ONSHORE OIL & GAS ORDER NO. 1
Approval of Operations on Onshore
Federal and Indian Oil and Gas Leases

HOBBS OCD

JUL 10 2014

RECEIVED

Prodigal Sun 17-24-34 #1H
330' FNL and 1660' FEL
Section 17, Township 24South, Range 34 East
Lea County, New Mexico

HOBBS OCD

JUL 10 2014

RECEIVED

1. EXISTING ROADS/LEASE ROADS

Driving directions are from Jal NM. West on HWY 128 approximately 17 miles to a road on Bert Madera land. Turn North and go approximately 1 mile on an existing caliche road on Section 15, T24S, R34E, then turn west through Section 16, then into Section 17-24-34, N.M.P.M., Lea County, New Mexico.

The proposed lease road approximately .75 miles in length and 20' in travel way width with a maximum disturbance area of 30' will be used, and in accordance with guidelines set forth in the BLM Onshore Orders. No turnouts are expected.

Existing deeded and lease roads will be used to enter proposed access road.

Surface disturbance and vehicular travel will be limited to the approved location and approved access route. Any additional area needed will be approved in advance.

Location, access, and vicinity plats attached hereto. **See Exhibits A-1 to A-4.**

2. NEW OR RECONSTRUCTED ACCESS ROADS

There will be Very little of new access to be constructed.

The new access road will be upgraded to a crowned and ditched road and will be graveled as needed for drilling. If requested by the surface owner, upgrading of this portion of the road will be kept to a minimum.

All existing roads (previously improved) will be used "as is" with the exception of minor blading as needed.

Surface disturbance and vehicular travel will be limited to the approved access route. Any additional area will be approved in advance.

Road Width: 14 – 20 feet traveling surface.

Maximum Grade: Road gradient less than 8%

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Crown Design: 2%

Turnouts will be installed along the access route as needed.

Ditch design: Drainage, interception and outlet.

Erosion Control: 6" rock under road.

Re-vegetation of Disturbed Area: All disturbed areas will be seeded by Broadcast or Drill and Crimp. Ground conditions will determine the method used.

Cattle guard(s) will be installed as needed.

Major Cuts and Fills: 2:1 Slope.

Surfacing material (road base derived from caliche or river rock) will be placed on the access road during construction. All surface disturbing activities will be discussed with and agreed to with the surface owner.

3. LOCATION OF EXISTING WELLS

All wells located within a 1-mile radius of the proposed location. **See Exhibit B.**

4. LOCATION OF PRODUCTION FACILITIES

It is anticipated that production facilities will be located on the East side of the Prodigal Sun 17-24-34 #1H well pad (Depicted in the attached SUP plat) and oil to be sold at that tank battery.

The production line will be buried 3 1/2" Fiberglass Pipe with a working pressure greater than 100 psi ran along existing disturbances.

Oil and gas measurement will be installed on this well location. **See Exhibits C.**

5. LOCATION AND TYPES OF WATER SUPPLY

Water will be obtained from a private water source.

Chevron will utilize the fresh water holding pond in Section 15-24-34 for fresh water.

Water to be piped into section 17.

A temporary 10" aluminum transfer line will run approx. 2.00 miles from the pond in section 15 to the location. All transfer lines will be laid on a disturbed area.

6. CONSTRUCTION MATERIALS

All construction materials will be used from the nearest Private, BLM, or State pit. All material (i.e. shale) will be acquired from private or commercial sources.

No construction material will be needed for well pad construction; subsurface spoil material will be utilized.

Surfacing material (caliche) will be purchased from a supplier having a permitted source of materials.

The entire location will be fenced with barb/woven wire and bermed with spoil dirt or gravel.

7. METHODS FOR HANDLING WASTE DISPOSAL

A closed system will be utilized consisting of above ground steel tanks.

All wastes accumulated during drilling operations will be contained in a portable trash cage and removed from location and deposited in a state approved facility.

Disposal of cuttings:

8. ANCILLARY FACILITIES

None

9. WELLSITE LAYOUT

The proposed site layout plat is attached showing the Ensign Rig #153 orientation and equipment location. **See Exhibit D.**

In order to level the location, cut and fill will be required. Please see attached Well Location and Acreage Dedication Plat – Exhibits A-1 to A-4.

A locking gate will be installed at the site entrance.

Any fences cut will be repaired. Cattle guards will be installed, if needed.

10. PLANS FOR RECLAMATION OF THE SURFACE

In the Event of Production

Interim reclamation will consist of reclaiming the pad to 50 feet outside the anchors or approximately 200 x 200 feet.

In the Event of a Dry Hole/Final Reclamation

Upon final abandonment of the well, caliche material from the well pad and access road will be removed and utilized to re-contour to a final contour that blends with the surrounding topography as much as possible. Any caliche material not used will be utilized to repair roads within the lease. Topsoil will be distributed over the reclamation area and cross ripped to control erosion; the site will be seeded with an approved BLM mixture.

The location will be restored to as near as original condition as possible. Reclamation of the surface shall be done in strict compliance with the existing New Mexico Oil Conservation Division regulations and BLM regulations.

11. SURFACE OWNERSHIP

Bert Madera

ROAD OWNERSHIP

All access roads are located on Private, Federal & State lands.

12. ADDITIONAL INFORMATION

Class III cultural resource inventory report was prepared by Boone Archaeological Services, Carlsbad, New Mexico for the proposed location. A copy of the report has been sent to the BLM office under separate cover and is also attached for reference.

13. Chevron REPRESENTATIVES

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GE Oil & Gas
Drilling & Production

Pressure Control Wellhead Equipment
Running Procedure For: Prodigal Sun

Chevron

13-3/8" x 9-5/8" x 5-1/2" x 2-7/8" 10M
SH2/SH2-R Wellhead Assembly

Publication # RP-2072
June, 2012

GE

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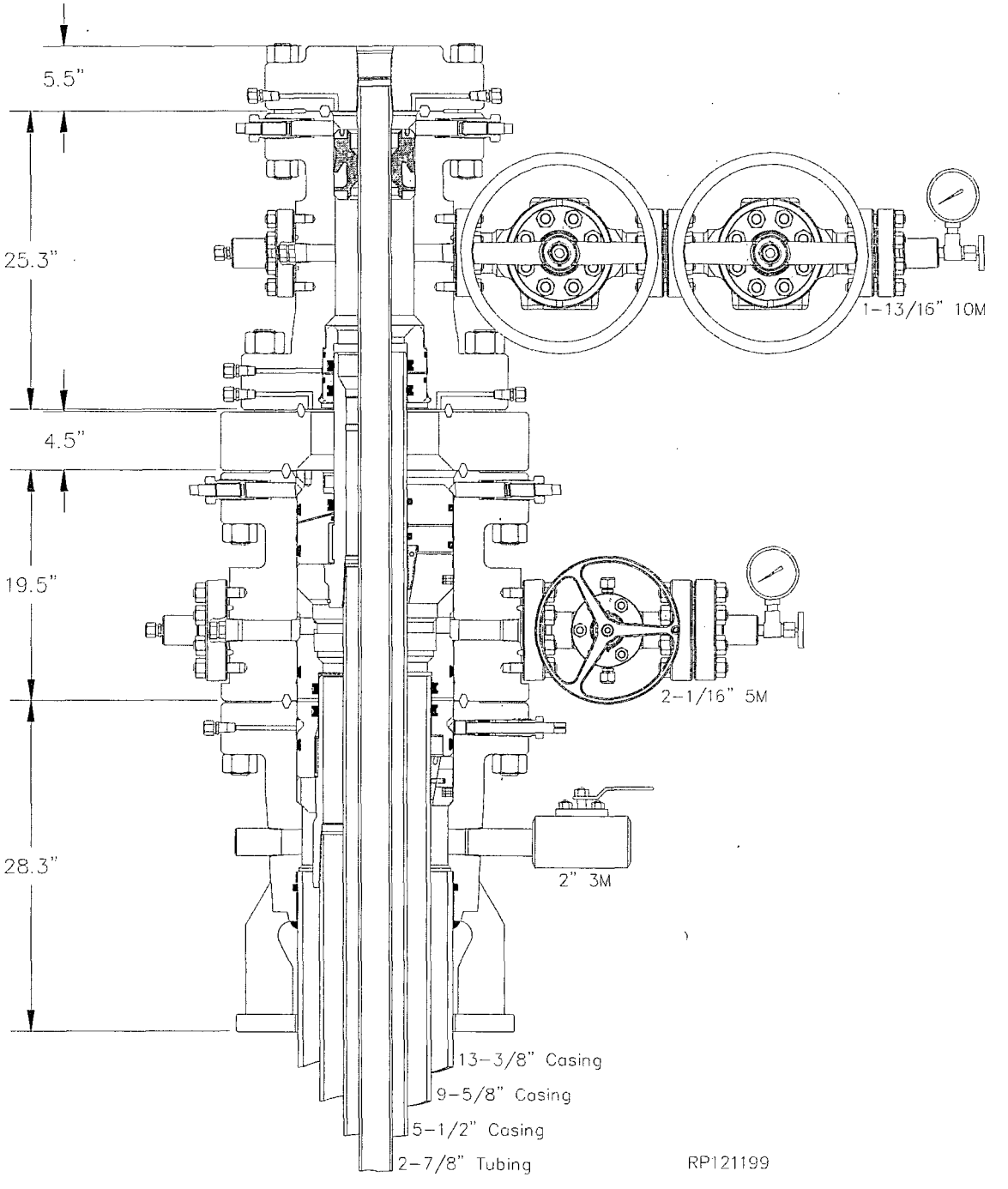
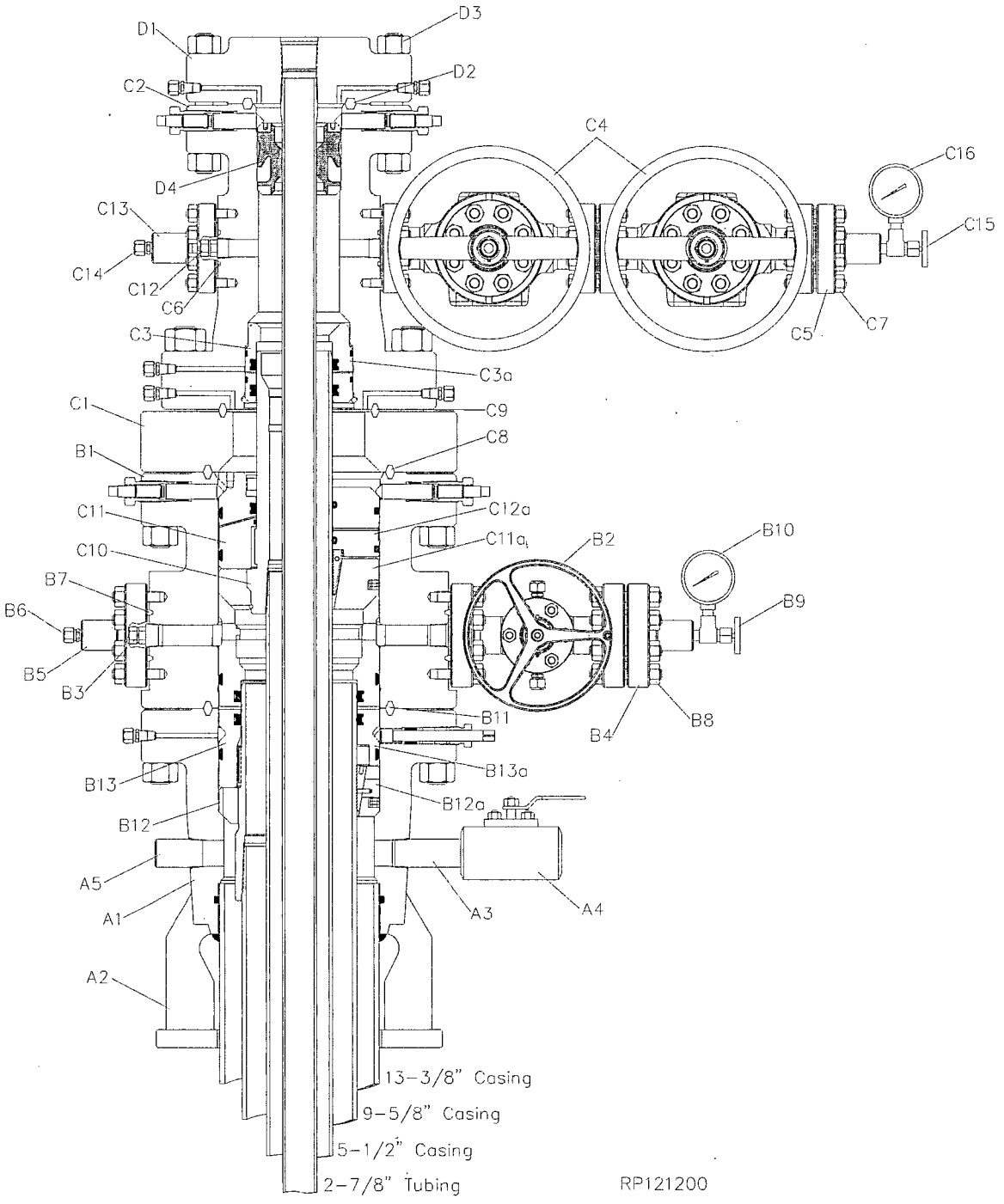
System Drawing



Bill of Materials



LOWER SH2 ASSEMBLY

Item	Qty	Description
A1	1	Housing, SH2-LWR, 13-5/8" 5M x 13-3/8" SOW, o-ring, with two 2" line pipe outlets Part # 3315122
A2	1	Baseplate Kit, 24" OD x 14" ID x 1.50" thick, with six #1 gussets and two 2-1/2" grout slots, (for 13-5/8" casing head) Part # 342693
A3	1	Nipple, 2" line pipe x 6" long, XXH with 1.50" bore Part # NI6
A4	1	Ball Valve, KF, CFH, 2 RP 3M, threaded, 2LP, carbon steel, with CS Trim Part # BV2-3
A5	1	Bull Plug, solid, 2" line pipe x 1/2" line pipe, 4" long Part # BPS-API

UPPER SH2 ASSEMBLY

Item	Qty	Description
B1	1	Housing, SH2-UPR, 13-5/8" 5M studded x 13-5/8" 5M with two 2-1/16" 5M studded outlets, integral lockscrews and seal test port Part # 376846
B2	1	Gate Valve, WG, 1000, 2-1/16" 3/5M, flanged, 6A-PU-AA-1-2 Part # 327693
B3	1	Valve Removal Plug, 1-1/2" sharp vee, with 1-1/4" hex, API Part # 329570
B4	2	Companion Flange, 2-1/16" 5M x 2" line pipe, 6A-PU-EE-NL-1 Part # 317865
B5	2	Bull Plug, tapped, 2" line pipe x 1/2" npt Part # BPT-API
B6	1	Fitting, grease/vent, 1/2" NPT 10M, SVC 1215 Part # A025-001
B7	3	Ring Gasket, R-24, Carbon Steel, Plated, AISI 1005/1020, API 6A PSL 1-4 Part # R24
B8	8	Stud, with two nuts, plated, 7/8" x 6-1/2, B7/2H Part # 331062
B9	1	Needle Valve, angled, 1/2" npt Part # NVA
B10	1	Pressure Gauge, 0-5000 PSI, Dual Gage, 75% liquid filled, 4" min. O.D. face, 1/2" NPT, SS Case, Poly Carbonite face, Crimped Bezel, Temp -40 to 220F Part # PG5
B11	1	Ring Gasket, BX-160, carbon steel, plated, API 6A PSL 1-4 Part # BX160
B12	1	Casing Hanger, SH2, 13-5/8" x 9-5/8" (36.0# - 40.0#) LC box bottom x 10.125" -4 ACME left hand pin, minimum bore 8.785", 6A-U-AA-1-2 Part # 336028
B13	1	Packoff Support Bushing, SH2E, 13-5/8" x 9-5/8" for use with mandrel hanger, 6A-PU-AA-1-2 Part # 348027

TUBING HEAD ASSEMBLY

Item	Qty	Description
C1	1	DSA, 13-5/8" 5M x 11" 5M, 6A-PU-EE-NL-1 Part # 332394
C2	1	Tubing Head, WG, T-EBS-F, 9", 11" 5M x 7-1/16" 10M, with two 1-13/16" 10M studded outlets Part # 350994
C3	1	Secondary Seal, WG, EBS-F, 9" x 7" Part # 350850
C4	2	Gate Valve, manual, 2200T, 1-13/16" 10M, flanged Part # 373740
C5	2	Companion Flange, 1-13/16" 10M x 2" line pipe, (5000 max wp) 6A-KX-EE-NL-1 Part # 351855
C6	4	Ring Gasket, BX-151, carbon steel, API 6A PSL 1-4 Part # BX151-SS
C7	16	Studs, with two nuts each, black, 3/4" x 5.50" long, stud A193-GR B7, nuts A194-GR 2H Part # 802029
C8	1	Ring Gasket, BX-160, carbon steel, API 6A PSL 1-4 Part # BX160
C9	1	Ring Gasket, R-54, PSL4 Part # RS4
C10	1	Casing Hanger, SH2-R-UPR, 13-5/8" 5M x 5-1/2" LC box bottom x 7.375" -4 ACME left hand pin top, with 5" BPV prep Part # 397222
C11	1	Packoff, SH2E-R-LWR, 13-5/8" x 7" for mandrel hanger, arranged for test port in upper housing Part# 397224
C12	1	Valve Removal Plug, 1-1/4" sharp vee, with 1-1/4" hex, API Part # 329569
C13	2	Bull Plug, tapped, 2" line pipe x 1/2" npt Part # BPT-API
C14	1	Fitting, grease/vent, 1/2" NPT 10M Part # A025001
C15	1	Needle Valve, angled, 1/2" npt Part # NVA
C16	1	Pressure Gauge, 0-5000 PSI, Dual Gage, 75% liquid filled, 4" min. O.D. face, 1/2" NPT, SS Case, Poly Carbonite face, Crimped Bezel Part # PG5

CHRISTMAS TREE ASSEMBLY

Item	Qty	Description
D1	1	Adapter, WG, B5, 7-1/16" 10M x 2-7/8" EU box bottom and top, 5M psi max Part # TBE-NWH
D2	1	Ring Gasket, BX-156, carbon steel, API 6A PSL 1-4 Part # BX156-SS
D3	12	Studs, with two nuts, PLT, 1-1/2" x 11-3/4" stud A193-GR B7, nut A194-GR 2H Part # 325237
D4	1	Stripper Rubber, TC, 7-1/16" x 2-7/8" Part # 318028

RECOMMENDED SERVICE TOOLS

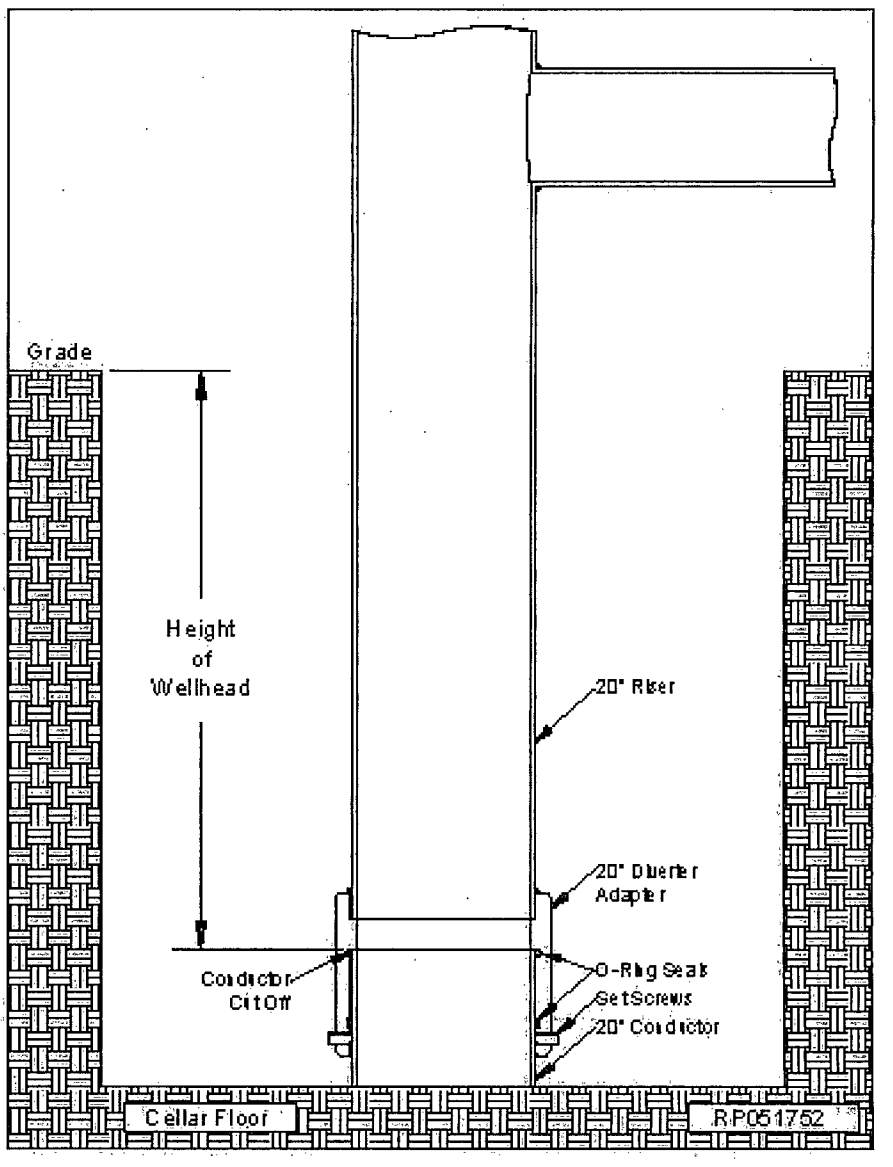
Item	Qty	Description
ST1	1	Diverter connector, SRC, 20" SOW x 20" Part # 307158
ST2	1	Lift Flange, 13-5/8" 5M x 13-3/8" Csg box, with 1.5" deep counter bore Part # 344520
ST3	1	Isolation bushing, SH2, WG, 13-5/8" x 13-3/8" ID x 28.5" long Part # 344552S
ST4	1	Test Plug/Retrieving Tool, WG-22, 13-5/8" nominal x 4-1/2" IF box x box Part # 301607
ST5	1	Test Plug/Retrieving Tool, SL, 13-5/8" nominal x 4-1/2" IF box top and bottom with 1-1/4" line pipe bypass and spring loaded dogs Part # 332044
ST6	1	Wear Bushing, WG, SH2-SL, 13-5/8" nominal x 12.36" I.D. x 33 long, with silt barrier Part # 345899
ST7	1	Casing Hanger Running Tool, SH2, 9-5/8" LCSG box top x 10.125"-4-2G left hand internal running threads Part # 300511
ST8	1	Running Tool, WG-SH2 packoff support bushing, 13-5/8" nominal x 4-1/2" IF pin x box Part # 301454
ST9	1	Wear Bushing, SH2-SL, 13-5/8" nominal x 12.62" ID x 13.6" long Part # 334035S
ST10	1	Casing Hanger Running Tool, SH2-R, 7" x 5-1/2" LC box x 7.375"-4-2G left hand internal running threads, 26.5" long Part # 397226
ST11	1	Packoff Running Tool, SH2E-R-LWR, 7.375" 4 Stub Acme LH pin top x 8.750" 4 Stub Acme RH pin bottom, 16.5" long Part # 397387

EMERGENCY EQUIPMENT

Item	Qty	Description
B12a	1	Casing Hanger, WG-SH1, 13-5/8" x 9-5/8", for high capacity, also for multi bowl Part # 359031
B13a	1	Packoff Support Bushing, WG-SH2S, Emergency, 13-5/8", with 9-5/8" double 'EBS' Seals Part # 348029
C3a	1	Secondary Seal, WG, EBS-F, 9" x 5-1/2" Part # 350848
C110a	1	Casing Hanger, WG, SH1-UPR, 13-5/8" x 5-1/2", for use with test port Part # 397263
C11a	1	Primary Seal, H-SH2, 13-5/8" x 5-1/2", for use with test port, arranged for emergency Part # TBE-NWH

Stage 1 — Installing the 20" Diverter Riser Assembly

1. Drill 20" rat hole and set 20" conductor pipe.
2. Cut the conductor pipe off at the correct height to accommodate the installation of the SH2 Wellhead Assembly and grind stub level.
3. Move rig on location and rig up as required.
4. Examine the ***20" Diverter Adapter (Item ST1)***. Verify the following:
   - 20" riser pipe is properly welded in place and is in good condition
   - all internal seals are in place and in good condition
   - 1" set screws are in place and fully retracted
5. Calculate the distance from the top of the 20" conductor pipe stub to the location of the diverter flowline.
6. Using the calculated dimension, locate and weld in-place, the flowline outlet of the diverter riser.
7. Thoroughly clean and lightly lubricate the I.D. seals of the Diverter Adapter with clean light grease.
8. Remove all old grease, scale and any sharp edges from the O.D. of the conductor stub and then lightly lubricate the stub with clean light grease.
9. Pick up the Diverter Riser Assembly, orientate the flowline outlet as required, and then carefully lower the assembly over the conductor stub until the stub contacts the inner stop shoulder.
10. While balancing the Diverter weight, run in all 1" set screws in an alternating cross pattern. Tighten screws securely.
11. Slack off all weight and secure Diverter Riser as required with necessary tie down lines.
12. Drill and condition hole for 13-3/8" casing.



13. Prior to running the 13-3/8" casing the Diverter Riser must be removed.
14. Remove as much fluid as possible from the Diverter Riser.
15. Fully retract all 1" set screws and remove tie down lines.
16. Attach a suitable lifting device to the Diverter Riser and retrieve with a straight vertical lift.

Stage 2 — Install Split Speed Head With Riser Assembly

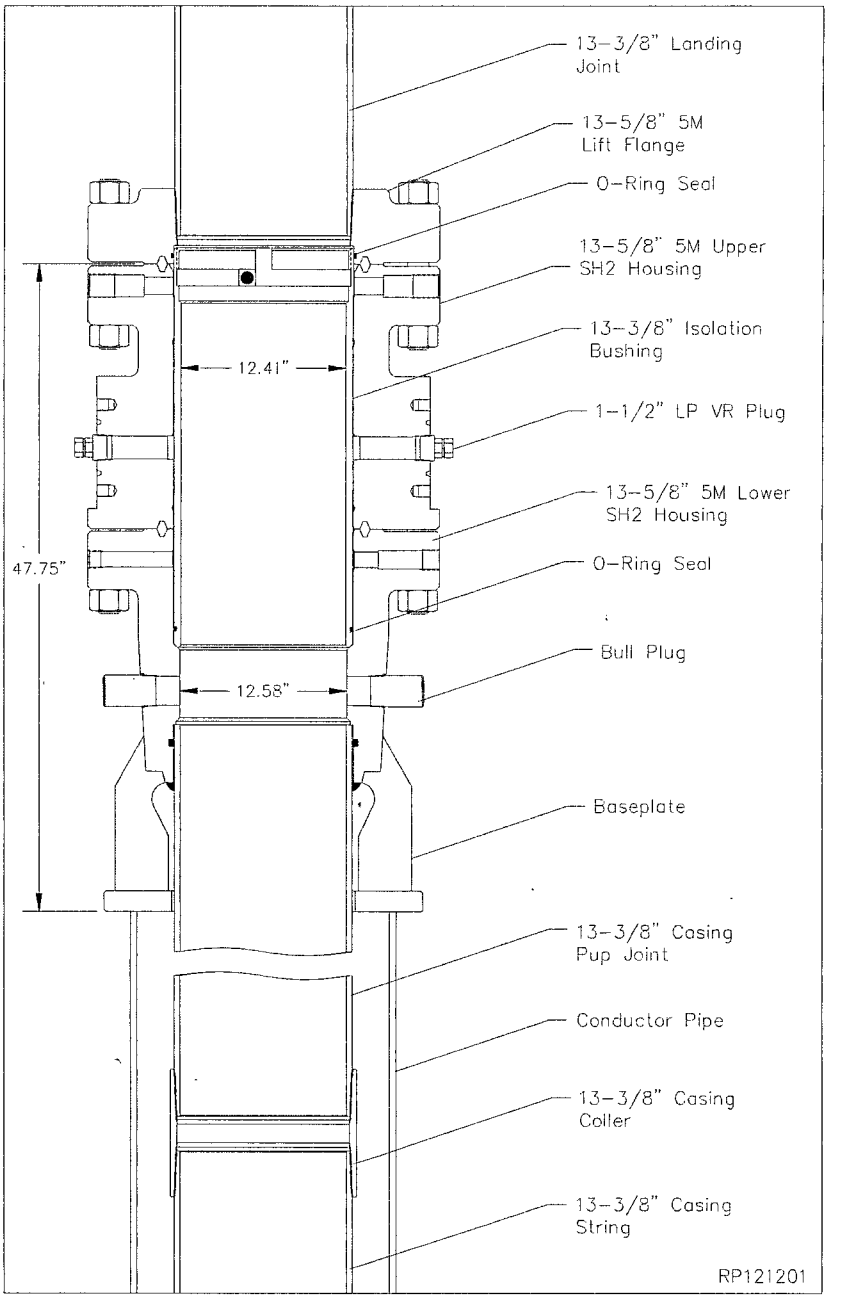
1. Drill and condition hole for surface casing.
2. Cut the conductor pipe off at the correct height above the cellar floor and grind stub level.

Note: The SH2 Riser Assembly is pre-assembled and tested prior to being shipped to location. The assembly is made up of a full length landing joint with flange, upper and lower SH2 housings, and a 10' long pup joint.

3. Examine the ***13-5/8" 5M x 13-3/8" SOW SH2 Speed Head/Riser Assembly (Items A1 & B1)***. Verify the following:
   - 10' pup joint is properly welded in place and casing threads are clean and in good condition
   - all outlet equipment has been removed including all studs and nuts, and valves
   - VR plugs are in place and tight
   - base plate is intact and properly welded to the casing head
   - isolation bushing is in place and properly retained with landing flange
   - landing flange with landing joint are in place and connection is properly made up

Note: Lockscrews are removed to clear 27-1/2" rotary.

4. Run the surface casing to the required depth and then set the last joint of casing run in the floor slips.
5. Pick up the SH2 Riser Assembly and make up the assembly in the casing string, tightening the thread connection to the thread manufacturers optimum make up torque.
6. Pick up the casing string and remove the floor slips and rotary bushings.
7. Slowly and carefully lower the assembly through the rotary table until the baseplate contacts the conductor pipe stub. Slack off all weight.
8. Rig up the cement head and cement the surface casing string as per program, taking returns through the circulation ports in the baseplate.
9. After the cement job is completed, bleed off and remove the cement head.
10. Remove the landing flange with landing joint and set aside.



11. Examine the ***13-5/8" 22 Test Plug/Retrieving Tool (Item ST4)***. Verify the following:
    - elastomer seals, lift lugs, and plugs are intact and in good condition
    - drill pipe threads are clean and in good condition
11. Orient the retrieving tool with elastomer up and lift lugs down. Make up a joint of drill pipe to the tool.
12. Slowly lower the tool into the Isolation Bushing.

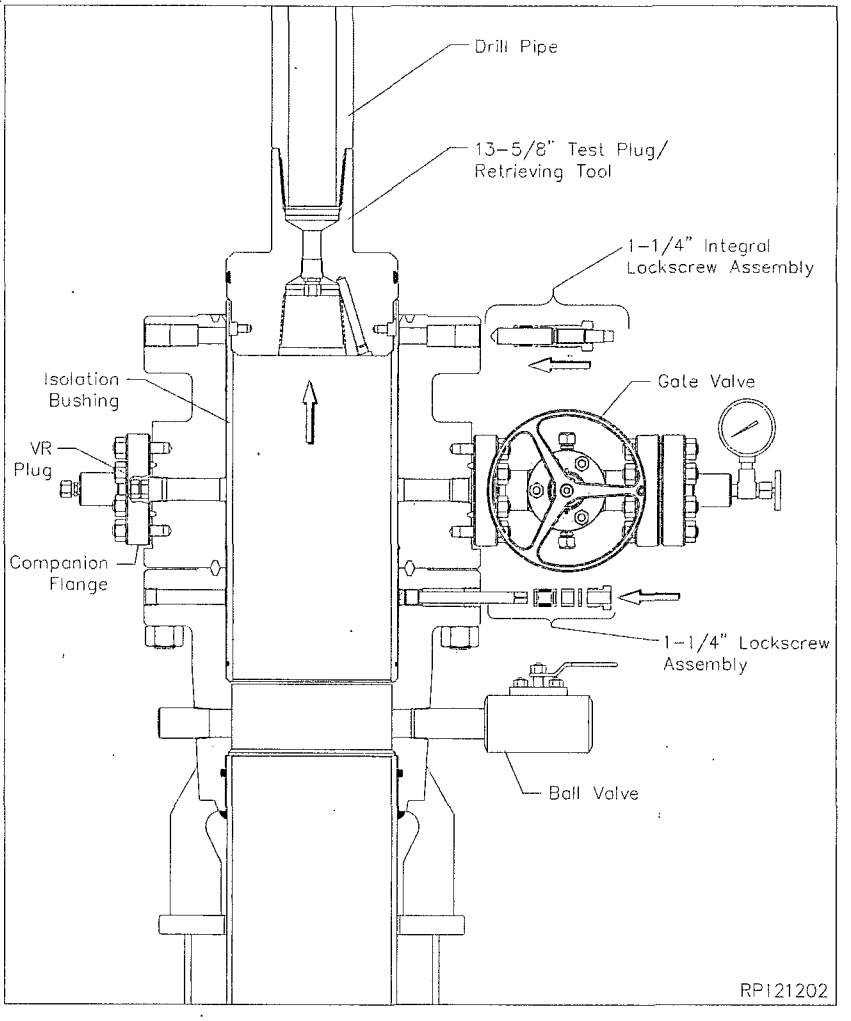
Stage 2 — Install Split Speed Head With Riser Assembly

13. Rotate the tool clockwise until the drill pipe drops approximately 2". This indicates the lugs have aligned with the bushing slots.
14. Slack off all weight to make sure the tool is down and then rotate the tool clockwise 1/4 turn to fully engage the lugs in the bushing.
15. Retrieve the bushing with a straight vertical lift, and remove it and the tool from the drill string..
16. Remove the duct tape from the O.D. of both the upper and lower flanges of the assembly and lightly grease all threaded lockscrew holes.
17. Locate the (six) 1-1/4" and the (twelve) 1-1/4" lockscrew assemblies.
18. Install the 1-1/4" integral lockscrew assemblies in the upper flange and the 1-1/4" assemblies in the lower flange as indicated. (Ref. Dwg. RP121202)

Installing the Outlet Equipment

Note: All outlet valves, test and injection fittings, and pad studs are shipped to location loose on a pallet.

1. Examine all loose equipment. Verify the following:
   - exposed valve and flange ring grooves are clean and in good condition
   - companion flange is made up on valve and flange bolting is tightened securely
   - all fittings are present and in good condition
   - all bull plug and nipple threads are clean and in good condition
   - all pad studs (16) are clean and in good condition
2. Remove all bull plugs, test port, and injection port plugs and set aside.
3. Using a high pressure fresh water hose, thoroughly wash out the entire bore, lockscrew threads and all ports until SH2 assembly is free of all cement debris.
4. Install all test port and injection port fittings as required and tighten securely.

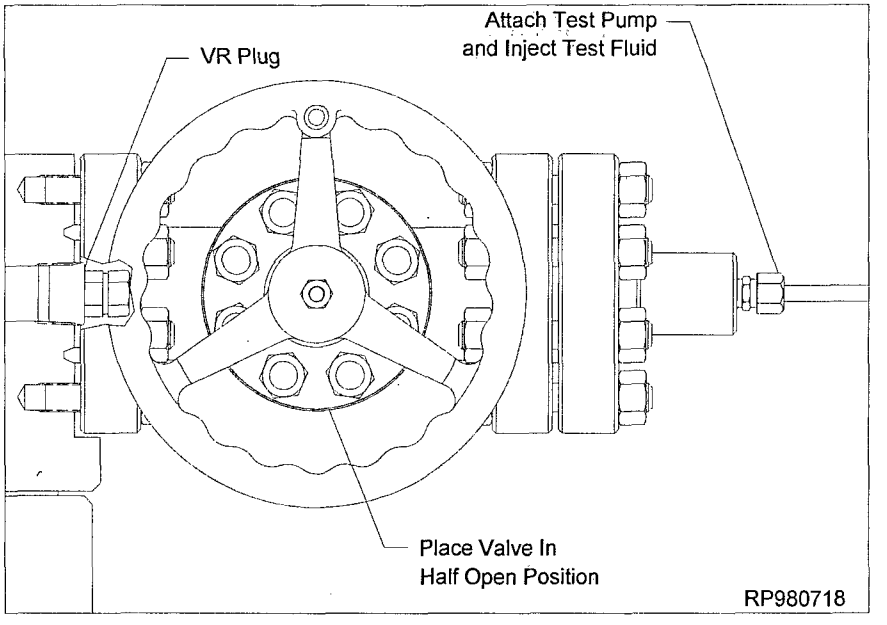


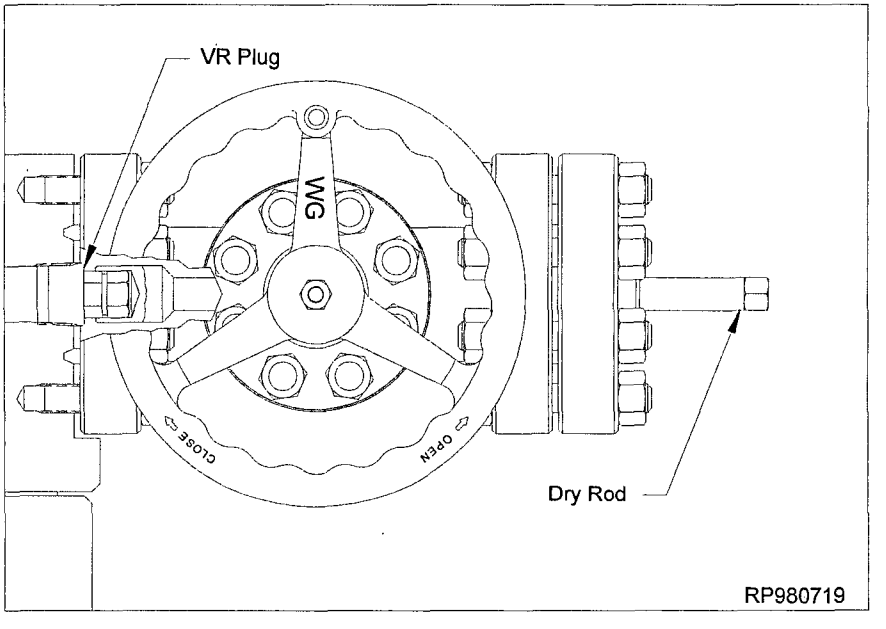
5. Install the ***2" LP, 3M WP Ball Valve, with 2" LP x 6" Long Nipple*** in the open port of the lower speed head and tighten connection securely.
6. Thoroughly clean the 2-1/16" 5M outlet ring grooves, removing all old grease and dirt.
7. Install the 7/8" x 4-1/2" pad studs (8 per outlet) in the side of the upper housing and tighten securely.
8. Place a new ***R-24 Ring Gasket*** in the appropriate outlet ring groove and then install the ***2-1\16" 5M x 2" LP Companion Flange with 2" LP Tapped Bull Plug***. Tighten flange bolting in an alternating cross pattern until a flange standoff of approximately 3/16" is achieved. Tighten bull plug securely.
9. Place a new ***R24 Ring Gasket*** in the opposite outlet ring groove and then install the ***2-1\16" 5M Gate Valve, 2-1\16" 5M x 2" LP Companion Flange and 2" LP, 1/2" NPT Tapped Bull Plug***. Tighten valve flange bolting in an alternating cross pattern until a flange standoff of approximately 3/16" is achieved. Tighten bull plug securely.

Stage 2 — Install Split Speed Head With Riser Assembly

Testing the Valve/Speed Head Connection

10. Place the valve in the half open position.
11. Attach a hand test pump to the open 1/2" NPT port of the bull plug and inject test fluid into the valve until a test pressure of 5,000 psi. is attained. Hold test for 10 minutes or as required by drilling supervisor.
12. After a satisfactory test is achieved, bleed off test pressure, remove test pump and bull plug and drain valve.
13. Fully open the gate valve.
14. Locate the 1-3/8" hex VR plug dry rod and pass the rod through the valve bore and engage it to the 1-3/8" hex of the VR plug.
15. Remove the VR plug from the split speed head by rotating the dry rod to the left until the plug comes free of the VR threads in the speed head.
16. Retrieve the VR plug from the valve bore and fully close the valve.
17. Nipple up BOP stack as required.





Stage 3 — Test the BOP Stack

1. Examine the ***13-5/8" Test Plug/Retrieving Tool (Item ST5)***. Verify the following:
   - elastomer seals, lift lugs, and plugs are intact and in good condition
   - drill pipe threads are clean and in good condition
2. Install a spare Ring Gasket in the ring groove of the Upper Housing and make up the BOP stack.

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

3. Orient the Test Plug with elastomer down and lift lugs up. Make up a joint of drill pipe to the Test Plug.

WARNING: Make sure the **elastomer is down** and the **lift lugs are up**.

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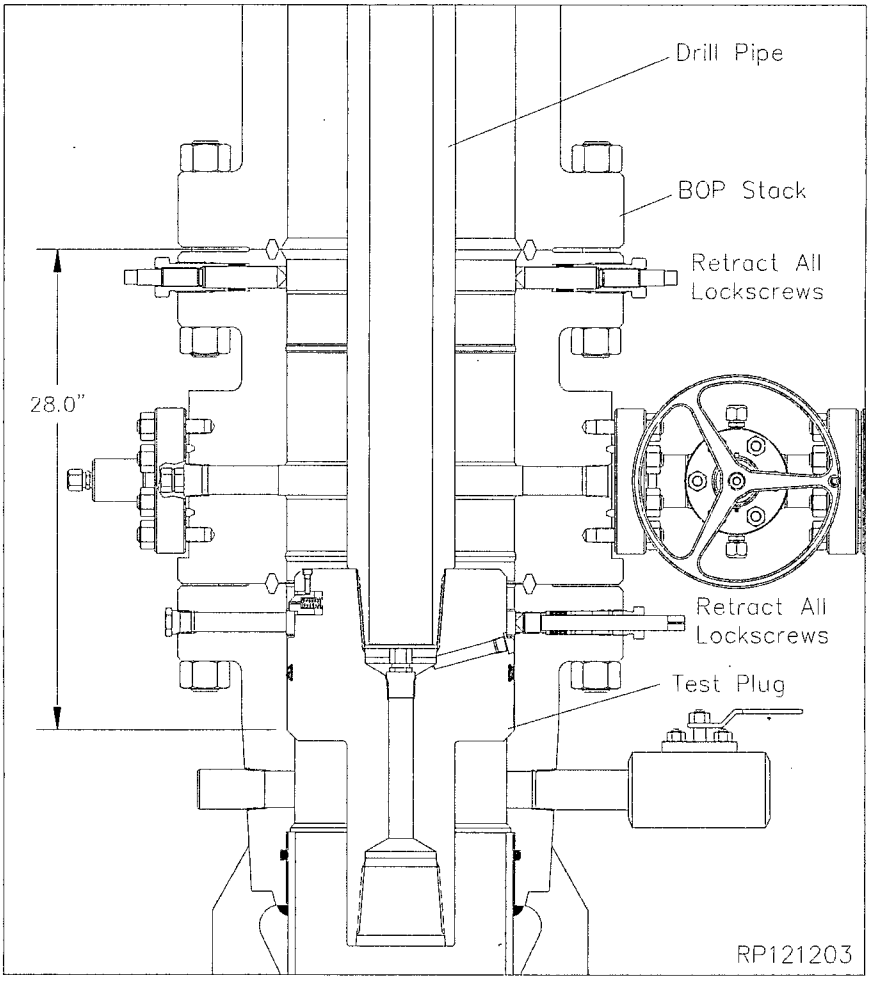
4. Remove 1/2" NPT pipe plug if pressure is to be supplied through the drill pipe.
5. Fully retract all lockscrews in the entire Speed Head Assembly.
6. Lubricate the elastomer seal of the Test Plug with a light oil or grease.
7. Lower the Test Plug through the BOP and into the Speed Head Assembly until it lands on the load shoulder in the Casing Head.
8. Open the Lower speed Head side outlet valve to monitor any leakage past the test plug seal.
9. Close the BOP rams on the drill pipe and test to 5,000 psi. or as required by drilling supervisor.
10. After a satisfactory test, release pressure, and open the rams.
11. Remove as much fluid from the BOP stack as possible.
12. Retrieve the Test Plug Assembly slowly to avoid damage to the seal.
13. Repeat steps 7 - 12 as required during the drilling of the hole.



Stage 4 — Run the Long Wear Bushing

Note: Always use a Wear Bushing while drilling to protect the load shoulders and seal area from damage by the drill bit or rotating drill pipe. The Wear Bushing **must be retrieved** prior to running the casing.

Note: Locate two opposing lockscrews of the Upper Housing, that are convenient and paint both screws **RED**.

1. Examine the ***13-5/8" Nominal Long Wear Bushing (Item ST6)***. Verify the internal bore is clean and undamaged.
2. Examine the ***13-5/8" Test Plug/Retrieving Tool (Item ST5)***. Verify the following:
   - drill pipe threads are clean and undamaged
   - lift lugs function as required

Run the Wear Bushing Before Drilling

WARNING: Make sure the **lift lugs are down** and the **elastomer is up** when latching into the Wear Bushing.

3. Attach the Tool to a joint of drill pipe.
4. Align the retractable lift lugs of the tool with the retrieval holes of the bushing and then carefully lower the tool into the Wear Bushing until the lugs snap into place.

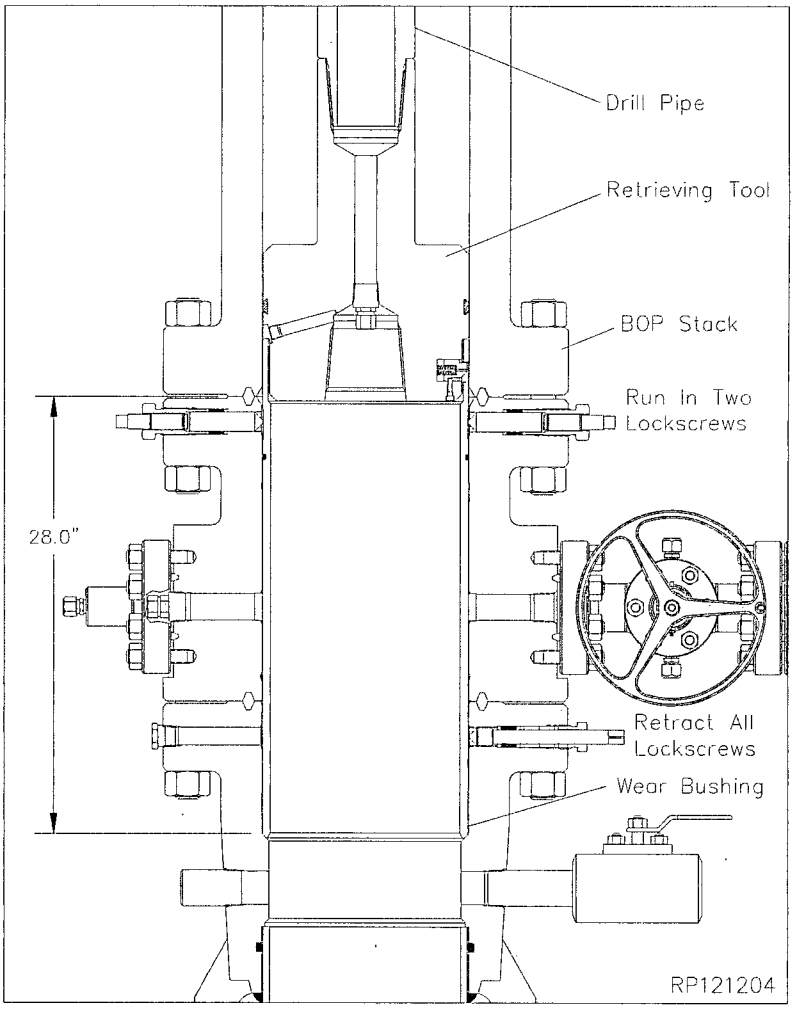
Note: If the lugs did not align with the holes, rotate the tool in either direction until they snap into place.

5. Apply a heavy coat of grease, not dope, to the O.D. of the bushing.
6. Ensure all lockscrews are fully retracted and then slowly lower the Tool/Bushing Assembly through the BOP stack and land it on the load shoulder in the lower Housing.

WARNING: When operating integral lockscrews, the gland nut is at no time to be backed off to operate the lockscrew.

7. Holding a backup on the Glandnut, ***run in the two Red Painted lockscrews of the Upper Housing*** until the lockscrews just contact the O.D. of the Bushing.
8. 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

9. Make up the Retrieving Tool to the drill pipe with the lift lugs down and the elastomer up.
10. Slowly lower the Tool into the Wear Bushing.
11. Rotate the Tool clockwise until a positive stop is felt. This indicates the lugs have snapped into the holes in the bushing.
12. Fully retract the red painted lockscrews only and the retrieve the Wear Bushing using the elevators if possible, and remove it and the Tool from the drill string.
13. Thoroughly clean and inspect the Wear Bushing and report any damage to the Drilling Supervisor immediately.

Stage 5 — Hang Off the 9-5/8" Casing

1. Run the 9-5/8" casing as required and space out appropriately for the mandrel casing hanger.
2. Examine the ***13-5/8" x 9-5/8" WG-SH2 Mandrel Casing Hanger (Item B12)***. Verify the following:
   - internal bore and threads are clean and in good condition
   - neck seal area is clean and undamaged

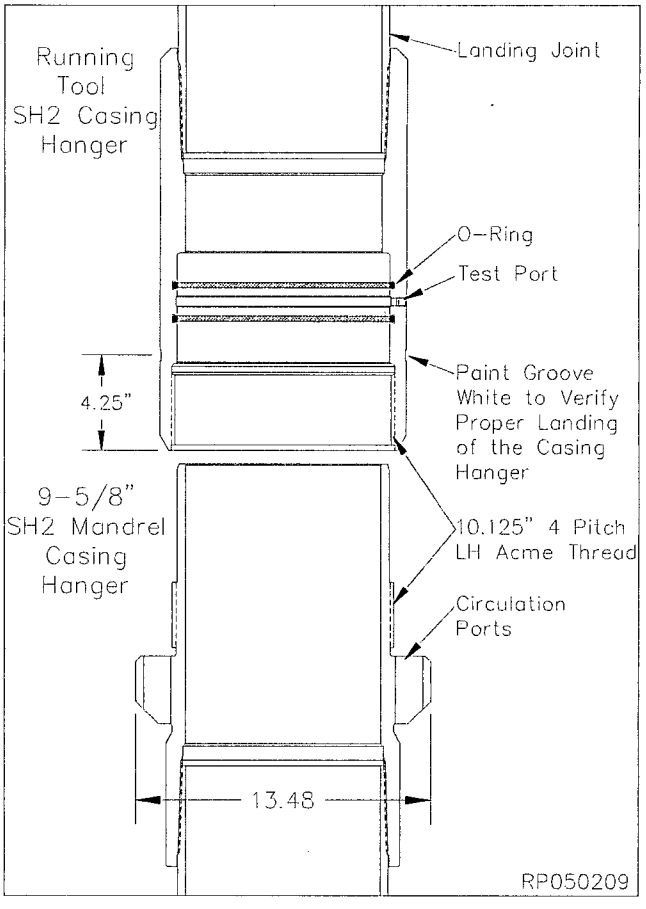
   Examine the ***13-5/8" x 9-5/8" WG-SH2 Mandrel Casing Hanger Running Tool (Item ST7)***. Verify the following:
   - internal bore and threads are clean and in good condition
   - o-rings are clean and undamaged
3. Thread the Hanger onto the last joint of casing to be run and torque connection to thread manufacturer's optimum make up torque.
4. Make up a landing joint to the top of the Running Tool and torque connection to thread manufacturer's maximum make up torque.
5. Liberally lubricate the O.D. of the Hanger neck and I.D. of the Running Tool o-rings with a light oil or grease.
6. ***Using chain tongs only***, thread the Running Tool onto the Hanger, with left hand rotation, until it bottoms out on the Hanger body.

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

Note: If steps 1 through 5 where done prior to being shipped to location, the running tool should be backed off and made back up to ensure it will back off freely.

7. Remove the 1/8" LP flush fitting Allen head pipe plug from the O.D. of the running tool and attach a test pump.
8. Apply hydraulic test pressure to ***5,000 psi*** and hold for 5 minutes or as required by drilling supervisor.
9. 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.
10. Locate the indicator groove machined in the O.D. of the Running tool and paint the groove with white paint.

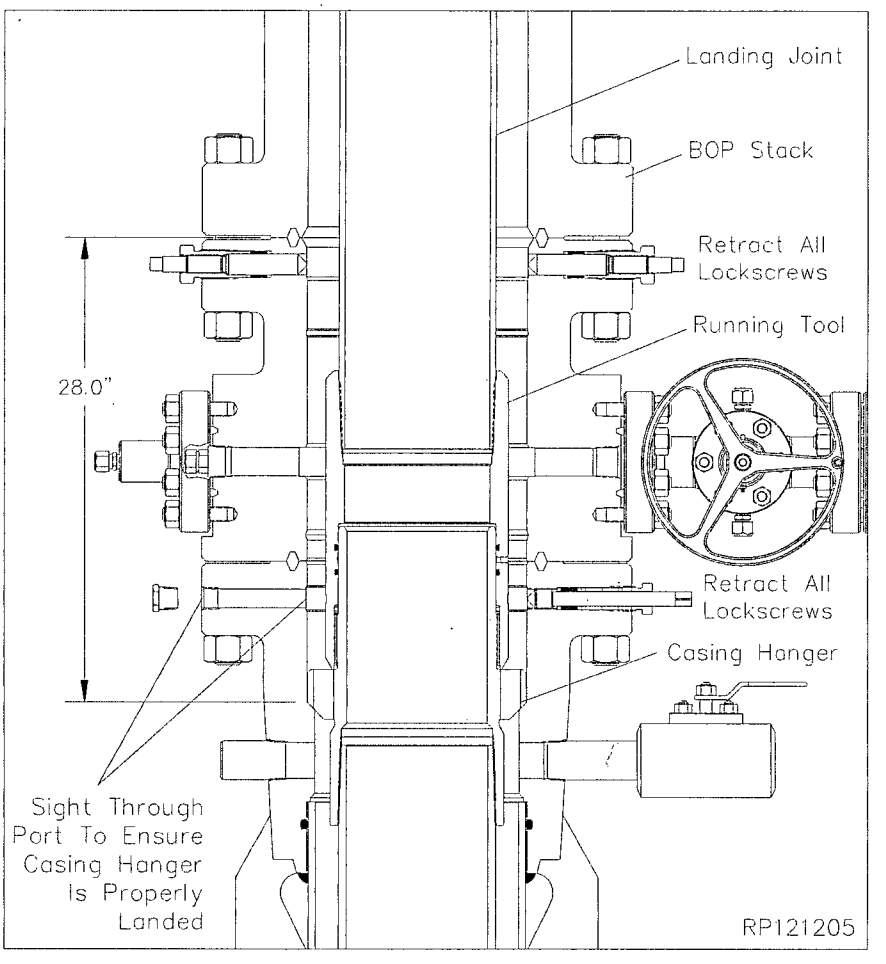
Note: If there is no groove present on the running tool, place a paint mark on the Running Tool as indicated.



Stage 5 — Hang Off the 9-5/8" Casing

11. Verify all lockscrews in the SH2 Assembly are fully retracted.
12. Calculate the total landing dimension by adding the previously attained rig floor to ground level dimension and 28.0", the depth of the wellhead.
13. Starting at the top of the 45° angle load shoulder of the casing hanger measure up 5 feet and place a horizontal paint mark on the landing joint and write 5 next to the mark.
14. Using the 5 foot stick, slowly and carefully lower the Hanger through the BOP, marking the landing joint at five foot increments until you come to the calculated total landing dimension. Place a paint mark on the landing joint at that dimension and write the landing dimension next to the mark.
15. Continue carefully lowering the hanger through the BOP stack and land it on the load shoulder in the lower Housing, 28.0" below the top of the upper Housing.
16. Slack off all weight on the casing and verify that the landing dimension paint mark has aligned with the rig floor.
17. If conditions exist or the paint mark has not aligned with the rig floor, verify through the inspection port that the Hanger has landed properly:
    a) Ensure well is stable and no pressure buildup or mud flow is occurring.
    b) Drain BOP stack through the casing head side outlet valve
    c) Remove the 1" pipe plug from the casing head flange port marked inspection port.
    d) Check to ensure that the groove on the Running Tool is in the center of the port.
    e) Reinstall the 1" pipe plug and tighten securely.
18. Place a vertical paint mark on the landing joint level to verify if the casing string rotates during the cementing process.
19. Cement the casing as required.

Note: Returns may be taken through the circulation ports and out the BOP or out the side outlets on the Casing Head.



Note: If the casing is to be reciprocated during cementing, it is advisable to pick up the casing hanger a minimum of the length of the pup joint below the hanger plus 4 feet above the landing point. Place a mark on the landing joint level with the rig floor and then reciprocate above that point. If at any time resistance is felt, re-land the casing hanger **immediately**.

20. ***Using Chain Tongs Only, located 180° apart***, retrieve the Running Tool and landing joint by rotating the landing joint to the right 12 full turns.

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.**

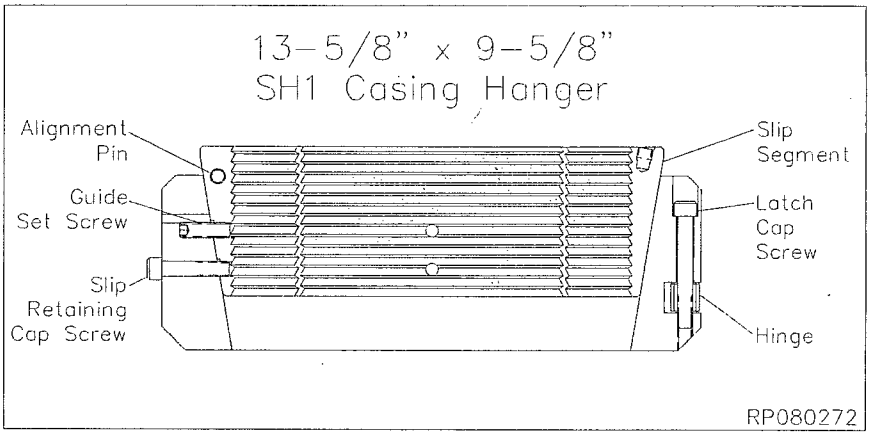
Stage 5A — Hang Off the 9-5/8" Casing (Emergency)

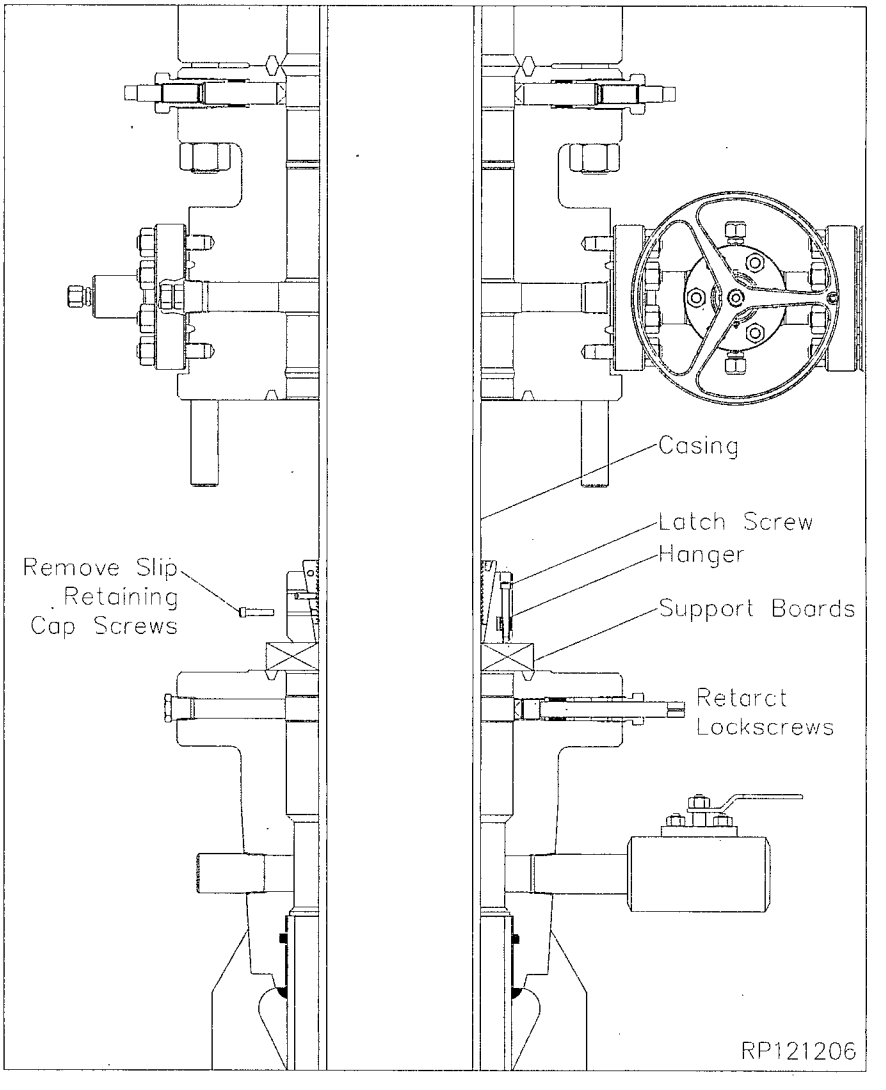
Note: The following procedure should be followed **ONLY** if the 9-5/8" casing should become stuck in the hole. If the casing did not get stuck and is hung off with the Mandrel Casing Hanger, skip this stage.

1. Cement the hole as required.
2. Drain the lower housing bowl through the side outlet.
3. Separate the upper housing from the lower housing.
4. Pull up on the upper housing and suspend it above the lower housing high enough to install the Slip Casing Hanger.
5. Washout as required.
6. Examine the ***13-5/8" x 9-5/8" WG-SH1 Slip Casing Hanger (Item B12a)***. Verify the following:
   - slips and internal bore are clean and in good condition
   - all screws are in place
7. Remove the latch screw to open the Hanger.
8. Place two boards on the lower housing flange against the casing to support the Hanger.
9. Wrap the Hanger around the casing and replace the latch screw.
10. Prepare to lower the Hanger into the lower housing bowl.

WARNING: Do Not Drop the Casing Hanger!

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





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

12. Remove the boards and allow the Hanger to slide into the lower housing bowl.
13. When the Hanger is down, 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.

14. Rough cut the casing approximately 8" above the top flange and move the excess casing out of the way.
15. Final cut the casing at 2" ± 1/8" above the casing head flange.
16. Grind the casing stub level 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 support bushing to be installed.

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

17. Remove and discard the used ring gasket from the lower housing.
18. Clean the mating ring grooves of the Upper and Lower SH2 Housings and wipe lightly with oil or grease.

WARNING: Excessive oil or grease may prevent a good seal from forming!

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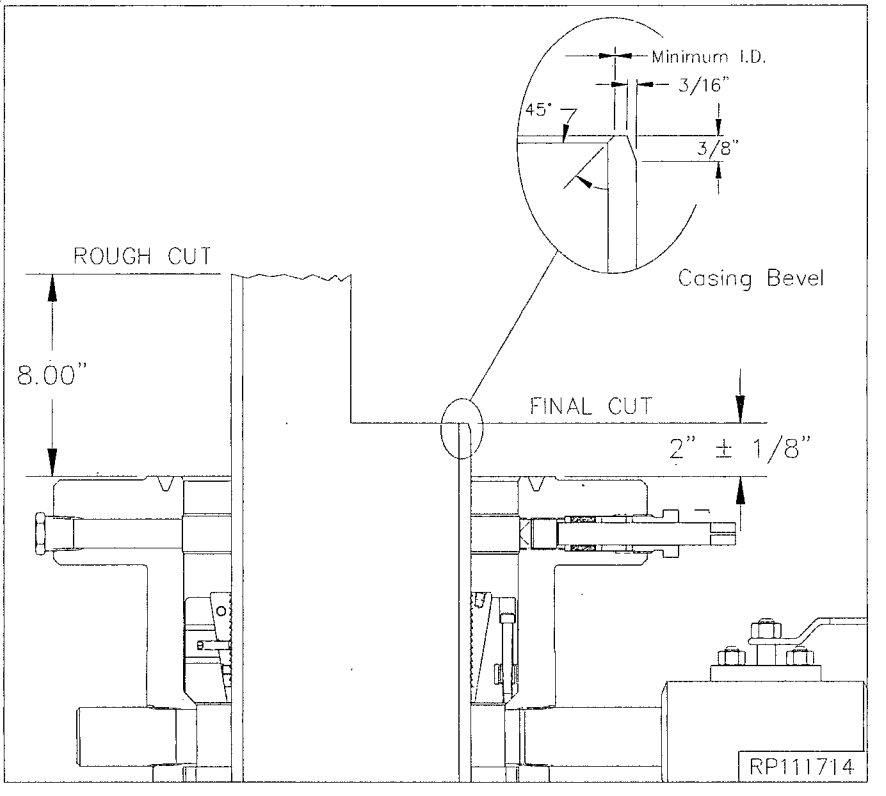
19. Install the new ***BX-160 Ring Gasket (Item B11)*** in the lower housing ring groove.
20. Reconnect the upper housing to the lower housing and loosely make up the connection.

Note: The upper and lower housing connection will be fully tightened after the Packoff Support Bushing is run and proper setting location is verified.



Stage 6 — Install Packoff Support Bushing, Drill Pipe

The following steps detail the installation of the WG-SH2E and SH2S Packoff Support Bushing. The installation procedure is identical for both the intended Packoff Support Bushing and the emergency Packoff Support Bushing.

1. Determine which Packoff Support Bushing to use:

If the casing has been run normally and is hung off with the Mandrel Casing Hanger, then use the ***13-5/8" x 9-5/8" SH2E Mandrel Packoff Support Bushing (Item B13).***

If the casing became stuck and the Slip Casing Hanger is hanging off the casing, then use the ***13-5/8" x 9-5/8" SH2S Emergency Packoff Support Bushing (Item B13a).***

2. Examine the appropriate Packoff Support Bushing. Verify the following:
   - all elastomer seals are in place and undamaged
   - internal bore, and ports, are clean and in good condition
   - paint the lockscrew relief groove white
3. Lubricate the I.D. of the EBS seals and the O.D. of the dovetail seals liberally with a light oil or grease.
4. Examine the ***Packoff Support Bushing Running Tool (Item ST8).*** Verify the following:
   - lift lugs are in place and in good condition
5. Make up a landing joint to the Running Tool and rack back assembly.
6. Carefully run two or three stands of drill pipe or collars in the hole and set in floor slips.

Note: Use heavy weight drill pipe or drill collars. Weight required to pull support bushing into head is approximately 3500 lbs. per O.D. seal.

WARNING: When lowering the drill collars into the well, extreme caution must be taken not to damage the top of the casing stub with the end of the drill pipe. It is recommended that the drill pipe be held centralized as closely as possible when entering the casing.

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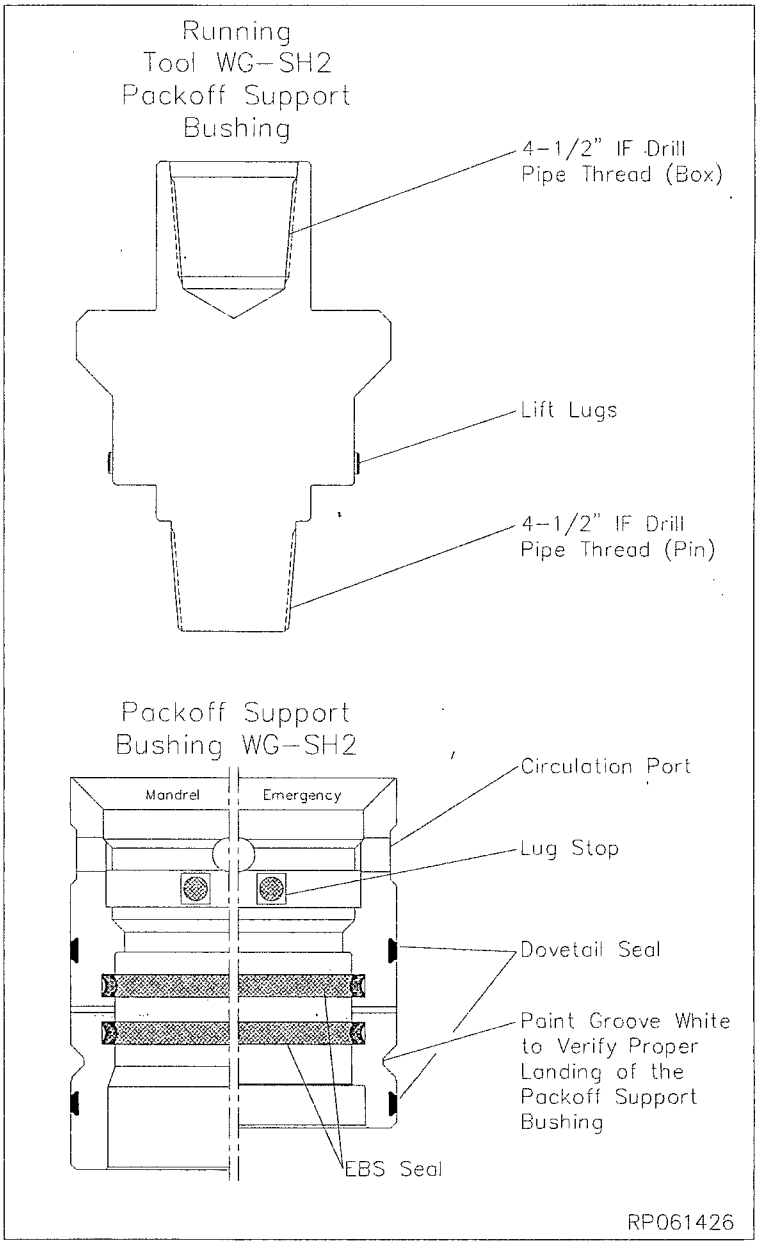
7. Carefully lower the support bushing over the drill pipe and set down on top of the floor slips.
8. Make up the landing joint/Running Tool assembly to the drill pipe suspended in the floor slips.
9. Carefully pick up the support bushing and slide the bushing over the lift lugs of the running tool and then rotate the bushing to the left 1/4 turn to secure the bushing on the running tool.



Stage 6 — Install Packoff Support Bushing, Drill Pipe

10. Drain BOP stack through the Lower Housing side outlet valve.

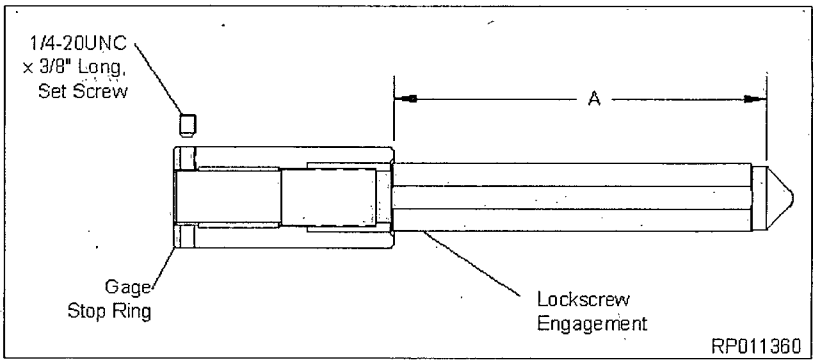
11. Using a high pressure water hose, thoroughly wash out the BOP stack and SH2 housing until returns are clear and no debris is visible on top of the Casing Hanger landing shoulder which would cause the Packoff to not properly set.

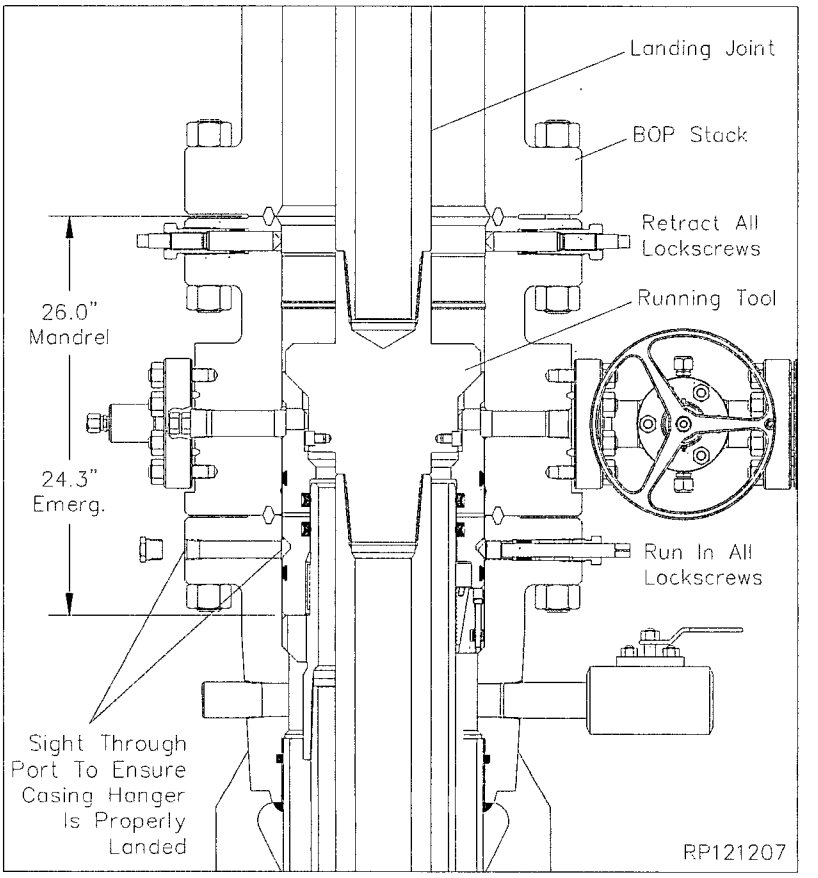
12. Lower the assembly through the BOP stack and Wellhead Assembly until the Packoff lands on the Casing Hanger.

13. Verify through the inspection port that the Packoff has landed properly:
    a) Ensure well is stable and no pressure buildup or mud flow is occurring.
    b) Drain BOP stack through the Lower Housing side outlet valve
    c) Remove the 1" pipe plug from the Lower Housing flange port marked inspection port.
    d) Verify through the inspection port the lockscrew relief of the Packoff, painted white, is visible.
    e) Stenciled next to the inspection port is the cross sectional dimension of the Lower Housing. Using the given dimension, adjust the gage stop ring on the lockscrew engagement tool to achieve that measurement as dimension 'A' from the start of the lockscrew nose. Tighten the 1/4" set screw to maintain the setting.
    f) Slide the Engagement Tool into the inspection port until either the gage stop ring contacts the flange O.D. or the nose of the Engagement Tool contacts the Packoff.

    - If the gage stop ring contacts the flange O.D., the Packoff is properly set.
    - If the nose of the Engagement Tool contacts the Packoff and a gap is visible between the flange OD and the gage stop ring, the Packoff is not properly seated.

    1 Remove the Support Bushing from the wellhead.
    2 Inspect the bushing and seals for any damage and repair as necessary
    3 Thoroughly wash the area of the hanger until returns are clean and free of all debris. Ensure that there is no cement or debris on top of the casing hanger landing shoulder.
    4 Reinstall the Packoff and check for proper setting position using the Engagement Tool as previously described.





    g) With the proper setting position confirmed, reinstall the 1" pipe plug and tighten securely.

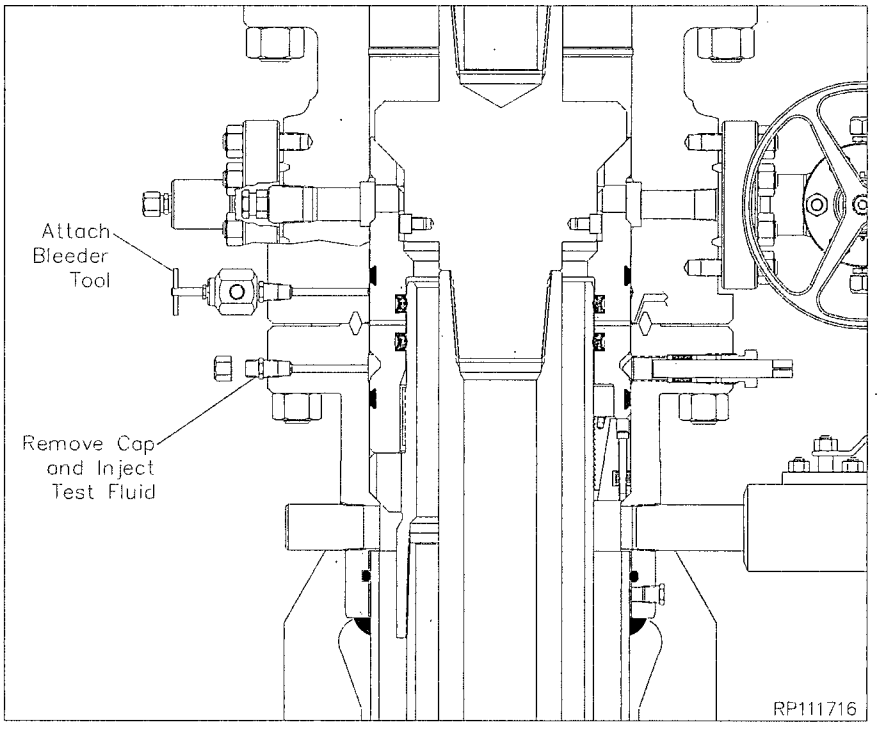
14. Fully make up the Lower and Upper Housing connection. Tighten all the studs in an alternating cross pattern until the flanges come face to face.

15. Run in the Lower Housing lockscrews to 100 ft lbs and verify the standoff is at 3.2" from the O.D. of the flange.

Stage 6 — Install Packoff Support Bushing, Drill Pipe

Flange and Seal Test

1. Locate the test fittings on the upper and lower housings as indicated and remove the dust cap from each fitting.
2. Attach a Bleeder Tool to the upper fitting and open the Tool.
3. Attach a Hydraulic Test Pump to the lower 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. Do Not exceed 80% of casing collapse.***
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 adjacent table.
7. Repeat this procedure until a satisfactory test is achieved.
8. When a satisfactory test is achieved, remove Test Pump and Bleeder Tool, drain test fluid, and reinstall the dust cap on each fitting.
9. Retighten the Lower Housing lockscrews to 100 ft lbs and verify the standoff is at 3.2" from the O.D. of the flange.
10. Paint the exposed end of the lockscrews RED to signify the lockscrews are not to be tampered with.
11. ***Using only chain tongs located 180° apart, rotate the landing joint clockwise to a positive stop.***
12. Retrieve the Packoff Running Tool to the rig floor with a straight vertical lift.



Leak Location	Appropriate Action
Into Spool Bore or Casing Annulus - Packoff Seals are Leaking	Retrieve Packoff and Replace Seals as Required.
Between Flanges - Ring gasket is Leaking	Further Tighten Connection.
Around Lockscrew - Lockscrew Packing is Leaking	Further Tighten Glandnut.

Stage 7 — Re-Testing the BOP Stack

1. Examine the ***13-5/8" Nominal x 4-1/2" IF SL Test Plug/Retrieving Tool (Item ST5)***. Verify the following:
   - elastomer seals, lift lugs, and plugs are intact and in good condition
   - drill pipe threads are clean and in good condition

Immediately after testing the support bushing seals, and periodically during the drilling of the hole for the next casing string, the BOP stack (connections and rams) must be tested.

2. Orient the Test Plug with elastomer down and lift lugs up. Make up a joint of drill pipe to the Test Plug.

WARNING: Make sure the **elastomer is down** and the **lift lugs are up**.

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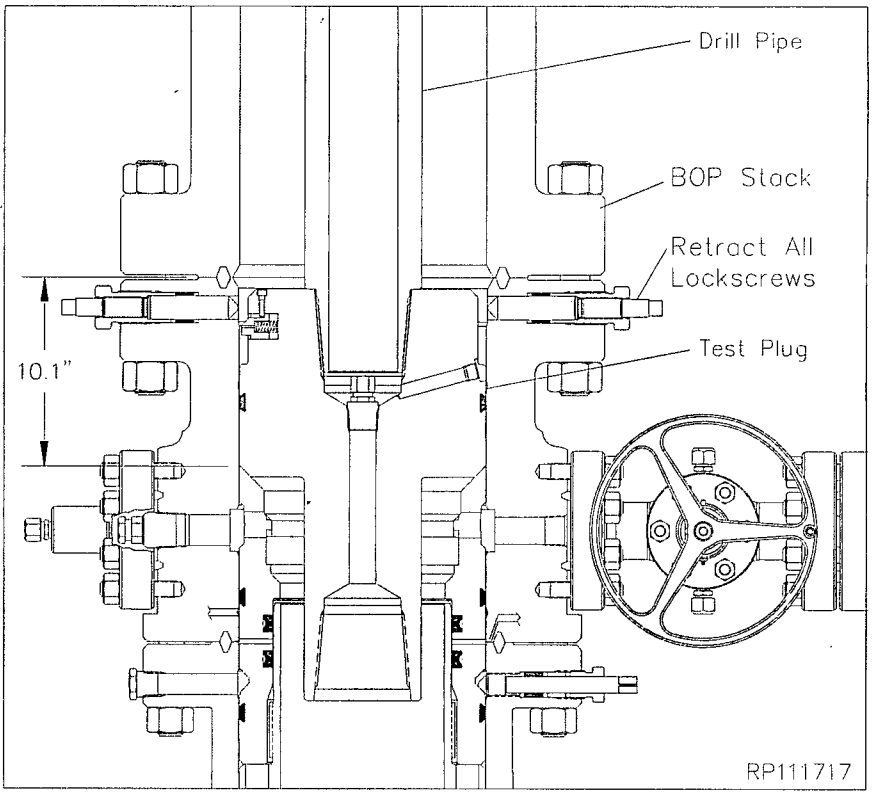
3. Remove 1/2" NPT pipe plug if pressure is to be supplied through the drill pipe.
4. Fully retract all lockscrews in the upper SH2 Housing .
5. Lubricate the elastomer seal of the Test Plug with a light oil or grease.
6. Lower the Test Plug through the BOP and into the SH2 Housing Assembly until it lands on top of the Packoff Support Bushing, 10.1" below the top of the SH2 Housing Assembly.
7. Close the BOP rams on the drill pipe and test to ***5,000 psi.*** or as required by drilling supervisor.
8. After a satisfactory test, release pressure, and open the rams.



Note: Any leakage past the test plug seal will be monitored at the open side outlet valve.

9. Remove as much fluid from the BOP stack as possible.
10. Retrieve the Test Plug Assembly slowly to avoid damage to the seal.

Note: If the blind rams are to be tested, run in the hole with a minimum of two joints of drill pipe with the appropriate size pin x pin crossover prior to running the test plug. This will ensure the test plug remains firmly seated when disconnecting from it.

Failure to do this may cause severe damage to the wellhead.

11. Repeat steps 6 - 11 as required prior to running the completion.

Stage 8 — Run the Short Wear Bushing

Note: Always use a Wear Bushing while drilling to protect the load shoulders and seal area from damage by the drill bit or rotating drill pipe. The Wear Bushing **must be retrieved** prior to running the casing.

Note: Locate two opposing lockscrews of the upper Housing, that are convenient and paint both screws **RED**.

1. Examine the ***13-5/8" nominal Short Wear Bushing (Item ST9)***. Verify the internal bore is clean and undamaged
2. Examine the ***13-5/8" Test Plug/Retrieving Tool (Item ST5)***. Verify the following:
   - drill pipe threads are clean and undamaged
   - lift lugs function as required

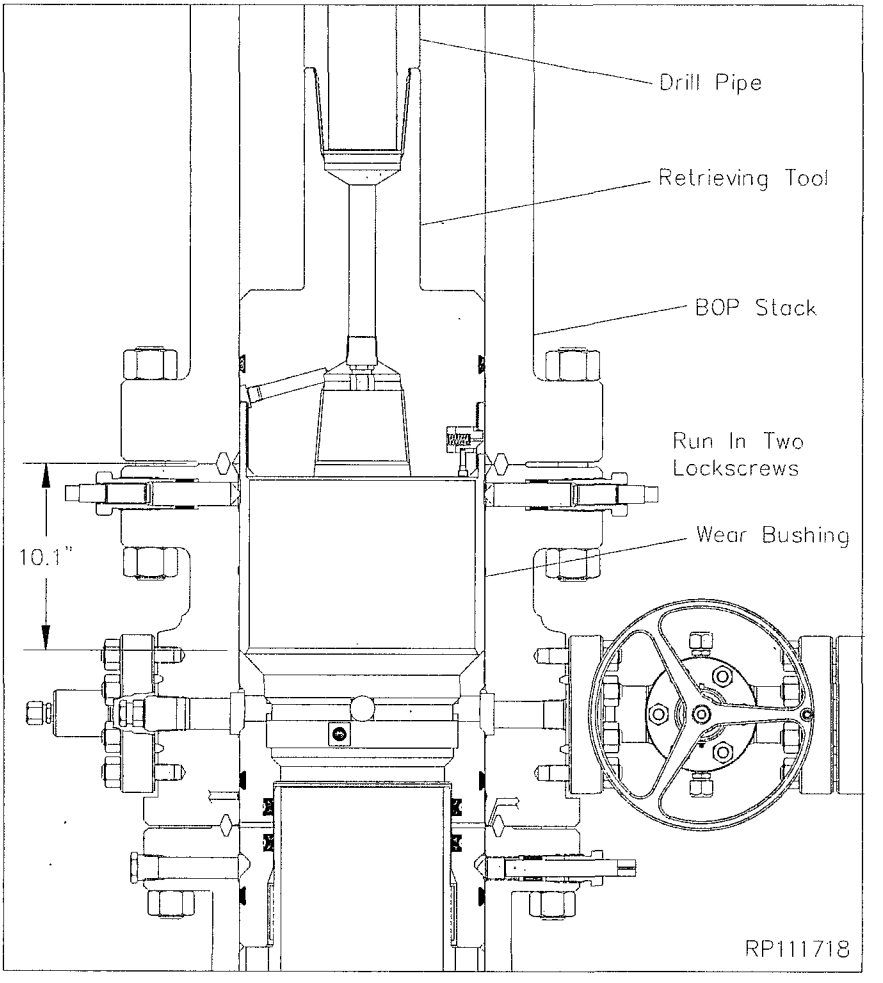
Run the Wear Bushing Before Drilling

WARNING: Make sure the **lift lugs are down** and the **elastomer is up** when latching into the Wear Bushing.

3. Attach the Tool to a joint of drill pipe.
4. Align the retractable lift lugs of the tool with the retrieval holes of the bushing and then carefully lower the tool into the Wear Bushing until the lugs snap into place.

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

5. Apply a heavy coat of grease, not dope, to the O.D. of the bushing.
6. Ensure all lockscrews are fully retracted and then slowly lower the Tool/Bushing Assembly through the BOP stack and land it on the load shoulder in the lower Housing.
7. Remove the Tool from the Wear Bushing by rotating the drill pipe counter clockwise 1/4 turn and lifting straight up.
8. 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

9. Make up the Retrieving Tool to the drill pipe with the lift lugs down and the elastomer up.
10. Slowly lower the Tool into the Wear Bushing.
11. Rotate the Tool clockwise until a positive stop is felt. This indicates the lugs have snapped into the holes in the bushing.
12. Fully retract the ***RED*** painted lockscrews and the retrieve the Wear Bushing using the elevators if possible, and remove it and the Tool from the drill string.
13. Thoroughly clean and inspect the Wear Bushing and report any damaged to the Drilling Supervisor immediately.

Stage 9 — Hang Off the 5-1/2" Casing

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

Note: If the 5" casing becomes stuck and the mandrel casing hanger can not be landed, Refer to **Stage 9A** for the emergency procedure.

2. Examine the ***13-5/8"x 5-1/2" WG-SH2 Upper Mandrel Casing Hanger (Item C10).*** Verify the following:
   - internal bore and threads are clean and in good condition
   - neck seal area is clean and undamaged

   Examine the ***7"x 5-1/2" WG-SH2-R Upper Mandrel Casing Hanger Running Tool (Item ST10).*** Verify the following:
   - internal bore and threads are clean and in good condition
   - o-rings are clean and undamaged

3. Thread the Hanger onto the last joint of casing to be run and torque connection to thread manufacturer's optimum make up torque.

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

5. Liberally lubricate the OD of the Hanger neck and ID of the Running Tool o-rings with a light oil or grease.

6. ***Using chain tongs only***, thread the Running Tool onto the Hanger, with left hand rotation, until it bottoms out on the Hanger body.

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

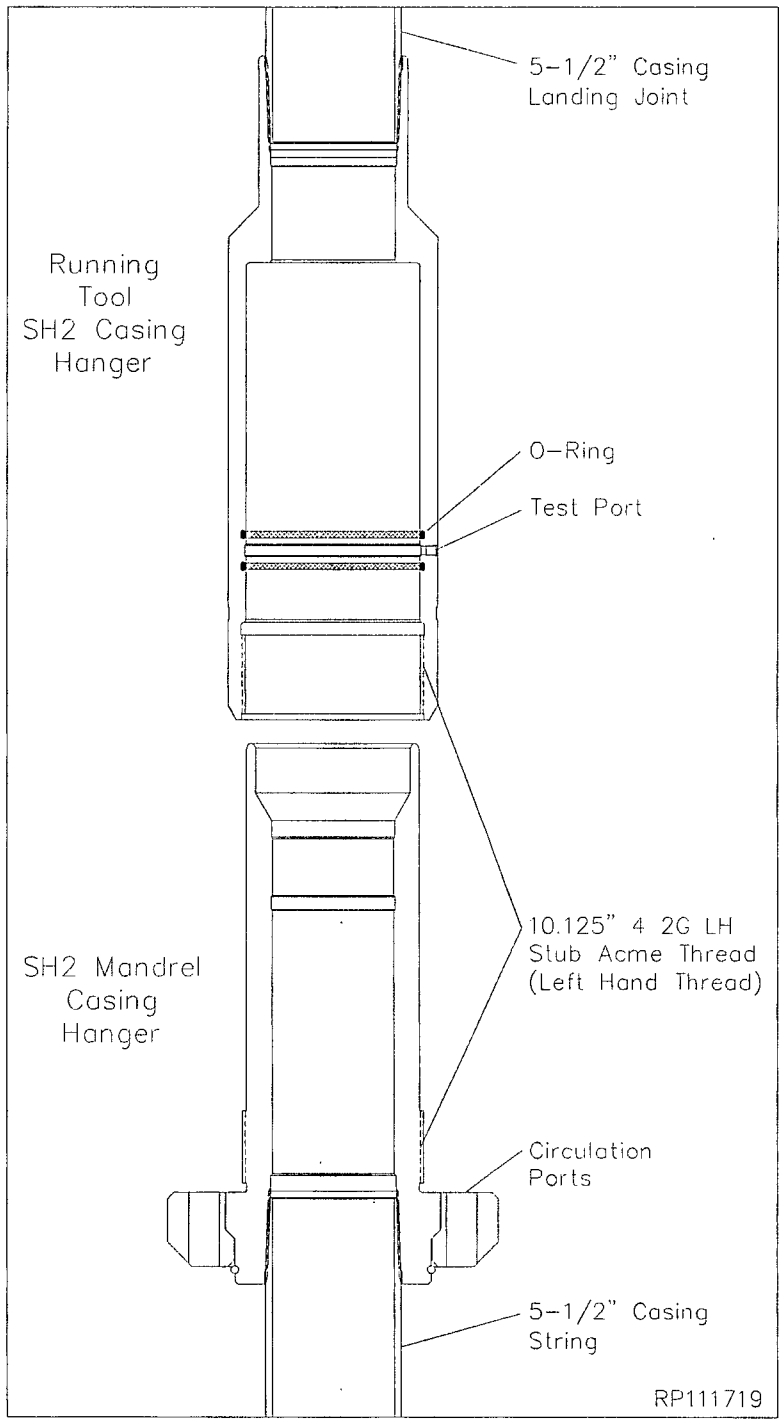
Note: If steps 1 through 5 where done prior to being shipped to location, the running tool should be backed off 1 turn and made back up to ensure it will back off freely.

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

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

9. 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.

10. Locate the indicator groove machined in the O.D. of the Running tool and paint the with white paint.



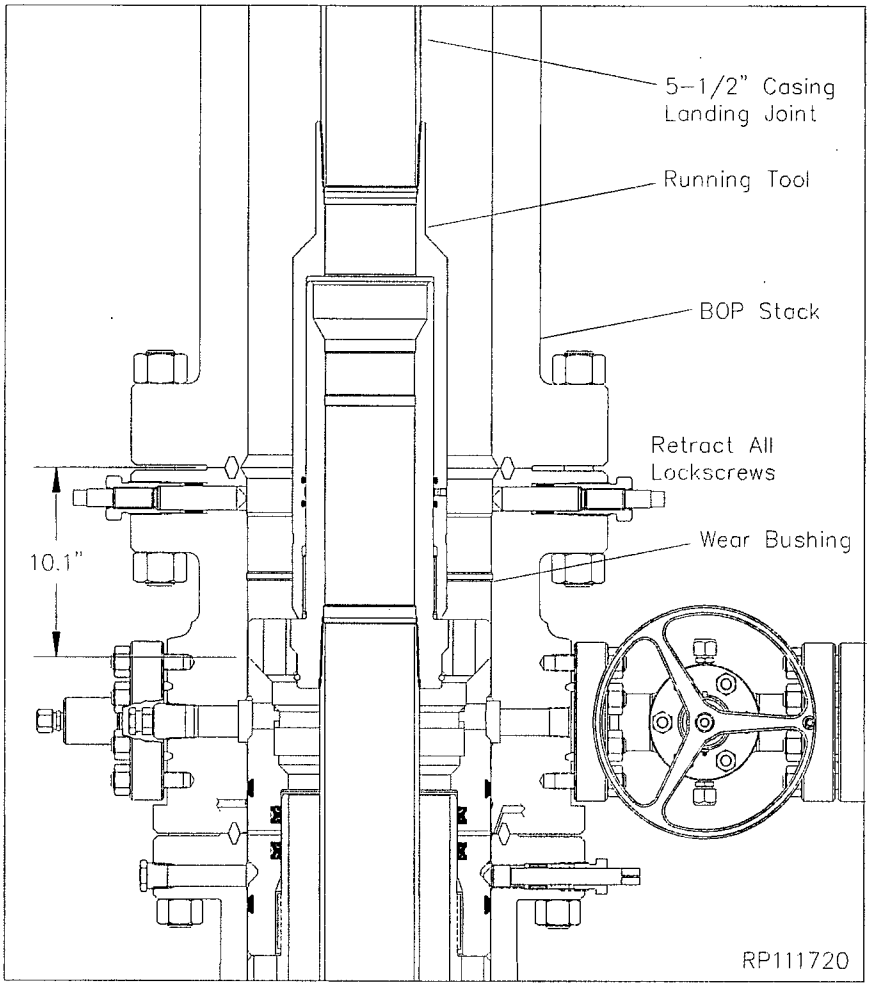
Note: If there is no groove present on the running tool, place a paint mark on the Running Tool as indicated.

Stage 9 — Hang Off the 5-1/2" Casing

11. Verify all lockscrews in the Upper SH2 Housing are fully retracted.
12. Calculate the total landing dimension by adding the previously attained RKB dimension and 10.1", the depth of the wellhead.
13. Starting at the top of the 45° angle load shoulder of the casing hanger measure up 5 feet and place a horizontal paint mark on the landing joint and write 5 next to the mark.
14. Using the 5 foot stick, slowly and carefully lower the Hanger through the BOP, marking the landing joint at five foot increments until you come to the calculated total landing dimension. Place a paint mark on the landing joint at that dimension and write the landing dimension next to the mark.
15. Continue carefully lowering the hanger through the BOP stack and land it on top of the 9-5/8" packoff support bushing, 10.1" below the top of the wellhead assembly.
16. Slack off all weight on the casing and verify that the landing dimension paint mark has aligned with the rig floor.
17. Place a vertical paint mark on the landing joint to verify if the casing string rotates during the cementing process.
18. Cement the casing as required.

Note: Returns may be taken through the circulation ports and out the BOP or out the side outlets on the Casing Head.

Note: If the casing is to be reciprocated during cementing, it is advisable to pick up the casing hanger a minimum of the length of the pup joint below the hanger plus 4 feet above the landing point. Place a mark on the landing joint level with the rig floor and then reciprocate above that point. If at any time resistance is felt, re-land the casing hanger **immediately**.



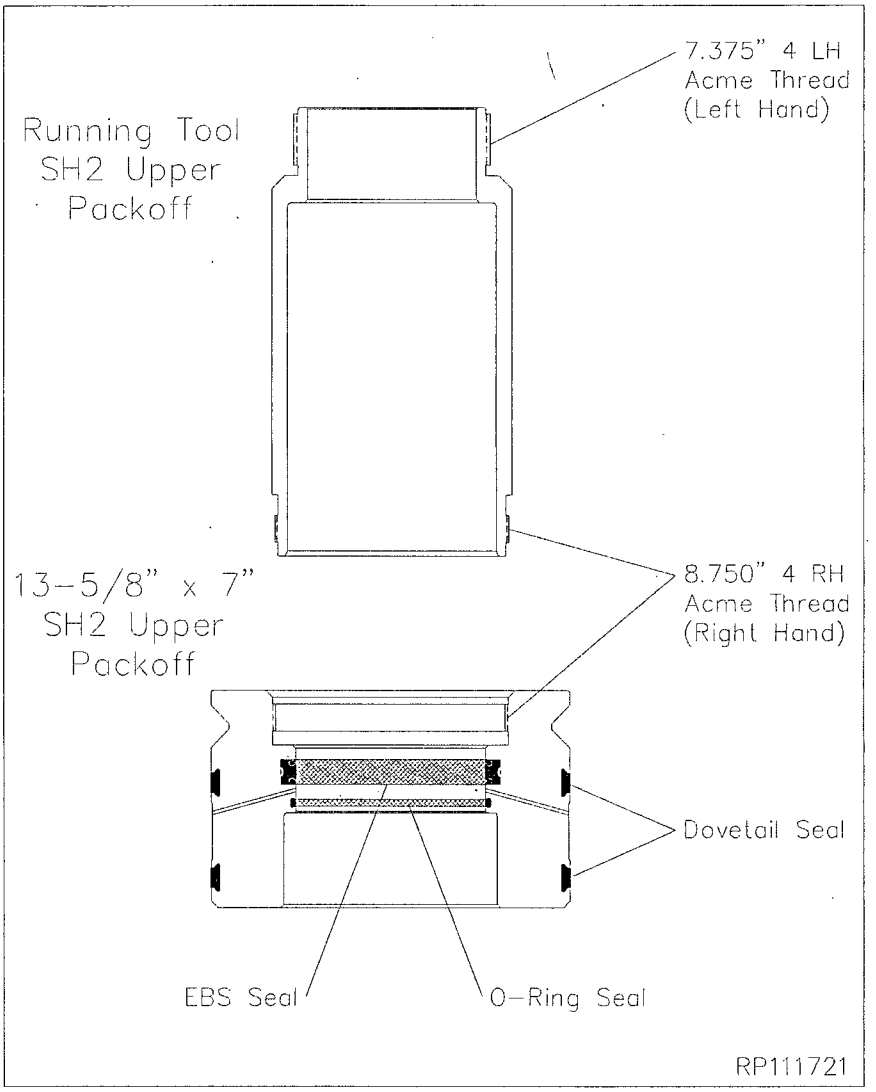
19. ***Using Chain Tongs Only located 180° apart***, retrieve the Running Tool and landing joint by rotating the landing joint to the right 12 full turns.

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 9 — Hang Off the 5-1/2" Casing

Install Packoff

1. Examine the ***13-5/8" Nominal x 5" SH2 Upper Packoff (Items C11)***. Verify the following:
   - all elastomer seals are in place and undamaged
   - internal bore is clean and in good condition
2. Liberally lubricate the packoff ID o-ring seals, the OD dovetail seals with oil or a light grease.
3. Examine the ***Packoff Running Tool (Items ST11)***. Verify the following:
   - bore is clean and free of debris
   - all threads are clean and undamaged
4. Thoroughly clean and lightly lubricate the mating Acme threads of the packoff and running tool with oil or a light grease.
5. Carefully thread the running tool into the packoff with right hand rotation to a positive stop.
6. Pick up the casing hanger running tool with landing joint with casing elevators and suspend above the packoff.
7. Thoroughly clean and lightly lubricate the mating Acme threads of the packoff and hanger running tools with oil or a light grease.
8. Carefully lower the casing hanger running tool over the packoff tool and thread them together with left hand rotation to a positive stop.



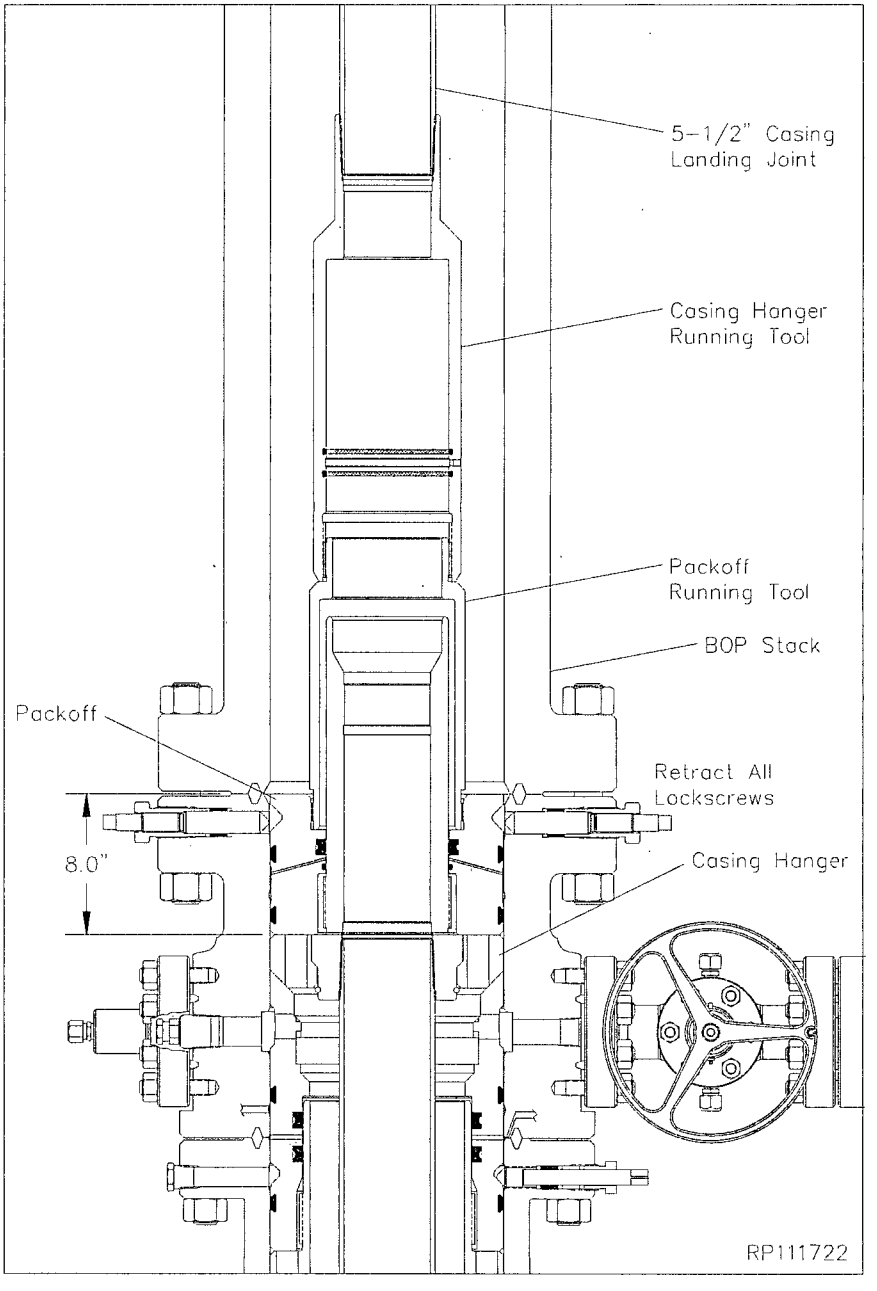
Stage 9 — Hang Off the 5-1/2" Casing

9. Drain BOP stack through the Upper Housing side outlet valve
10. Thoroughly washout the Housing using a high pressure water hose until returns from the open outlet valve on the Upper Housing are clean and free of debris.
11. Calculate the total landing dimension by adding the previously attained RKB dimension and 8.0", the depth of the wellhead.
12. Starting at the bottom of the packoff and measure up 5 feet and place a horizontal paint mark on the landing joint and write 5 next to the mark.
13. Using the 5 foot stick, slowly and carefully lower the Packoff through the BOP, marking the landing joint at five foot increments until you come to the calculated total landing dimension. Place a paint mark on the landing joint at that dimension and write the landing dimension next to the mark.
14. Continue lower the packoff into the wellhead until the packoff paint mark aligns with the rig floor and a positive stop is felt.

Note: It may be necessary to use the weight of the blocks or top drive unit to push the Packoff into position.

Note: The mark on the landing joint will be level with the rig floor when the Packoff is properly landed. This may be used as secondary identification while running the Packoff. The Packoff location should always be verified by removing one of the upper housing lockscrew assemblies and sighting through the hole to verify. The white painted lockscrew rap of the packoff will be clearly visible through the open hole.

15. Reinstall the lockscrew assembly.



Stage 9 — Hang Off the 5-1/2" Casing

16. Locate the test fitting on the upper SH2 housing upper flange marked "SEAL TEST" and remove the dust cap from the fitting.
17. Attach a hydraulic test pump to the open fitting and inject test fluid between the packoff seals until a pressure of 5,000 psi is attained.
18. Hold test pressure for 15 minutes or as required by drilling supervisor.
19. After a satisfactory test is achieved, bleed off test pressure and remove test pump.
20. Reinstall the dust cap on the open fitting.

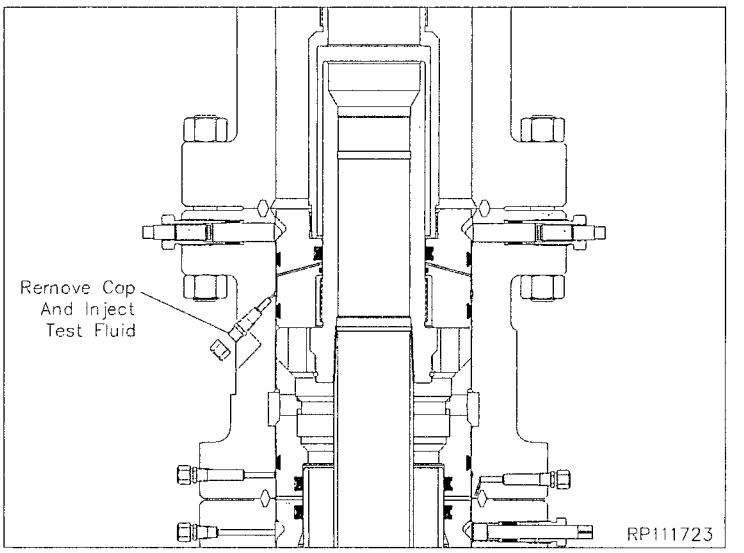
Note: Prior to operating lockscrews, refer to the procedure in the back of this manual for proper lockscrew operating procedures.

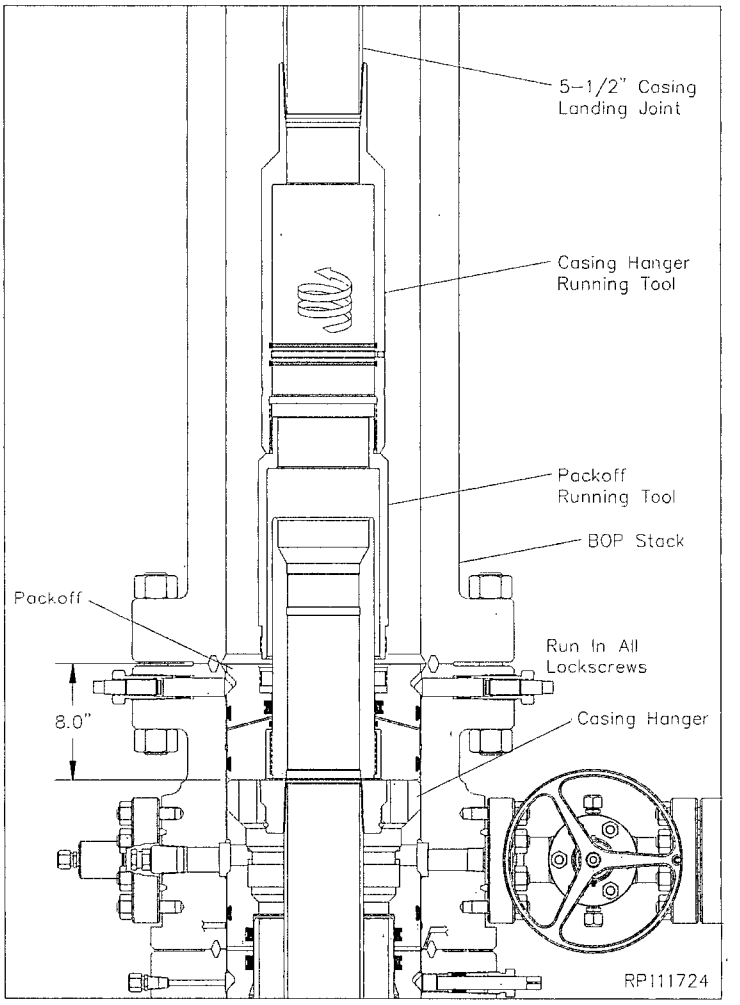
21. Holding a backup wrench on the lockscrew gland nuts, fully run in all of the Upper Housing lockscrews in an alternating cross pattern to approximately 100 ft lbs. When fully made up the lockscrews will protrude approximately 2.69" from the O.D. of the upper housing flange.

Note: Lockscrews are to be operated by Pressure Control personnel only.

22. Remove the running tool by rotating the landing joint 8 turns to the left or until it comes free of the packoff.
23. Retrieve the Running Tool assembly to the rig floor with a straight lift.
24. Install a 5" BPV.
25. Nipple down and remove BOP stack.

WARNING: Ensure all valves are in the closed position prior



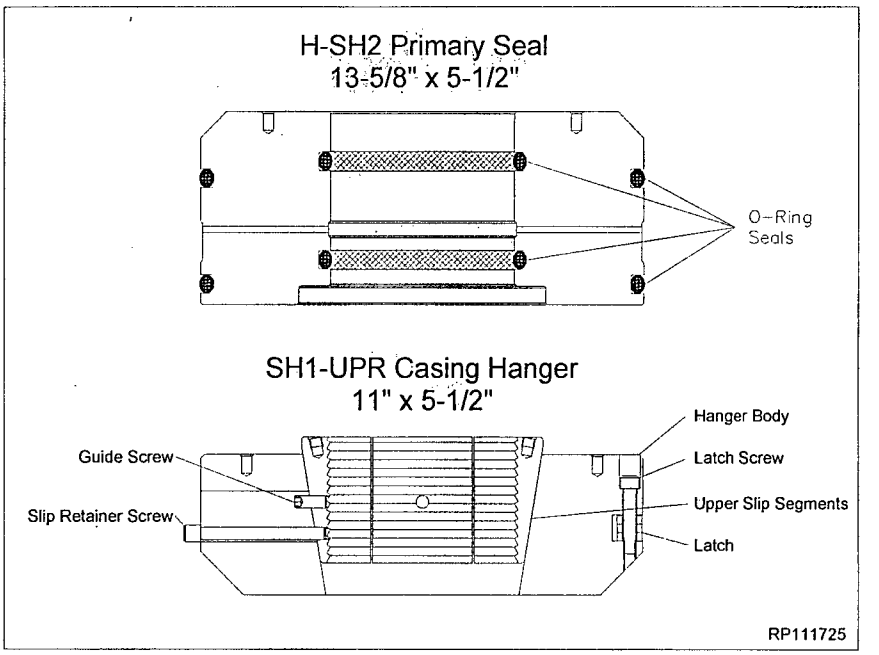


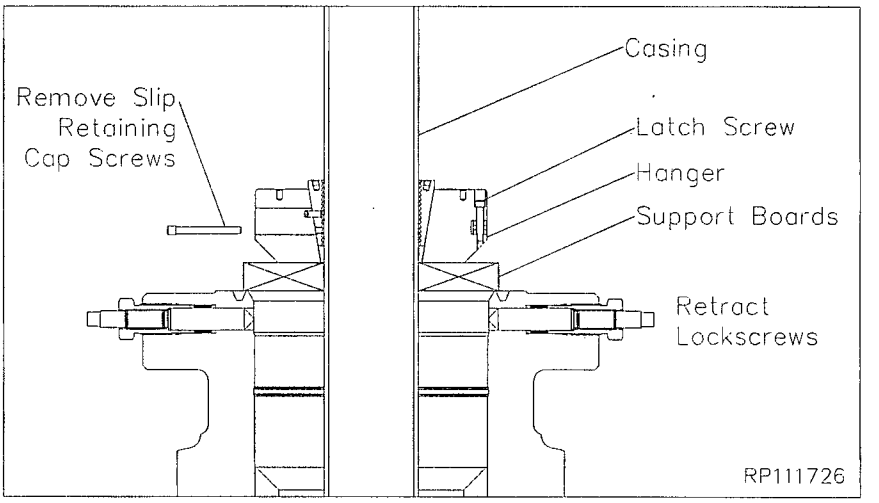
Stage 9A — Hang Off the 5-1/2" Casing (Emergency)

1. Run the 5" casing string as required and cement in place.
2. Drain the SH2 Upper Housing bowl through the side outlet and ensure the lockscrews are fully retracted from the bore.
3. Examine the ***13-5/8" x 5-1/2" SH1-UPR Casing Hanger (Item C10a)***. Verify the following:
   - slips and internal bore are clean and undamaged
   - slip retainer screws are in place
4. Examine the ***13-5/8" x 5-1/2" H-SH2 Primary Seal (Item C11a)***. Verify the following:
   - bore is clean and free of debris
   - seals are properly installed, clean and undamaged
5. Separate the BOP from the Upper Housing and lift the BOP approximately 12" to 16" above the Housing and secure BOP with safety slings.
6. Using a fresh water hose, thoroughly wash out the bowl.

Note: The side outlet valve to remain open while setting the Hanger.

7. Remove the latch screw and open the Hanger
8. Place two boards across the flange against the casing to support the Hanger.
9. Place the Hanger on the support boards and wrap the around the casing and replace the latch screw.
10. Remove all of the slip retainer screws from the of the Hanger.
11. Wipe the OD of the Hanger with a coat of oil or grease.
12. Remove the boards and allow the Hanger to slide into the bowl.





Stage 9A — Hang Off the 5-1/2" Casing (Emergency)

13. 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.

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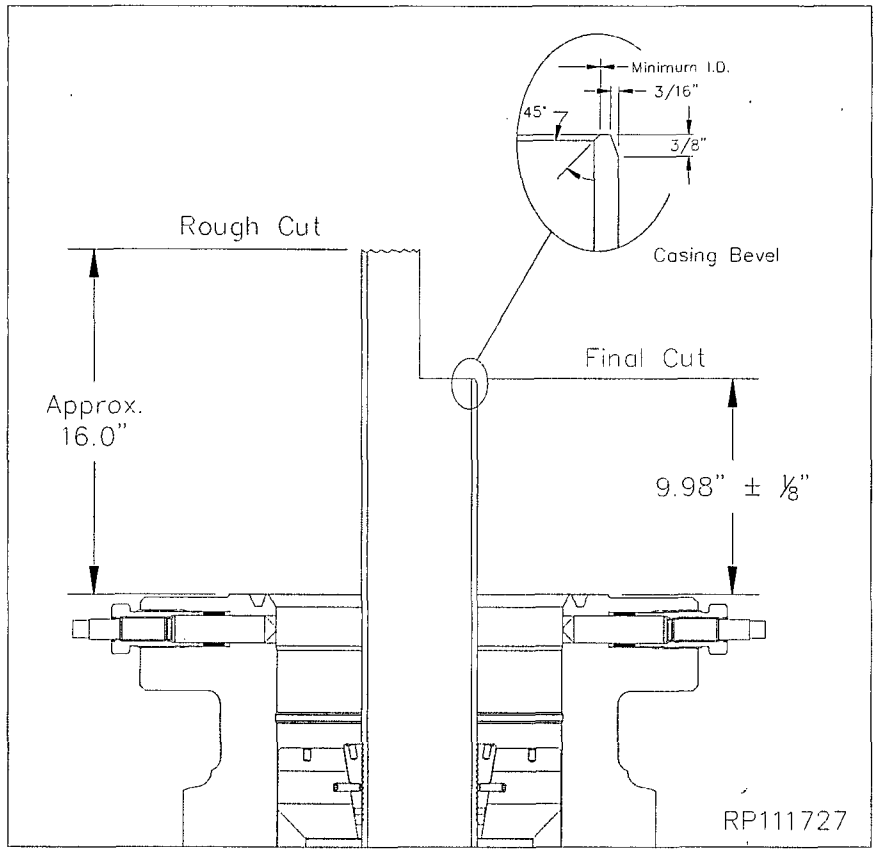
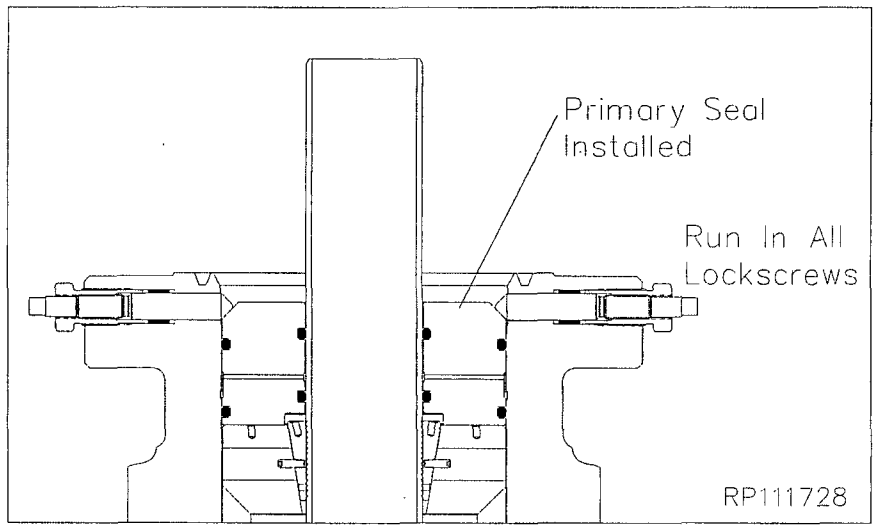
14. Rough cut the casing approximately 12" above the top of the Housing and move the excess casing and BOP out of the way.
15. Final cut the casing at 9.98" ± 1/8" above the top flange of the Housing.
16. Grind the casing stub level and place a 3/16" x 3/8" bevel on the casing stub.
17. Using a high pressure water hose, thoroughly clean the top of the Housing, Casing Hanger, and casing stub and blow dry with compressed air. Ensure all cutting debris are removed .
18. Install the Primary Seal over the casing stub and land it on the top of the Casing Hanger.
19. Run in all of the lockscrews in an alternating cross fashion to approximately 100 ft lbs.





Stage 9A — Hang Off the 5-1/2" Casing (Emergency)

20. Locate the test fitting on the upper SH2 housing upper flange marked "SEAL TEST" and remove the dust cap from the fitting.

21. Attach a hydraulic test pump to the open fitting and inject test fluid between the packoff seals until a pressure of 5,000 psi is attained.

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

23. After a satisfactory test is achieved, bleed off test pressure and remove test pump.

24. Reinstall the dust cap on the open fitting.

Note: Prior to operating lockscrews, refer to the procedure in the back of this manual for proper lockscrew operating procedures.

25. Holding a backup wrench on the lockscrew gland nuts, fully run in all of the Upper Housing lockscrews in an alternating cross pattern to approximately 100 ft lbs. When fully made up the lockscrews will protrude approximately 2.61" from the O.D. of the upper housing flange.

Note: Lockscrews are to be operated by Pressure Control personnel only.

WARNING: Ensure all valves are in the closed position prior to leaving location after completion of job.

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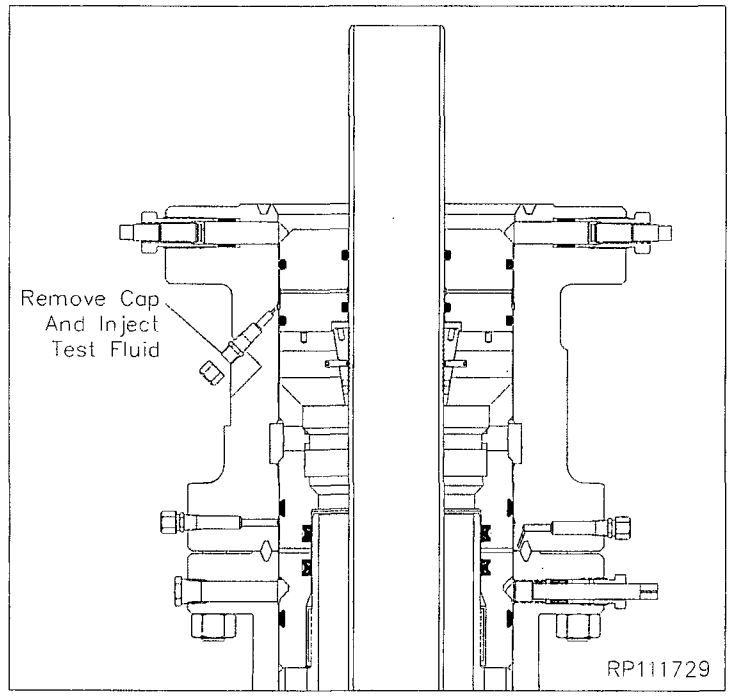
26. Fill the void above the Seal with clean test fluid to the top of the Housing flange.

WARNING: Do Not over fill the void with test fluid - trapped fluid under the ring gasket may prevent a good seal from forming.



Stage 10 — Install the Tubing Head Assembly

1. Examine the ***13-5/8" 5M x 11" 5M DSA (Item C1)***. Verify the following:
   - bore is clean and free of debris
   - all studs are in place and properly made up
   - ring grooves are clean and free of debris
2. Thoroughly clean the mating ring grooves of the DSA and LSH housing, removing all old grease and debris.
3. Lightly wipe both grooves with a light oil.
4. Place the ***BX-160 Ring Gasket (Item C8)*** in the ring groove of the LSH housing.
5. Pick up the DSA and position it above the housing.
6. Orientate the DSA to a proper Two Hole position and then carefully lower it over the casing stub and land it on the ring gasket.

WARNING: Two Hole position is when two studs straddle the center line of the DSA. This position is attainable in only four equally spaced locations. Improper two holing will result in the tubing head to be miss aligned with the LSH housing.

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7. Examine the ***11" 5M x 7-1/16" 10M T-EBS-F Tubing Head Assembly (Item C2)***. Verify the following:
   - seal area and bore are clean and in good condition
   - ***EBS-F Secondary Seal Bushing (Item C3 or C3a)*** is in place and properly retained with square snap wire
   - all peripheral equipment is intact and undamaged
8. Clean the mating ring grooves of the Tubing Head and DSA.
9. Lightly lubricate the ID of the EBS seals and the casing stub with a light grease.

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

10. Install a new ***R-54 Ring Gasket (Item C9)*** in the ring groove of the DSA.
11. Orientate the outlets to aline with the casing head outlets then carefully lower the Tubing Head Assembly over the casing stub or hanger neck and land it on the ring gasket.

WARNING: Do Not damage the EBS Seal elements or their sealing ability will be impaired!

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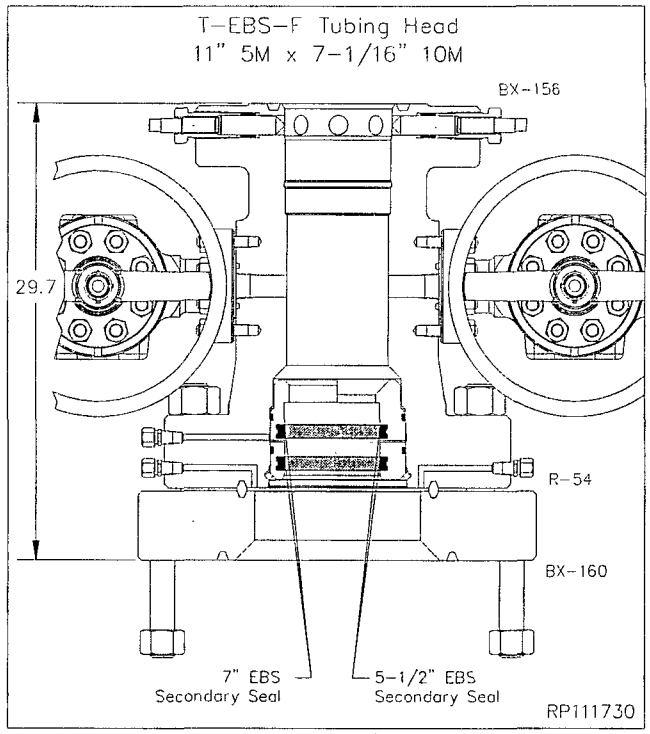
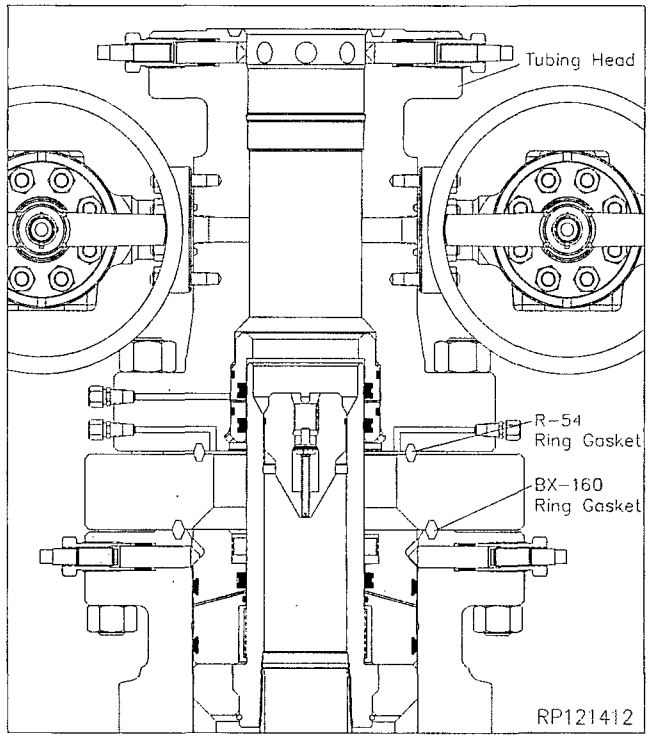
12. Make up both flange connections using the DSA studs and nuts, tightening them in an alternating cross pattern.

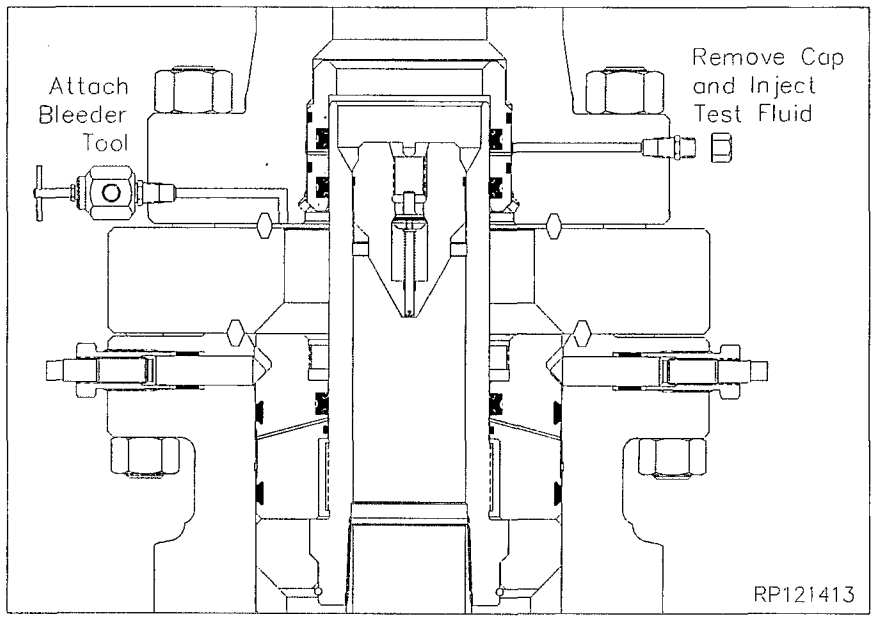




Stage 10 — Install The Tubing Head Assembly

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 EBS Seals until a test pressure of ***10,000 psi. or 80% of casing collapse pressure - 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.
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.

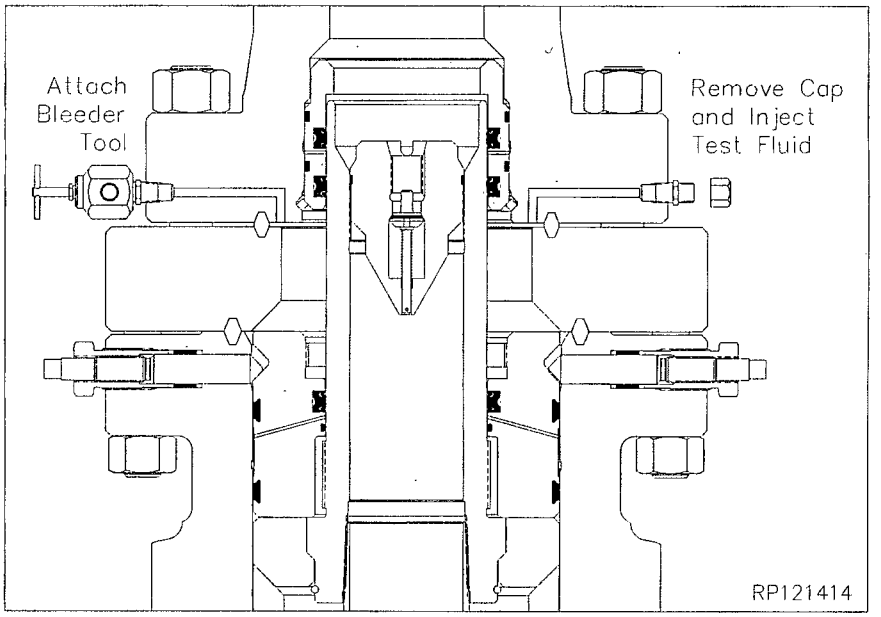


Leak Location	Action
Tubing Head bore - Upper EBS seal leaking	Remove tubing head and replace leaking seal.
Flange Test Bleeder Tool - Lower EBS seal leaking	Remove tubing head and replace leaking EBS seal.

Stage 10 — Install The Tubing Head Assembly

Flange Test

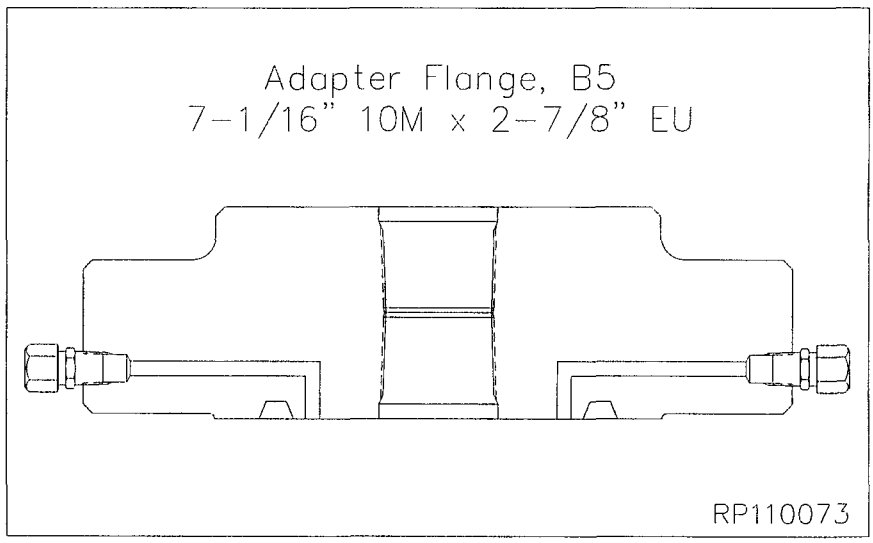
1. Locate the remaining FLG TEST fitting on the tubing head lower flange and remove the dust cap from the fitting.
2. Attach a test pump to the open FLG TEST fitting and inject test fluid into the flange connection until a continuous stream flows from the opposite FLG TEST bleeder tool.
3. Close the FLG TEST bleeder tool and continue to inject test fluid to ***5,000 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 from the adjacent chart.
6. Repeat this procedure until a satisfactory test is achieved.
7. Once a satisfactory test is achieved, remove the test pump and bleeder tool, drain all test fluid, and reinstall the dust caps.

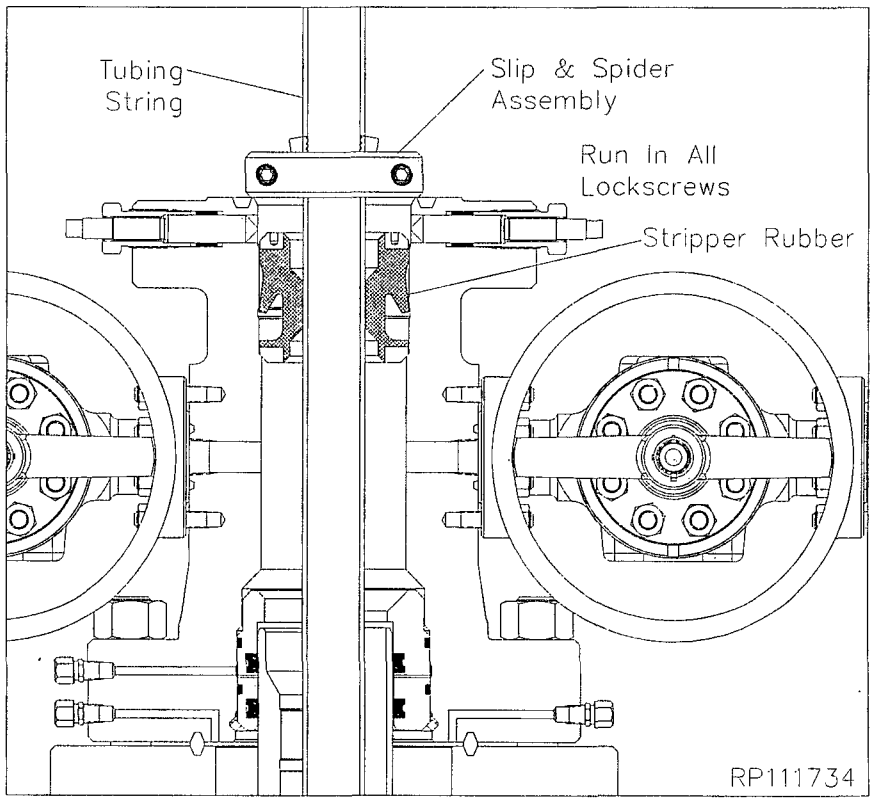


Leak Location	Action
Around lockscrews - Lockscrew packing leaking	Further tighten Glandnut.
Between Flanges - Ring Gasket leaking	Further tighten connection.
Casing Annulus - Hanger seal leaking	Remove tubing head and further tighten slip hanger cap nuts.

Stage 11 — 2-7/8" Tubing Completion

1. Thoroughly clean the top of the tubing head and bowl, removing all old grease and debris.
2. Examine the ***7-1/16" Nominal x 2-7/8" TC Stripper Rubber (Item D4)***. Verify the following:
   - ID and OD seal rubber is intact and undamaged
3. Thoroughly clean the entire stripper rubber, removing all old grease and packaging debris.
4. Lightly lubricate the ID and OD of the stripper rubber with a light grease.
5. Ensure all tubing head lockscrews are fully retracted and then push the stripper rubber into the tubing head bowl until it bottoms on the load shoulder.
6. Run in all the tubing head lockscrews until they make firm contact with the lockscrew rap on the stripper rubber.
7. Place a suitable flange protector on top of the tubing head and rig up the slip and spider assembly.
8. Pick up the first joint of tubing and push it through the stripper rubber.
9. Continue running tubing to the required depth.
10. Engage tubing anchor and then set the tubing in the slip and spider.
11. Remove the coupling from the last joint ran.
12. Pass the ***BX-156 Ring Gasket (Item D2)*** over the tubing and set it on top of the spider assembly.
13. Examine the ***7-1/16" 10M x 2-7/8" EU B5 Adapter Flange (Item D1)***. Verify that:
    - ID threads are clean and in good condition
    - ring groove is clean and free of defects
14. Thoroughly clean the entire flange,

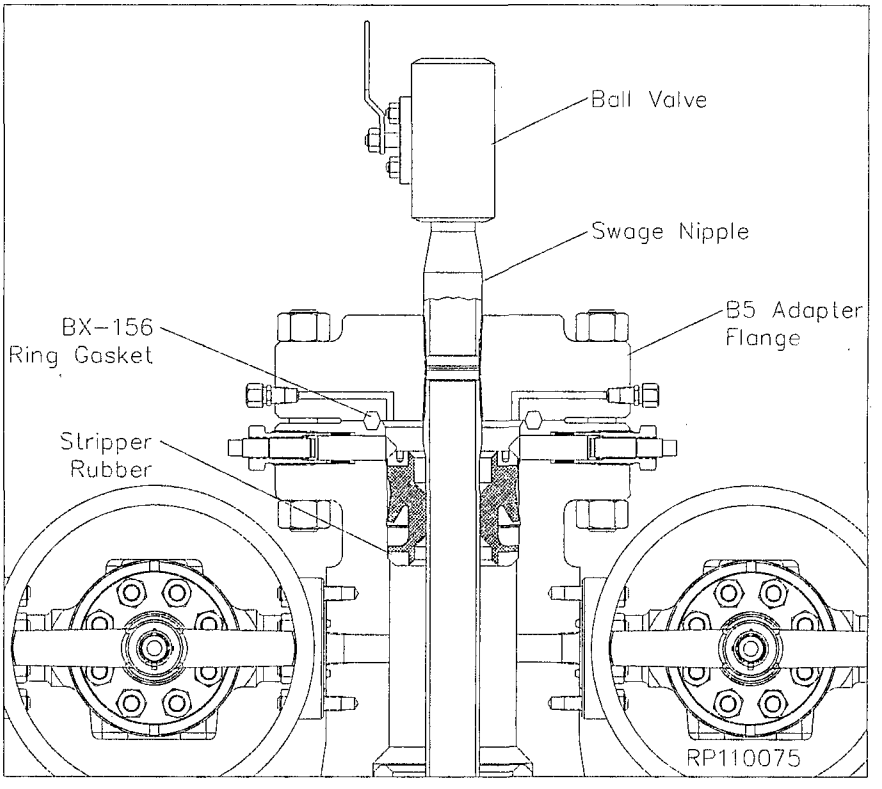




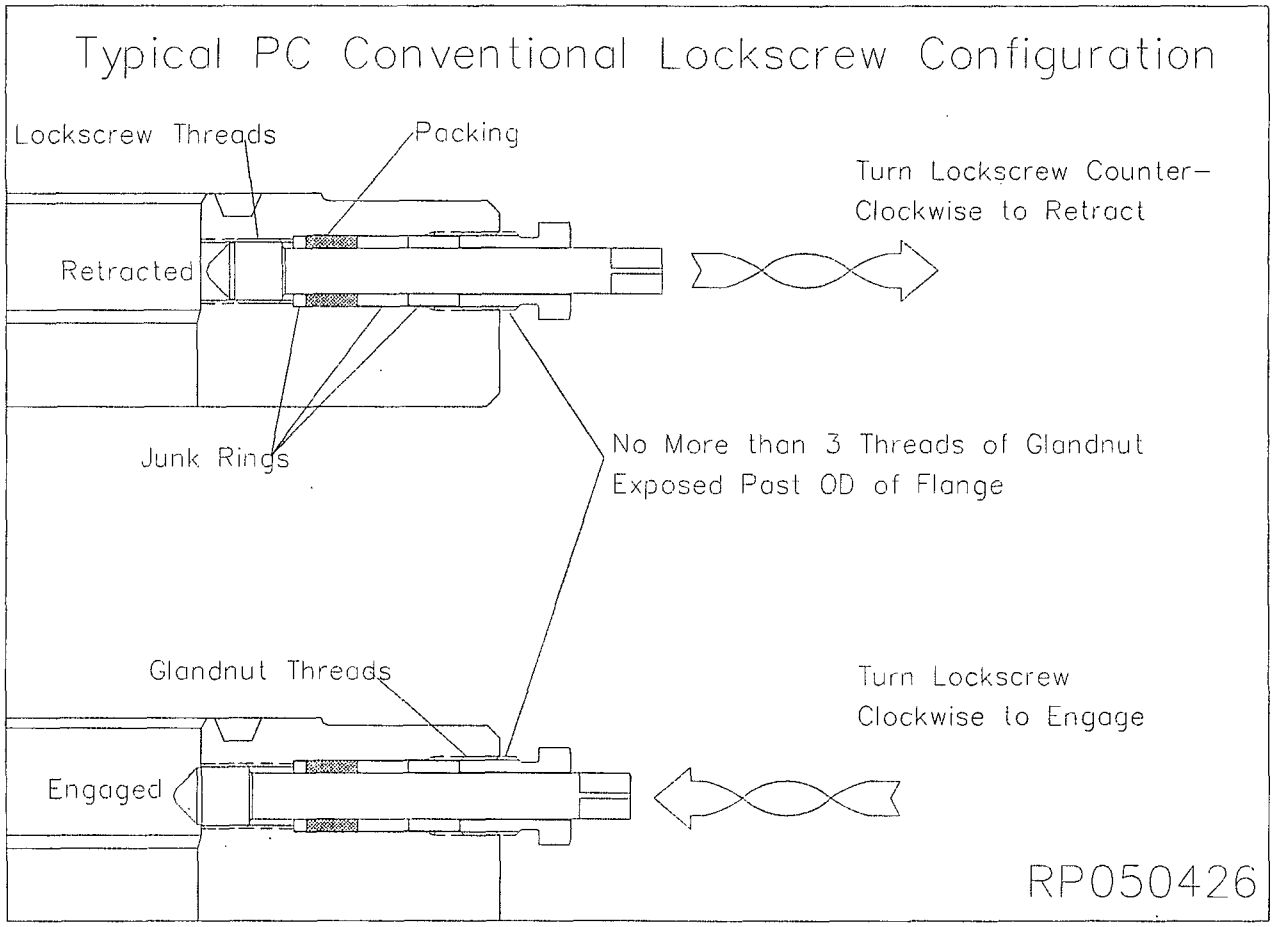
Stage 11 — 2-7/8" Tubing Completion

removing all old grease and debris.

15. Make up the appropriate length handling joint to the top of the flange and tighten connection to thread manufacturer's minimum make up torque.
16. Apply approved pipe thread sealant to the mating threads of the flange and the tubing string.
17. Carefully make up the flange to the tubing string and torque connection to thread manufacturer's optimum make up torque.
18. Pick up on the tubing string and ring gasket and remove the slip and spider assembly.
19. Place the ring in the ring groove of the tubing head and then carefully lower the tubing into the well and land the flange on the ring gasket.
20. Make up the flange connection using the appropriate size ***studs and nuts***, tightening them in an alternating cross pattern.
21. Remove handling joint and install Swedge Nipple and Ball Valve.
23. Run in all the lockscrews in an alternating cross pattern as required.



Conventional Lockscrew Operation



Lockscrew Operation Instructions

These instructions are applicable to ONLY Pressure Control "Conventional" style lockscrews. This procedure does not cover lockscrews manufactured or installed in wellhead equipment not supplied by Pressure Control.

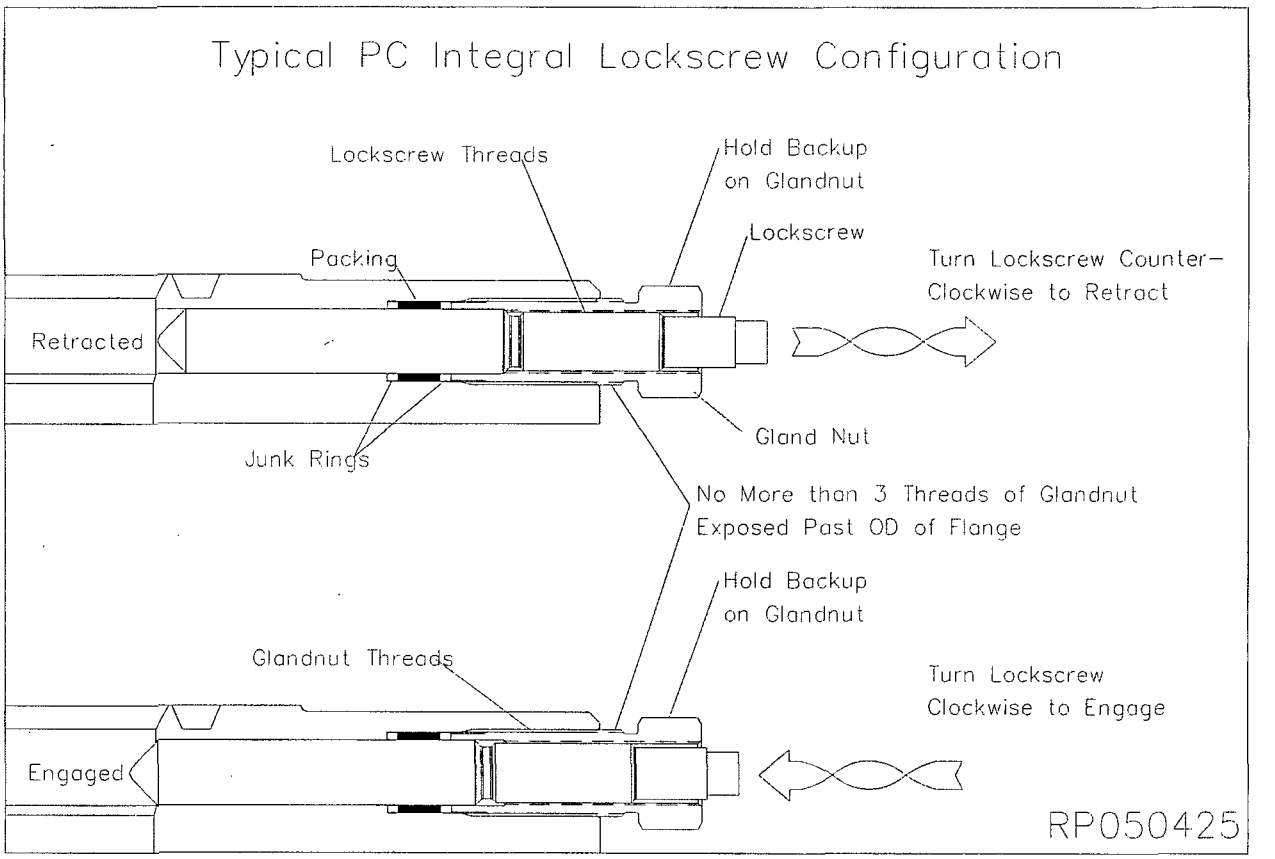
1. The Conventional lockscrew is threaded into the wellhead or flange with enough thread to back out clear of the bowl or to extend into the bowl. This will not disturb the seal/packing around the lockscrew shaft.
2. The seal around the shaft is a compression type with metal Junk Rings. The Packing is energized with the Glandnut on the outside diameter of the flange.
3. The lockscrew is normally backed out of the bowl. The lockscrews are extended into the bowl only after a hanger has been installed. The lockscrew must be backed out prior to removing the hanger.
4. To properly operate the lockscrew it is advised to first backoff (Counterclockwise) the Glandnut no more the one full turn and while holding a backup wrench on the Glandnut, rotate the lockscrew in or out as required. Retighten the Glandnut. The Glandnut, when properly installed, should not expose more than 3 external threads past the OD of the wellhead.

Under a pressure situation the Glandnut should remain tight and the lockscrew rotated as required.

Always use the appropriate size wrench to rotate the Lockscrew. Do not use a pipe wrench.

For lockscrew or lockscrew packing replacement instruction, refer to OM-044.

Integral Lockscrew Operation



Lockscrew Operation Instructions

These instructions are applicable to ONLY Pressure Control "Integral" style lockscrews. This procedure does not cover lockscrews manufactured or installed in wellhead equipment not supplied by Pressure Control.

1. The Integral Lockscrew is threaded into the Glandnut of the assembly with enough thread to back out clear of the bowl or to extend into the bowl. This will not disturb the seal/packing around the lockscrew shaft.
2. The seal around the shaft is a compression type with metal Junk Rings. The Packing is energized with the Glandnut on the outside diameter of the flange and isolates the lockscrew threads from the well bore.
3. The lockscrew is normally backed out of the bowl. The lockscrews are extended into the bowl only after a hanger has been installed. The lockscrew must be backed out prior to removing the hanger.
4. To properly operate the lockscrew it is required to place a backup wrench on the Glandnut, rotate the lockscrew in or out as required. In new installations the Glandnut torque is preset and should not be backed off to operate the lockscrew. The Glandnut, when properly installed, should not expose more than 3 external threads past the OD of the wellhead.
5. When replacing the lockscrew assembly, the junk rings and packing are to be placed in the lockscrew prep as indicated followed by the lockscrew/Glandnut assembly. The Glandnut is then torqued as required. Once the Glandnut torque is met, the Lockscrew may be operated as required.

Under no circumstances is the Glandnut to be backed off to operate the lockscrew.

Always use the appropriate size box wrench or socket to rotate the Lockscrew. Do not use a pipe wrench.

For lockscrew or lockscrew packing replacement instruction, refer to OM-044.