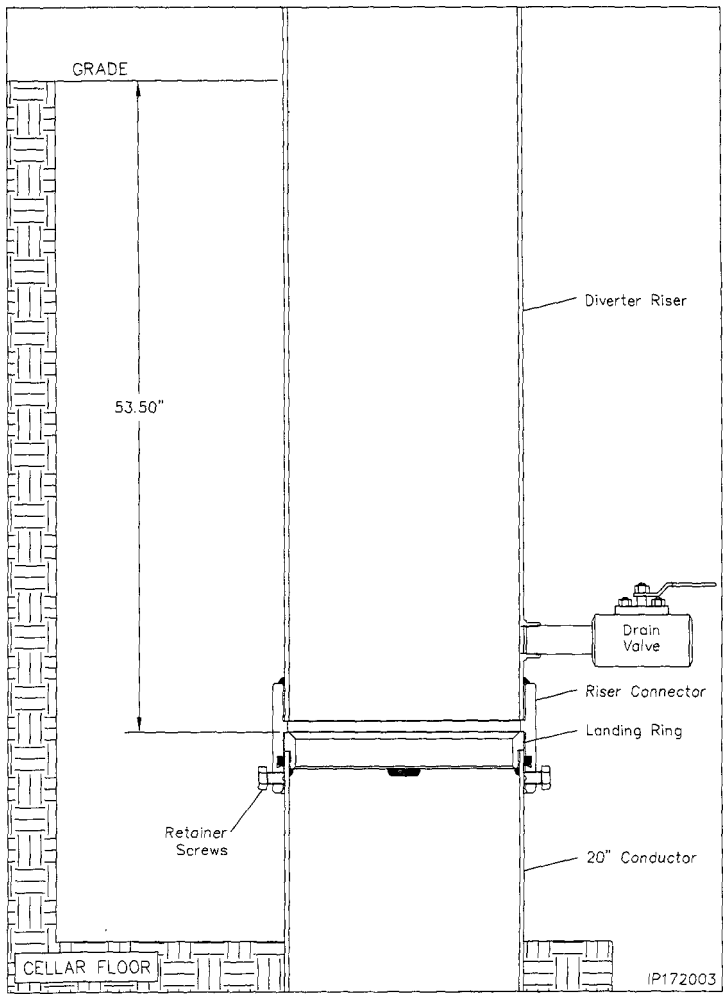
Note: In cold weather environments it is recommended to remove the o-ring from the connector and heat it on the floor board of the service vehicle or heat the O.D. of the connector with a rose bud to soften o-ring for easier installation.

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.



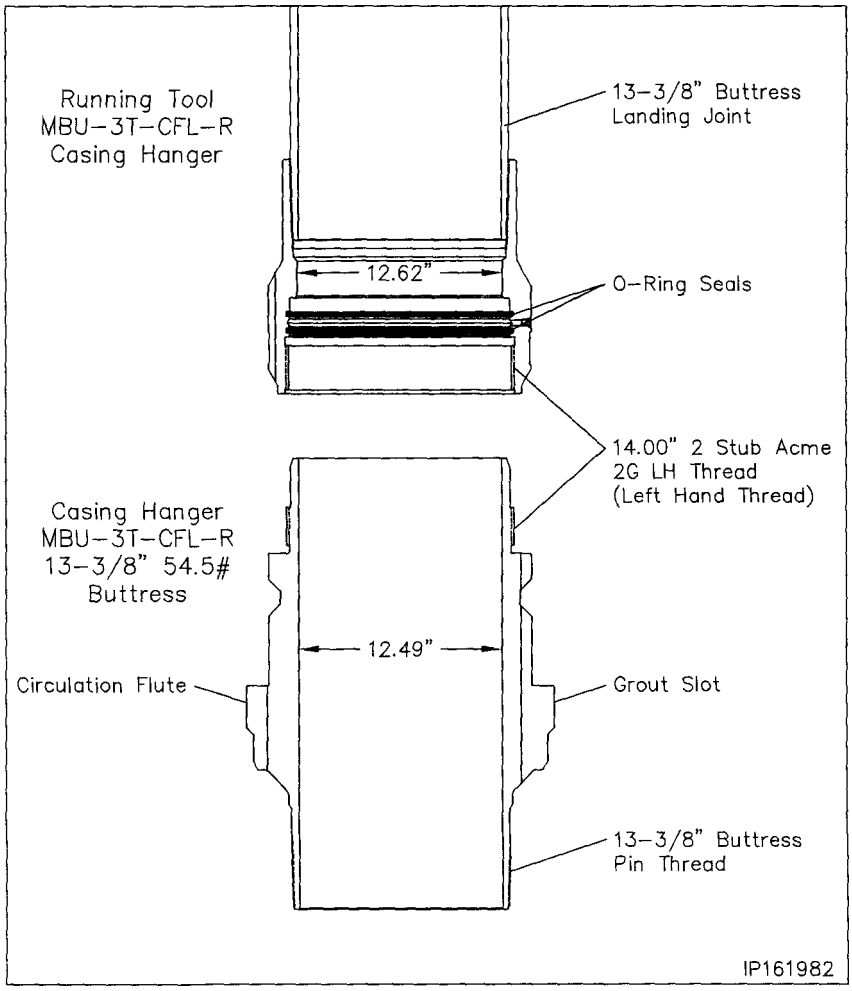


Stage 3 — Hang Off the 13-3/8" Casing

1. Examine the ***13-3/8" (54.5#) 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

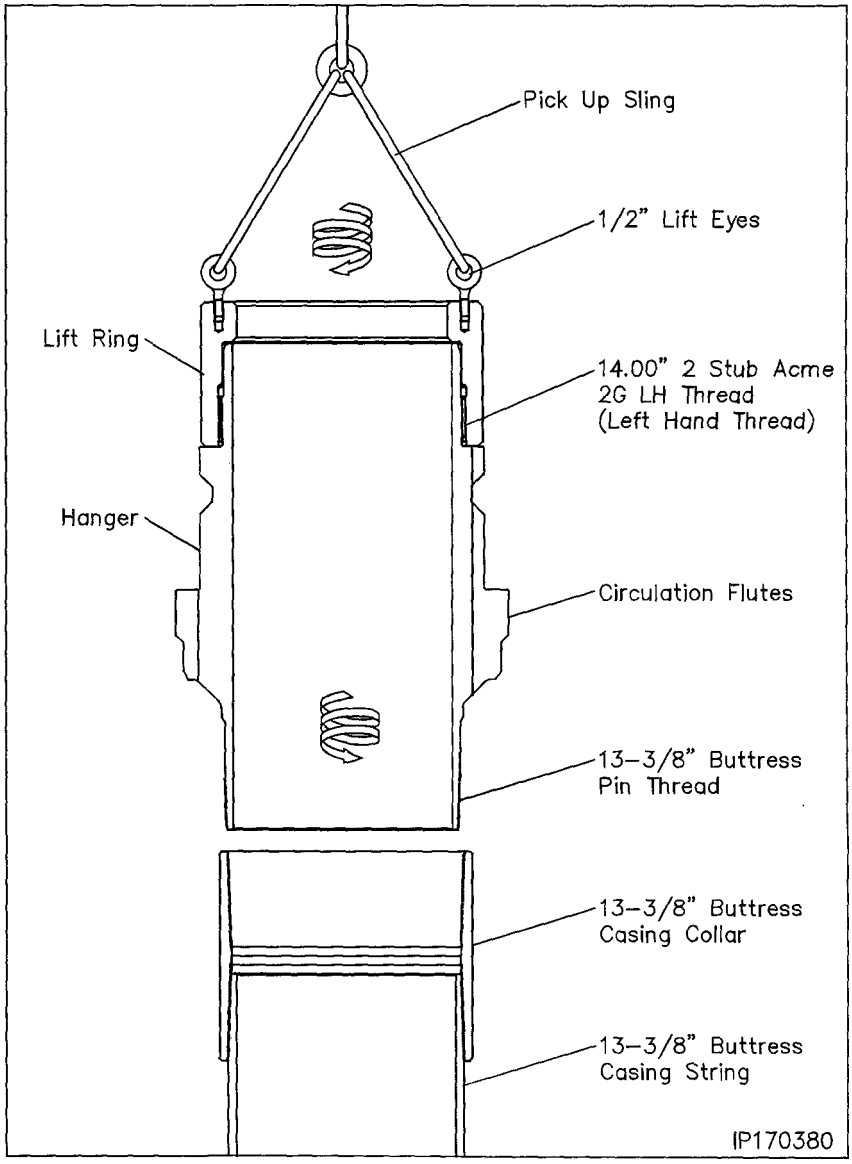
2. Examine the ***13-3/8" Buttress Box MBU-3T-CFL-R Casing Hanger Running Tool (Item ST2).*** Verify the following:
   - internal threads are clean and in good condition
   - bore is free of debris
   - o-rings are in place and undamaged

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" lift 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 devise to the hanger lift ring using the 3/4" lift 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.

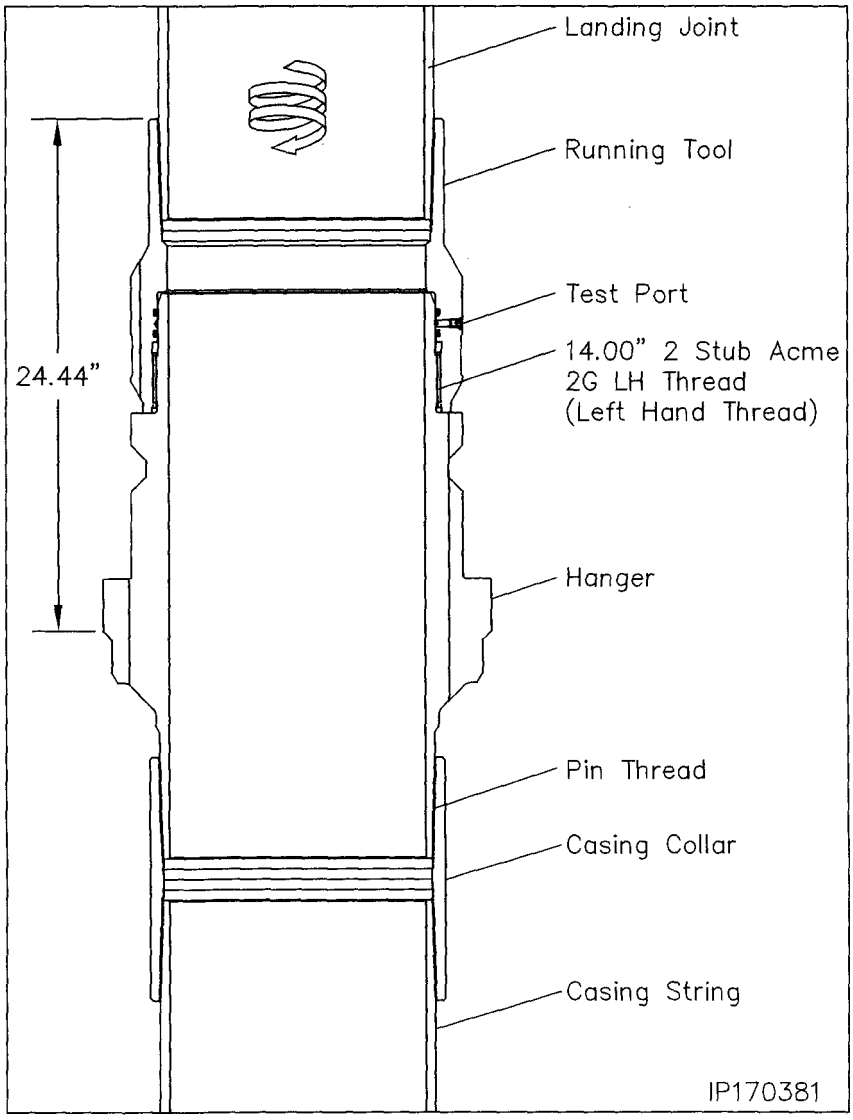
19. ***Using chain tongs only,*** rotate the running tool to the right to locate the tread start and then to the left to a positive stop. Approximately 4-1/2 turns.

WARNING: 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 5 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" lift 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 devise 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.

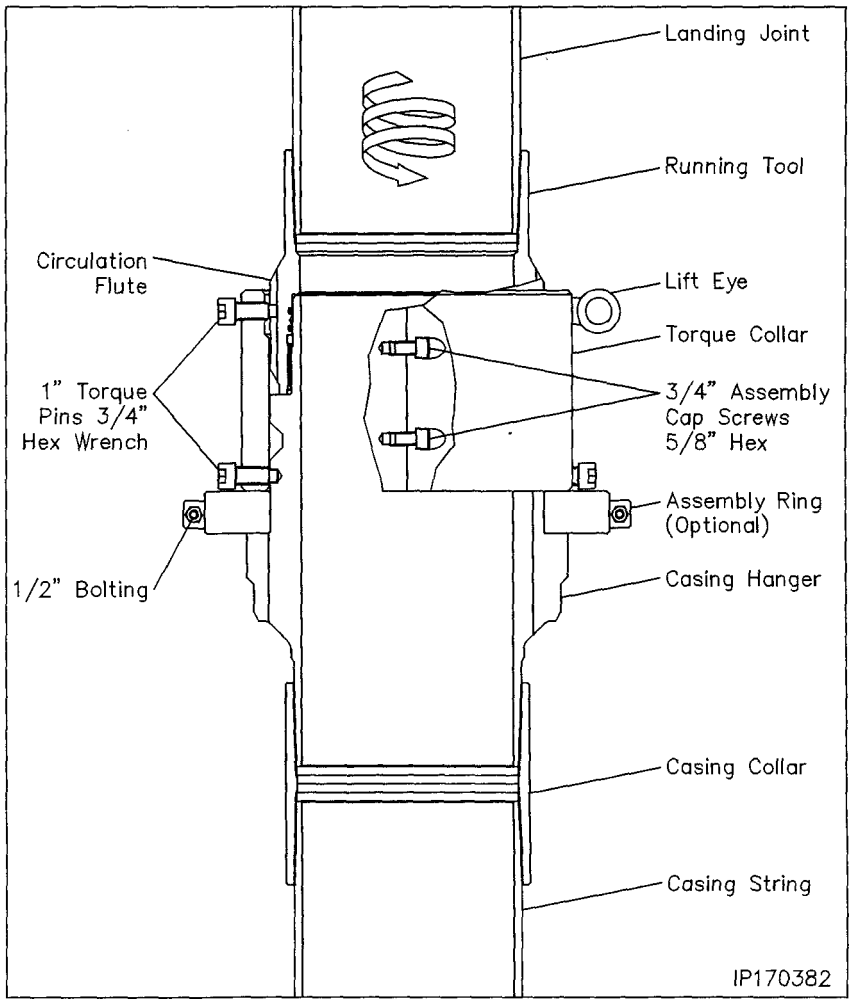
30. Remove the lift eyes.

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 lift eyes

37. Attach a suitable lifting devise 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 53.50", 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, 53.50" below grade.

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.

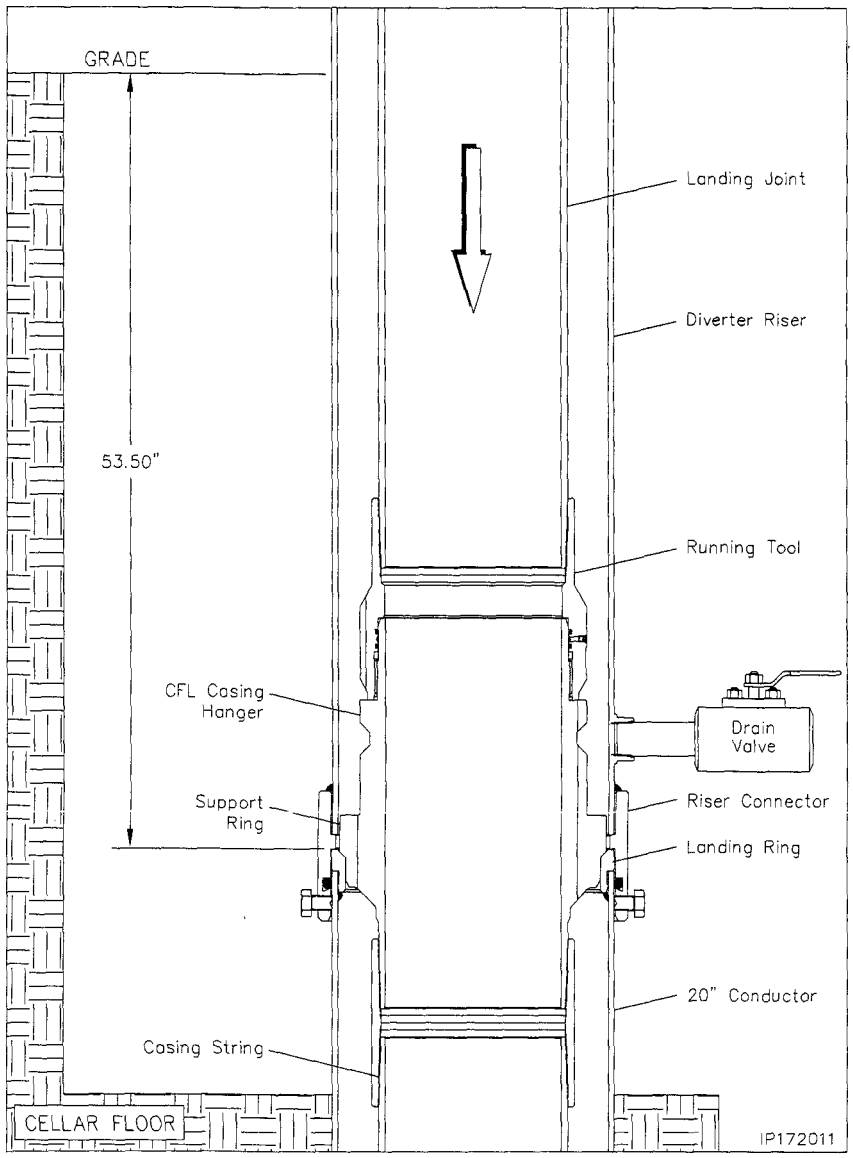
45. Cement the casing as required.

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. ***Using Chain Tongs Only located 180° apart,*** 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.

WARNING: 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.**

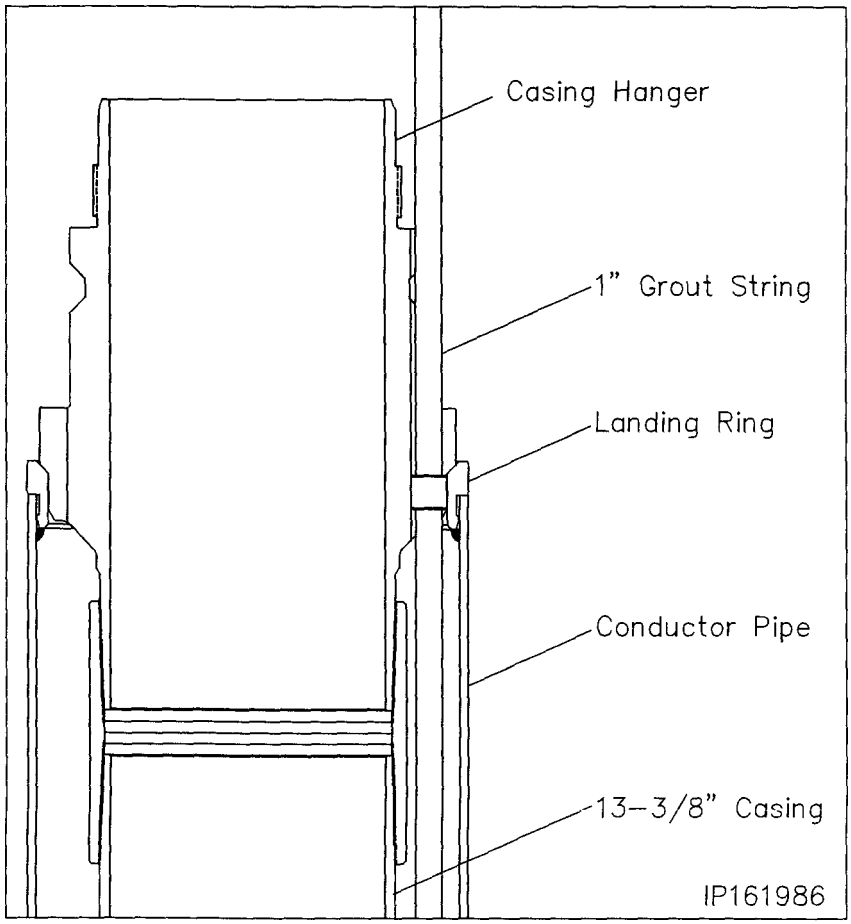


Stage 3 — Hang Off the 13-3/8" Casing

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 21.0" 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.



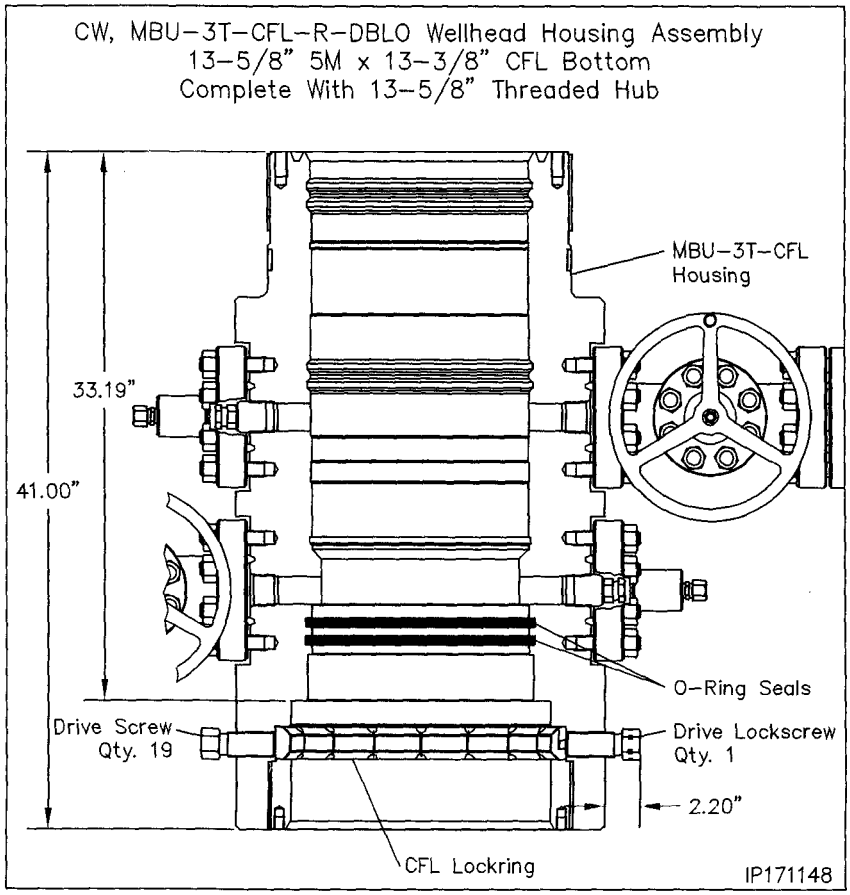
Stage 4 — Install the MBU-3T-CFL-R-DBLO Housing

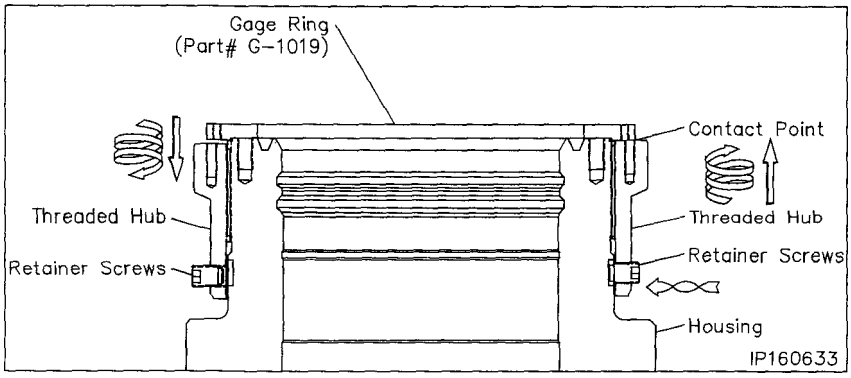
1. Remove protector cap if previously installed.
2. Using a high pressure water hose, thoroughly clean the top and neck of the CFL hanger, removing all old grease and debris.
3. Examine the ***13-5/8" 5M x 13-3/8 Double 'O' Bottom MBU-3T-CFL-R-DBLO Wellhead Assembly (Item A3)***. Verify the following:
   - 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 4 through 11.

4. Examine the ***13-5/8" 5M x 19.00" 4 Stub Acme Threaded Hub (Item R1)***. Verify the following:
   - Acme thread are clean and in good condition
   - remove the (4) retainer set screws an place them in a safe place
5. Thoroughly clean and lightly lubricate the mating threads of the housing and the Thread Hub with Copper Coat or Never Seize.
6. 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.
7. 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.
8. Rotate the Hub clockwise (UP) until it contacts the gage ring.

WARNING: Do not off seat the gage ring.





9. Locate the retainer screw holes in the threaded hub.
10. Rotate the Hub up or down to align the holes in the hub with the notches in the housing.
11. Install the set screws and tighten securely. Remove gage ring.
12. Thoroughly clean and lightly lubricate the mating seal surfaces of the hanger neck and the wellhead housing with oil or a light grease.
13. Ensure the lockring is heavily coated with grease or copper coat and fully retracted from the bore.

Stage 4 — Install the MBU-3T-CFL-R-DBLO Housing

14. Verify that the Drive Lockscrew is engaged in the retainer groove of the lockring and that the lockring does not rotate.

15. Verify drive screws extend out 2.20" as indicated.

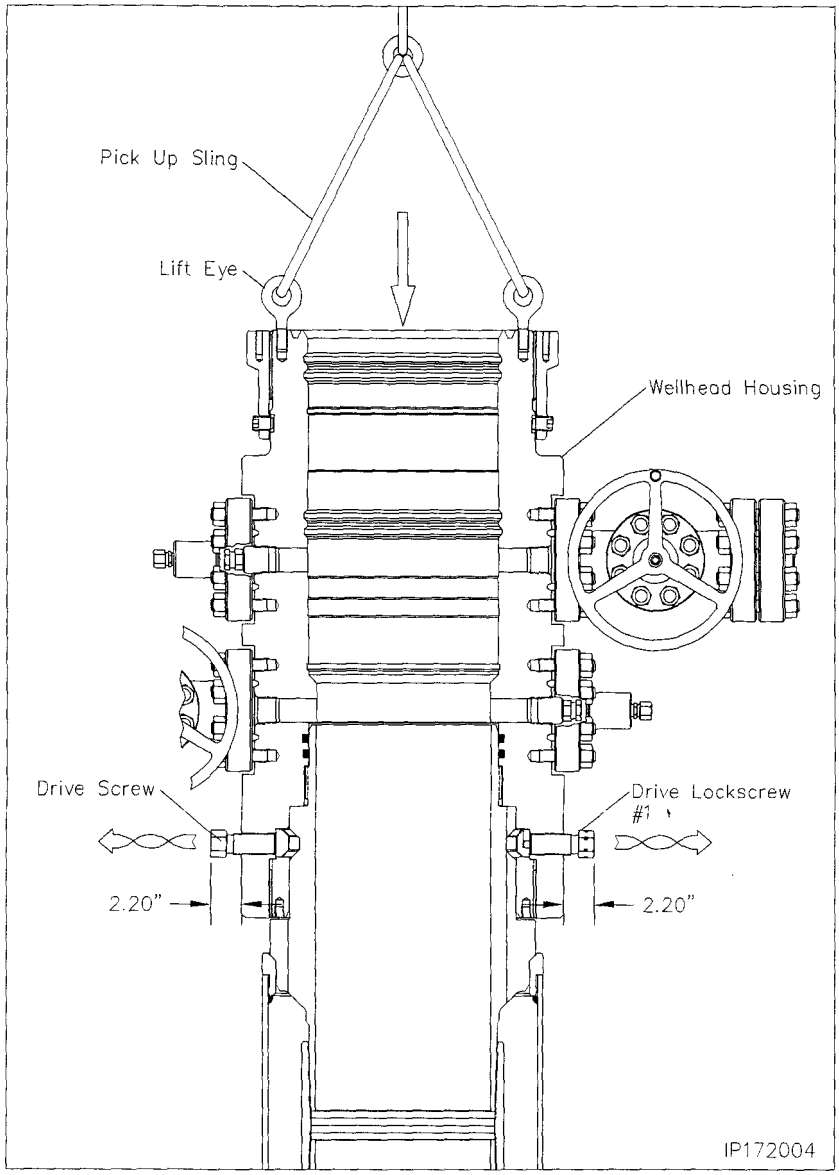
16. Attach a four point pick up sling to the lift eyes of the housing and suspend the Wellhead Assembly over the well bore.

Warning: 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".

17. Align and level the Wellhead Assembly over the hanger neck, orienting the outlets so they will be compatible with the production equipment.

18. Carefully lower the assembly over the hanger and land it on the hanger neck.

19. Ensure the wellhead is correctly positioned. It can be rotated at this time to the right or left to attain proper alignment.



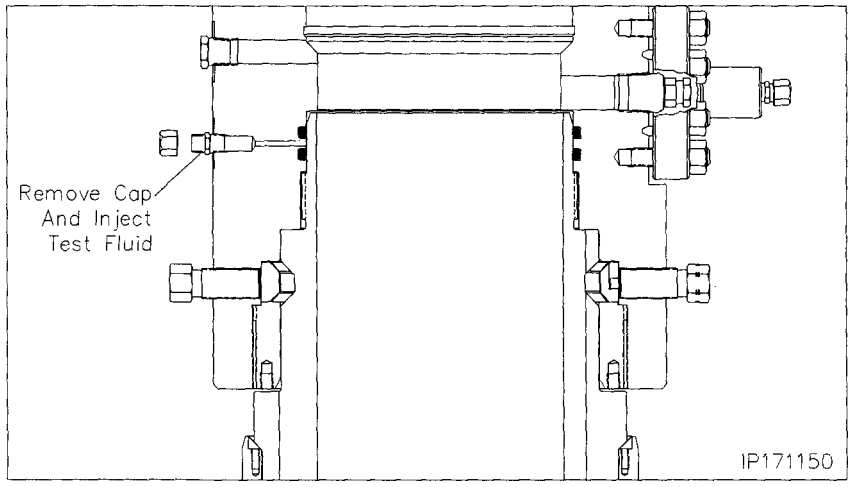
Stage 4 — Install the MBU-3T-CFL-R-DBLO Housing

Test Between the 'O-ring' Seals

1. Locate the "SEAL TEST" fitting 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.

WARNING: 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 leaving the test manifold in place.



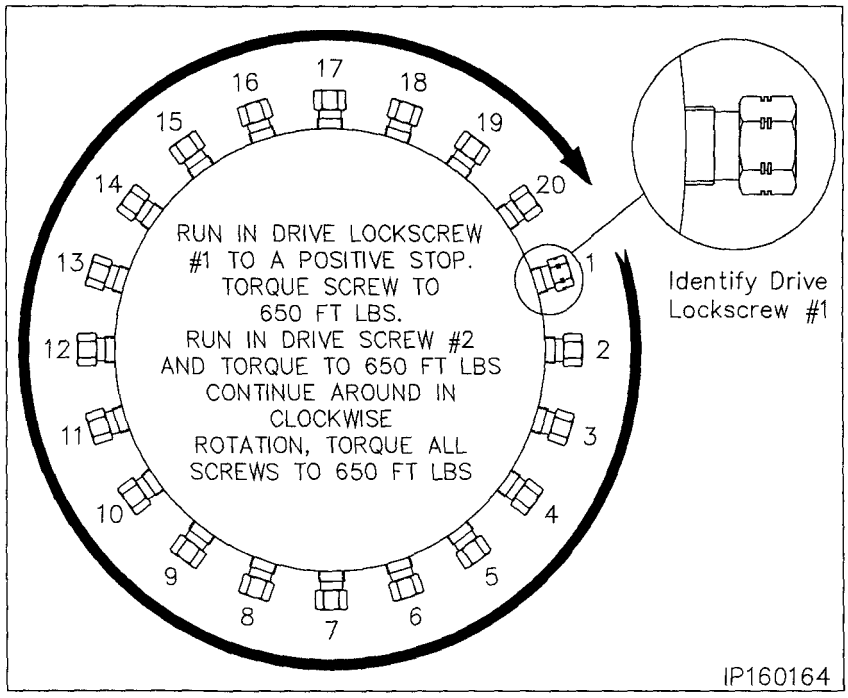
Stage 4 — Install the MBU-3T-CFL-R-DBLO Housing

Engaging the Lockring

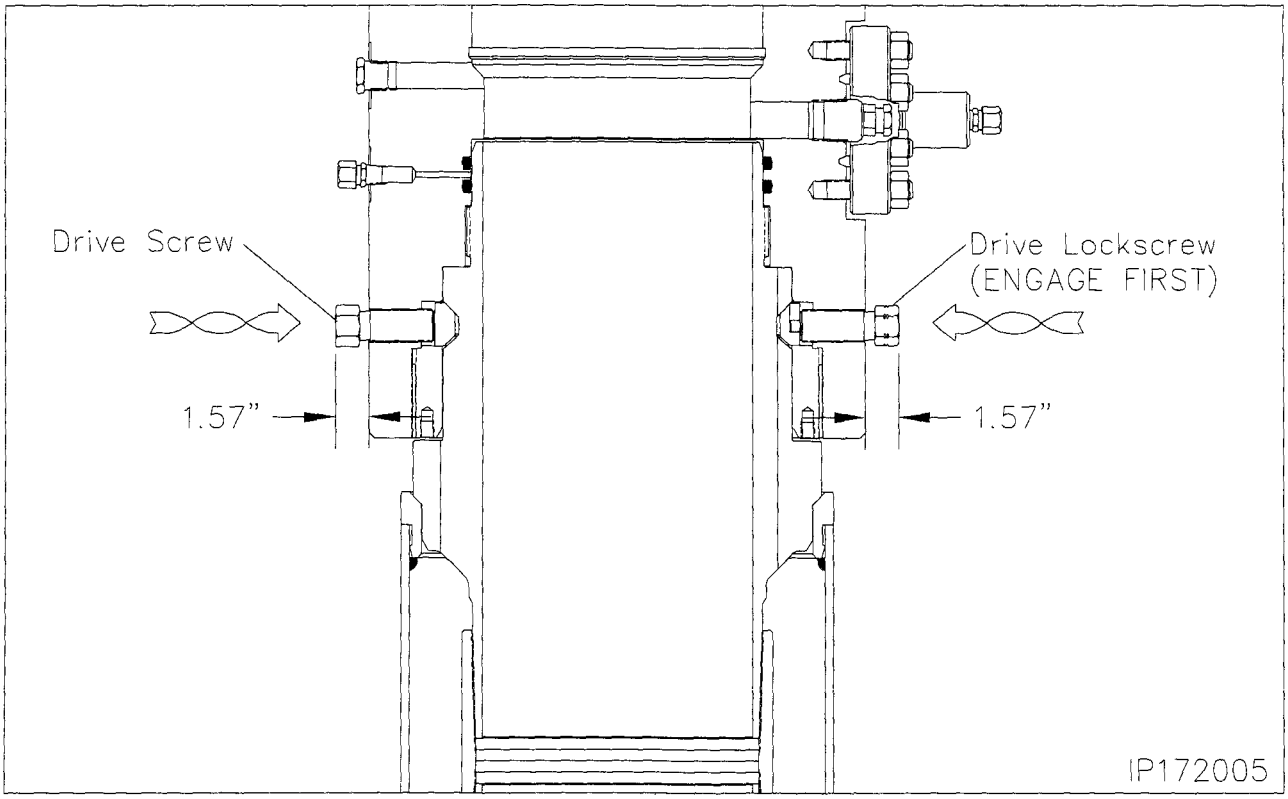
1. Locate the Drive Lockscrew as indicated in IP Dwg, IP160164 with the scribe marks on the hex and number 1 stamped on the body above the screw.
2. Using an 1-5/8" socket, run in the Drive Lockscrew to a positive stop and torque to 650 ft lbs.
3. Locate the Drive Screw to the left marked 2 and fully 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 OD of the housing.

5. With lockring engagement is 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 and install the dust cap on the open fitting.



Stage 5 — Install the MBU-3T-R Drilling Adapter

1. Examine the ***13-5/8" 5M x 19.00" 4 Stub Acme Threaded Hub (Item R1)***. Verify the following:
   - Acme thread are clean and in good condition
   - remove the (4) retainer set screws an place them in a safe place

2. Thoroughly clean and lightly lubricate the mating threads of the housing and the Thread Hub with Copper Coat or Never Seize.

3. 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.

4. 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.

5. Rotate the Hub clockwise (UP) until it contacts the gage ring.

WARNING: Do not off seat the gage ring.

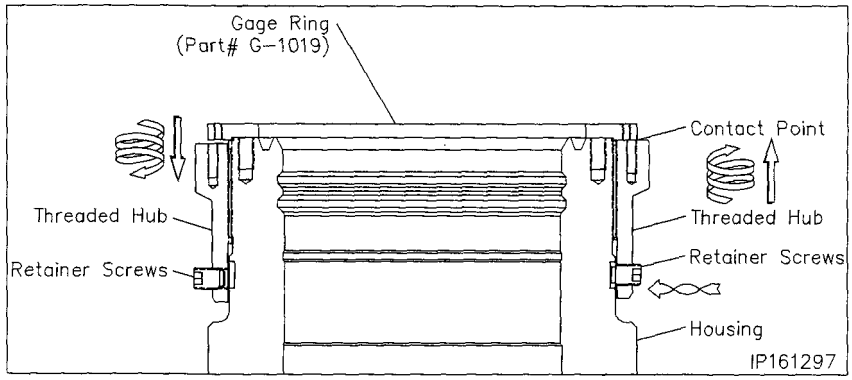
6. Locate the retainer screw holes in the threaded hub.

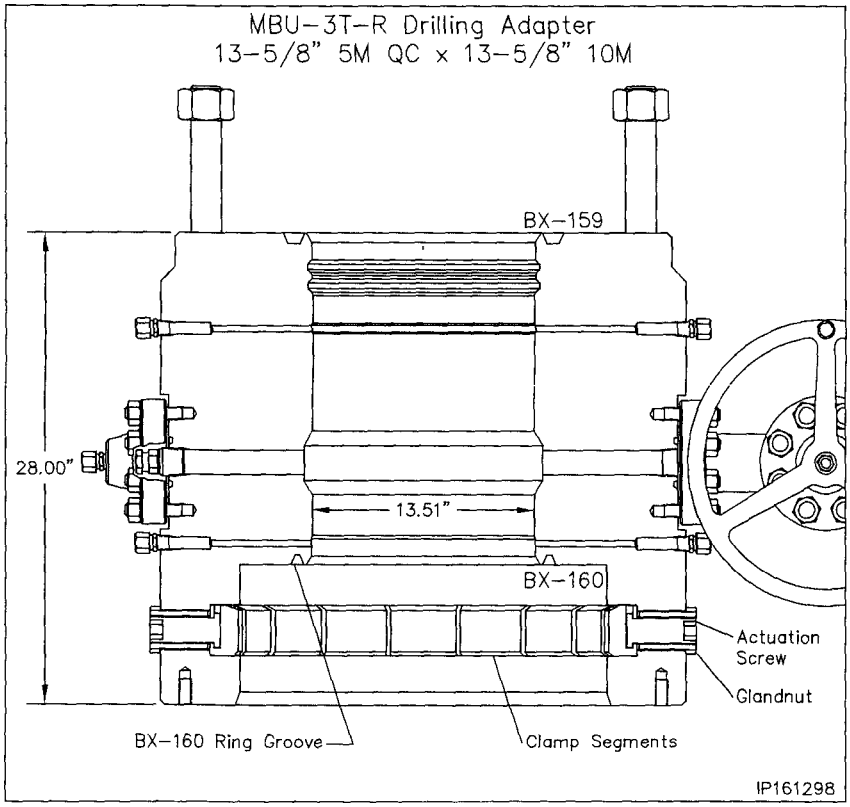
7. Rotate the Hub up or down to align the holes in the hub with the notches in the housing.

8. Install the set screws and tighten securely. Remove gage ring.

The MBU-3T-R Upper Drilling Housing is shipped to location dressed out with all outlet equipment installed.

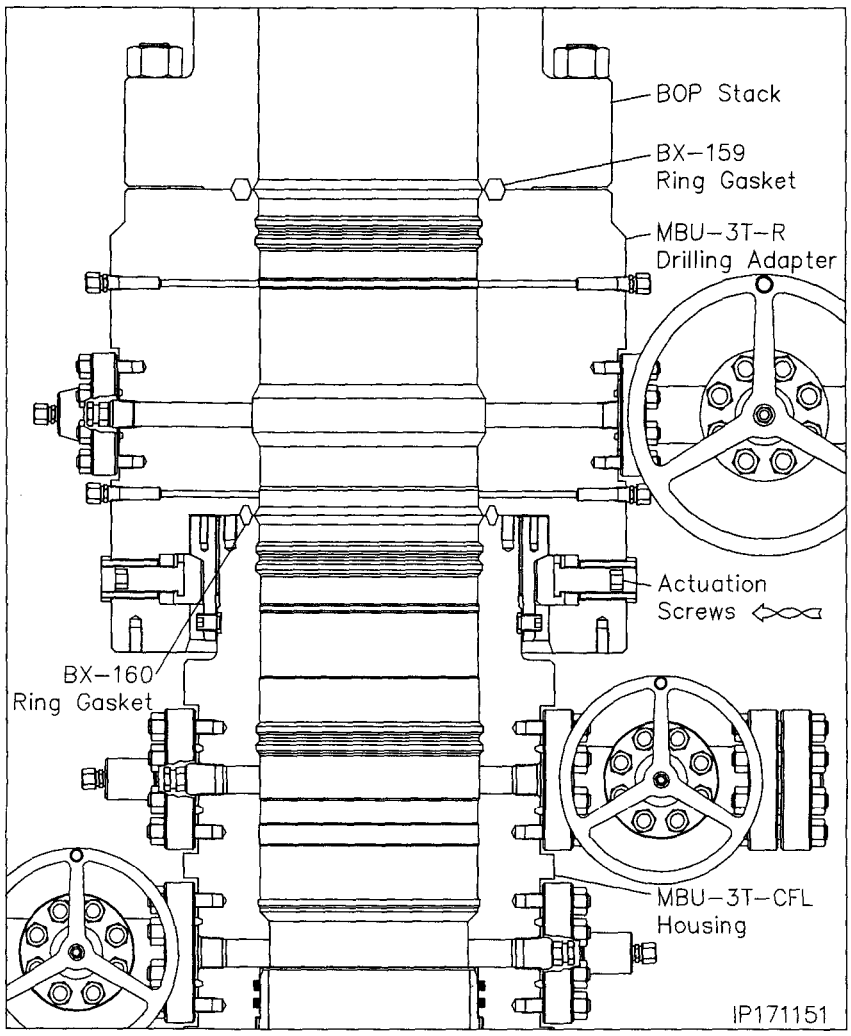
9. Examine the ***13-5/8" 10M Studded x 13-5/8" 5M MBU-3T-R Quick Connect Drilling Adapter (Item R2).*** Verify the following:
   - bore is clean and free of debris
   - ring grooves are clean and undamaged
   - (16) drive screws and clamp segments are properly installed and fully retracted
   - lift eyes are installed and tightened securely
   - outlet equipment is in place and valve operates properly





Stage 5 — Install the MBU-3T-R Drilling Adapter

10. Thoroughly clean the mating ring grooves of the drilling adapter and the MBU-3T housing.
11. Place a new ***BX-160 Ring Gasket*** in the ring groove of the MBU-3T housing.
12. Using a suitable lifting device, pick up the drilling adapter and suspend it above the well bore.
13. Carefully lower the assembly over the top of the MBU-3T housing with thread hub and land the assembly on the ring gasket while paying close attention to pinch point hazards.
14. Ensure the assembly is level and then carefully run in all of the actuation screws of the drilling adapter to contact point.
15. Ensure the assembly remains level, run in one actuation and torque to 100 ft lbs.
16. Locate the screw 180° from the first and torque to 100 ft lbs.
17. Locate the screws 90° to the right and left and torque them to 100 ft lbs.
18. Position the second 4 point sequence 90° from the first and torque each screw to 200 ft lbs
19. Run in all remaining screws to contact and then torque each screw to 400 ft lbs.
20. Make one additional round until a stable torque of 400 ft lbs on all (16) screws is achieved.
21. Install a new ring gasket in the ring groove of the drilling adapter and nipple up the BOP stack as required.



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.

1. Examine the ***13-5/8" Nominal x 4-1/2" IF CW 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

Note: Prior to installing the BOP it is recommended to attain an accurate RKB dimension for future use for accurately landing 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. Ensure this dimension is placed on the BOP board in the dog house and on the drillers daily report sheet.

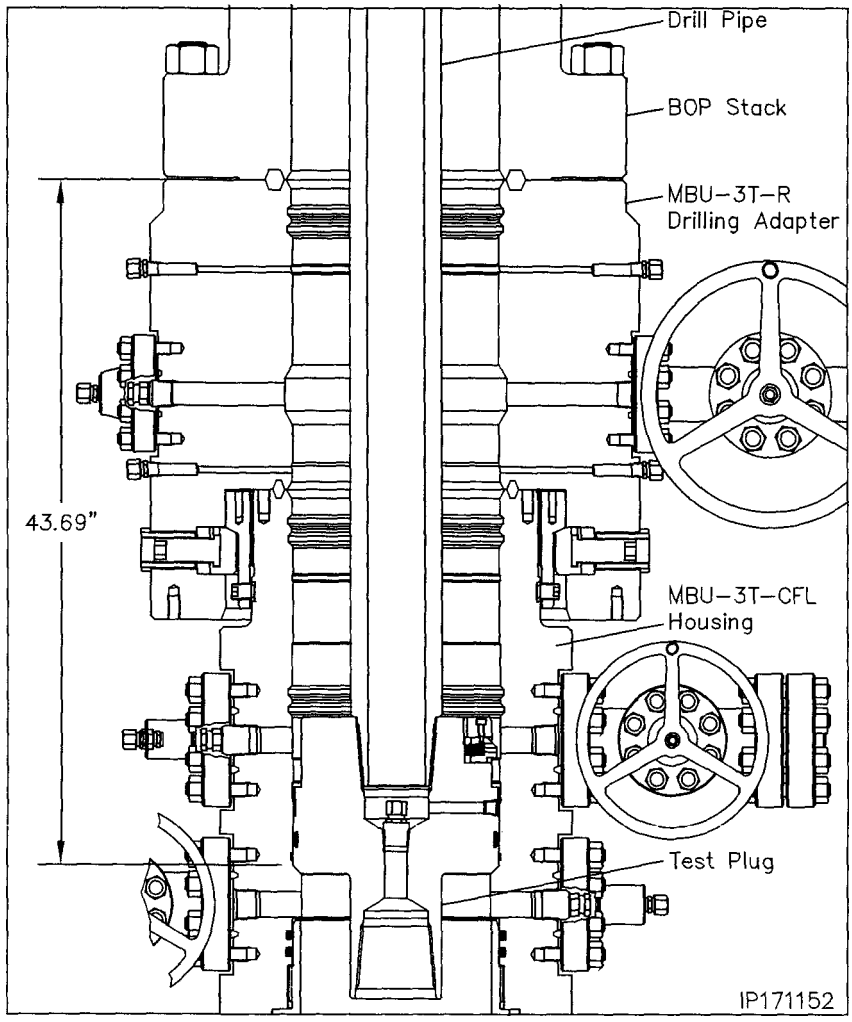
2. Position the test plug with the elastomer seal down and the lift lugs up and make up the tool to a joint of drill pipe.

WARNING: Ensure that 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.

4. Open the housing 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 MBU-3T housing, 43.69" 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 and the retrieve the test plug with a straight vertical lift.

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

Stage 7 — Run the Lower Wear Bushing

Note: 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-3T-R 2 STAGE-LWR Wear Bushing (Item ST5).*** 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
   - 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 CW Test Plug/Retrieving Tool (Item ST4)*** with drill pipe connection up.

3. Attach the Retrieving Tool to a joint of drill pipe.

4. Align the retractable lift lugs of the tool with the retrieval holes of the bushing and the 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 OD of the bushing.

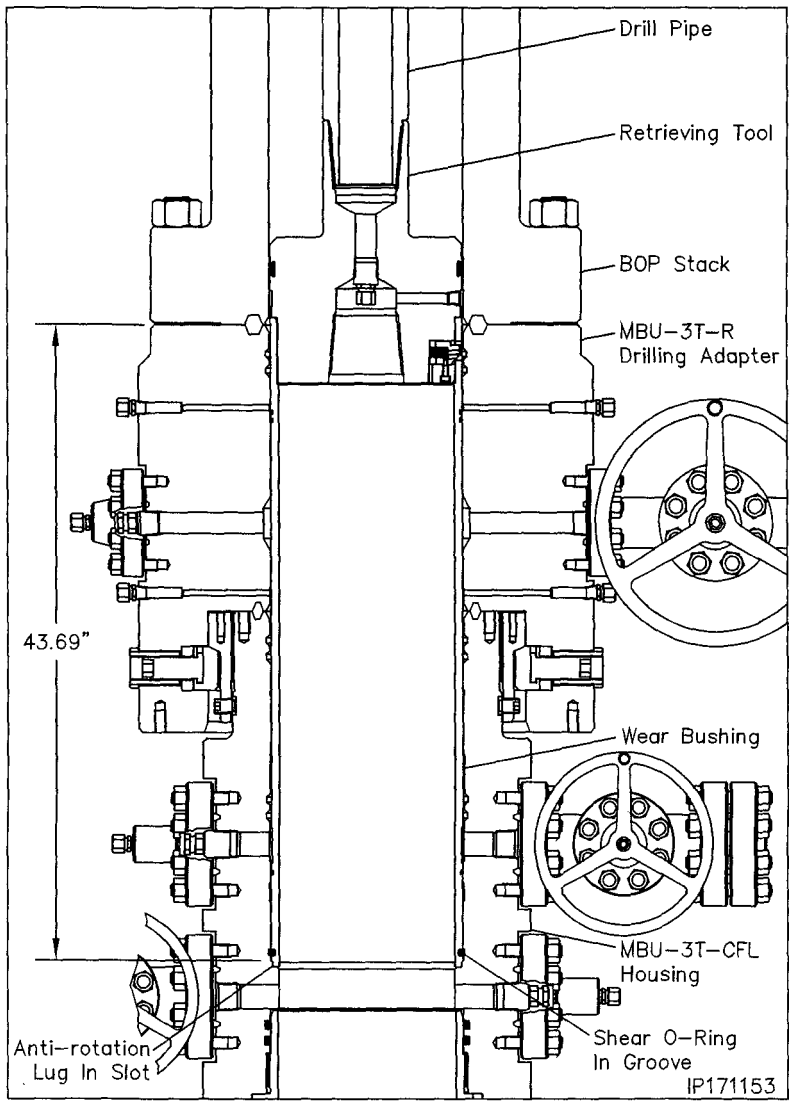
6. Fully retract all drilling housing lockscrews.

7. Slowly lower the Tool/Bushing Assembly through the BOP stack and land it on the load shoulder in the MBU-3T housing, 43.69" 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 head 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.

Note: 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. Pick up and balance the riser weight.

14. Rotate the Retrieving Tool clockwise until a positive stop is felt. This indicates the lugs have snapped into the holes in the bushing.

15. Retrieve the Wear Bushing, and 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-MBU-3T-TP4 Casing Hanger Running Tool (Item ST6).*** 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.

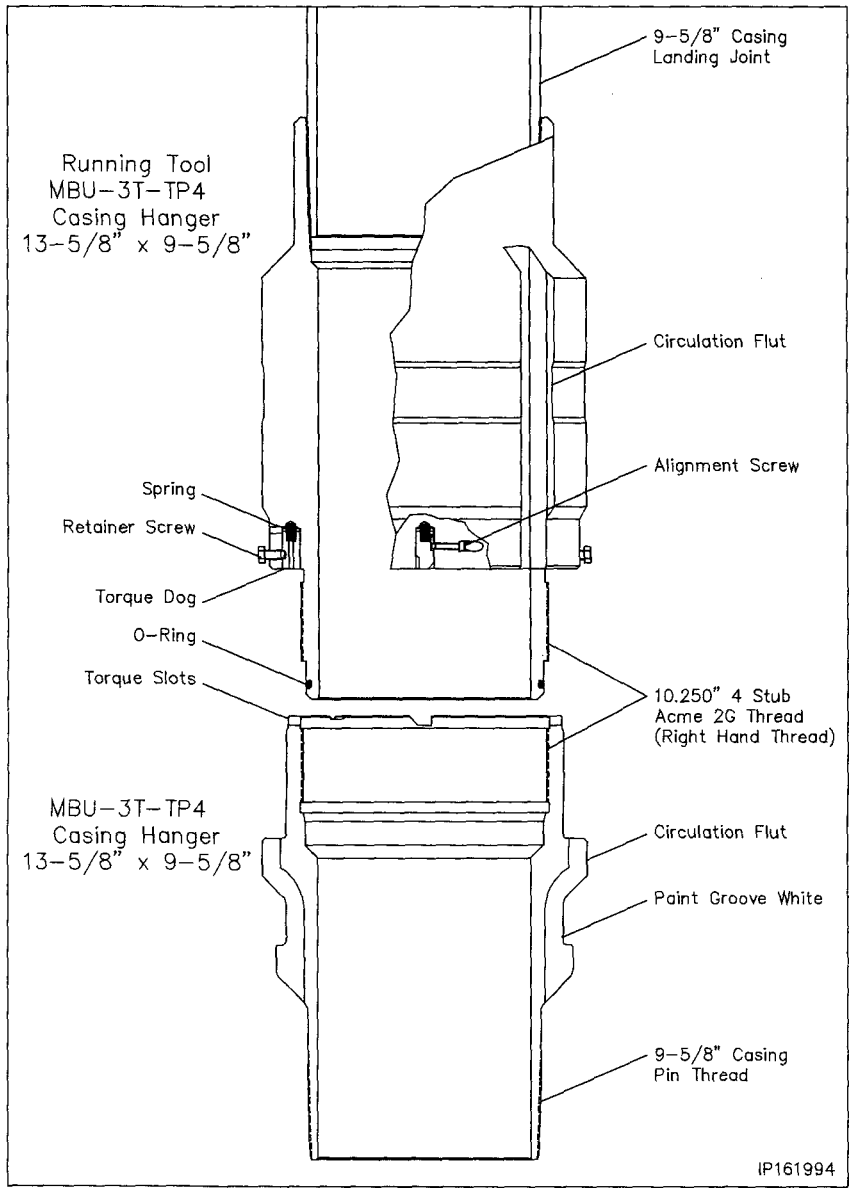
4. On the pipe rack, examine the ***13-5/8" x 9-5/8" CW-MBU-3T-TP4 Mandrel Casing Hanger (Item A13).*** Verify the following:
   - internal bore and threads are clean and in good condition
   - neck seal area is clean and undamaged
   - torque slots are clean and in good condition
   - pin threads are clean and in good condition. **Install thread protector**
   - paint indicator groove white 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 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.

WARNING: 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.



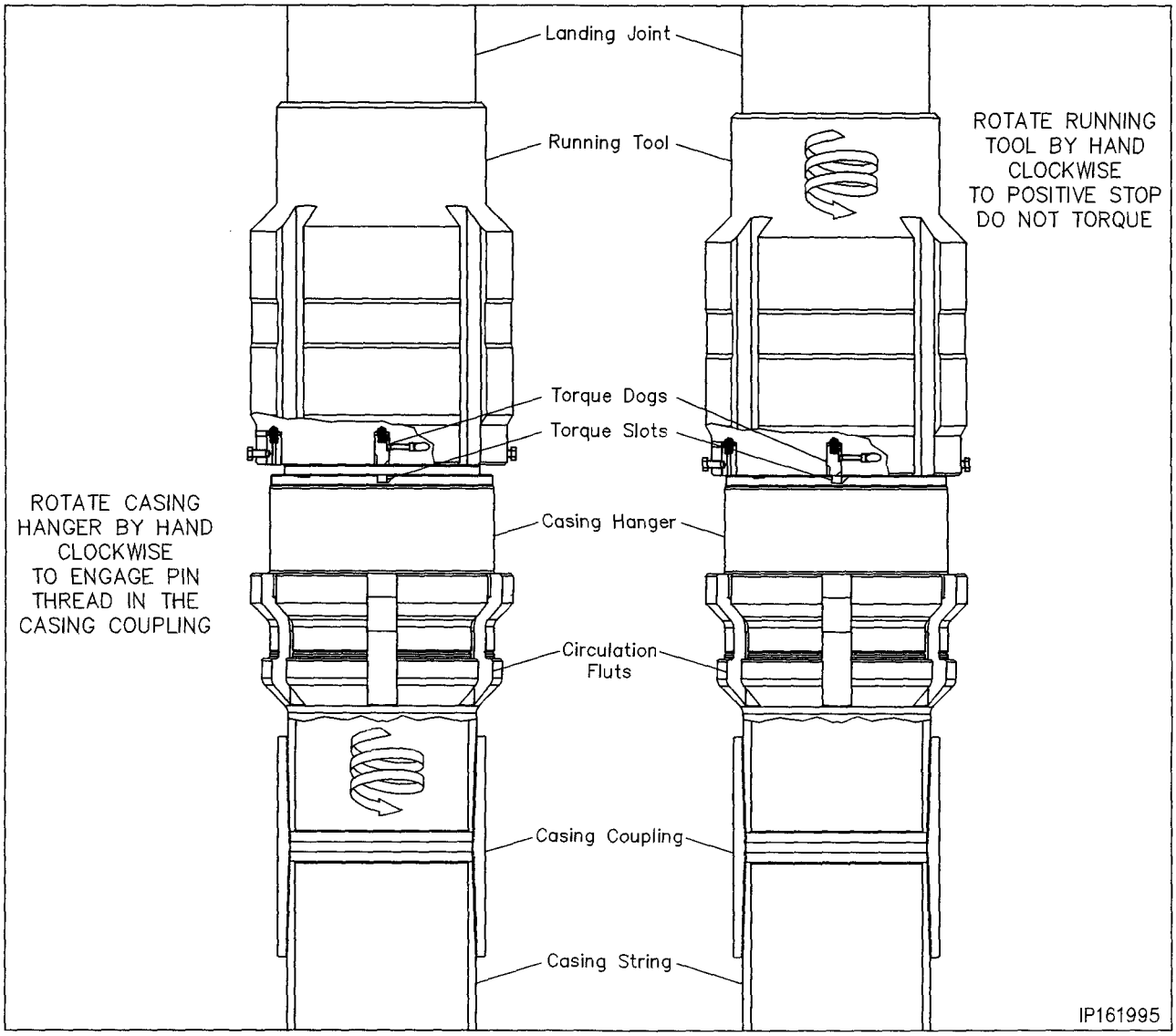
7. Calculate the total landing dimension by adding the previously determined RKB dimension and 29.69", the depth of the wellhead.

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" 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

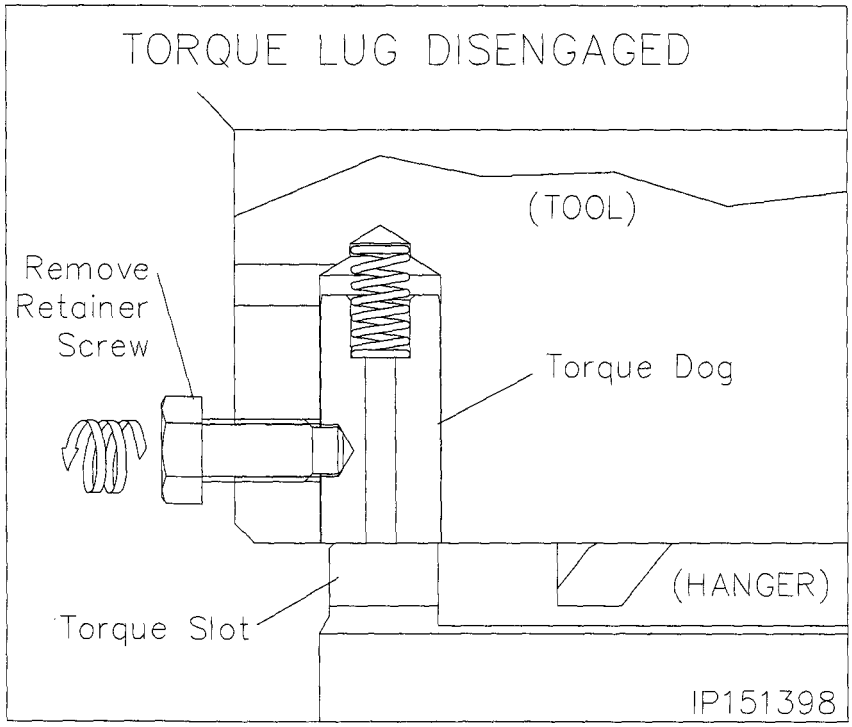
14. Locate the (4) 3/8" hex head screws in the side of the hanger running tool and remove the screws.

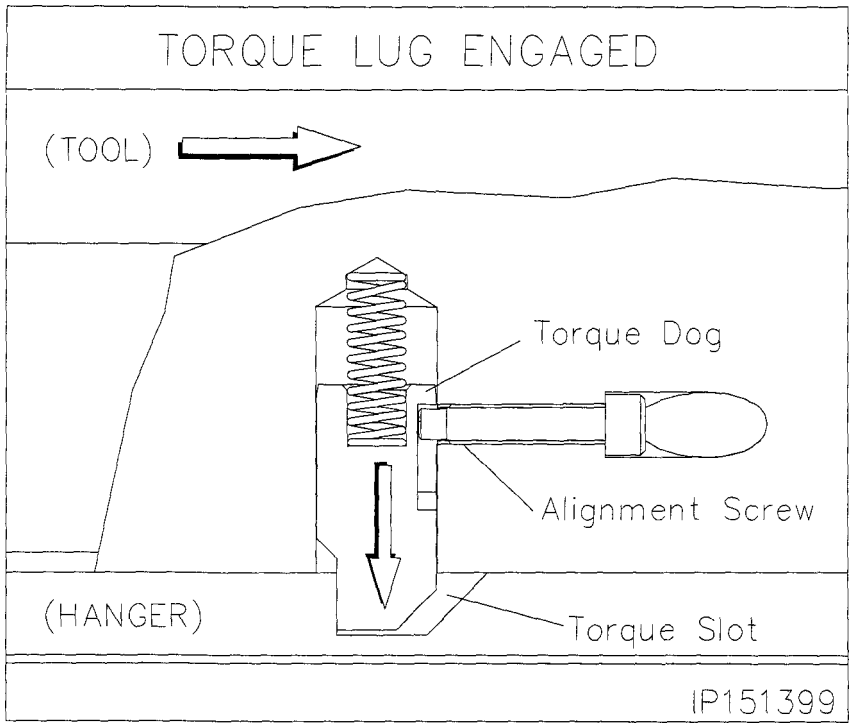
WARNING: Place the screws in a safe place to reinstall in the tool when the job is completed.

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.

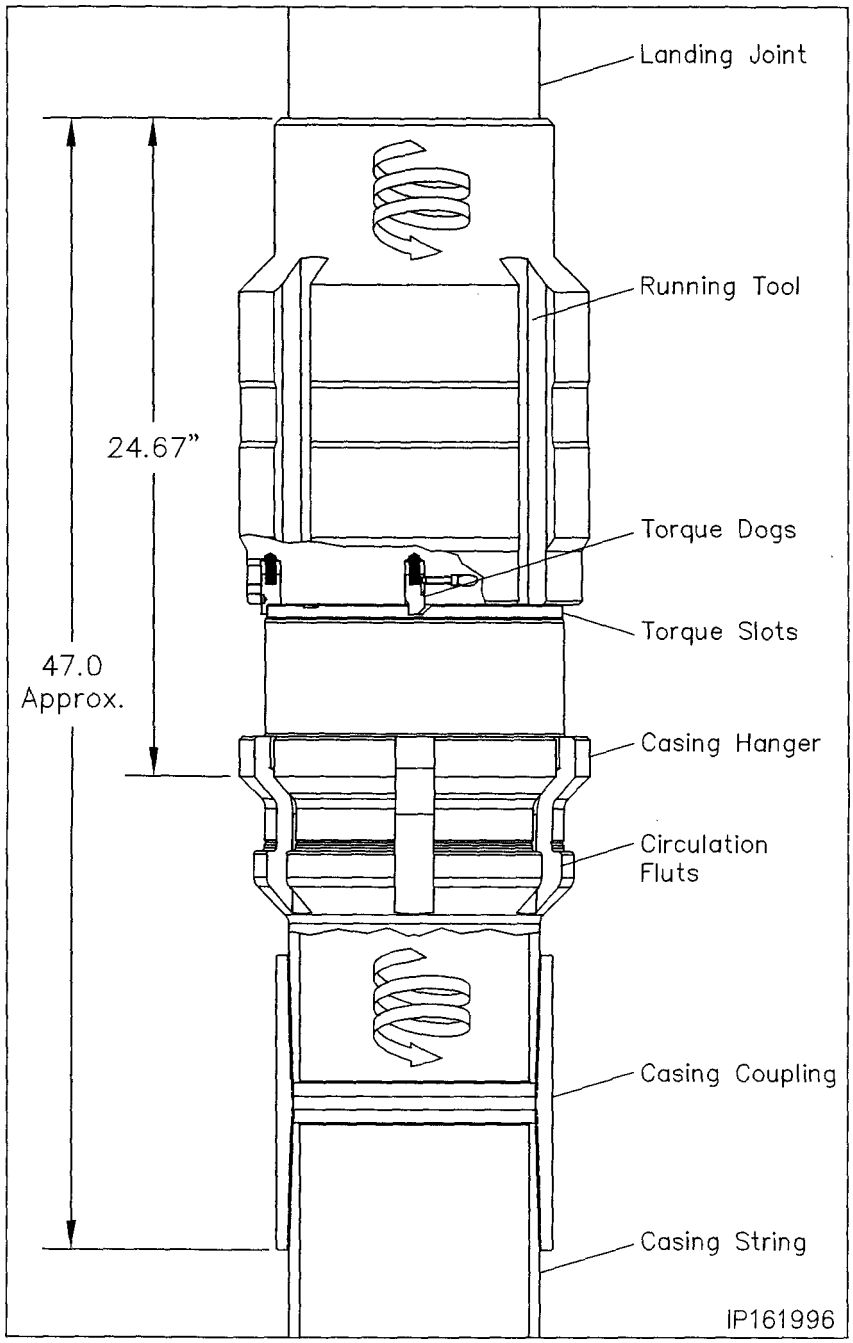
WARNING: Do not rotate the running tool more than 1/4 turn to the left. Doing so will decrease the torque dog engagement





Stage 8 — Hang Off the 9-5/8" Casing

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



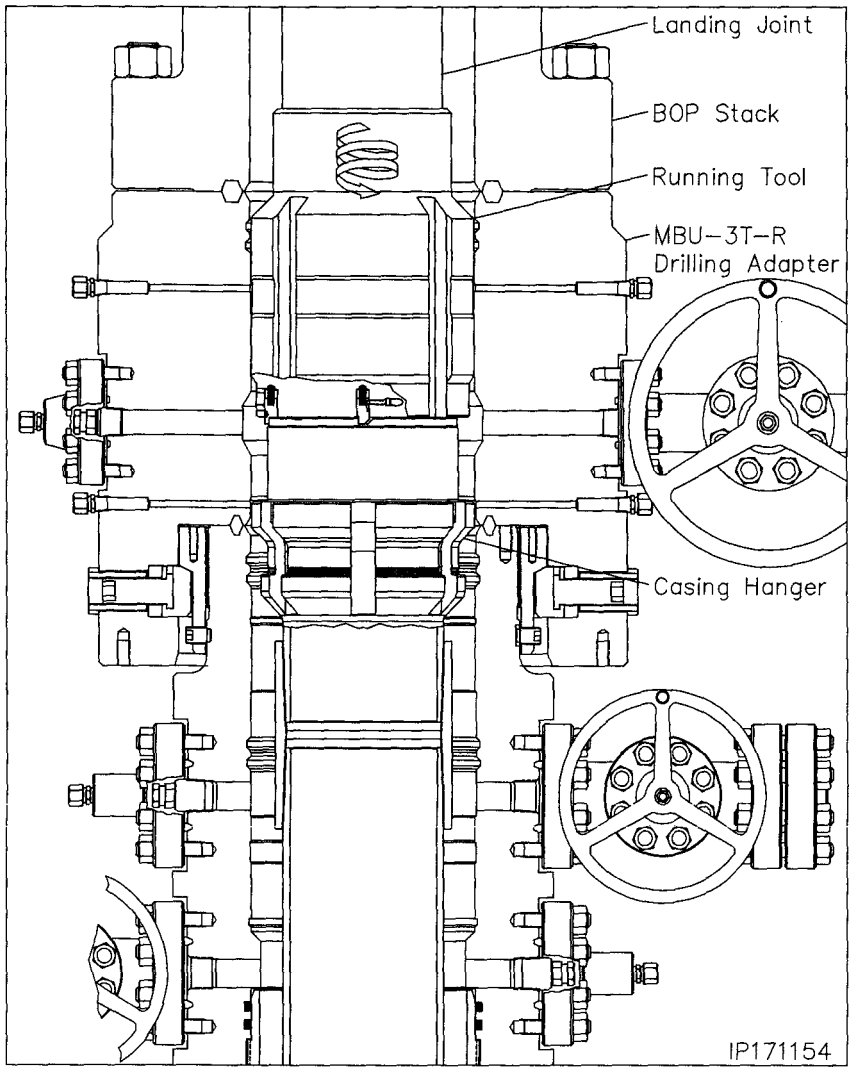
Stage 8 — Hang Off the 9-5/8" Casing

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 of 18,000 ft lbs.



Stage 8 — Hang Off the 9-5/8" Casing

WARNING: 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 housing, 43.69" 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. Open the housing lower outlet valve and drain the BOP stack.

23. Sight through the valve bore to confirm the hanger is properly landed. The white painted indicator groove will be clearly visible in the center of the open outlet valve.

24. 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.

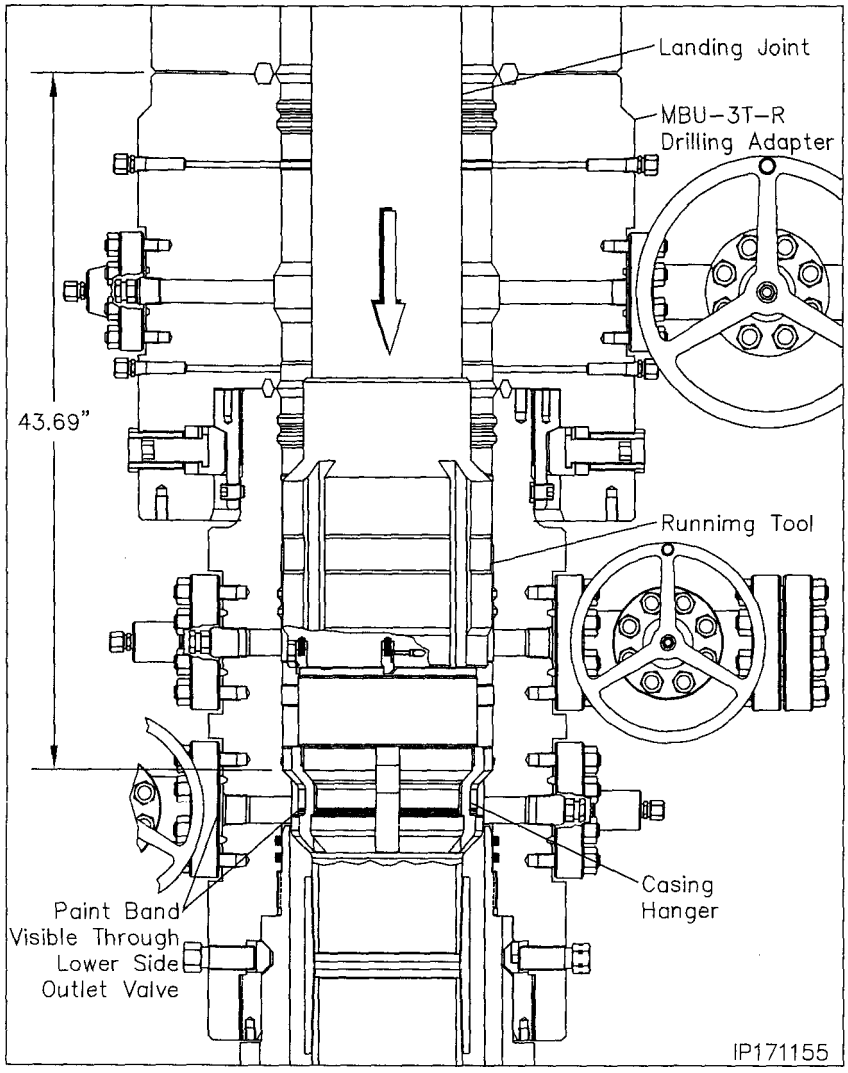
25. Cement the casing as required.

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.

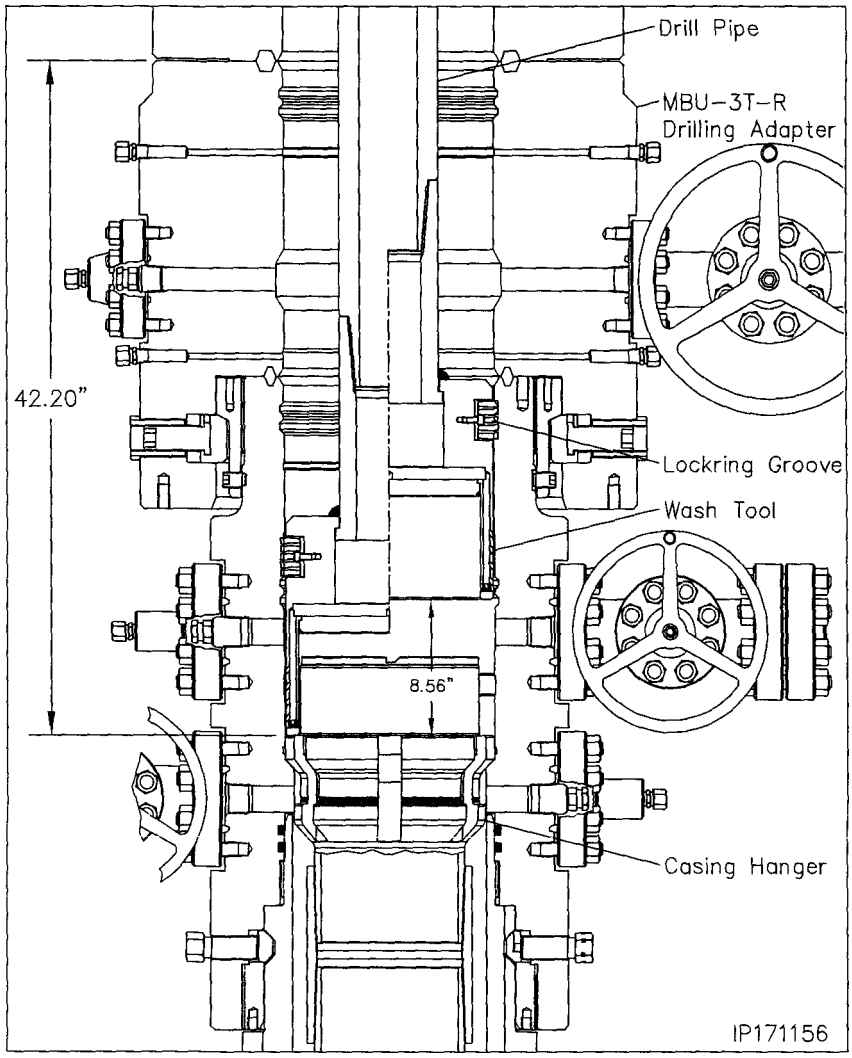
WARNING: The rig floor tong may be used to break the connection but **under no circumstances is the top drive to be used to rotate or remove the casing hanger running tool.**



Stage 8 — Hang Off the 9-5/8" Casing

Running the 13-5/8" Wash Tool

1. Open the lower side outlet on the MBU-3T housing and drain the BOP stack.
2. Monitor the open outlet to ensure the well is in a no flow condition.
3. Close the valve and rig up cellar pump.
4. Examine the ***13-5/8" x 4-1/2" IF Wash Tool (Item ST8).*** 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
5. Orient the Wash Tool with drill pipe box up. Make up a joint of drill pipe to the tool.
6. Carefully lower the Wash Tool through the BOP and land it on top of the 9-5/8" casing hanger, 42.20" below the top flange of the drilling adapter.
7. Place a paint mark on the drill pipe level with the rig floor.
8. Using chain tongs, rotate the tool clockwise approximately 6 turns to loosen any debris that may be on top of the hanger flutes.
9. 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,
10. Open the lower side outlet valve and pump water (at approximately 25 SPM) through the tool and up the BOP stack.
11. 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.



12. Once washing is complete, land the wash tool on the hanger flutes.
13. Shut down pumps and monitor the outlet returns for debris.
14. 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 was 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.

15. Once the returns are clean and free of debris, retrieve the tool to the rig floor.
16. 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.

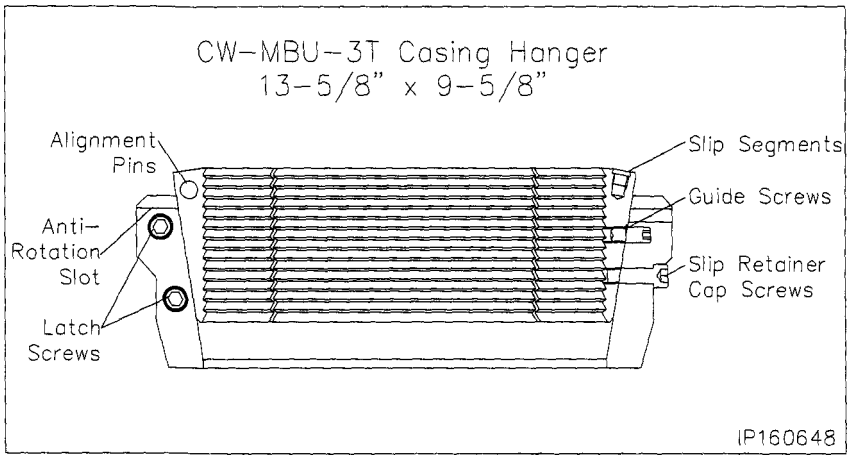
WARNING: Continue washing until all debris is removed.

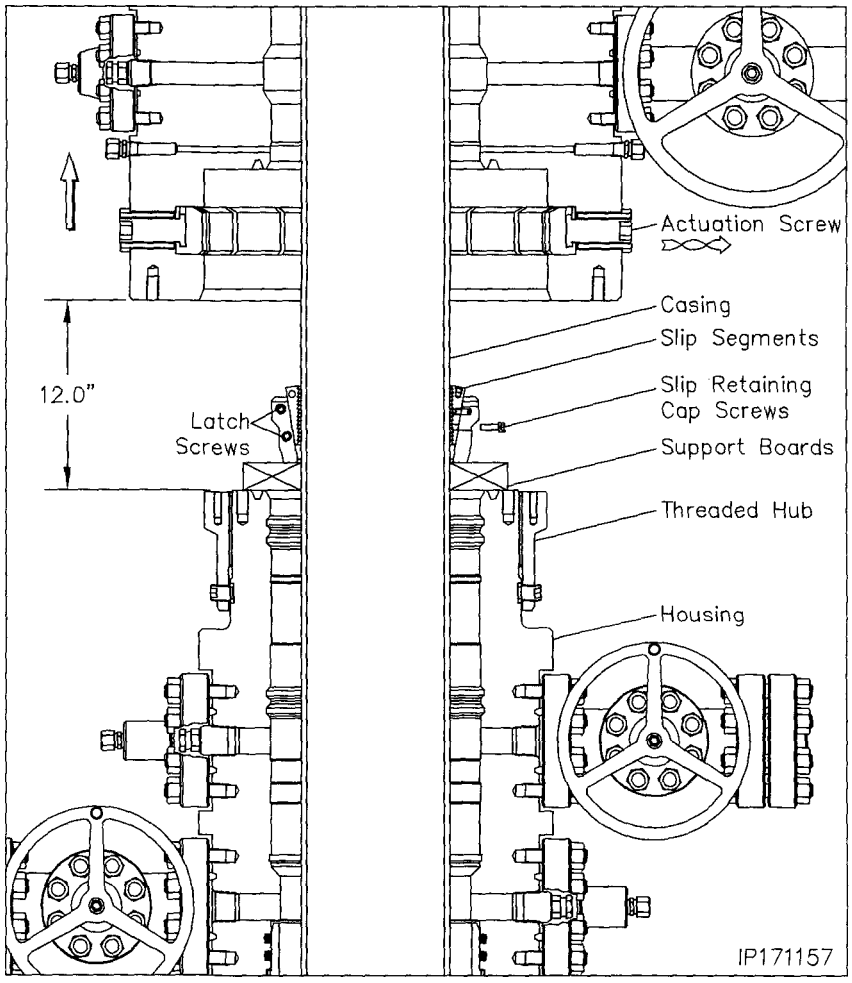
17. Once washing is complete, remove the tool from the well bore and close the open side outlet valve.

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

Note: 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.
2. Drain the BOP stack through the housing side outlet valve.
3. Locate the actuation screw on the OD of the drilling adapter.
4. Using a hex drive, fully retract the actuation screws until they are slightly over flush with the glandnuts.
5. Pick up on the BOP stack a minimum of 12" above the housing hub and secure with safety slings.
6. Washout as required.
7. Examine the ***13-5/8" x 9-5/8" MBU-3T Slip Casing Hanger (Item A13a).*** Verify the following:
   - slips and internal bore are clean and in good condition
   - all screws are in place
8. There are two latch screws located in the top of the casing hanger. Using a 5/16" Allen wrench, remove the two 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.





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

WARNING: Do Not Drop the Casing Hanger!

15. Grease the Casing Hanger's body and remove the slip retaining screws.

16. 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.

17. Pull tension on the casing to the desired hanging weight and then slack off.

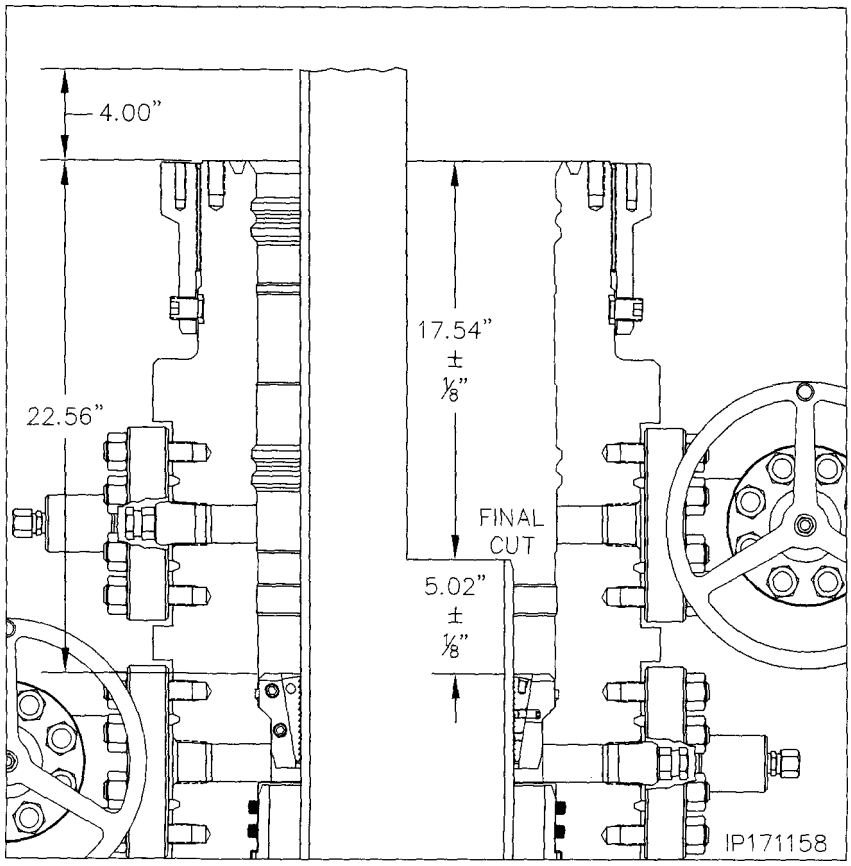
Note: A sharp decrease on the weight indicator will signify that the hanger has taken weight and at what point, If this does not occur, pull tension again and slack off once more.

WARNING: Because of 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 gas with an approved sensing device prior to cutting off the casing. If gas is present, do not use an open flame torch to cut the casing. It will be necessary to use a air driven mechanical cutter which is spark free.

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

19. Using the Wach's internal casing cutter, final cut the casing at 17.54" ± 1/8" below the top of the lower adapter or 5.02" ± 1/8" above the hanger body.

20. 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 a I.D. chamfer to match the minimum bore of the packoff to be installed.



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

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

22. Locate the two anti-rotation notches in the top of the sip bowl.

23. Place a straight edge on top of the slip bowl and in line with the center of one of the notches.

24. 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 9 — Install the MBU-3T Mandrel Hanger Packoff

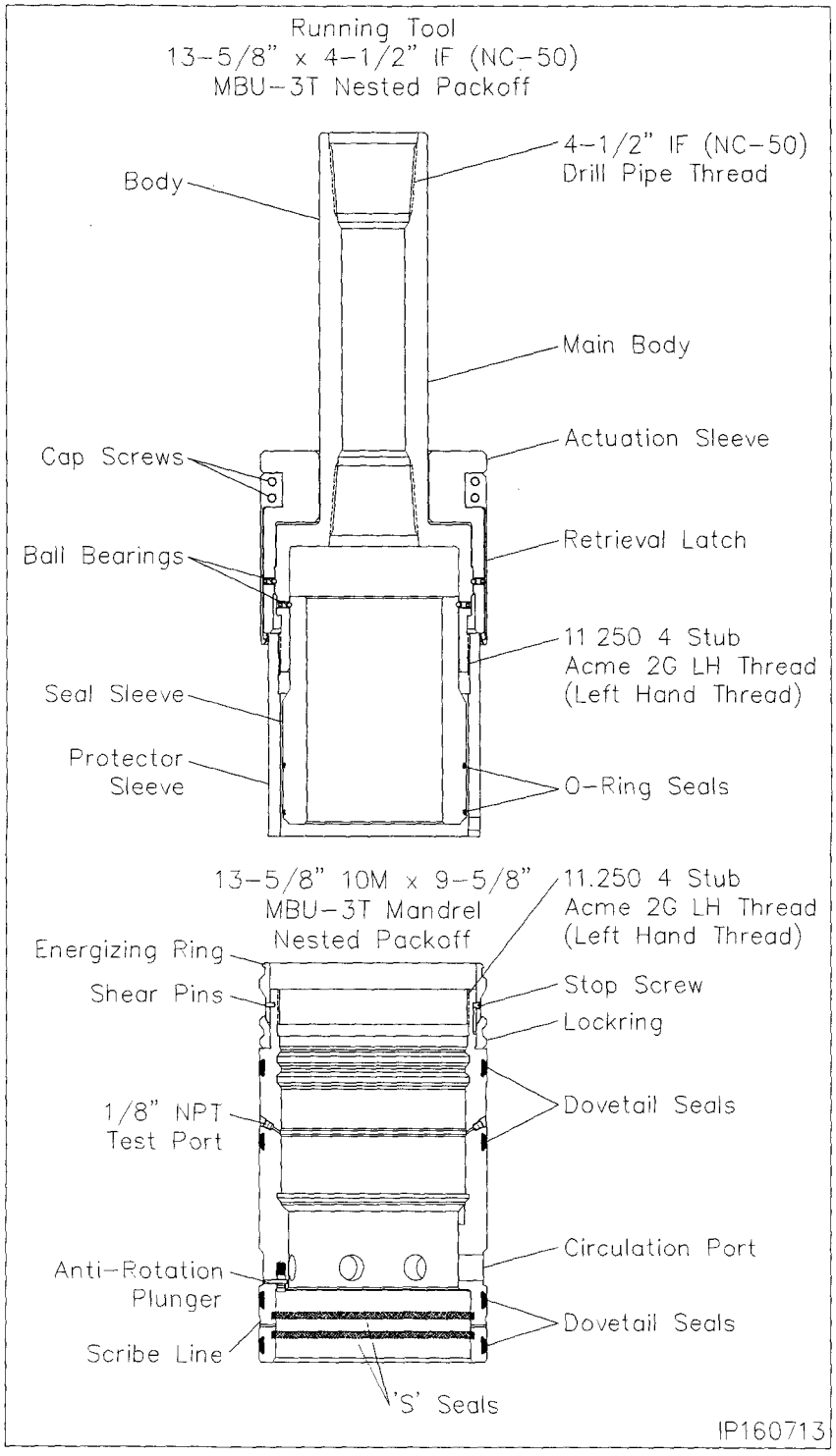
The following steps detail the installation of the MBU-3T Nested Packoff Assembly for the mandrel hanger. If the casing was landed using the emergency slip hanger, skip this step and proceed with Stage 9A for installing the emergency MBU-3T Nested packoff.

1. Examine the ***13-5/8" x 11.250" 4 Stub Acme 2G LH box top MBU-3T Mandrel Hanger Nested Packoff Assembly (Item A14).*** 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 and stop screws are loose
   - anti-rotation plungers are in place, free to move

2. Inspect the ID and OD 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 ST9).*** Verify the following:
   - Acme threads are clean and in good condition
   - retrieval latch is in position and retained with cap screws
   - Remove seal sleeve protector sleeve
   - seal sleeve is in position and rotates freely
   - seal sleeve o-rings are in place and in good condition
   - reinstall seal sleeve protector

4. Remove the retrieval latch and set aside.

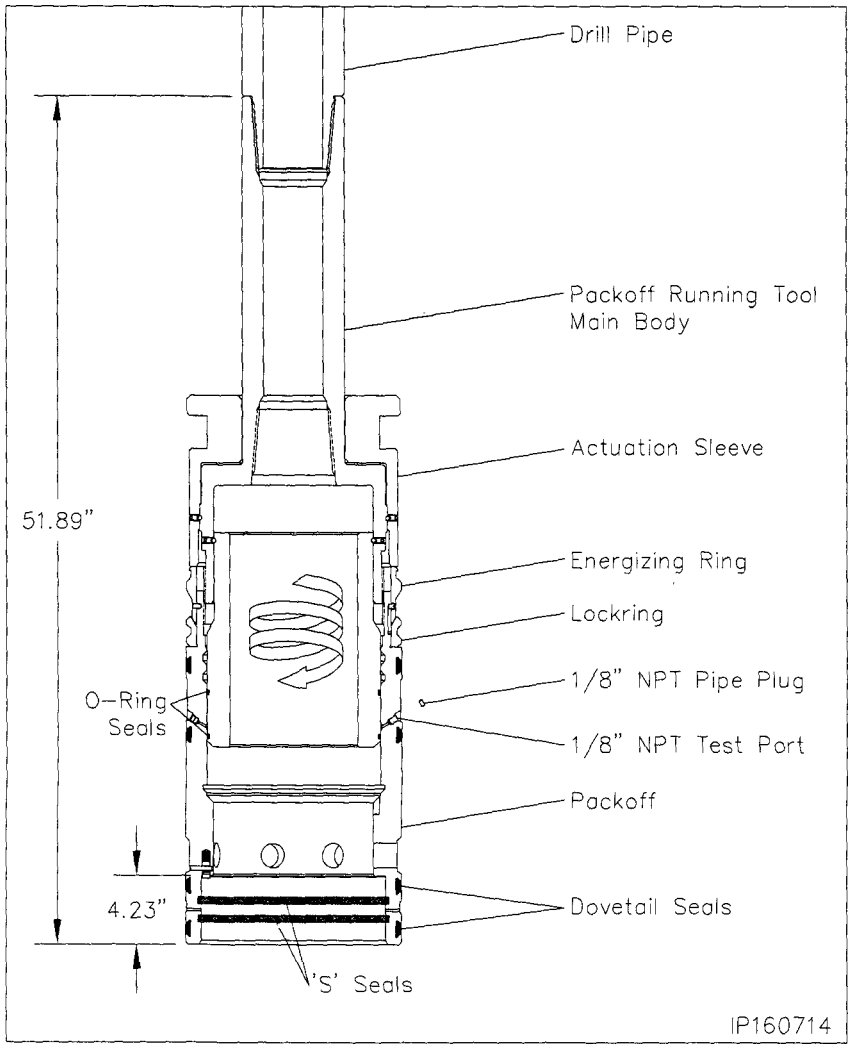


Stage 9 — Install the MBU-3T Mandrel Hanger Packoff

5. Make up the running tool to 4-1/2" drill pipe and torque the connection to optimum make up torque.
6. Pick up the Running Tool with landing joint and suspend it above the packoff.
7. Remove the tool protector sleeve with counter clockwise rotation and set the sleeve aside.
8. Thoroughly clean and lightly lubricate the mating Acme threads of the running tool and packoff with oil or light grease.
9. Lightly lubricate the seal sleeve o-rings with oil or a light grease.
10. 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 upper body makes contact with the packoff Energizing Ring. Approximately 4 turns.
11. Install (1) 1/8" NPT pipe plug in the OD test port of the packoff and tighten securely.
12. Attach a test pump to the remaining open port and inject test fluid between the seal sleeve o-rings until a stable test pressure of 5000 psi is achieved.
13. If the test fails, remove the tool and replace the leaking o-rings.
14. After a satisfactory test is achieved remove the test pump and the 1/8" pipe plug from the opposite test port.

WARNING: All 1/8" pipe plugs must be removed prior to installing the packoff

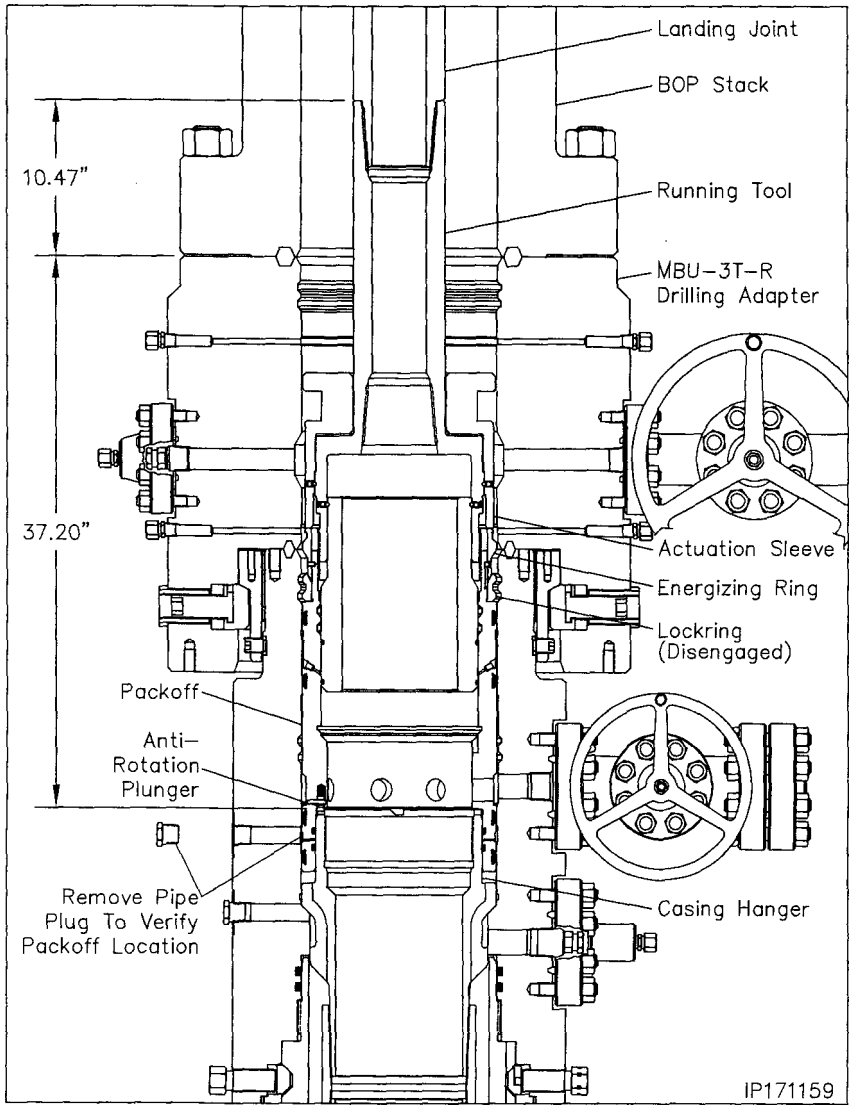
15. Pick up the assembly and thoroughly clean and lightly lubricate the packoff ID 'S' seals and the OD dovetail seals with oil or light grease.



Stage 9 — Install the MBU-3T Mandrel Hanger Packoff

Landing the Packoff

16. Remove the hole cover.
17. Measure up 5 foot from the paint mark on the OD of the packoff and place a paint mark on the drill pipe.
18. 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.
19. Place a paint mark on the landing joint at that dimension and mark land off. Place an additional mark 1-1/2" above the first one and mark engaged.
20. Continue lowering the packoff until it passes over the neck of the hanger and lands on the casing hanger neck, 37.20" below the top of the drilling adapter.
21. Locate the upper 1" sight port pipe plug and remove the plug
22. Look through the port to verify that the packoff is properly landed. The white paint scribe line will be clearly visible in the center of the open port.
23. Reinstall the pipe plug and tighten securely.



Stage 9 — Install the MBU-3T Mandrel Hanger Packoff

Seal Test

24. Locate the upper and lower seal test fittings on the O.D. of the housing and remove the dust cap from the fittings.

25. 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.

26. Hold test pressure for 5 minutes.

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

28. Repeat steps 24 through 27 for the remaining seal test.

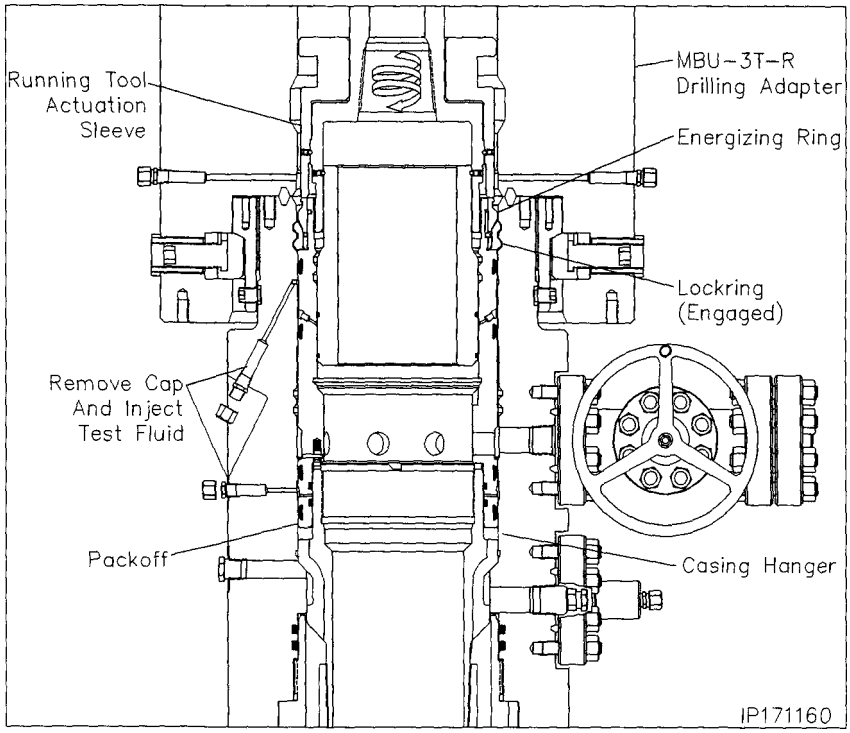
29. After satisfactory tests are achieved, bleed off the test pressure but leave the test manifolds in place.

Engaging the Lockring

30. 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.

31. Using only chain tongs, 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-LR 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.

WARNING: 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.

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

32. Back off the landing joint/running tool approximately three turns. Using the top drive, exert a 40,000 lbs. pull on the landing joint.

33. Reattach the test pump to the open test manifolds and retest the packoff seals to 5,000 psi for 15 minutes. This will also verify that the packoff is in place.

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

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

Stage 9 — 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

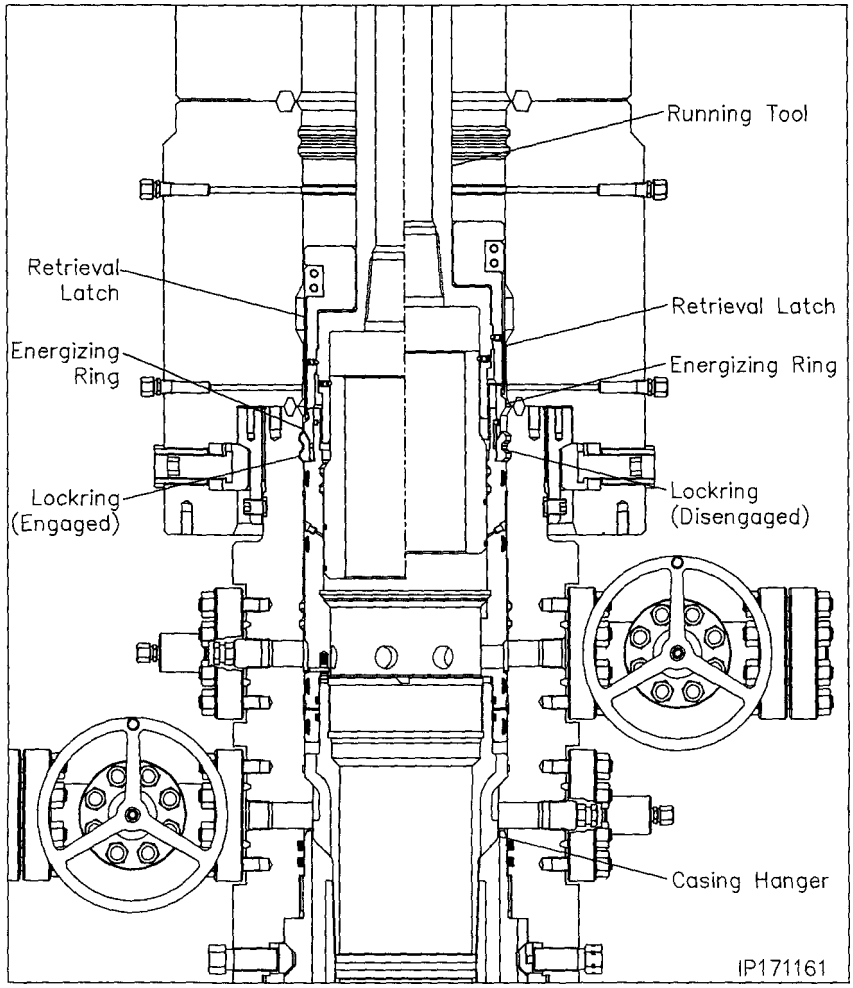
1. Position the retrieval latch so the latch finger extend from the bottom of the running tool body.
2. Reinstall the cap screws and tighten them securely.
3. Ensure the retrieval latch freely rotates on the running tool body.
4. Carefully lower the running tool through the BOP stack and into the packoff.
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".

Warning: 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-3T 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 9A — Install the MBU-3T Emergency Packoff

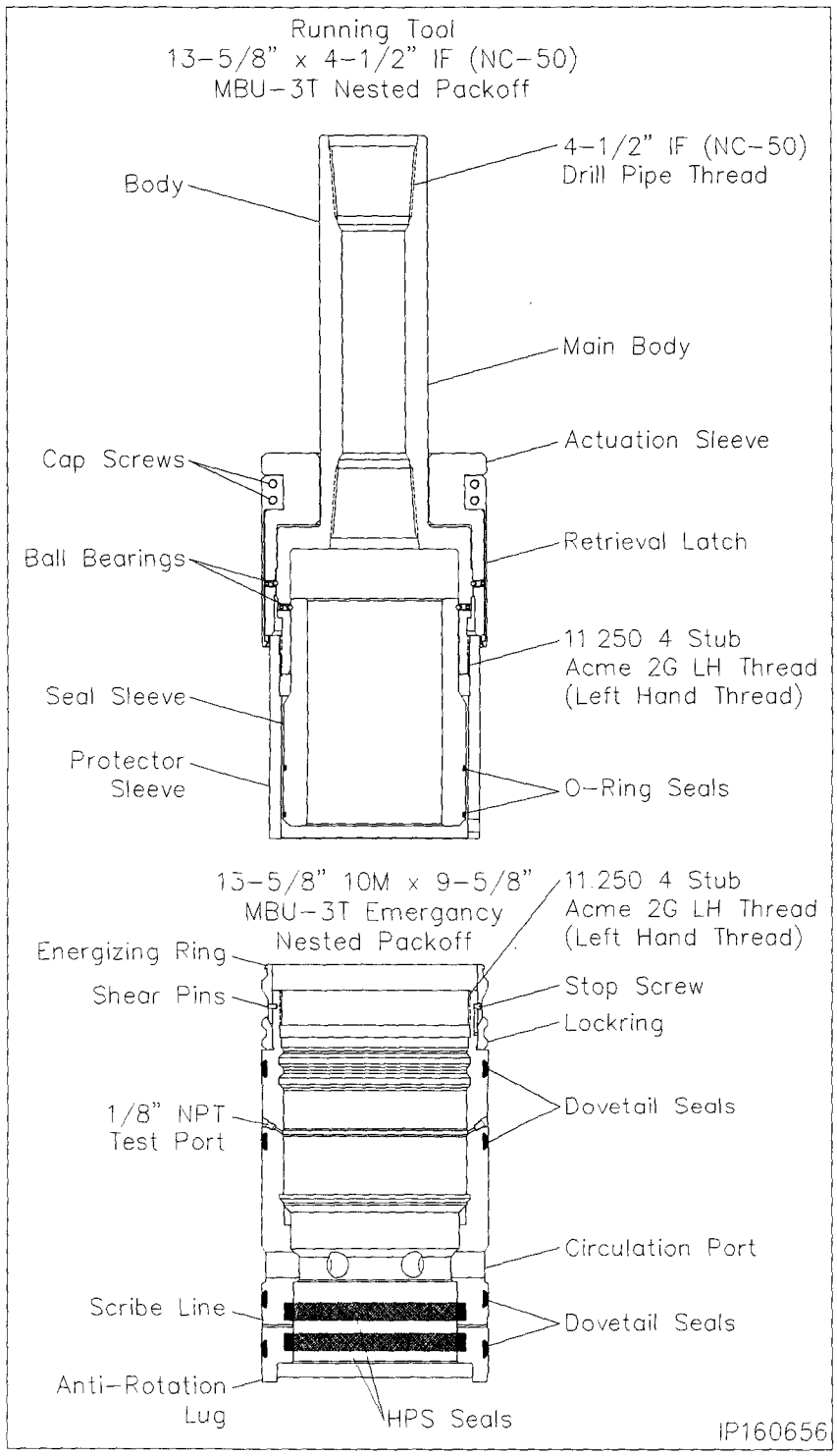
1. Examine the ***13-5/8" 10M x 9-5/8" x 11.250" 4 Stub Acme 2G LH box top MBU-3T Emergency Nested Packoff Assembly (Item A14a).*** Verify the following:
   - all elastomer seals are in place and undamaged
   - internal bore, and ports, are clean and in good condition
   - lockring is fully retracted
   - energizer ring is in its upper most position and retained with shear pins

2. Inspect the ID and OD 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 ST9).*** Verify the following:
   - Acme threads are clean and in good condition
   - retrieval latch is in position and retained with cap screws
   - seal sleeve is in position and rotates freely
   - seal sleeve o-rings are in place and in good condition
   - reinstall seal sleeve protector

4. 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.

5. Run in the hole with two stands of drill pipe and set in floor slips.



Stage 9A — Install the MBU-3T Emergency Packoff

6. Pick up the packoff and carefully pass it over the drill pipe and set it on top of the floor slips.

7. Pick up the running tool with landing joint and remove the tool protector sleeve with counter clockwise rotation and set the sleeve aside.

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

9. Lightly lubricate the seal sleeve o-rings with oil or a light grease.

10. Make up the running tool to the drill pipe in the floor slips using the appropriate length pip x pin sub.

11. Pick up the packoff and thread it onto the running tool with clockwise (Right) rotation until the Energizing Ring makes contact with the lower body of the tool. (Approximately 4 turns).

12. Install (1) 1/8" NPT pipe plug in the OD test port of the packoff and tighten securely

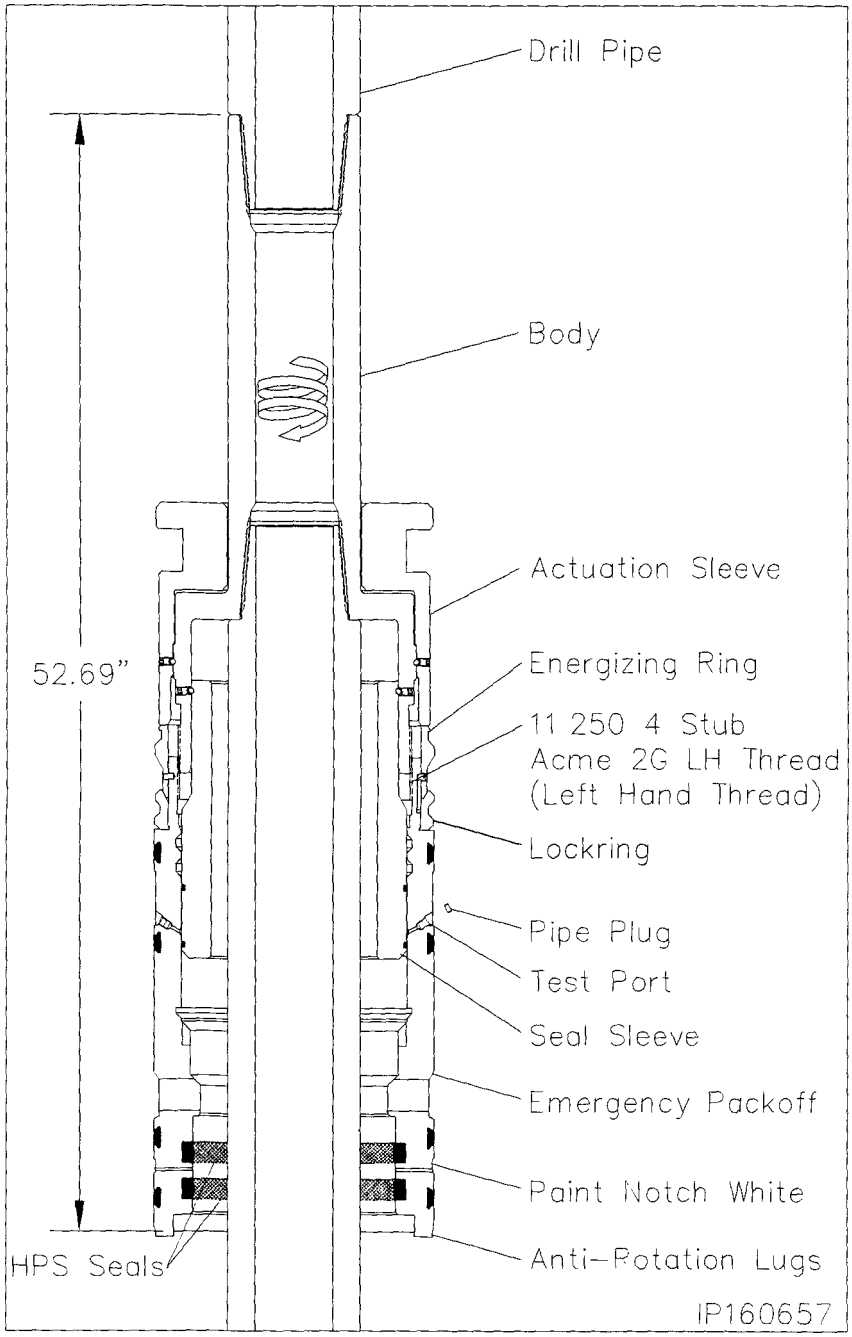
13. Attach a test pump to the remaining open port and inject test fluid between the seal sleeve o-rings until a stable test pressure of 5,000 psi is achieved.

14. If the test fails, remove the tool and replace the leaking o-rings.

15. After a satisfactory test is achieved remove the test pump and the 1/8" pipe plug from the opposite test port.

WARNING: All 1/8" pipe plugs must be removed prior to installing the packoff

16. Thoroughly clean and lightly lubricate the packoff ID 'HPS' seals and the OD dovetail seals with oil or light grease.



17. Using a straight edge positioned vertically and centered on the anti-rotation lug on the bottom of the packoff, place a white paint mark up the side of the packoff in line with the lug.

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

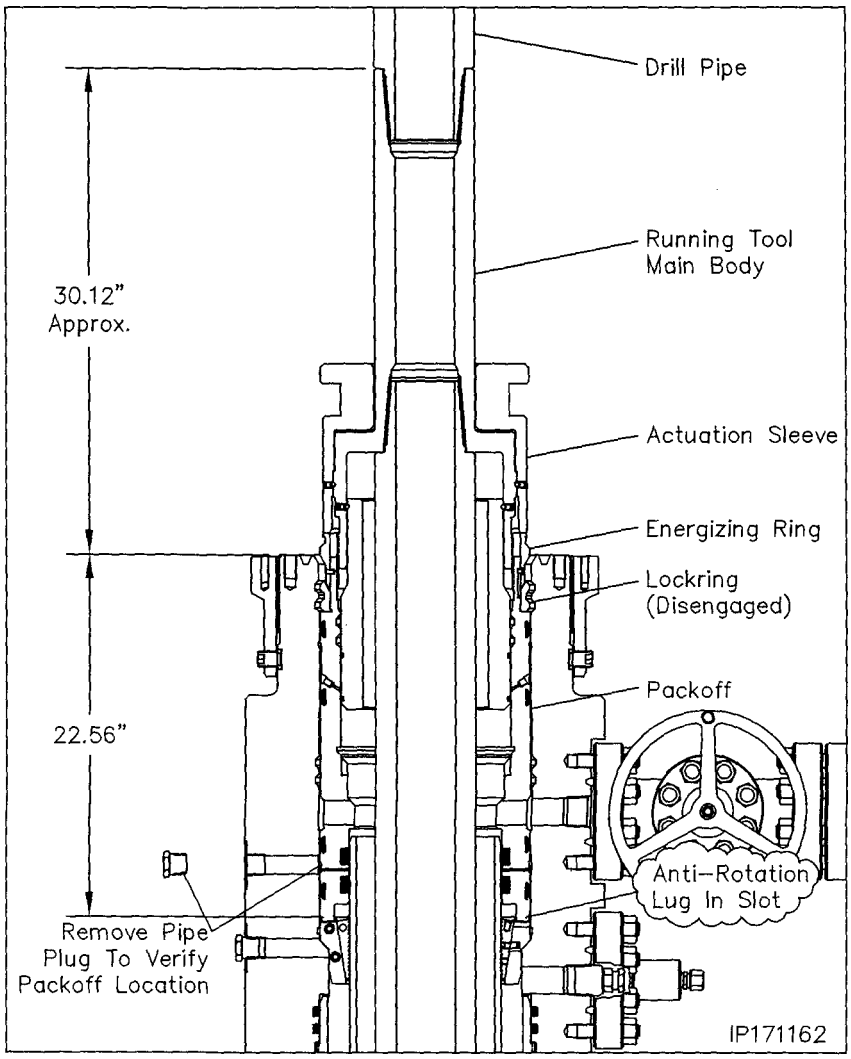
Stage 9A — Install the MBU-3T Emergency Packoff

Landing the Packoff

18. Pick up the drill string and remove the floor slips.
19. Carefully lower the packoff through the rig floor and position it just above the housing.
20. Align the white paint line with the existing paint mark on top of the housing.
21. While holding the packoff to maintain alignment, 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-3T Housing.

22. 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.
23. With landing verified, reinstall the pipe plug and tighten securely.



Stage 9A — Install the MBU-3T Emergency Packoff

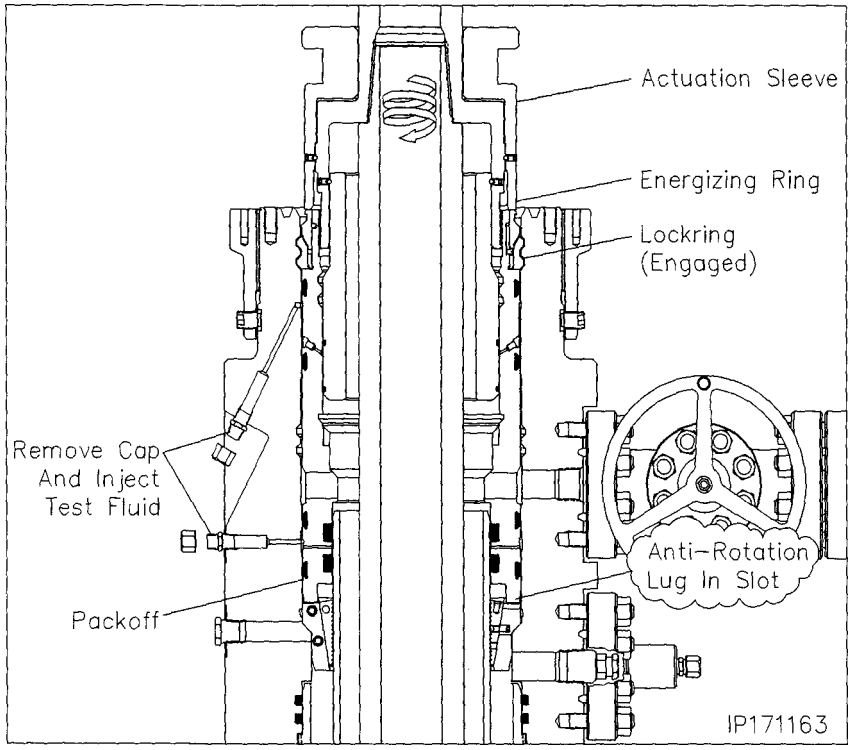
Seal Test

1. Locate the upper and lower seal test fittings on the O.D. of the housing and remove the dust cap from the fittings.
2. 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.
3. Hold test pressure for 5 minutes.
4. If a leak develops, bleed off test pressure, remove the packoff from the wellhead and replace the leaking seals.
5. After satisfactory test is achieved, bleed off the test pressure but leave the test manifold in place.
6. Repeat steps 1 through 5 for the upper seal test port.

Engaging the Lockring

7. Using only chain tongs, 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-3T 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.



WARNING: 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.

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

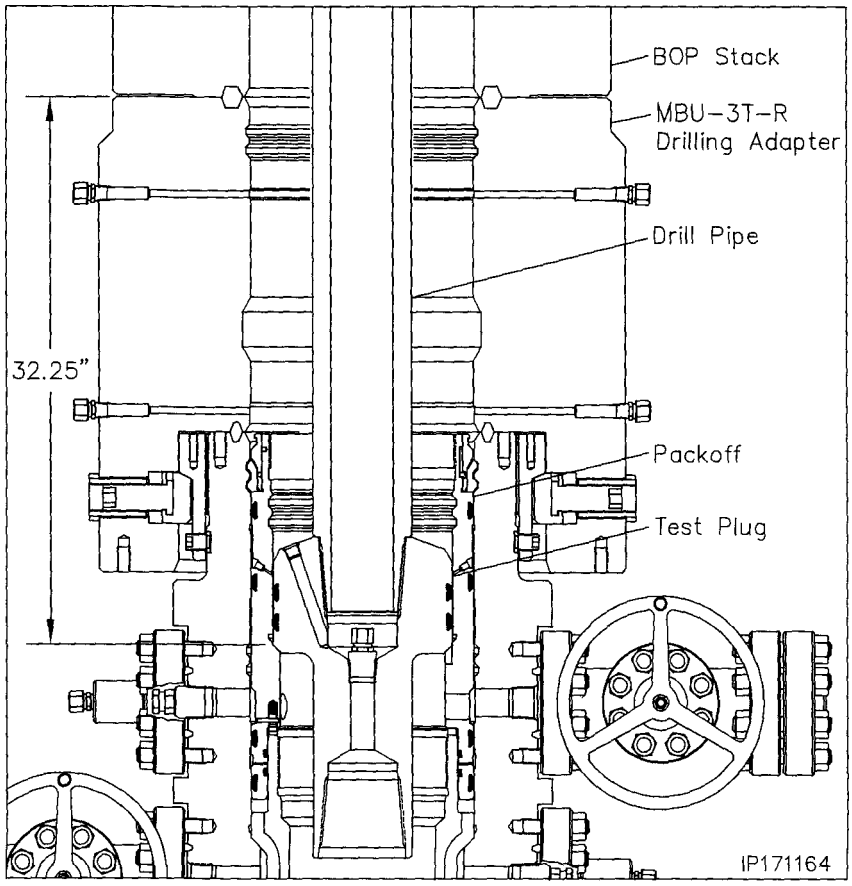
8. Back off the landing joint/running tool approximately three turns. Using the top drive, exert a 40,000 lbs. pull on the landing joint.
9. Reattach the test pump to the open test manifolds and retest the packoff seals to 5,000 psi for 15 minutes. This will also verify that the packoff is in place.
10. After satisfactory test is achieved, bleed off all test pressure, remove test pump and reinstall the dust cap on the open fittings.
11. Using only chain tongs, rotate the landing joint clockwise until the tool comes free of the packoff (approximately 9 to 9-1/2 turns) and then retrieve the tool with a straight vertical lift.
12. Reinstall and nipple up the BOP stack.

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 ***11" Nominal x 4-1/2" IF CW Test Plug. (Item ST10)***. 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 tong neck down and the elastomer seals up 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.
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 9-5/8" packoff, 32.25" 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 and the retrieve the test plug with a straight vertical lift.

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

Stage 11 — Run the Upper Wear Bushing

Note: 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 9.00" ID MBU-3T-UPR Wear Bushing (Item ST11).*** 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
   - 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 CW Test Plug/Retrieving Tool (Item ST4)*** with drill pipe connection up.

3. Attach the Retrieving Tool to a joint of drill pipe.

WARNING: Ensure that the lift lugs are down and the elastomer seal is up

4. Align the retractable lift lugs of the tool 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.

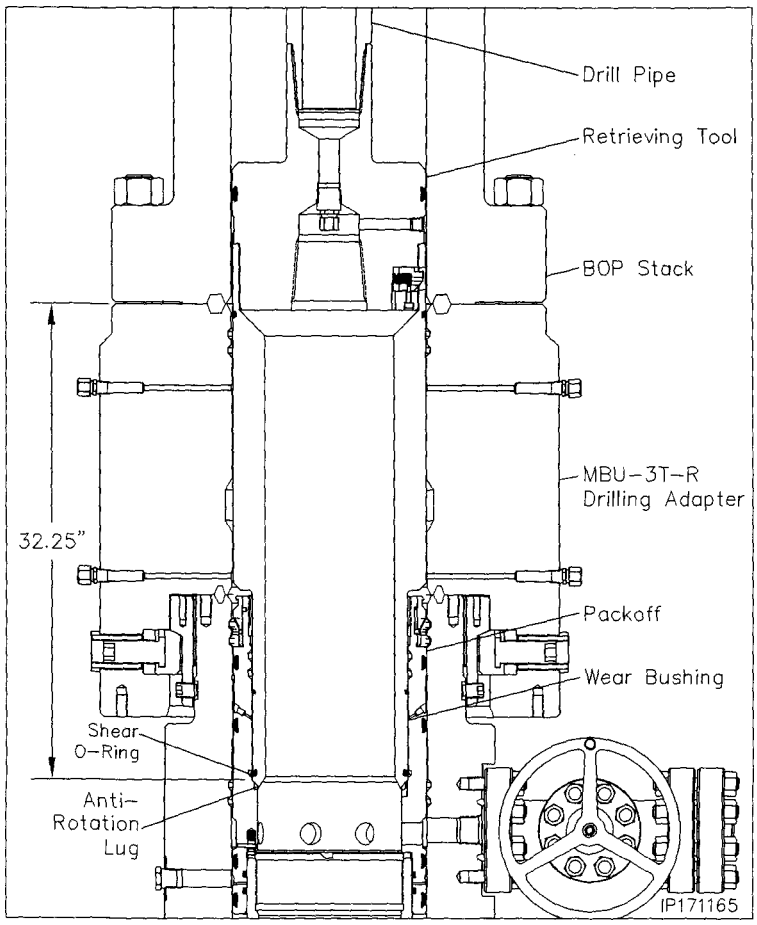
5. **Apply a heavy coat of grease, not dope, to the OD of the bushing.**

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

7. Slowly lower the Tool/Bushing Assembly through the BOP stack and land it on the load shoulder in the 9-5/8" packoff, 32.25" 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 head 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.

Note: 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. Using the top drive, slowly pick up on the landing joint in 1000 lbs increments until the busing starts to rise. This action should take a minimum of 3000 lbs pull. Do Not Exceed 60,000 lbs.

15. Retrieve the Wear Bushing, and remove it and the Retrieving Tool from the drill string.

Stage 12 — Hang Off the 7" Casing

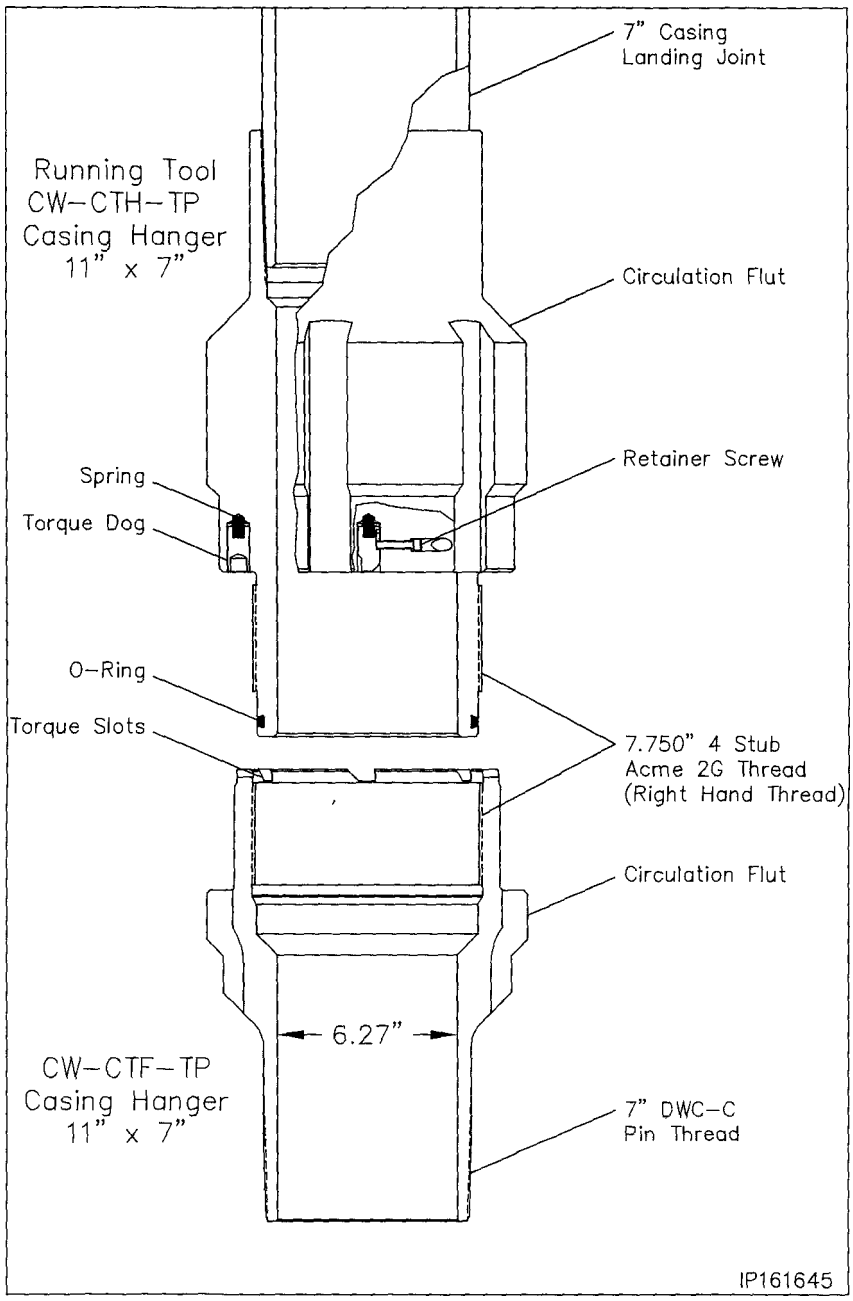
1. Run the 7" casing as required and space out appropriately for the mandrel casing hanger.

Note: If the 7" casing becomes stuck and the mandrel casing hanger can not be landed, Refer to **Stage 12A** of the base procedure for the emergency procedure.

2. On the pipe rack, examine the ***11" x 7" CW-CTF-TP Mandrel Casing Hanger (Item A15).*** Verify the following:
   - internal bore and threads are clean and in good condition
   - casing pin threads are clean and in good condition
   - neck seal area is clean and undamaged
   - torque slots are clean and in good condition

3. Examine the ***11" x 7" CW-CTH-TP 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 cap screws are tightened securely

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



Stage 12 — Hang Off the 7" Casing

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.

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

Note: If steps 1 through 8 where 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 attained RKB dimension and 32.25", 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 the calculated dimension and place a paint mark on the joint. Mark **HANGER LANDED**.

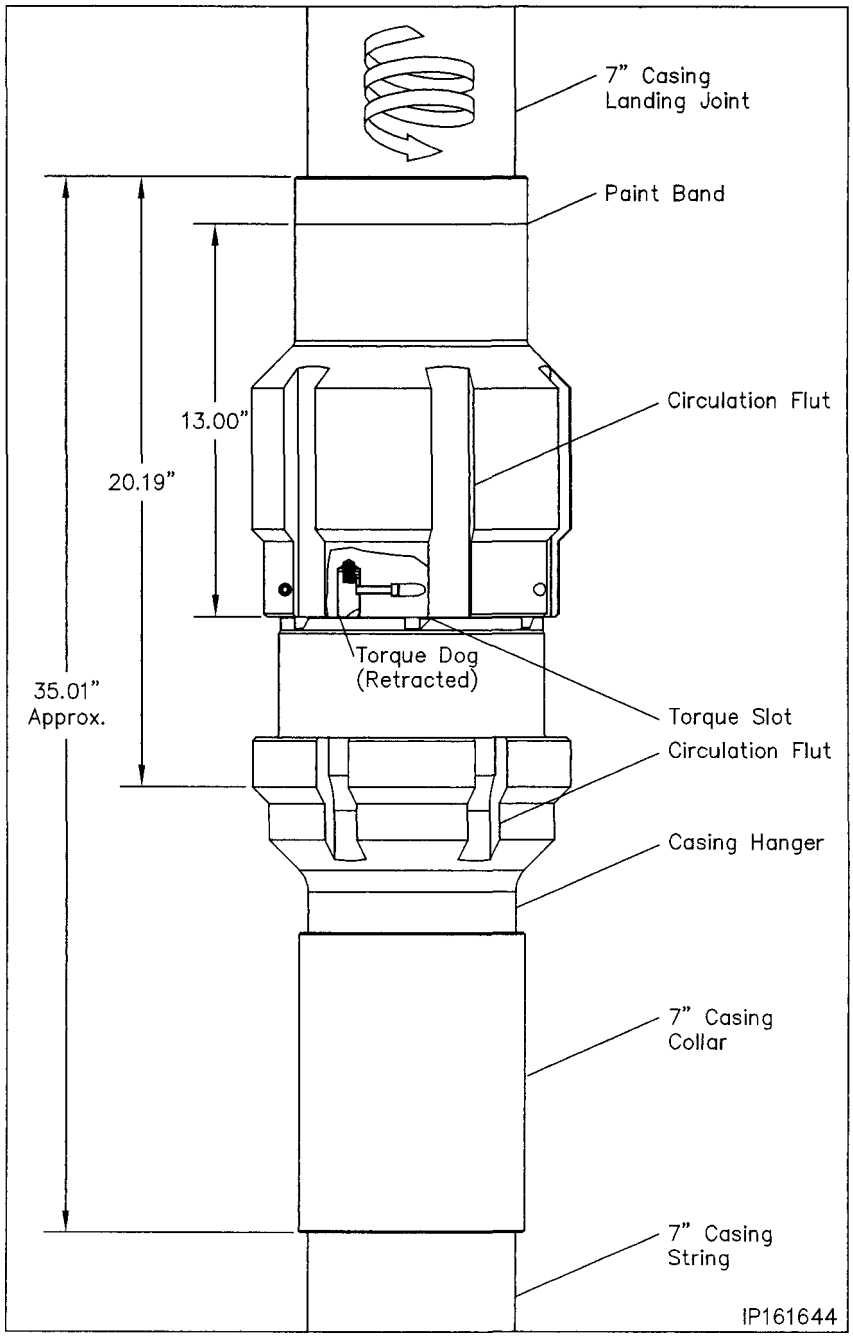
9. Place a second mark 13" below the first and mark **STOP ROTATING**.

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

Note: If the 7" casing becomes stuck and the mandrel casing hanger can not be landed, Refer to **Stage 12A** of the base procedure for the emergency procedure.

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

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.



Stage 12 — Hang Off the 7" Casing

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

13. Locate the (8) 1/4" cap screws in the side of the hanger running tool and back off each screw approximately 1/4 turn.

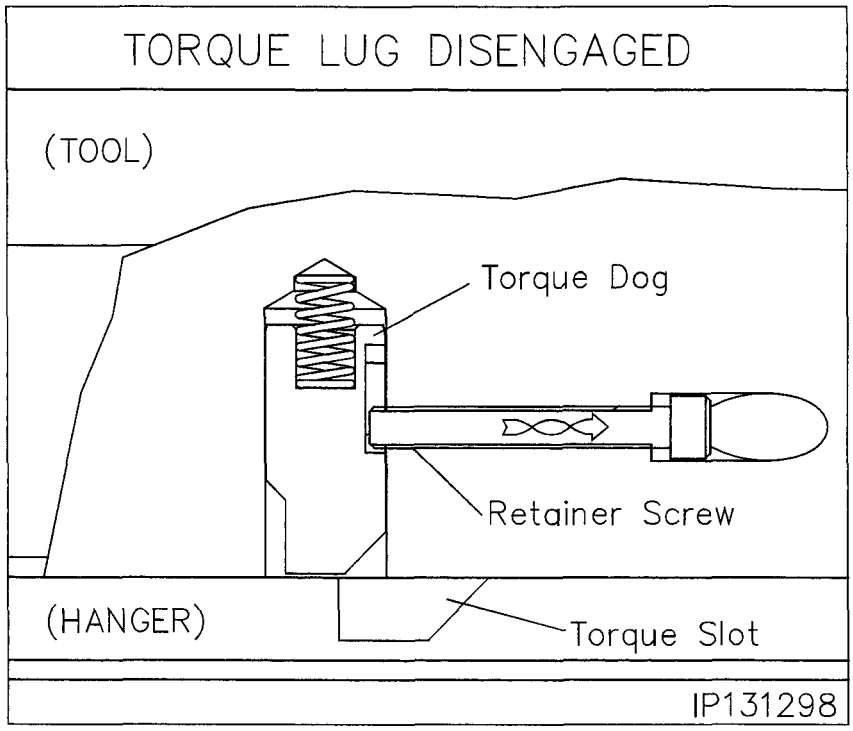
Note: This will release the running tool torque dogs allowing them to move downward.

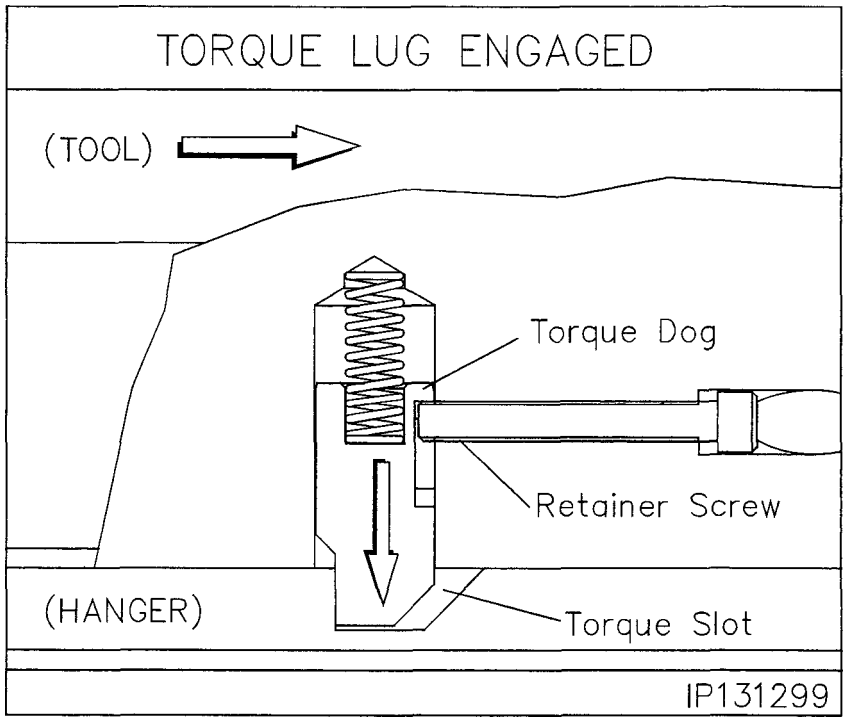
14. Using only chain tongs, rotate the running tool to the left to allow the torque dogs to engage the torque slots in the top of the hanger.

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

15. 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.

WARNING: 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" Casing

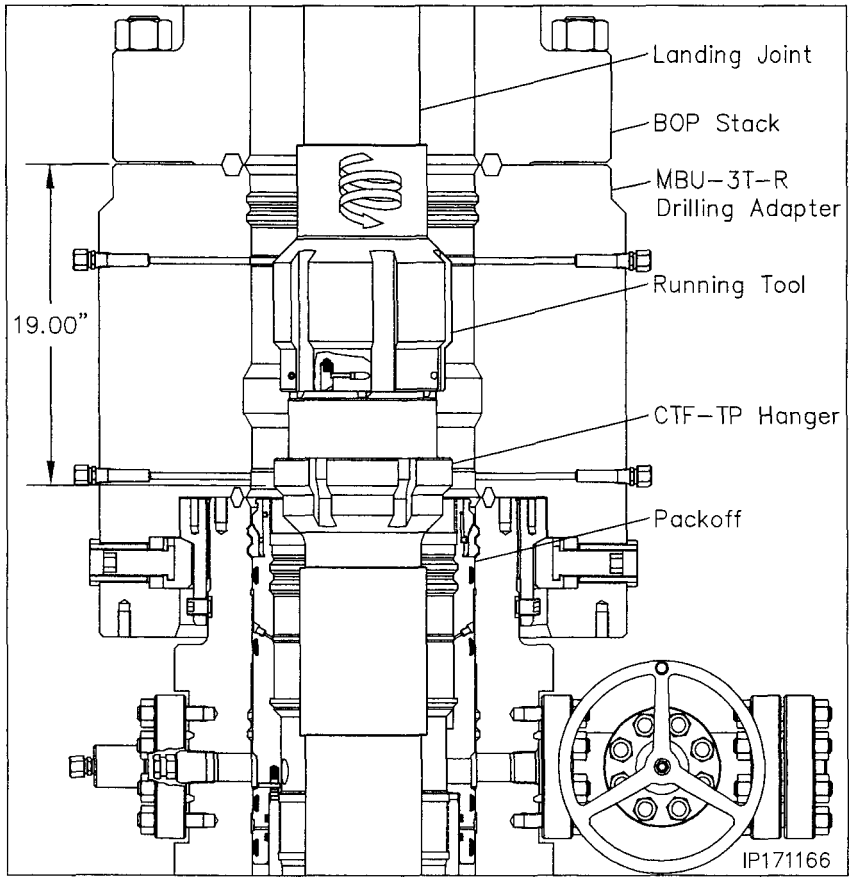
16. Pick up the casing string and remove the floor slips and rotary bushings.

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

18. 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.

19. Ensure the hanger is not rotated into the drilling adapter lower then 13.0" from landing point

Note: The Torque Dogs have a maximum rated capacity of 25,000 ft lbs.



Stage 12 — Hang Off the 7" Casing

20. Cease rotation and continue carefully lowering the hanger through the wellhead and land it on the load shoulder in the 9-5/8" packoff, 32.25" 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. Open the upper outlet valve on the housing and drain the BOP stack and wellhead.

23. Open the drilling spool side outlet valve and drain the BOP stack.

24. Sight through the valve bore to ensure the hanger is properly landed. The white paint band on the running tool will be clearly visible in the center of the outlet. Close valves.

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

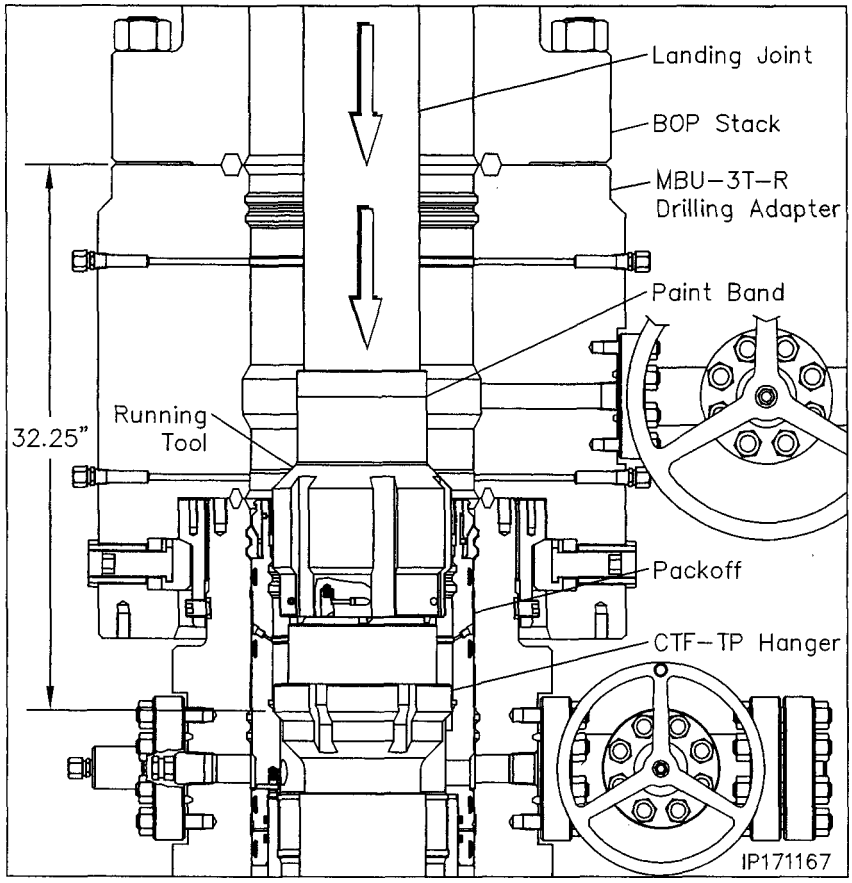
26. Cement the casing as required.

Note: Returns may be taken through the circulation slots and out the BOP or out the side outlets on the lower 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 approximately 13 turns or until the tool comes free of the hanger.

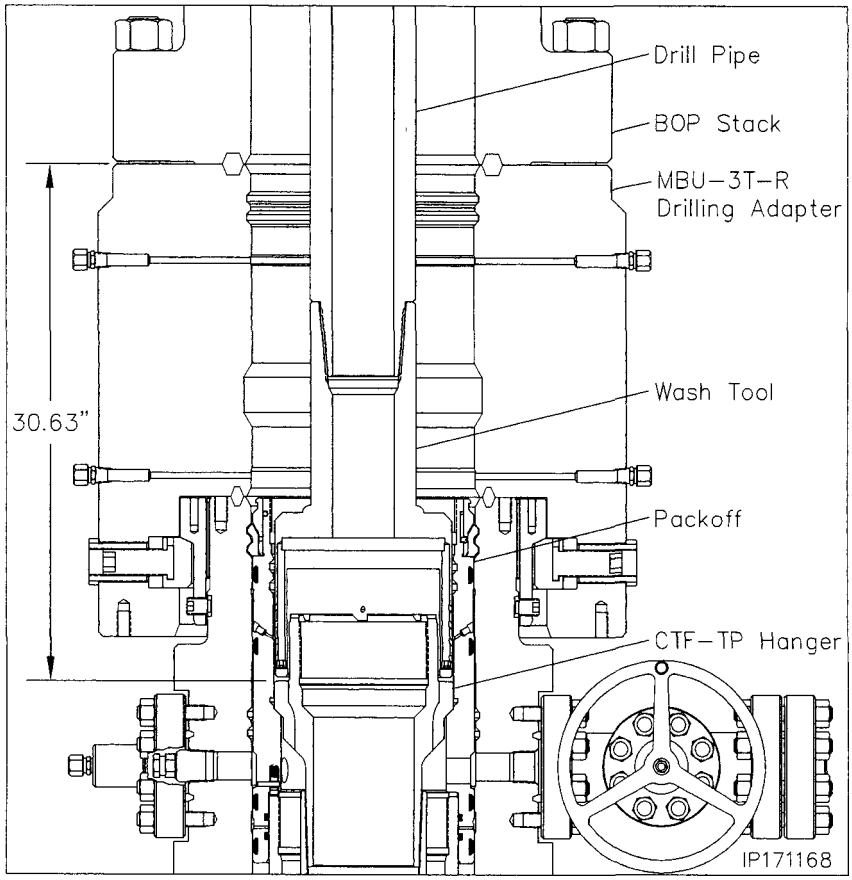
WARNING: The rig floor tong may be used to break the connection but **under no circumstances is the top drive to be used to rotate or remove the casing hanger running tool.**



Stage 12 — Hang Off the 7" Casing

Running the 11" Wash Tool

1. Examine the ***11" x 4-1/2" IF Wash Tool (Item ST13).*** 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 7" casing hanger, 30.63" below the top flange of the drilling adapter.
4. Place a paint mark on the drill pipe level with the rig floor.
5. Open the housing side outlet valve and drain the BOP stack.
6. Using chain tongs, rotate the tool clockwise approximately 6 turns to loosen any debris that may be on top of the hanger flutes.
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 allow the BOP stack to drain.



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 was 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.

WARNING: Continue washing until all debris is removed.

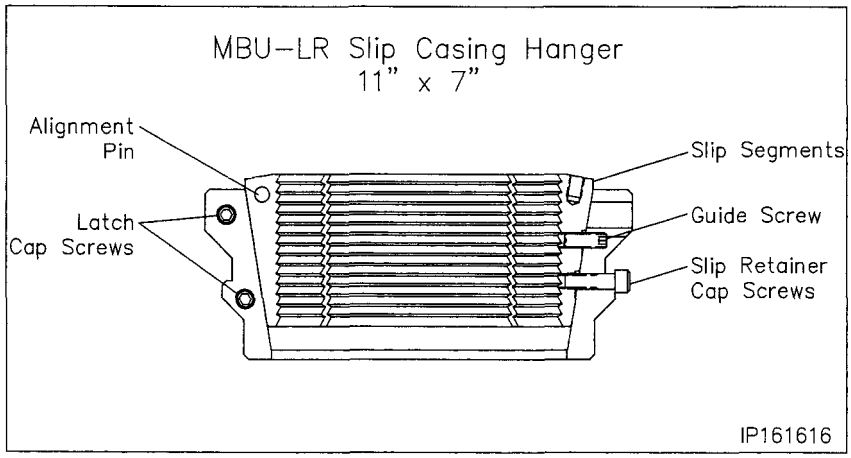
Stage 12A — Hang Off the 7" Casing (Emergency)

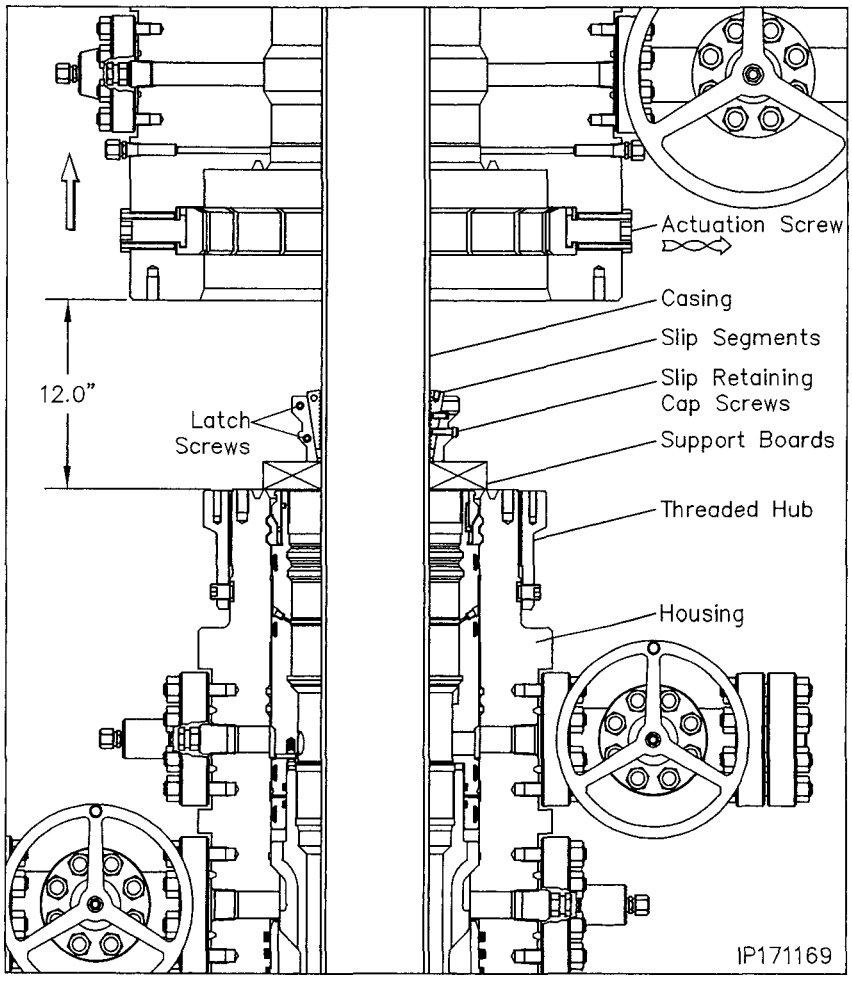
Note: The following procedure should be followed **ONLY** if the 7" casing should become stuck in the hole. If the casing did not get stuck and is hung off with the Mandrel Casing Hanger, skip this stage.

1. Cement the hole as required.
2. Drain the BOP stack through the housing side outlet valve.
3. Locate the actuation screw on the OD of the drilling adapter.
4. Using a hex drive, fully retract the actuation screws until they are slightly over flush with the glandnuts.
5. Pick up on the BOP stack a minimum of 12" above the housing hub and secure with safety slings.
6. Washout as required.
7. Examine the ***11" x 7" MBU-LR Slip Casing Hanger (Item A15a).*** 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 halves.
9. Place two boards on the housing flange against the casing to support the Hanger.
10. Place on half of the hanger around the casing and on top of the boards.
11. Position the second half adjacent the first and push the two halves together. Ensure the alignment pins properly engage the mating holes in the slip segments. Reinstall the 4 latch screws and tighten securely.
12. Prepare to lower the Hanger into the packoff bowl.

WARNING: Do Not Drop the Casing Hanger!

13. Grease the Casing Hanger's body and remove the slip retaining screws.





Stage 12A — Hang Off the 7" Casing (Emergency)

14. Remove the boards and allow the Hanger to slide into the packoff bowl. When properly positioned the top of the hanger will be approximately 11.58" below the top of the housing.

15. Pull tension on the casing to the desired hanging weight and then slack off.

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

WARNING: Because of 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 gas with an approved sensing device prior to cutting off the casing. If gas is present, do not use an open flame torch to cut the casing. It will be necessary to use a air driven mechanical cutter which is spark free.

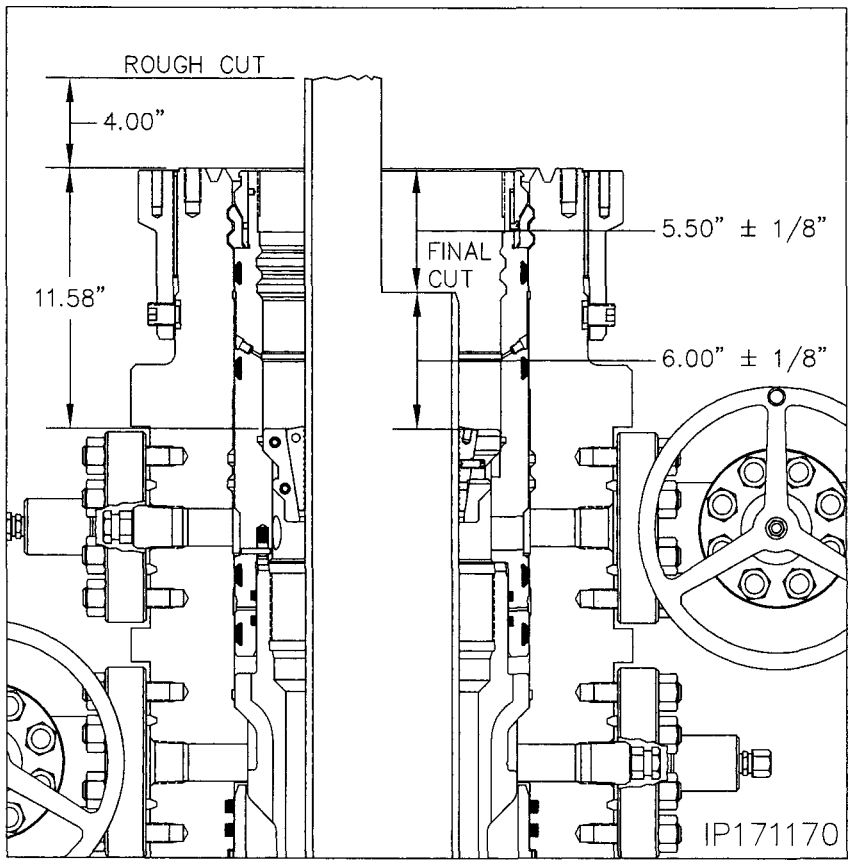
16. Rough cut the casing approximately 4" above the top flange and move the excess casing out of the way.

17. Using an internal casing cutter, final cut and bevel the casing at 5.50" ± 1/8" below the top of the housing.

18. Remove the internal casing cutter and grind an I.D. chamfer in the casing stub to match the minimum bore of the packoff to be installed.

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

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



20. Locate the anti-rotation slots in the top of the slip bowl.

21. Using a straight edge held centered on one of the notches, place a corresponding paint mark on top of the housing in line with the notch

WARNING: This will allow for easy visual alignment of the slip bowl and the emergency packoff.

Warning: Do not reinstall the BOP stack The Emergency packoff is installed open hole and not through the BOP stack.

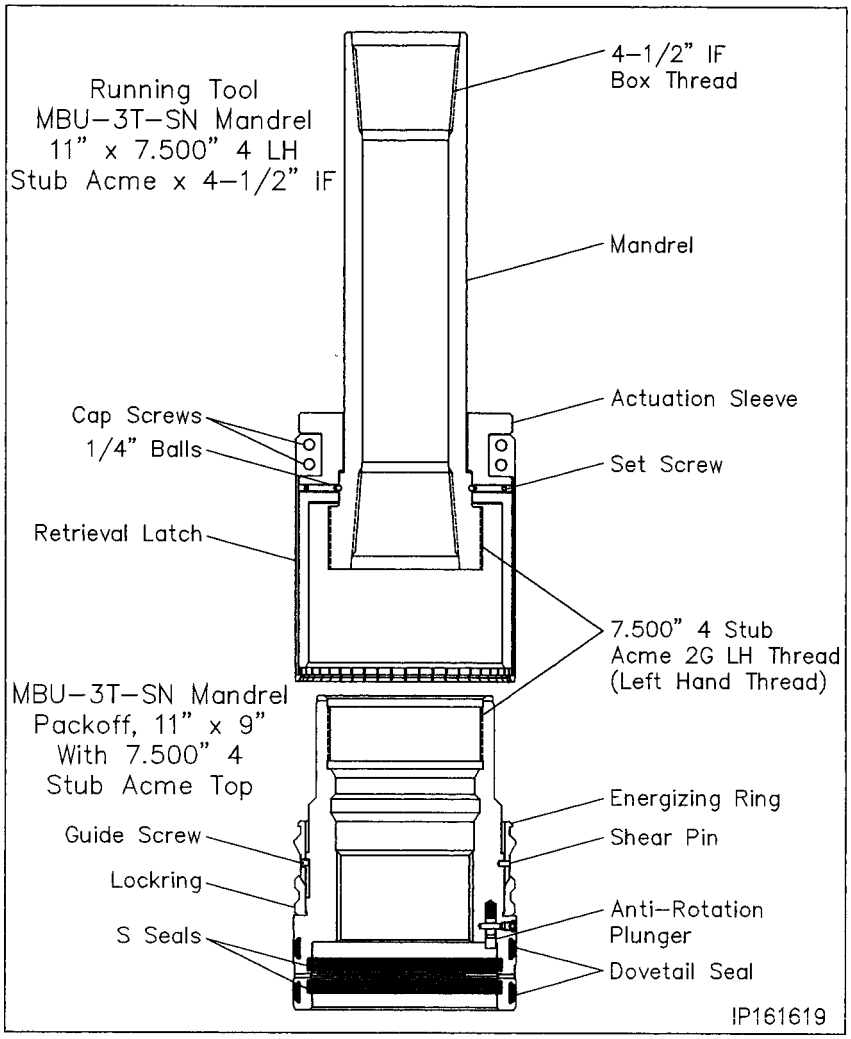
Stage 13 — Install the 7" Mandrel Hanger Packoff

The following steps detail the installation of the CW MBU-3T-SN Packoff Assembly for the mandrel hanger. If the casing was landed using the emergency slip hanger, skip this step and proceed with Step 13A for installing the emergency MBU-3T-SN packoff.

1. Examine the ***11" Nominal x 7.500" 4 Stub Acme 2G LH box top MBU-3T-SN Packoff Assembly (Item A16a).*** 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 plunger is in place, free to move

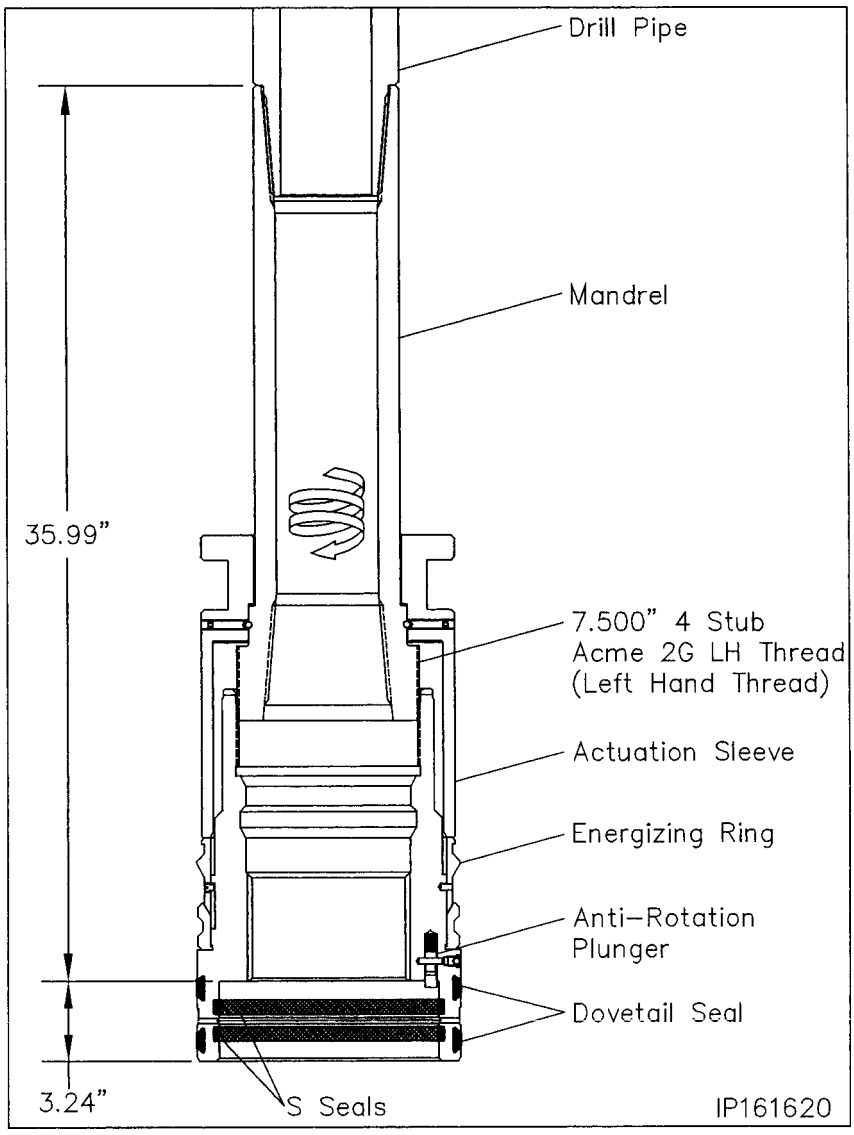
2. Lubricate the ID of the 'S' seals and the OD of the dovetail seals liberally with a light oil or grease.

3. Examine the ***11" Nominal x 7.500" 4 Stub Acme 2G LH, MBU-3T-SN Mandrel Packoff Running Tool (Item ST14).*** Verify the following:
   - Acme threads are clean and in good condition
   - actuation sleeve is clean, in good condition and rotates freely
   - retrieval latch is removed and stored is safe place



Stage 13 — Install the 7" Mandrel Hanger Packoff

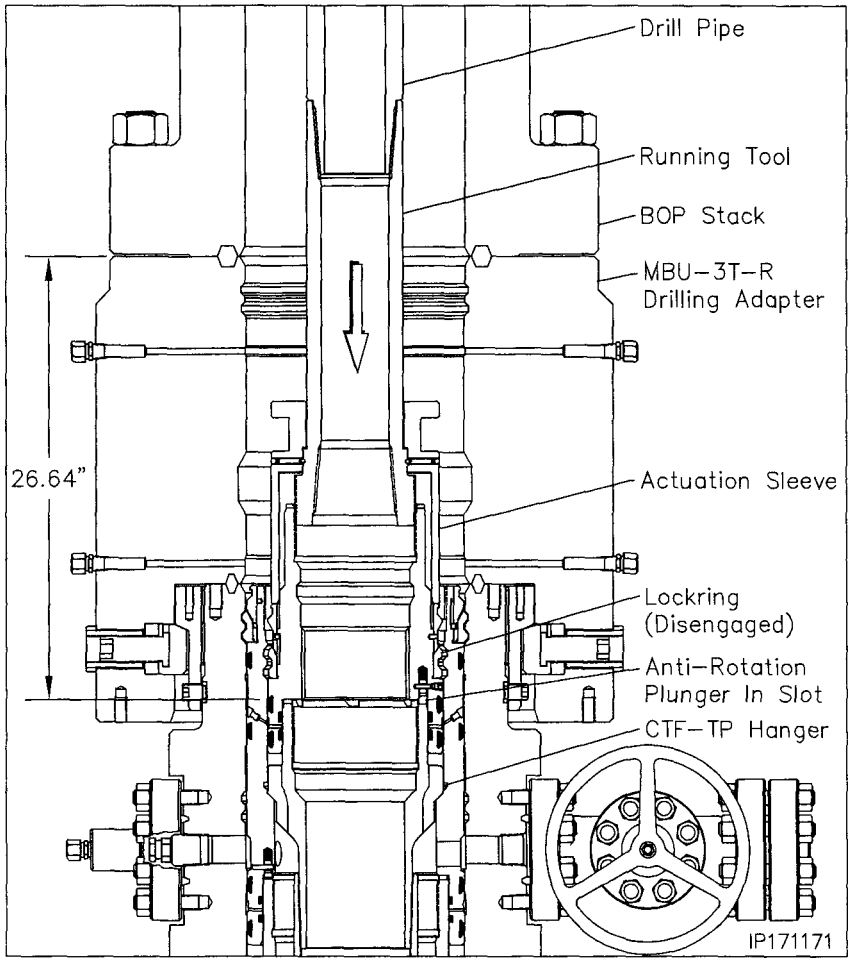
4. Make up a 4-1/2" IF drill collar to the top of the Running Tool and tighten connection to thread manufacturer's maximum make up torque.
5. Thoroughly clean and lightly lubricate the mating Acme threads of the running tool and packoff with oil or light grease.
6. Pick up the Running Tool with landing joint and suspend it above the packoff
7. Carefully lower the tool over 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 6 turns.
8. Pick up the assembly and thoroughly clean and lightly lubricate the packoff ID 'HPS' seals and the OD dovetail seals with oil or light grease.
9. Measure up from the bottom of the packoff 3.24" and place a mark on the packoff.
10. Measure up 5 foot from that mark and place a paint mark on the drill pipe landing joint.



Stage 13 — Install the 7" Mandrel Hanger Packoff

Landing the Packoff

1. Calculate the total landing dimension by taking the attained landing dimension of the 7" mandrel casing hanger and subtracting 5.62"
2. Remove the hole cover.
3. Pick up the packoff/running tool assembly and carefully lower the assembly through the BOP marking the landing joint every five feet until you come the calculated dimension.
4. 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.
5. Continue lowering the packoff until it passes over the neck of the hanger and lands on top of the casing hanger neck, 26.64" below the top of the drilling adapter.



Stage 13 — Install the 7" Mandrel Hanger Packoff

Seal Test

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

7. 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 5,000 psi is attained.

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.

8. Hold test pressure for 15 minutest or as required by drill supervisor.

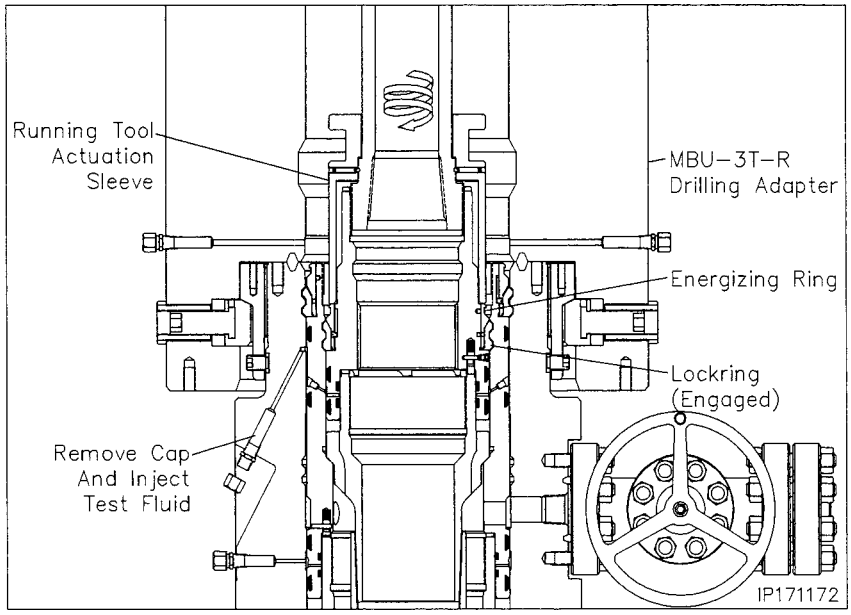
9. If a leak develops, bleed off test pressure, remove the packoff from the wellhead and replace the leaking seals.

10. 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

11. Using chain tongs only located 180° apart, slowly rotate the packoff assembly counter clockwise 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.

12. 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 9-5/8" 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.

WARNING: 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.

WARNING: If the required turns to engage the lockring or not met or excessive torque is encountered, remove the packoff and call Houston Engineering.

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

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

Stage 13 — Install the 7" CTF 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. 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 (approximately 9 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 (approximately 6-1/2 turns) to a positive stop. The drill pipe should rise approximately 1-1/2".

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

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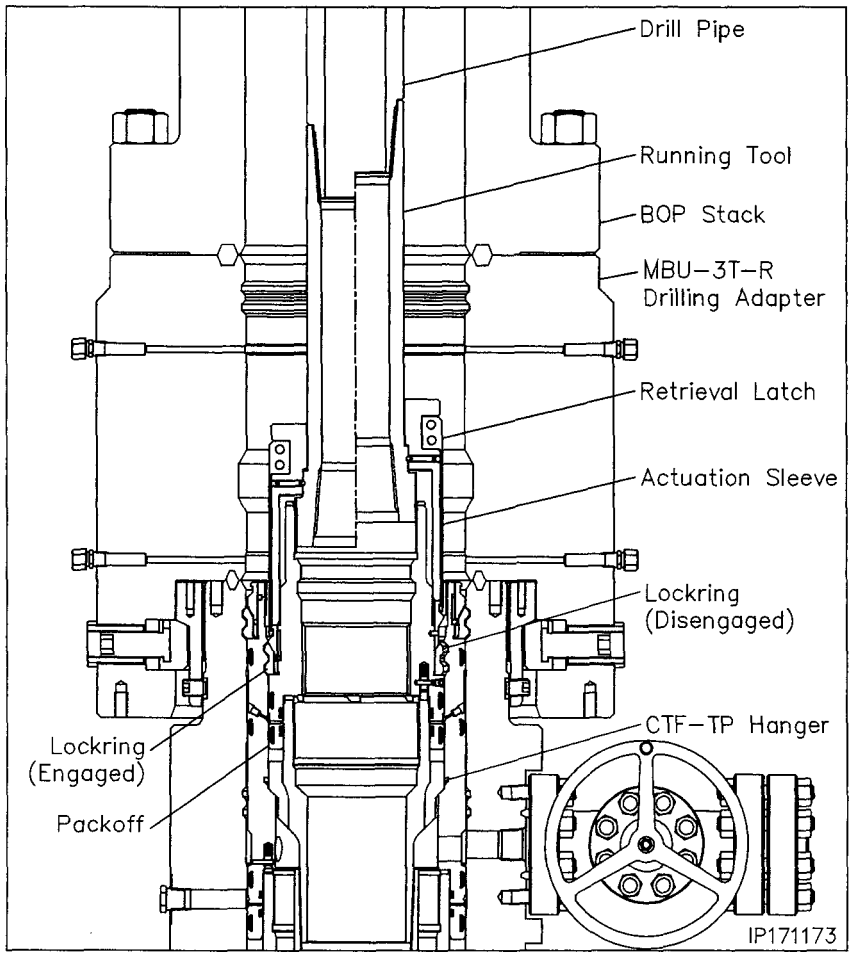
7. Carefully pick up on the drill pipe and remove the packoff from the wellhead with a straight vertical lift.
8. Redress the Packoff and reset as previously outlined.



Stage 13A — Install the 7" Emergency Hanger Packoff

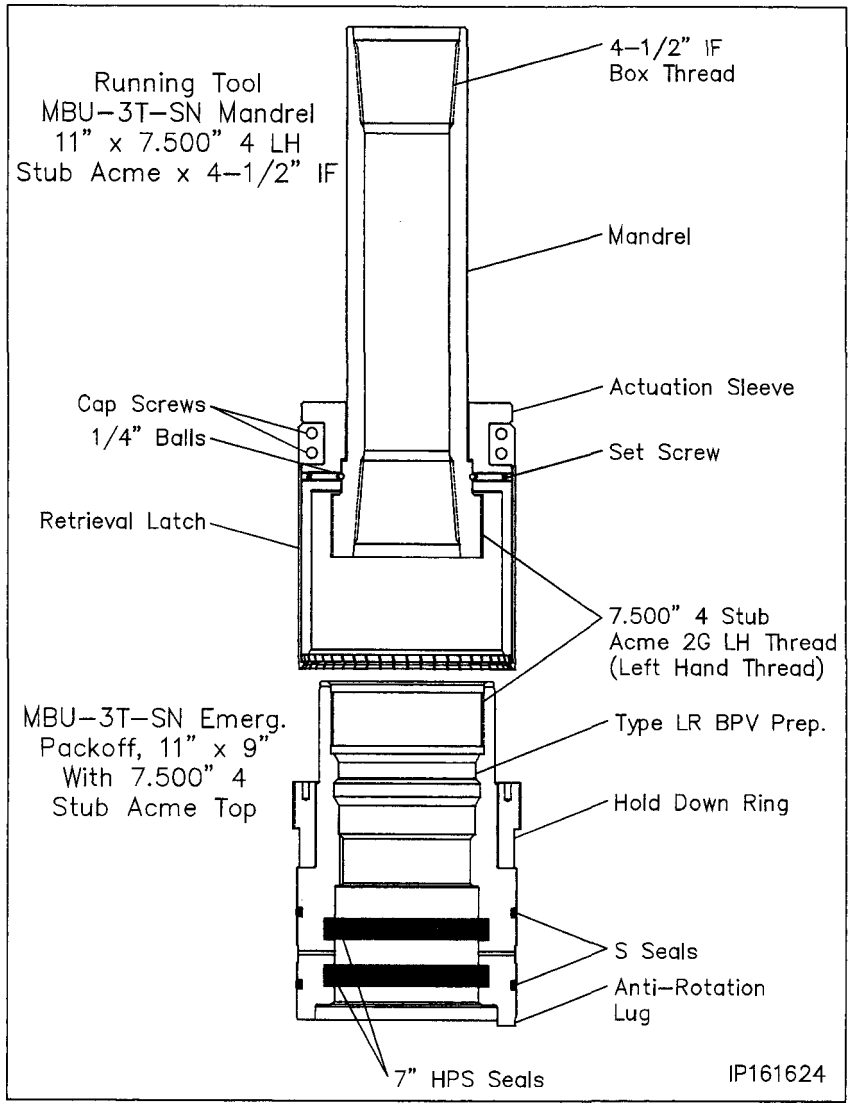
The following steps detail the installation of the CW MBU-3T-SN Packoff Assembly for the emergency casing hanger.

1. Examine the ***11" Nominal x 7.500" 4 Stub Acme 2G LH box top MBU-3T-SN Packoff Assembly (Item A16a).*** 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
   - hold down ring is removed and set aside

2. Using a straight edge, place a vertical paint mark the full length of the Emergency Packoff and running tool in line with one of the anti-rotation lugs

3. Lubricate the ID of the 'HPS' seals and the OD of the dovetail seals liberally with a light oil or grease.

4. Examine the ***11" Nominal x 7.500" 4 Stub Acme 2G LH, MBU-3T-SN Mandrel Packoff Running Tool (Item ST14).*** Verify the following:
   - Acme threads are clean and in good condition
   - actuation sleeve is clean, in good condition and rotates freely
   - retrieval latch is removed and stored is safe place



Stage 13A — Install the 7" Emergency Hanger Packoff

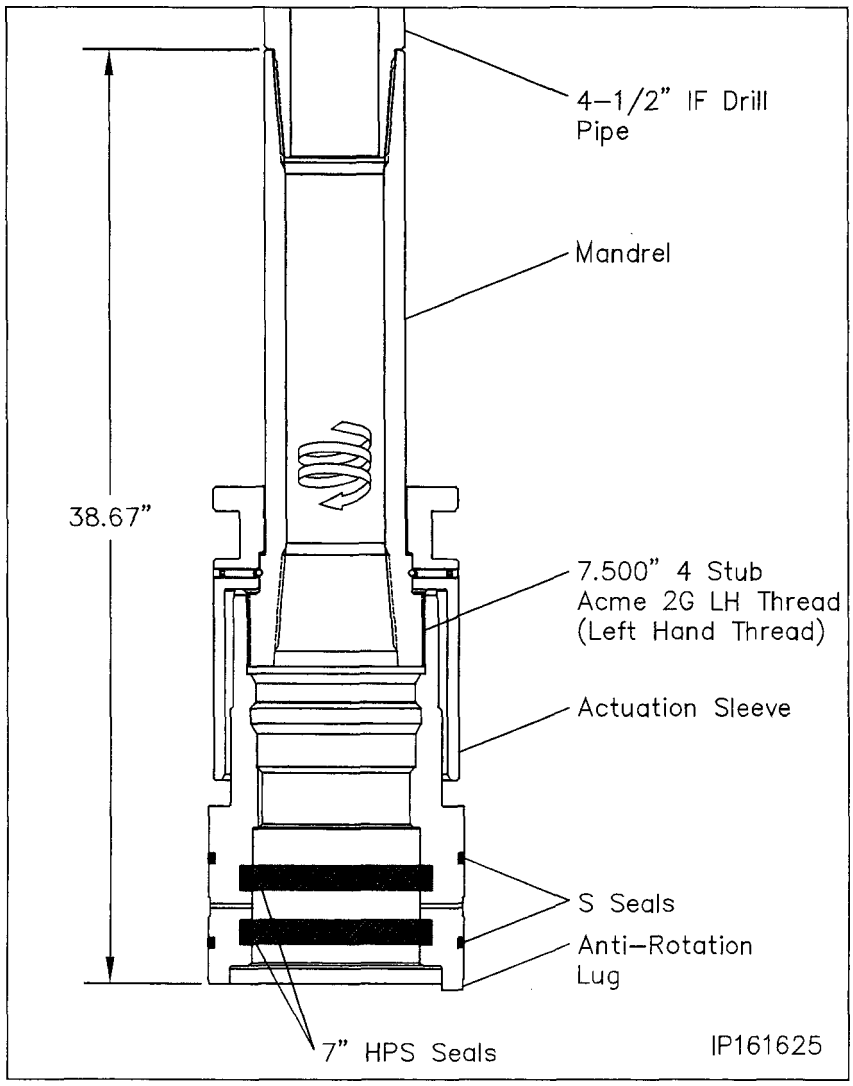
5. Make up a 4-1/2" IF drill collar to the top of the Running Tool and tighten connection to thread manufacturer's maximum make up torque.

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

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

8. Carefully lower the tool over 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 top of the packoff. Approximately 10-1/2 turns.

9. Pick up the assembly and thoroughly clean and lightly lubricate the packoff ID 'HPS' seals and the OD dovetail seals with oil or light grease.



Stage 13A — Install the 7" Emergency Hanger Packoff

Landing the Packoff

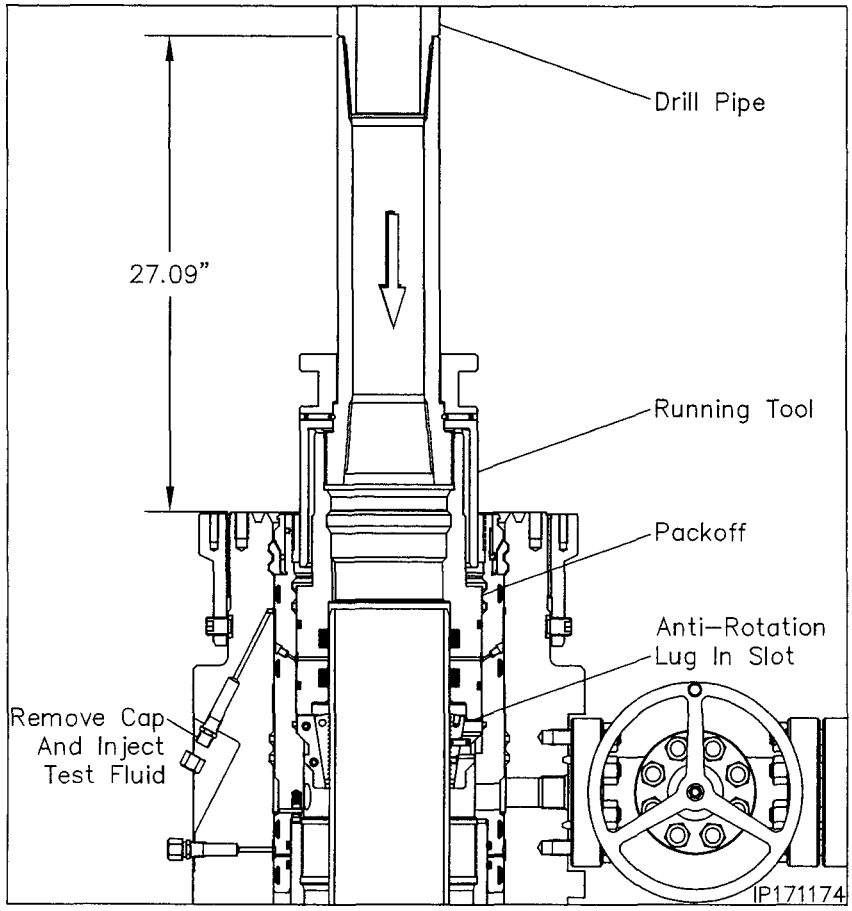
1. Remove the hole cover and carefully lower the packoff through the rig floor and suspend it above the well bore.
2. Align the vertical paint mark of the packoff with the paint mark on the top of the housing.
3. Carefully lower the packoff into the housing until it lands on top of the 7" casing hanger, 11.58" below the top of the housing.

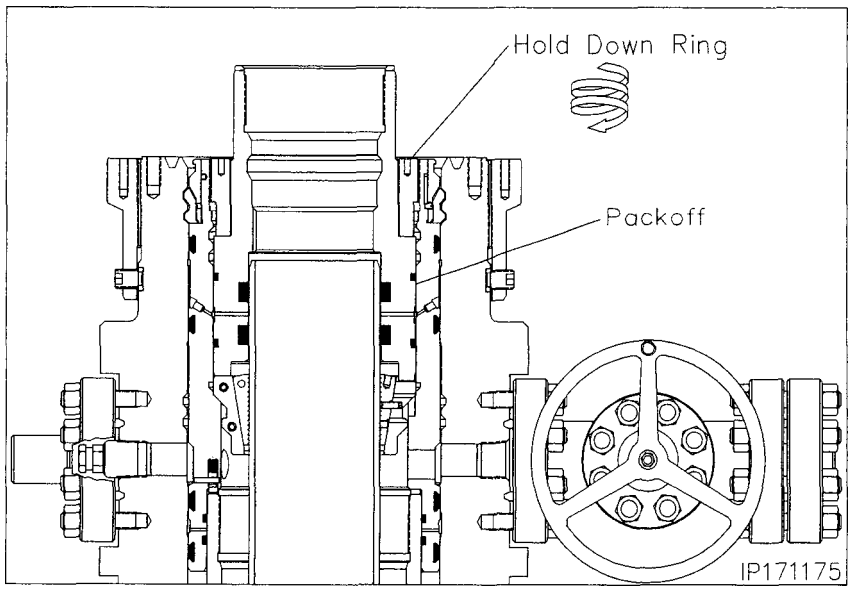
Seal Test

4. Locate the "SEAL TEST" fitting on the upper OD of the housing and remove the dust cap from the fitting.
5. 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 ***5,000 psi or 80% of casing collapse - Whichever is less***.

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.

6. Hold test pressure for 15 minutest or as required by drill supervisor.
7. If pressure drops a leak has developed. Remove the packoff and replace the leaking seals.
8. After a satisfactory test is achieved, bleed off test pressure, remove test pump and manifold and reinstall the dust cap on the open fitting.
9. Remove the running tool with clockwise rotation.
10. Thoroughly clean and lightly lubricate the mating threads of the hold down ring and the 9-5/8" packoff.
11. Carefully lower the ring over the neck of the 7" packoff and thread the ring into the 9-5/8" packoff until the top of the rig is flush with the top of the 9-5/8" packoff.





12. Reinstall the drilling adapter and BOP as previously outlined.

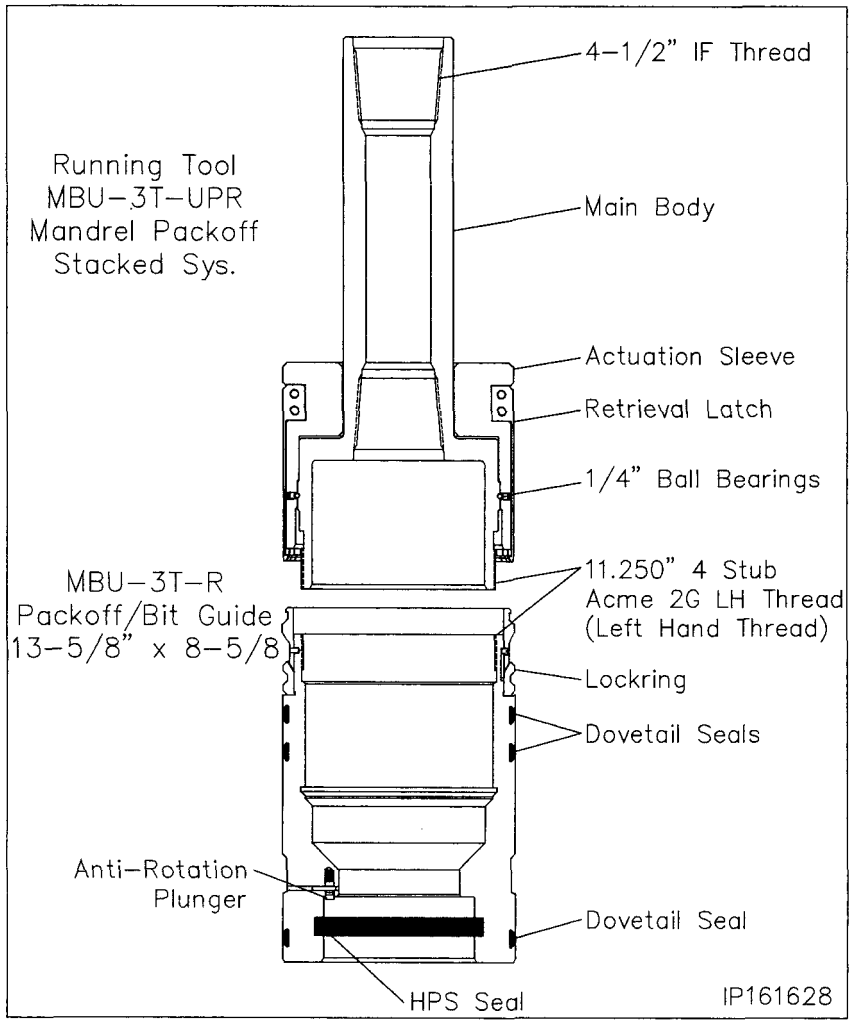
Stage 14 — Install the MBU-3T-R Upper Packoff/Bit Guide

The following steps detail the installation of the CW MBU-3T-R Packoff Assembly for wellbore reentry and drilling of the hole section for the 4-1/2" liner.

1. Examine the ***13-5/8" Nominal x 4-1/2" IF x 11.250" 4 Stub Acme 2G LH Pin Bottom MBU-3T-UPR Mandrel Packoff Running Tool (Item ST16).*** 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. Examine the ***13-5/8" Nominal x 8-5/8" x 11.250" 4 Stub Acme 2G LH box top MBU-3T-R Packoff Assembly (Item ST15).*** 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

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



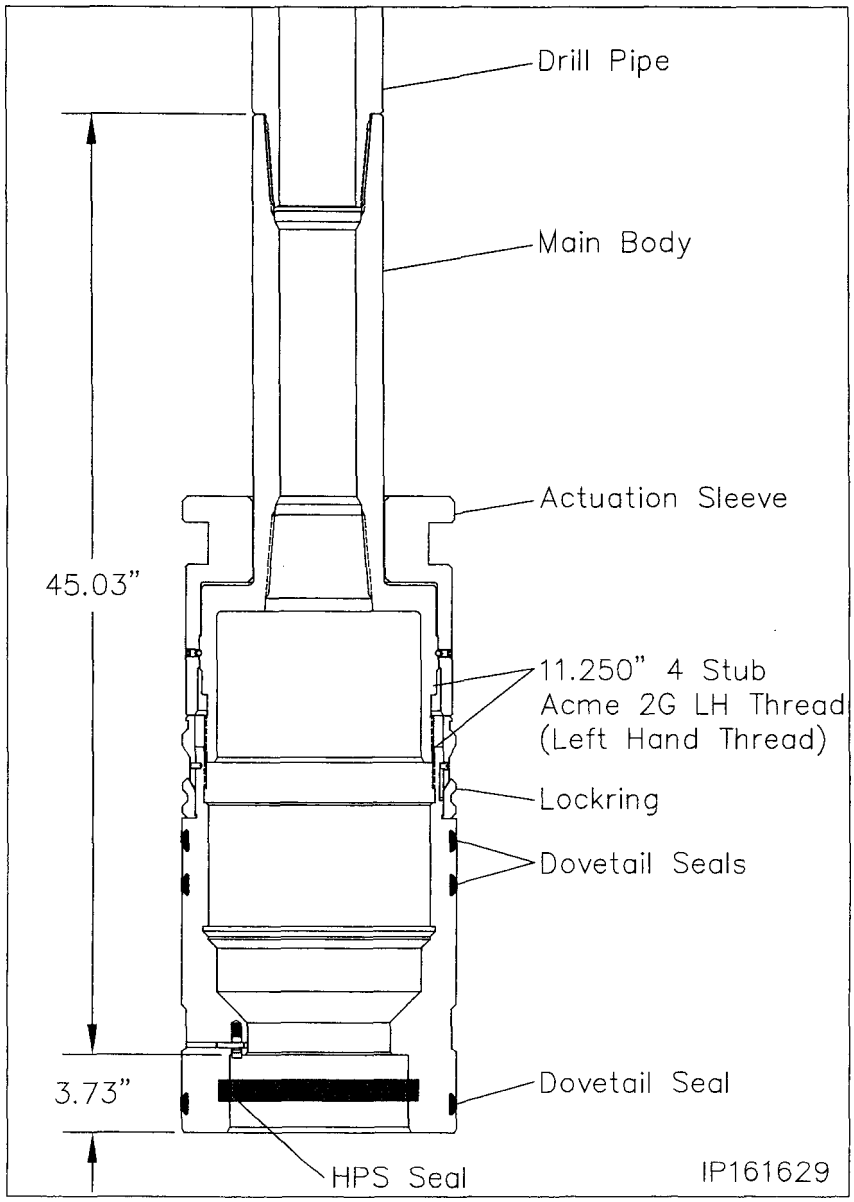
Stage 14 — Install the MBU-3T-R Upper Packoff/Bit Guide

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

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) approximately 3 turns until the tool actuation sleeve makes contact with the packoff Energizing Ring.

6. Place a paint mark on the side of the packoff 3.73" from the bottom as indicated.

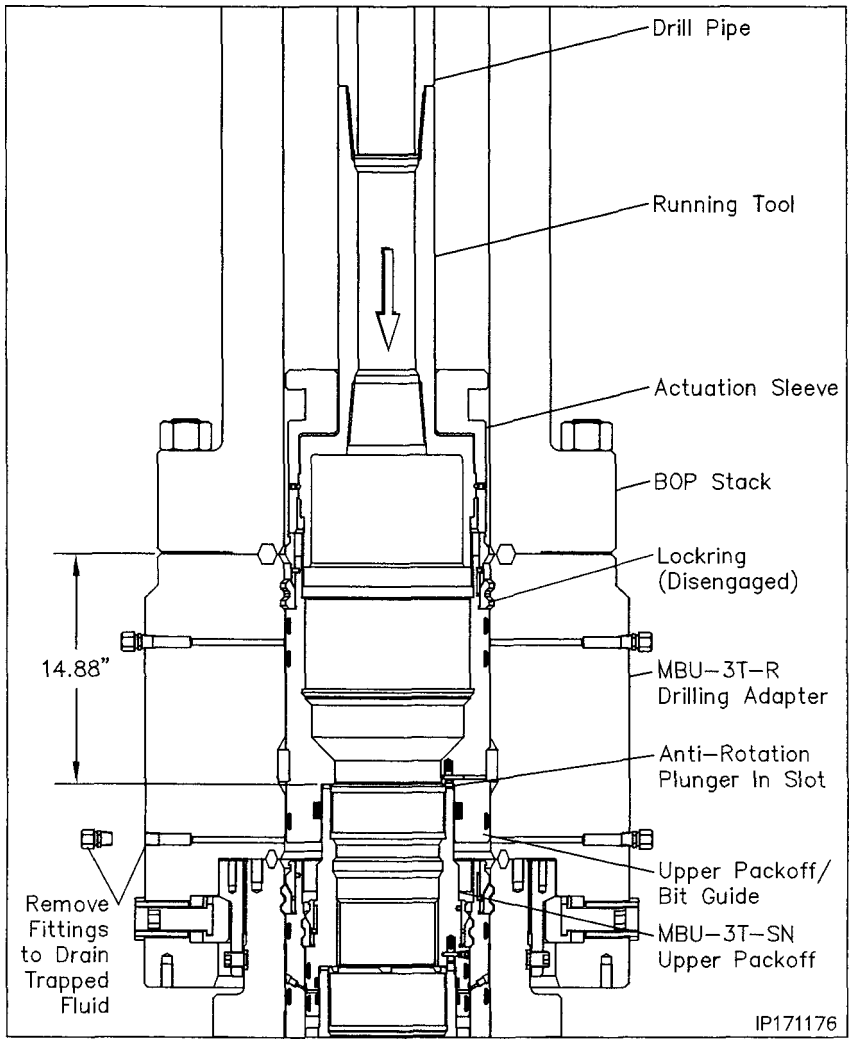
7. Calculate the landing dimension by taking the previously taken RKB dimension and adding 14.88" the depth of the wellhead at landing point.



Stage 14 — Install the MBU-3T-R Upper Packoff/Bit Guide

Landing the Packoff

8. Remove the hole cover.
9. Measure up 5 feet from the paint mark of the OD of the packoff and place a paint mark on the drill pipe landing joint.
10. 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.
11. 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.
12. Remove the (2) 1/2" NPT Test Fittings from the lower body of the drill adapter to drain and residual fluids from the ID of the bop stack.
13. Continue lowering the packoff until it passes over the neck of the 7" packoff and lands on top of the packoff, 14.88" below the top of the drilling adapter.



Stage 14 — Install the MBU-3T-R Upper Packoff/Bit Guide

Upper Seal Test

14. Locate the upper "SEAL TEST" fitting on the upper OD of the drilling adapter and remove the dust cap from the fitting.

15. 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.

16. Hold test pressure for 15 minutes or as required by drill supervisor.

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

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

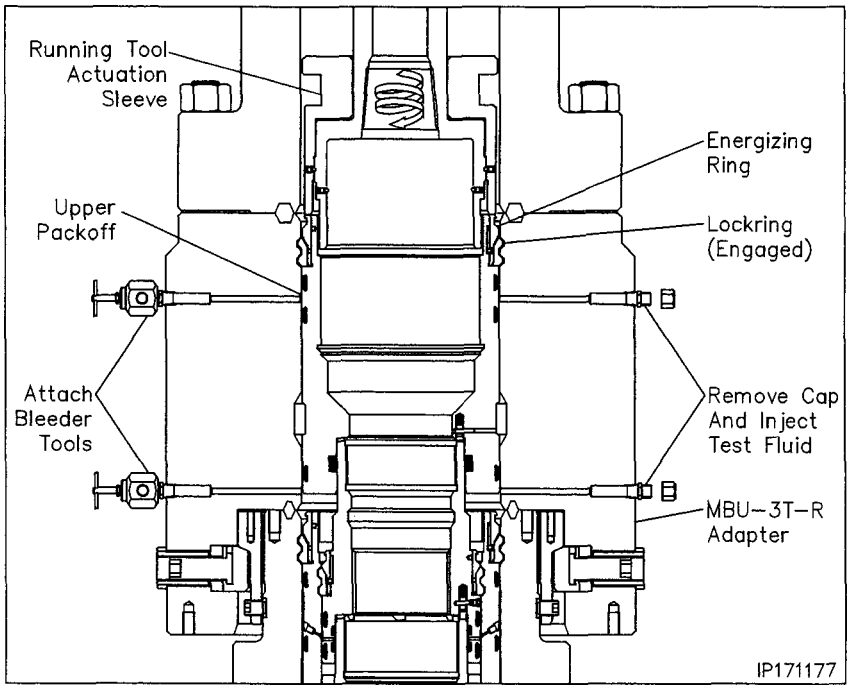
Engaging the Lockring

19. 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.

20. Using only chain tongs, rotate the landing joint approximately 6 turns counter clockwise (left) to engage the packoff lockring in its mating groove in the bore of the MBU-3T 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 drill pipe will align with the rig floor.



WARNING: 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.

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

21. 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.

22. Reattach the test pump to the open test manifold and retest the packoff upper seal to ***10,000 psi.*** This will also verify that the packoff is in place.

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

24. Reinstall the (2) 1/2" NPT test fittings in the lower body of the housing.

Lower Seal Test

25. Remove the dust cap from both fittings and install a bleeder tool to one of the open fittings and open the tool.

26. Pump clean test fluid into the void area of the housing and adapter until a stable test pressure of 5,000 psi is achieved.

27. After a successful teat is achieved, bleed off the test pressure, drain test fluid and reinstall the dust caps on the open fittings.

28. 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.

Stage 15 — 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 3-1/2" IF CW Test Plug/Retrieving Tool (Item ST17)***. 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.

WARNING: Ensure that 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.

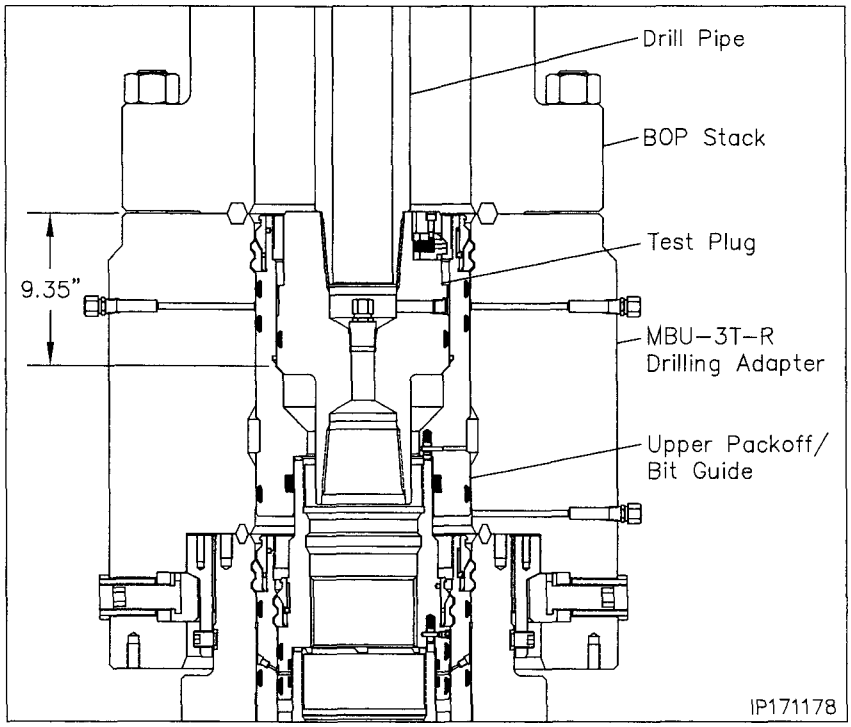
4. Open the housing side outlet valve.

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 MBU-3T-R packoff, 9.35" 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 and the retrieve the test plug with a straight vertical lift.

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

Stage 16 — Run the Upper Wear Bushing

Note: 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-3T-R 2 STAGE-UPR Wear Bushing (Item ST18).*** 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
   - 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 CW Test Plug/Retrieving Tool (Item ST4)*** with drill pipe connection up.

3. Attach the Retrieving Tool to a joint of drill pipe.

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

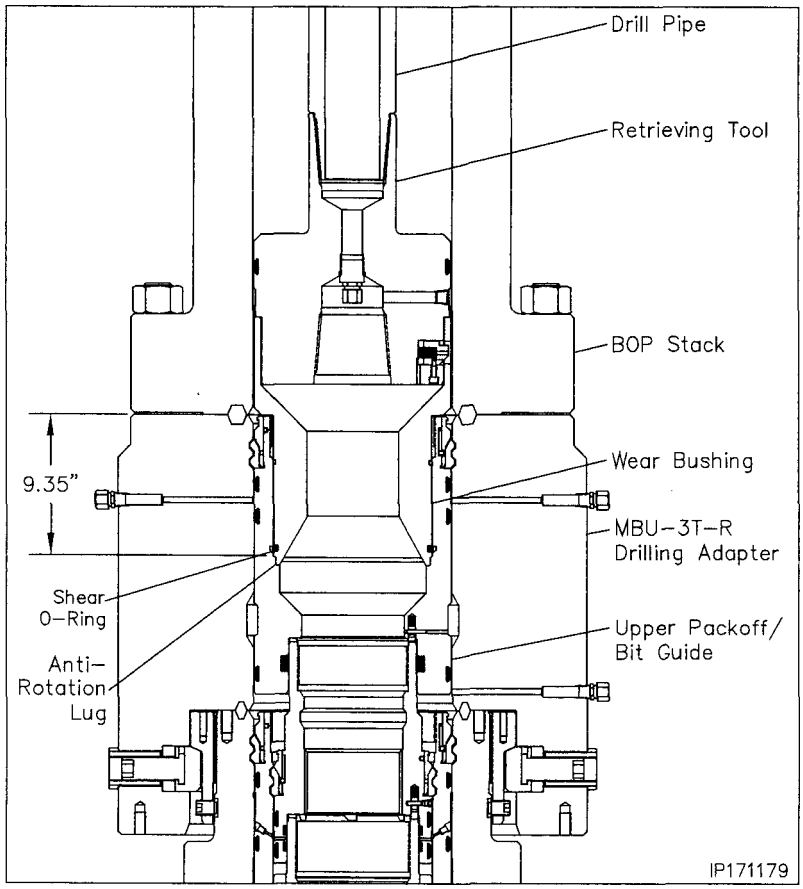
Note: If the lugs did not align with the holes, rotate the tool in either direction until they snap into place.

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

6. Slowly lower the Tool/Bushing Assembly through the BOP stack and land it on the load shoulder in the MBU-3T-R packoff, 9.35" 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.

Note: 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.

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, and remove it and the Retrieving Tool from the drill string.

Stage 17 — Remove the MBU-3T-R Upper Packoff/Bit Guide

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 (approximately 9 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 (approximately 6-1/2 turns) to a positive stop. The drill pipe should rise approximately 1-1/2".

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

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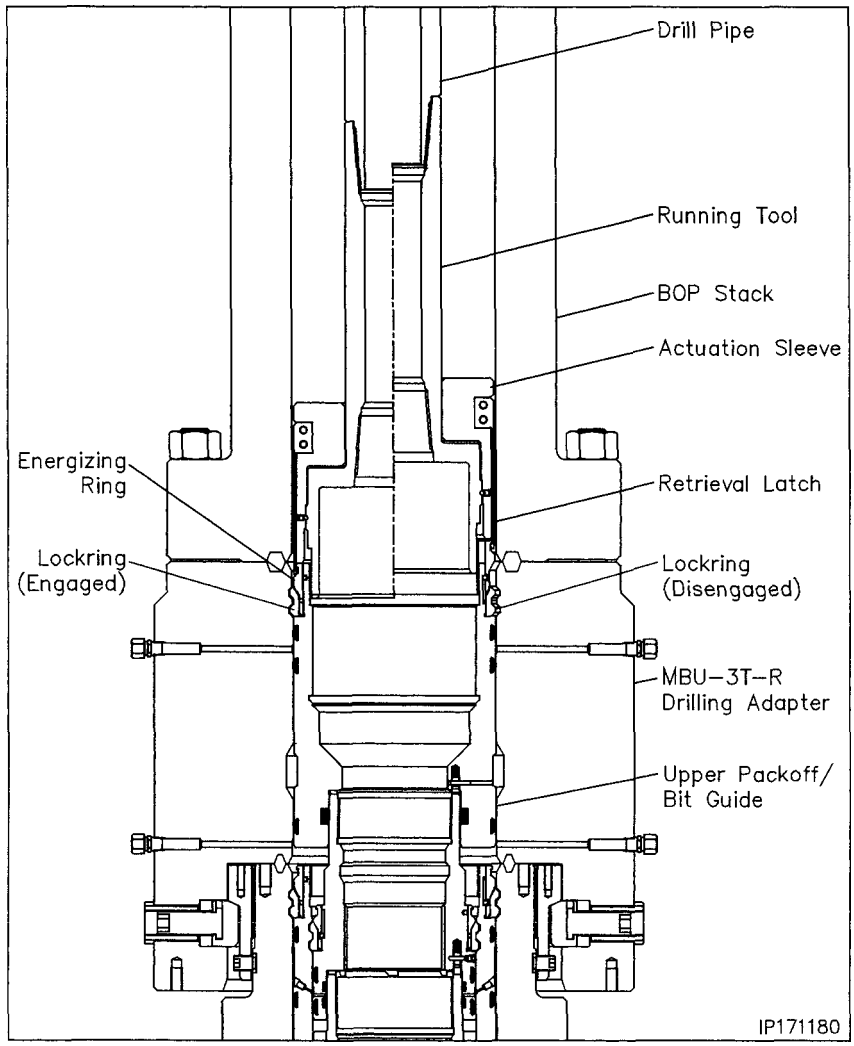
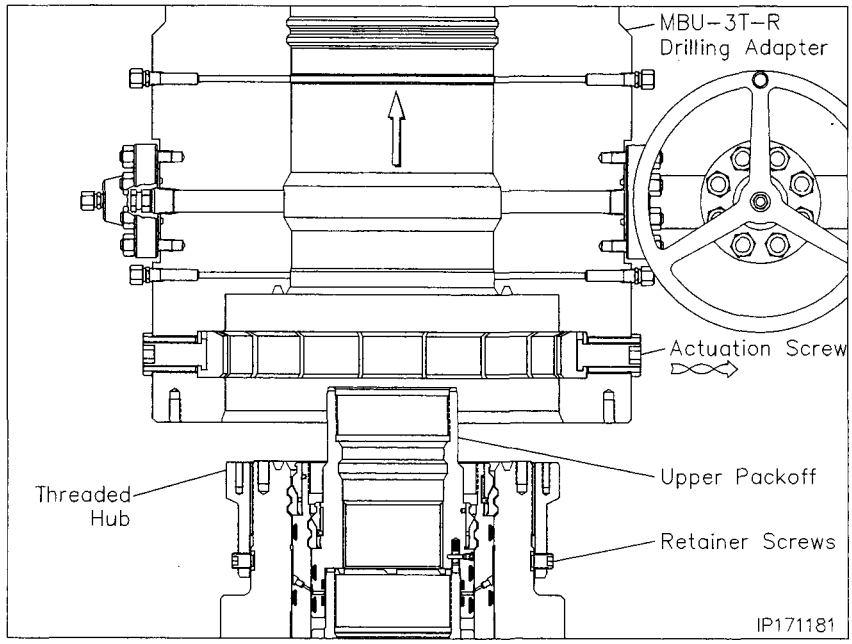
7. Carefully pick up on the drill pipe and remove the packoff from the wellhead with a straight vertical lift.



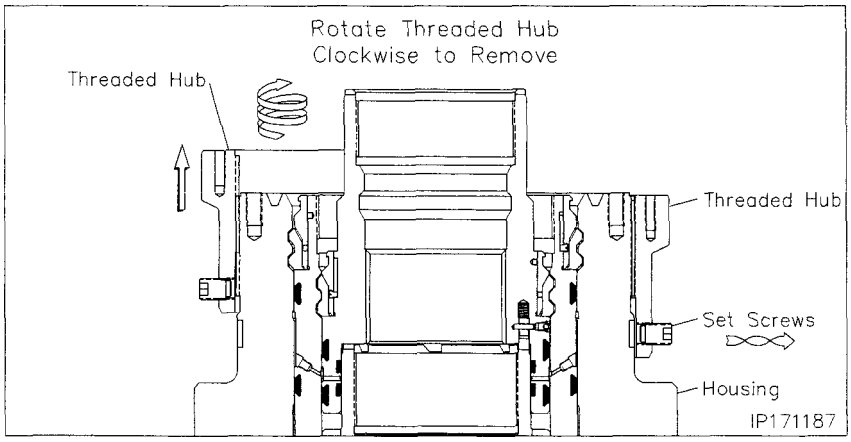
Stage 18 — Remove the Drilling Adapter

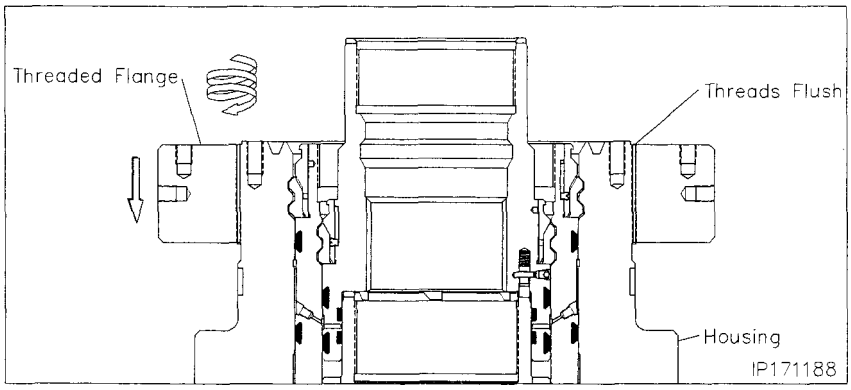
1. Locate the actuation screws on the OD of the drilling adapter.
2. Using a hex drive, fully retract the (16) actuation screws until they are slightly over flush with the glandnuts.
3. Pick up on the BOP stack with drilling adapter and set the BOP stack aside.
4. Using a high pressure water hose, thoroughly clean the top of the housing and casing hanger or casing stub, removing all old grease and drilling debris. Blow dry with compressed air.



Stage 19 — Install the TA Cap

1. Remove the thread hub set screws.
2. Remove the thread hub from the top of the housing with clockwise rotation.
3. Examine the 13-5/8" 5M Thread Flange. Verify the following:
   - Acme thread are clean and in good condition
4. Thoroughly clean and lightly lubricate the mating threads of the housing and the Thread Flange with Copper Coat or Never Seize.
5. 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.
6. Rotate the flange in either direction to two hole.





Stage 19 — Install the TA Cap

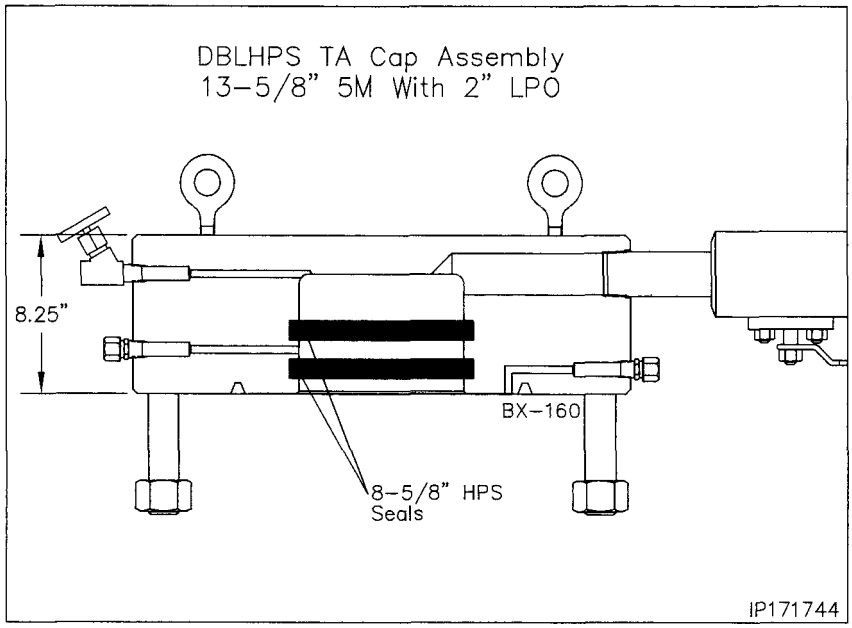
1. Examine the ***13-5/8" 5M x 2" LP TA Cap Assembly (Item R3).*** Verify the following:
   - seal area and bore are clean and in good condition
   - HPS seals are in place and in good condition
   - all peripheral equipment is intact and undamaged
2. Clean the mating ring grooves of the TA Cap and MBU-3T.
3. Lightly lubricate the I.D. of the TA Cap 'HPS' seals and the hanger neck or packoff neck with a light oil or grease.

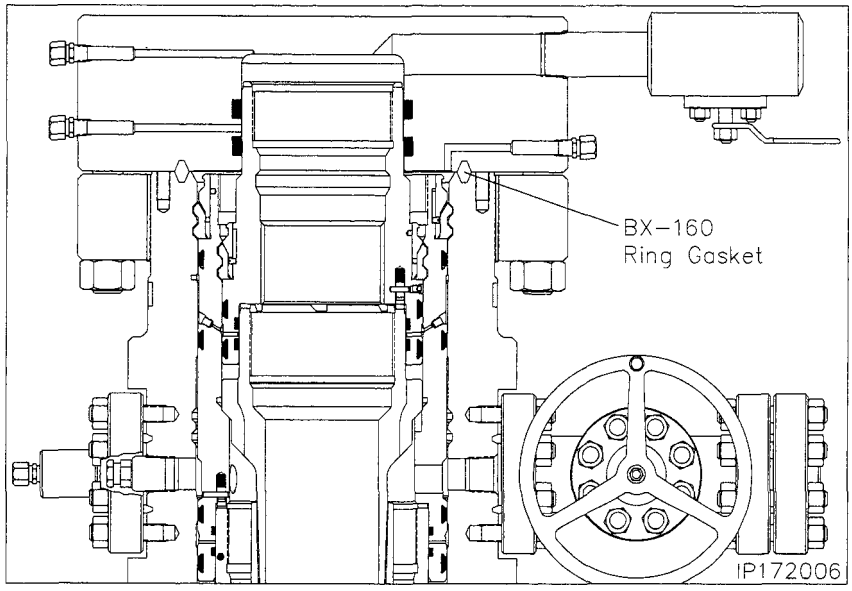
Note: Excessive grease may prevent a good seal from forming!

4. Install a new ***BX-160 Ring Gasket*** in the ring groove of the MBU-3T housing.
5. Orient the TA Cap so the outlet is in the proper position and then carefully lower the assembly over the hanger neck or packoff neck and land it on the ring gasket.

Warning: Do Not damage the TA cap HPS Seals elements or their sealing ability will be impaired!

6. Make up the flange connection with the TA Cap studs and nuts, tightening them in an alternating cross pattern.

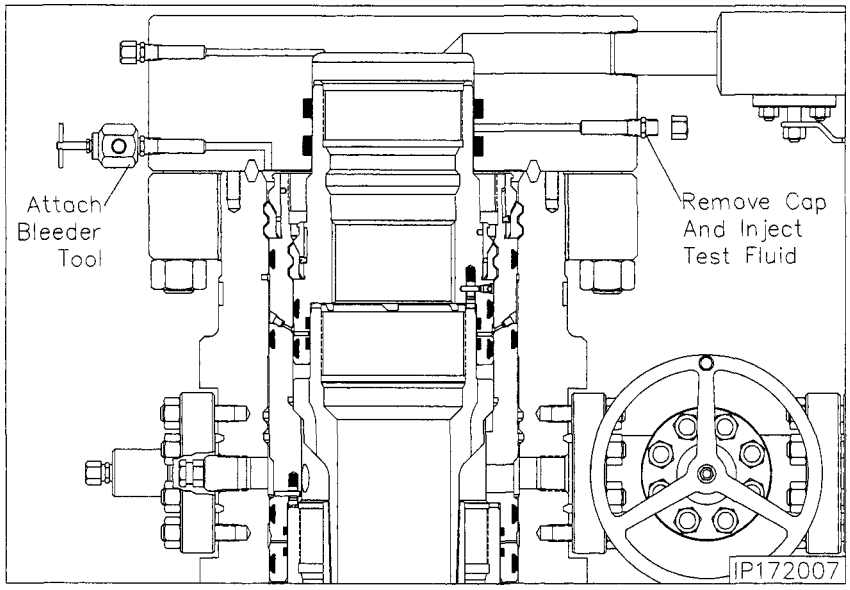




Stage 19 — Install the TA Cap

Seal Test

1. Locate the "SEAL TEST" fitting and one "FLG TEST" fitting on the TA Cap flange and remove the dust cap from both fittings.
2. Open the needle valve and close the ball valve.
3. Attach a Bleeder Tool to one of the open "FLG TEST" fitting and open the Tool.
4. Attach a Hydraulic Test Pump to the "SEAL TEST" fitting and pump clean test fluid between the packoff neck S Seals until a test pressure of ***5,000 psi.***
5. Hold the test pressure for fifteen (15) minutes or as desired by the drilling supervisor.
6. If pressure drops a leak has developed. Take the appropriate action in the table below.
7. Repeat steps 1 - 6 until a satisfactory test is achieved.
8. When a satisfactory test is achieved, remove Test Pump, drain test fluid, and reinstall the dust cap on the open "SEAL TEST" fitting.

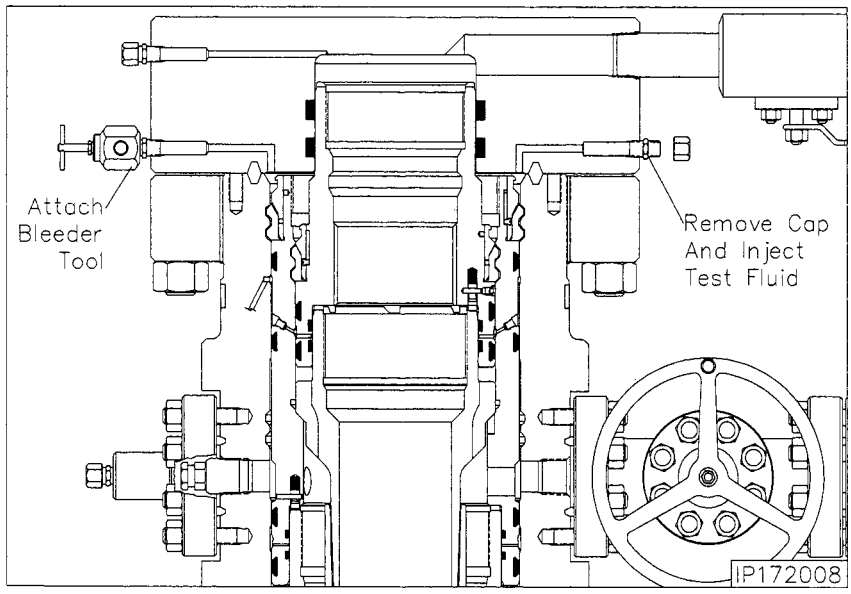


Packoff Seal Test	
Leak Location	**Appropriate Action**
Open needle valve - Upper S seal leaking	Remove TA Cap and replace leaking seals. Re-land and retest seals
From open bleeder tool - Lower S seal leaking	

Stage 19 — Install the TA Cap

Flange Test

1. Locate the remaining FLG TEST fitting on the TA Cap flange and remove the dust cap from the fitting.
2. Attach a bleeder tool to the SEAL TEST fitting and open the tool.
3. Attach a test pump to the open FLG TEST fitting and pump clean test fluid into the flange connection until a continuous stream flows from the open FLG TEST bleeder tool.
4. Close the bleeder tool and continue pumping test fluid to ***5,000 psi.*** Hold the test pressure for fifteen (15) minutes or as desired by the drilling supervisor.
5. If pressure drops a leak has developed. Take the appropriate action from the adjacent chart.
6. Repeat steps this procedure until a satisfactory test is achieved.
7. Once a satisfactory test is achieved, remove the test pump and bleeder tool, drain test fluid, and reinstall the dust caps.



Flange Test	
Leak Location	**Appropriate Action**
Flange connection - Ring gasket is leaking	Further tighten the flange connection
Open Seal Test bleeder tool - Lower packoff neck seal is leaking	Remove TA Cap and replace leaking seals. Re-land and retest seals

Stage 20 — Install the Tubing Head

1. Examine the ***13-5/8" 5M x 7-1/16" 10M 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 fully retracted from the bore

2. Clean the mating ring grooves of the Tubing Head and Housing.

3. Lightly lubricate the ID of the HPS Seals and the casing stub with a light grease.

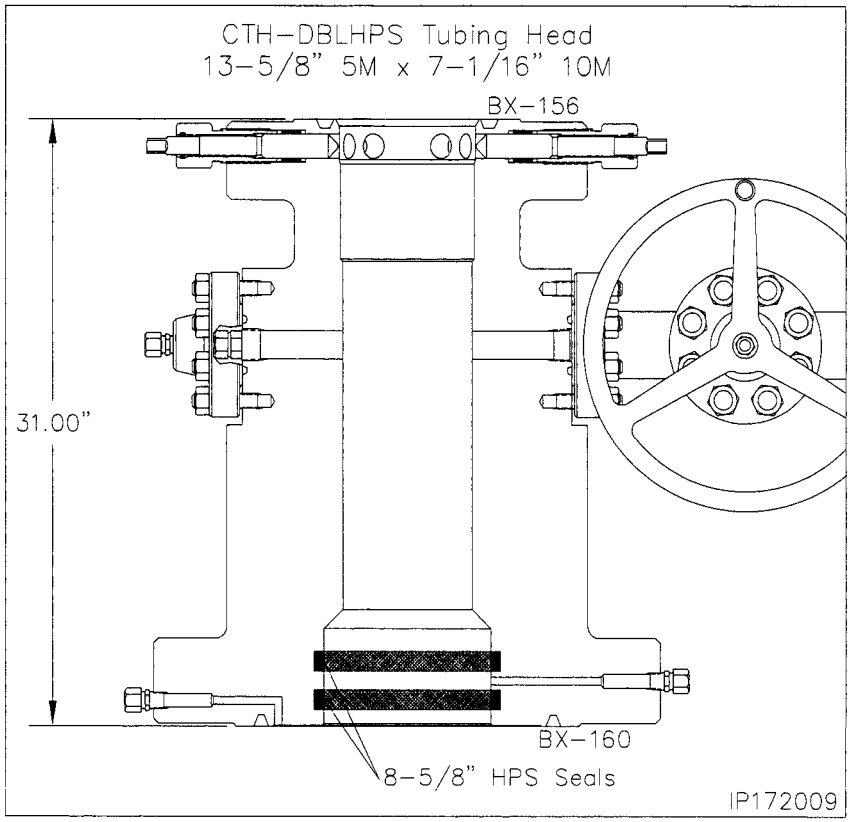
Note: Excessive grease may prevent a good seal from forming!

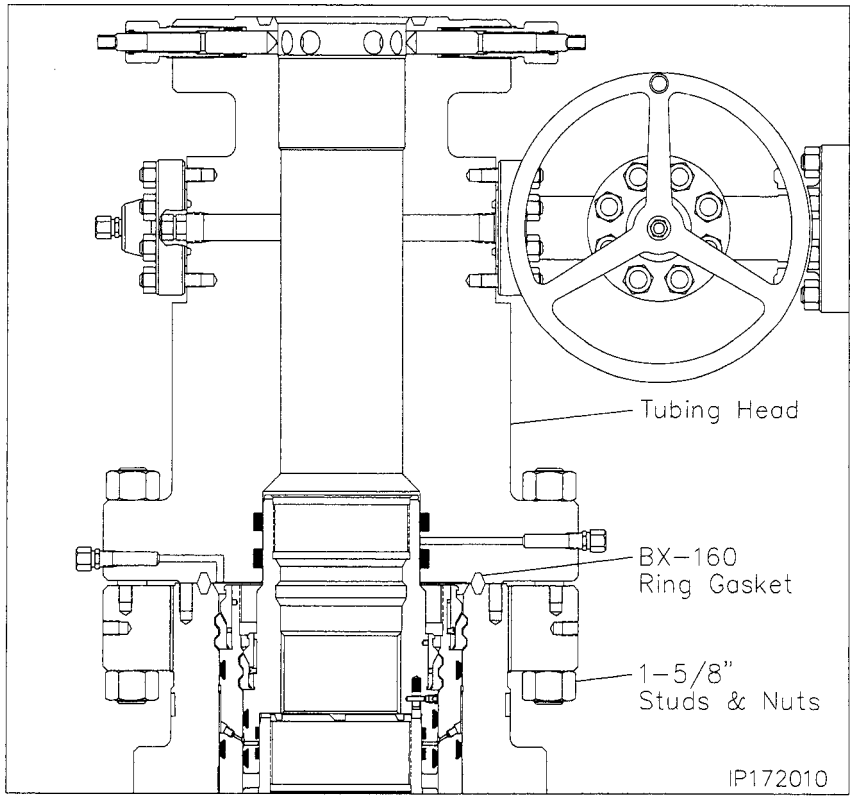
4. Install a new ***BX-160 Ring Gasket (Item B11)*** in the ring groove of the MBU-3T housing.

5. Orient the Tubing Head so the outlets are in the proper position and then carefully lower the head over the hanger neck or casing stub and land it on the ring gasket.

Warning: Do Not damage the HPS Seal elements or their sealing ability will be impaired!

6. Make up the flange connection using the appropriate size ***1-5/8" x 12-3/4" Studs and Nuts (Item B12)***, tightening them in an alternating cross pattern.

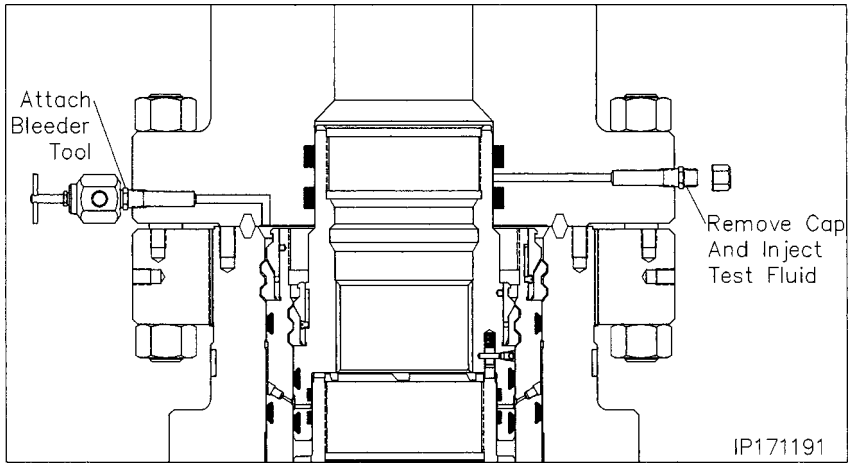




Stage 20 — Install the Tubing Head

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 one of the open "FLG TEST" fitting and open the Tool.
3. Attach a Hydraulic Test Pump to the "SEAL TEST" fitting and pump clean test fluid between the HPS Seals until a test pressure of ***10,000 psi. or 80% of casing collapse — whichever is less***
4. Hold the test pressure for fifteen (15) minutes or as desired by the drilling supervisor.
5. If pressure drops a leak has developed. Take the appropriate action in the table below.
6. Repeat steps 1 - 6 until a satisfactory test is achieved.
7. When a satisfactory test is achieved, remove Test Pump, drain test fluid, and reinstall the dust cap on the open "SEAL TEST" fitting.

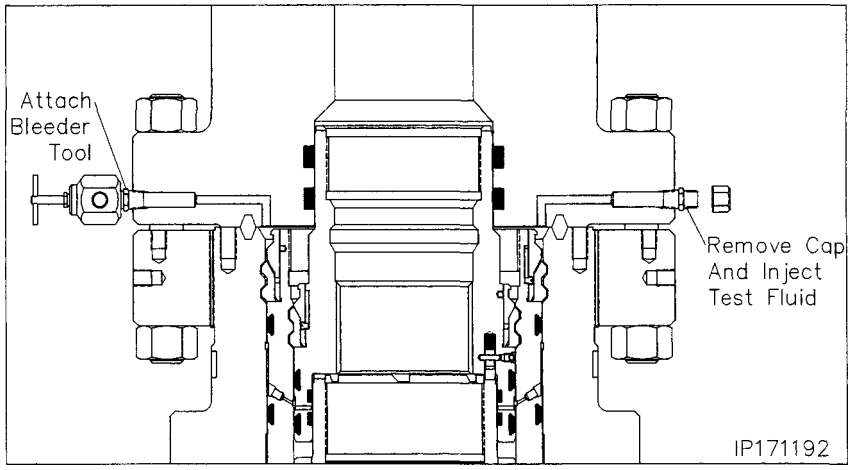


Seal Test	
Leak Location	**Appropriate Action**
Into Tubing Head bore - Upper HPS seal leaking	Remove tubing head and replace leaking seals. Re land and retest seals
From open bleeder tool - Lower HPS seal leaking	

Stage 20 — Install the Tubing Head

Flange Test

1. Locate the two FLG TEST fittings on the bottom flange of the Tubing Head and remove the dust cap from both fittings.
2. Attach a bleeder tool to the SEAL TEST fitting and open the tool.
3. Attach a test pump to one fitting and pump clean test fluid into the flange connection until a continuous stream flows from the bleeder tool.
4. Close the bleeder tool and continue pumping test fluid to ***5,000 psi. or 80% of casing collapse — whichever is less.***
5. Hold the test pressure for fifteen (15) minutes or as desired by the drilling supervisor.
6. If pressure drops a leak has developed. Take the appropriate action from the adjacent chart.
7. Repeat steps this procedure until a satisfactory test is achieved.
8. Once a satisfactory test is achieved, remove the test pump and bleeder tool, drain test fluid, and reinstall the dust caps.



Flange Test	
Leak Location	**Appropriate Action**
Into casing annulus - Packoff seal element is leaking	Remove tubing head and packoff and replace leaking seals
Flange connection - Ring gasket is leaking	Further tighten the flange connection