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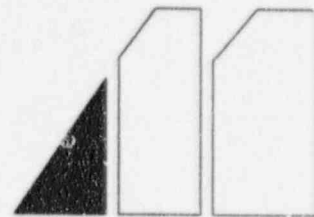
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MILLSTONE NUCLEAR POWER STATION
MAINTENANCE PROCEDURE



**Main Steam Safety Relief Valve Main Stage
Assembly and Valve Replacement**

MP 717.1

Rev. 12

STOP

THINK

ACT

REVIEW

Approval:

PORC Mtg. No: 1-97-083

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Level of Use
General

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Main Steam Safety Relief Valve Main Stage Assembly and Valve Replacement

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1. PURPOSE

1.1 Objective

The objective of this procedure is to provide instructions for removing, overhauling and installing the main steam safety relief valve main stage.

1.2 Discussion

The main steam safety relief valves are Target Rock Model 7567F pilot-operated valves and consist of two principle assemblies, a pilot stage assembly and a main stage assembly.

These two assembly stages are directly coupled to provide a unitized, dual-function, safety and relief valve. The pilot stage assembly, also called the "topworks," is the pressure-sensing and control element and the main stage assembly is a system fluid-actuated follower valve which provides the pressure relief function. Self-actuation of the pilot assembly at set pressure vents the main piston chamber, permitting the system pressure to fully open the main assembly, which results in system depressurization at full rated flow.

This procedure provides instructions to remove and install the main body from the main steam system. Instructions are also provided to remove the base assembly from the main body, inspect valve body internals and evaluate main stage seat tightness. Typically, valve maintenance is not performed on site.

1.3 Applicability

This procedure applies to the six Target Rock Model 7567F safety relief valves having the following local IDs:

- 1-MS-3A "Main Steam Safety/Relief "A"
(Target Rock/APR) —Valve
- 1-MS-3B "Main Steam Safety/Relief "B"
(Target Rock/APR) —Valve
- 1-MS-3C "Main Steam Safety/Relief "C"
(Target Rock/APR) —Valve
- 1-MS-3D "Main Steam Safety/Relief "D"
(Target Rock/APR) —Valve
- 1-MS-3E "Main Steam Safety/Relief "E"
(Target Rock/APR) —Valve
- 1-MS-3F "Main Steam Safety/Relief "F"
(Target Rock/APR) —Valve

2. PREREQUISITES

2.1 General

- 2.1.1 The solenoid valve has been removed in accordance with MP 717.8, "Main Steam Safety Relief Valve—Solenoid Changeout (EQ)."
- 2.1.2 The topworks assembly has been removed in accordance with MP 717.7, "Target Rock Safety Relief Valve—Topworks Changeout."
- 2.1.3 If valve is to be repaired at an off-site facility, a purchase order has been approved for the work and retest requirements have been specified.
- 2.1.4 Planned valve repairs have been evaluated in accordance with WC 3, "ASME Section XI Repair and Replacement Program." If necessary, an ASME Section XI Repair/Replacement Plan has been prepared and approved and included in the AWO.

2.2 Documents

- 2.2.1 C MP 715, "Installation of Lockwire and Lockplates"
- 2.2.2 MP 717.7, "Target Rock Safety Relief Valve—Topworks Changeout (EQ)"
- 2.2.3 MP 717.9, "Gagging Target Rock Safety/Relief Valves"

2.3 Measuring and Test Equipment (M&TE)

- 2.3.1 M&TE calibration is current and in accordance with WC 8, "Control and Calibration of Measuring and Test Equipment."
- 2.3.2 Depth micrometer with a range of 1 inch and an accuracy of ± 0.0005 such as MPS-64
- 2.3.3 QA torque wrenches (click or dial type) have a minimum accuracy and maximum full scale value listed in the table below:

Specified Torque Application Range	Maximum Torque Wrench Full Scale Value <i>between</i>	Minimum Accuracy (%)
15 to 25 ft•lbs	35 to 120 ft•lbs	5
45 to 55 ft•lbs	80 to 225 ft•lbs	5
95 to 105 ft•lbs	150 to 475 ft•lbs	5
335 to 365 ft•lbs	470 to 1625 ft•lbs*	5
675 to 745 ft•lbs	950 to 3,300 ft•lbs*	5
970 to 1,070 ft•lbs	1,400 to 4,850 ft•lbs*	5

*A torque multiplier may be required to achieve torque values of this magnitude.

2.4 Tools and Consumables

2.4.1 Tools

- Standard mechanic's tool kit
- Wire brush

2.4.2 Special Tools

- Main internal lift tool, T-10060-1
- Main piston spanner tool, T-20075-1

2.4.3 Equipment

- Chain hoist, 1-ton minimum capacity
- Drawbar, 1 inch diameter x 12 inches long, two required
- Hoisting slings, minimum 1-ton capacity
- Lifting eyebolt, $\frac{1}{2}$ –13, two required
- Metal protective cover (inlet piping flange)
- Slugging wrench, $1\frac{3}{8}$ inch
- Temporary regulated nitrogen supply (including gage, regulator, adapters, fittings, and hoses or tubing) capable of pressurizing valve body to 875 psig.

2.4.4 Consumables

- Approved cleaning solvent such as Polywater Hydrafoam 2020 All-Purpose Cleaner
- Approved lapping compound such as Clove or Moco
- Approved thread lubricant and anti-seize compound such as Nuclear-Grade Never Seez
- Approved leak detector such as Snoop
- Approved marking dye such as Mark-TEX Blue
- Approved lubricant such as DAG 156
- Fine-grit abrasive
- Protective covers or wrap, (inlet and outlet main body flanges, and outlet piping flange)
- Lockwire (annealed 0.031 inch diameter)
- Low-lint cloths
- Nitrogen supply capable of pressurizing valve body to 875 psig
- Scotch Brite pads

2.4.5 Spare Parts

- Tab washer (101)
- Inlet gasket (130), (8¹/₂ OD X 7¹/₂ ID X 0.125)
- Outlet gasket (132), (14¹/₄ OD X 11⁵/₁₆ ID X 0.175)
- Gasket (133), (1³/₈ OD X 1 ID X 0.100)
- Gasket (134), (1¹⁵/₃₂ OD X 1¹/₁₆ ID X 0.100)
- Gasket (135), (7¹⁵/₃₂ OD X 7⁵/₃₂ ID X 0.135)
- Gasket (136), (7³/₄ OD X 7⁵/₃₂ ID X 0.135)

2.5 Responsibilities

- 2.5.1 Performance Evaluations Department is responsible for liquid dye penetrant inspection of internal valve body surface and body welds.
- 2.5.2 Health Physics Department is responsible for releasing valve for shipping.

3. PRECAUTIONS

- 3.1 Ensure all consumables to be used in or on power plant components are controlled in accordance with CC 1, "Control of Chemical Consumable Products," and a Restricted Use Permit has been issued as necessary.
- 3.2 Components being disassembled must be labeled or match marked to aid in reassembly. Delicate parts or critical mating surfaces must *not* be match marked.
- 3.3 Approved thread lubricant and anti-seize compound must be applied to all threads prior to threading.
- 3.4 Handle asbestos in accordance with U1 WC 1 (Att), "Control of Asbestos Containing Materials."
- 3.5 These valves fall within the ASME Section XI boundary. Repair or replacement of pressure-retaining components must be evaluated in accordance with WC 3, "ASME Section XI Repair and Replacement Program."
- 3.6 The entire safety or relief valve must be removed from service if any valve fails to function as designed, except for pressure setpoint requirements, and the cause of the malfunction is *not* clearly determined, understood, and corrected. The valve must be disassembled, inspected, repaired, and tested with steam for proper operation before returning the valve to service.

4. INSTRUCTIONS

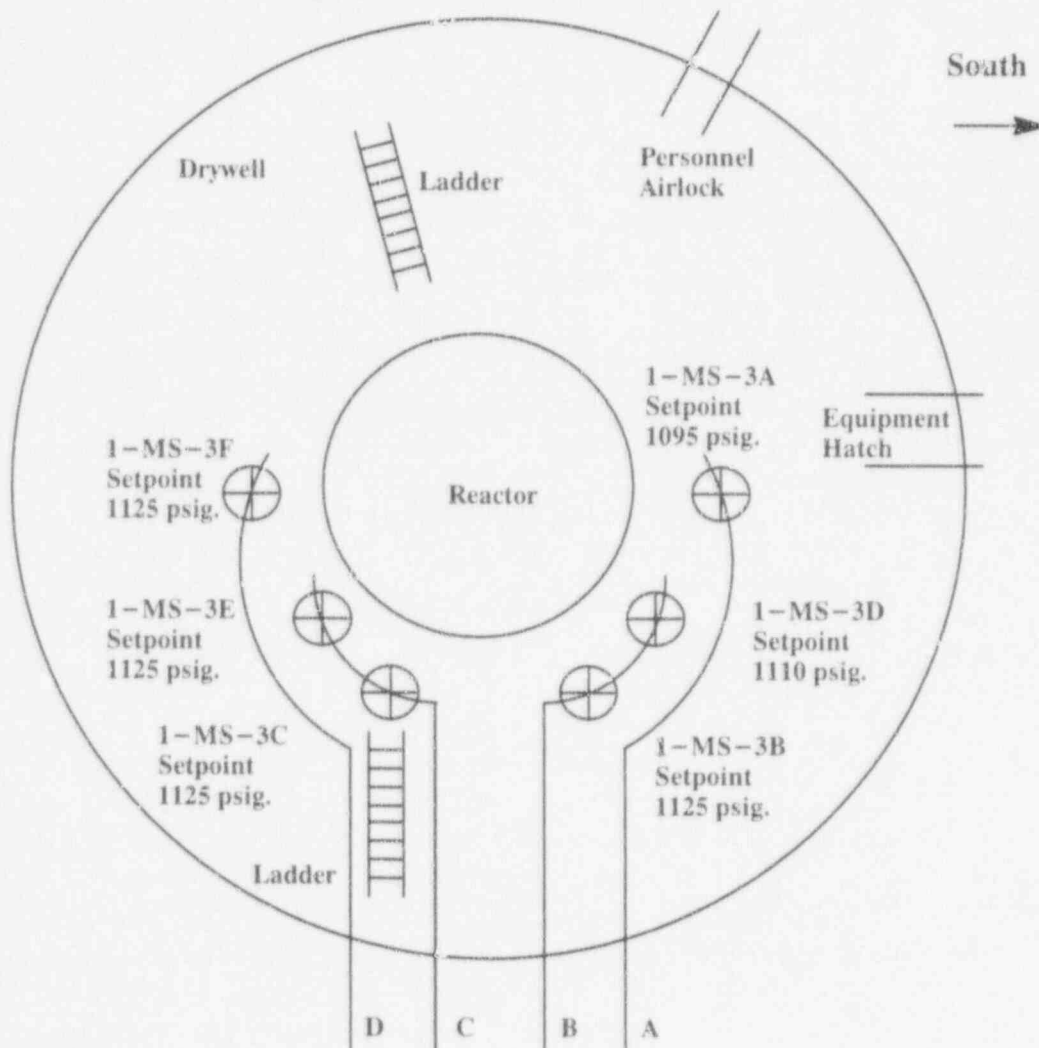
4.1 Safety Relief Valve Assembly Removal

NOTE

If any valve fails to function as designed, except for pressure setpoint requirements, and the cause of the malfunction is *not* clearly determined, understood, and corrected, the entire valve must be removed from service, disassembled, inspected, repaired, and tested with steam for proper operation before returning the valve to service

4.1.1 Refer To Figure 1, and AWO and LOCATE valve to be worked.

Figure 1. Main Steam Lines





CAUTION



Insulation is critical to performance of safety relief valves. Insulation must be inspected before removal and stored in a safe area where insulation will *not* be subject to damage.

- 4.1.2 INSPECT insulation for damage.
- 4.1.3 IF insulation is damaged, REQUEST FLS CONSULT Engineering.
- 4.1.4 *Carefully*, REMOVE valve insulation, and STORE in secure area.
- 4.1.5 RIG hoist and slings to valve assembly.
- 4.1.6 Refer To Attachment 1, and REMOVE outlet flange studs and nuts.
- 4.1.7 LABEL and STORE outlet flange studs and nuts.
- 4.1.8 LOOSEN but do *not* remove inlet flange nuts (114).
- 4.1.9 REMOVE all but two inlet flange studs (105) and nuts (114).
- 4.1.10 Using hoist and slings, SUPPORT weight of valve.
- 4.1.11 REMOVE remaining inlet flange studs (105) and nuts (114).
- 4.1.12 LABEL and STORE inlet flange studs and nuts.
- 4.1.13 Refer To Attachment 6, and RECORD all labeled items and storage location.
- 4.1.14 MAINTAIN valve as upright as possible, and REMOVE valve assembly from piping system.
- 4.1.15 Refer To Attachment 1, and REMOVE inlet gasket (130) and outlet gasket (132).



CAUTION



Protective covers must be installed on valve and piping to prevent damage to seating surfaces and prevent debris from entering valve and piping.

- 4.1.16 INSTALL metal protective cover on inlet piping flange.
- 4.1.17 INSTALL protective covers or wraps on inlet and outlet valve flanges and outlet piping flange.
- 4.1.18 MAINTAIN valve as upright as possible, and TRANSFER valve to controlled work area.
- 4.1.19 Refer To Attachment 6, and RECORD main body serial number.
- 4.1.20 IF valve assembly maintenance will *not* be performed on site, CONSULT Health Physics Department and PREPARE valve for shipping.

4.2 Base Assembly Removal

NOTE

The base assembly can be removed in the dry well without removing the main body assembly.

- 4.2.1 Refer To Attachment 2 for appropriate valve condition and PERFORM the following:
 - a. RIG hoist and slings to base assembly.
 - b. SUPPORT weight of base assembly.
- 4.2.2 Refer To Attachment 1, and REMOVE lockwire from base--to--main--body studs (83).



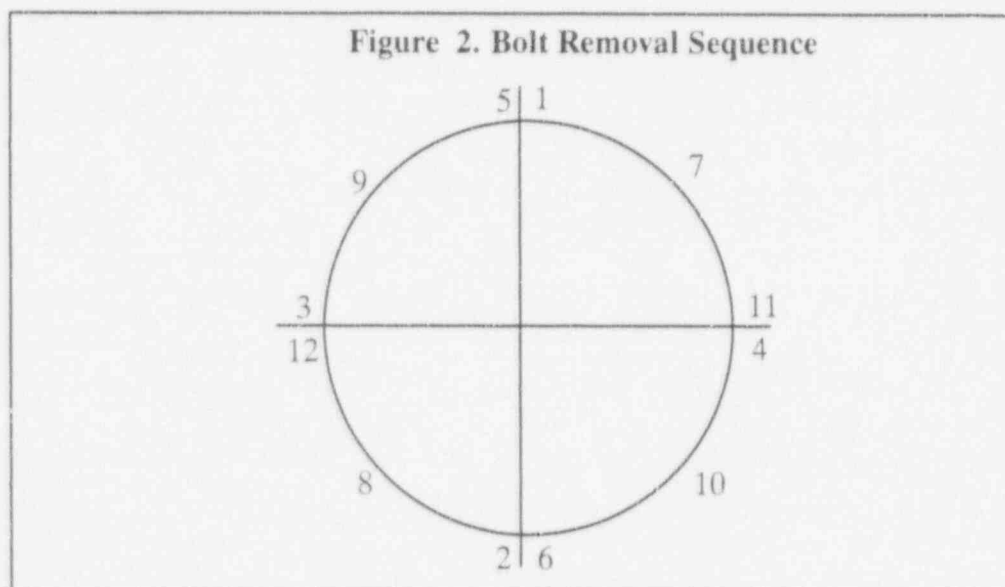
WARNING



Main spring (100) is preloaded to 250 lbs and is located behind base assembly.

4.2.3 REMOVE base assembly (21) as follows:

- a. Refer To Figure 2, and using the sequence shown, LOOSEN but do *not* remove bolts (107), and nuts (115).



- b. REMOVE two bolts and nuts 180° apart.
- c. INSTALL drawbars in locations where bolts were removed.
- d. ENSURE weight of base assembly is supported by slings.
- e. REMOVE all but two remaining bolts (107), and nuts (115) located diametrically opposite to each other.
- f. *Slowly and uniformly* UNBOLT last two bolts (107) and nuts (115) and RELEASE main spring preload.
- g. SLIDE base assembly along drawbars, and WHEN clear of main spring (100), and studs (83), REMOVE base assembly.



CAUTION



Sealing surface of base assembly flange face and body flange face must *not* be damaged when removing gaskets.

- h. REMOVE gaskets (133, 134, and 135 or 136), from base assembly or body flange.



CAUTION



Protective cover must be installed on base assembly flange face and gasket surfaces to prevent damage to seating surfaces and prevent debris from entering assembly.

- 4.2.4 INSTALL protective cover on base assembly flange face.
- 4.2.5 MOVE base assembly onto a firm surface.
- 4.2.6 REMOVE main spring (100) and drawbars from main body.



CAUTION



Protective cover must be installed on body flange face and gasket surfaces to prevent damage to seating surfaces and prevent debris from entering valve.

- 4.2.7 INSTALL protective cover on body flange face and gasket surfaces.
- 4.2.8 LABEL and STORE the following items:
- Bolts (107)
 - Nuts (115)
 - Main spring (100)
- 4.2.9 Refer To Attachment 6, and RECORD all labeled items and base assembly serial number.

4.3 Disassembly of Main Stage

- 4.3.1 IF necessary, Refer To Attachment 3, and POSITION valve for disassembly.
- 4.3.2 Refer To Attachment 1, and BEND tab of tab washer (101) flat.
- 4.3.3 Using main piston spanner tool, HOLD piston (102) and LOOSEN nut (103).
- 4.3.4 REMOVE the following:
 - a. Nut (103)
 - b. Tab washer (101)
 - c. Main piston spanner tool
- 4.3.5 INSTALL main internal lift tool in place of tab washer (101).
- 4.3.6 INSTALL nut (103) and TORQUE to 20 ft•lbs (15 to 25 ft•lbs).



CAUTION



Diametral clearance between main guide (42) and body (25) is 0.001 to 0.003 inch. During removal, do *not* tilt guide so as to avoid possible jamming of guide in body.

NOTE

Application of lubricant at 7¹/₈-inch diameter gasket groove will aid removal. The lubricant between main guide (42) and body (25) will allow for easier removal. If assembly becomes stuck during removal, application of lubricant is to be repeated. Additionally, gently tapping main disc (48) against blind side of main guide (42) in an outward direction will aid in freeing guide from body.

- 4.3.7 IF necessary, APPLY approved lubricant to 7¹/₈-inch diameter gasket groove.
- 4.3.8 Using main internal lift tool, REMOVE main stage internal subassembly.

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4.3.9 IF main stage internal subassembly sticks, APPLY additional approved lubricant and as necessary gently TAP main disc (48) against blind side of main guide in outward direction.

4.3.10 **DISASSEMBLE** main stage internals as follows:

- a. REMOVE nut (103).
- b. REMOVE main internal lift tool.
- c. Using soft-faced vise or clamp, **SECURE** main disc (48) with axial centerline in vertical position.
- d. **INSTALL** main piston spanner tool onto piston (102).

NOTE

It may be necessary to free piston from main disc at threaded joint by application of axial impacts or application of lubricant. The impact force may be applied alternatively by tapping on main piston spanner tool face (downward) followed by applying a force to blind side of piston by use of main guide as "pull hammer."

- e. Using main piston spanner tool, **UNSCREW** piston (102) from main disc (48).
- f. IF piston (102) sticks, APPLY approved lubricant and as necessary and using main guide as a "pull hammer," **IMPACT** blind side of piston axially.
- g. REMOVE main guide (42) and main piston spanner tool.
- h. REMOVE seal ring (71) from main guide (42).
- i. REMOVE piston rings (99) from piston (102).

NOTE

Removing dowel pin (139) from main guide (42) is *not* required.

- j. REMOVE main disc (48) from vise or clamp.

4.3.11 **LABEL** and **STORE** all parts.

4.3.12 Refer To Attachment 6, and RECORD all labeled items.

4.4 Safety Relief Valve Cleaning, Inspection and Maintenance



CAUTION



All consumables to be used in or on power plant components must be controlled in accordance with CC 1, "Control of Chemical Consumable Products," and a Restricted Use Permit must be issued when necessary.

4.4.1 Using approved cleaning solvent, CLEAN all components.

4.4.2 Using a fine-grit abrasive or Scotch-Brite pads, REMOVE the following from all mating surfaces:

- Dirt
- Paint
- Loose scale
- Corrosion
- Burrs
- Raised surfaces

NOTE

Structural defects and damage include breakage, cracks, deformation, distortion, corrosion, pitting, scoring, scratches, erosion, abrasion, galling, and indications of misalignment.

4.4.3 Visually INSPECT all components for wear, structural defects, and damage.

4.4.4 If inspection results are *not* satisfactory, Refer To ASME Section III Repair and Replacement Program and EVALUATE applicable component(s).

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4.4.5 Visually INSPECT body (25) for the following:

- Seat surface clean and free of blemishes.
- Main guide bore ID ($7\frac{1}{8}$ inch diameter) free of any raised metal.
- Gasket seating surfaces free of blemishes that extend radial boundary of gasket seal.

4.4.6 INSPECT main guide (42) for the following:

- OD free of any raised metal.
- ID shall have a 32 RMS finish or better (both diameters).
- Ring groove clean and free of sharp edges.

4.4.7 INSPECT main disc (48) for the following:

- Seat surface clean and free of blemishes.
- OD (both diameters) shall have a 32 RMS finish or better.
- Thread form and finish general condition.

4.4.8 Visually INSPECT piston (102) for the following:

- OD free of any contact or wear indications.
- Ring grooves clean and free of sharp edges.
- Thread form and finish general condition.

4.4.9 Visually INSPECT piston rings (99) for the following:

- OD free of significant wear.
- Faces of rings free of blemishes.
- Edges of OD and face free of burrs or rolled over material.

4.4.10 Visually INSPECT seal ring (71) for the following:

- OD and face free of blemishes

4.4.11 PERFORM liquid dye penetrant inspection of internal valve body surface as follows:

- a. Using a wire brush, CLEAN internal valve body surface in area of main seat ring and up to 2 inches around seal weld.
- b. REQUEST Performance Evaluations perform liquid dye penetrant inspection of internal valve body surface in area of main seat ring and up to 2 inches around seal weld for linear discontinuities.
- c. Refer To Attachment 6, and RECORD inspection results.
- d. IF unacceptable indications are found, REQUEST FLS consult Engineering for further guidance.
- e. IF repairs are required, INSPECT entire valve body internal surface with liquid dye penetrant.

4.4.12 PERFORM liquid dye penetrant inspection of valve body welds as follows:

- a. Using a wire brush, CLEAN welds between valve body, plate, and pilot inlet tube.
- b. REQUEST Performance Evaluations perform liquid dye penetrant inspection of welds between valve body, plate, and pilot inlet tube for linear discontinuities.
- c. Refer To Attachment 6, and RECORD inspection results.
- d. IF there are indications that are *not* acceptable, REQUEST FLS consult Engineering for further guidance.



CAUTION



The repair or replacement of all pressure-retaining components must be evaluated in accordance with the ASME Section XI Repair and Replacement Program.

4.4.13 IF lapping main disc-to-seat, PERFORM the following:

- a. VERIFY all main disc seating surfaces have a 32 RMS finish or better.

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- b. Refer To Attachment 4, and INSTALL main guide (42).
- c. Using an approved lapping compound LAP main disc (48) to seat with main internal lift tool in place.
- d. Using an approved cleaning solvent, CLEAN disc and valve seat sealing surfaces.
- e. Using contact inspection technique, INSPECT disc and valve seat for proper contact as follows:
 - 1) APPLY a thin, tint coat of approved marking dye to valve seat.
 - 2) POSITION lapped surface of disc onto valve seating surface and ROTATE disc 90°.
 - 3) REMOVE disc from valve body.
 - 4) Visually INSPECT main disc-to-valve seat contact pattern.



CAUTION



A satisfactory main disc-to-valve seat contact check must indicate the following:

- An unbroken ring of contact over *at least* 75 percent of seating surface width *throughout* 360° of seating surface.
- *No* high or low spots.

- 5) IF contact check does *not* indicate a ring of contact over at least 75 percent of seating surface width throughout 360° of surface OR high or low spots are detected, CONSULT FLS for further guidance.

- f. Using an approved cleaning solvent, CLEAN disc and valve seat sealing surfaces, and ENSURE all marking dye and lapping compound are removed.

4.4.14 IF machining valve components, PERFORM the following:

- a. ENSURE all machined surfaces have a 32 RMS finish or better.

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- b. Refer To Attachment 4, and as applicable, ENSURE all body seating and main guide surfaces are concentric, perpendicular, or parallel.
- c. Refer To Attachment 4, and ENSURE all main disc, seat, and main guide surfaces are concentric.
- d. ENSURE seat surface and intersecting diameter are "dead true" to each other.

NOTE

Recommended minimum thickness (normal to seat surface) of hardface is 0.090 inch.

- e. TAKE as light a cut as possible on seat or main disc to preserve hardface thickness.
- f. ENSURE the following main disc and seat attribute requirements are met:
 - Main disc (48) seat included angle shall be 59° to 60° .
 - Main seat (female) included angle shall be 62° to 63° by 0.170 inch deep (maximum).
- g. Using low-lint cloth and approved cleaning solvent, CLEAN all parts.

4.5 Assembly of Main Stage

NOTE

1. Independent Verifier generally designates a Performance Evaluations Inspector which may also be a Job Supervisor, FLS, Maintenance Specialist, Maintenance Technician, Independent Mechanic, or Electrician if approved by FLS.
2. Step 4.5.1 constitutes an Inspection Hold Point. Cognizant FLS may elect to waive inspection as applicable to specific activity.

4.5.1 Refer To Attachment 1, and, IF main guide (42) is a replacement part, **PERFORM** the following:

- a. **INSTALL** main guide (42) in body.
- b. Using a depth micrometer, **MEASURE** mismatch between top face of main guide and flange face of body.
- c. **RECORD** the following onto Attachment 6:
 - Mismatch dimension
 - Caliper serial number
 - Calibration due date
- d. Refer To Attachment 1, and IF face of main guide (42) is *not* flush to 0.005 inch below body flange face, **PERFORM** the following:
 - 1) IF face of main guide is above body flange face, **TRIM** main guide face.
 - 2) IF face of main guide is below body flange face greater than 0.005 inch, **REPLACE** main guide.
 - 3) Go To step 4.5.1.b, and **MEASURE** mismatch between top face of main guide (42) and flange face of body.

4.5.2 **INSTALL** piston rings (99) onto piston (102).

4.5.3 **INSTALL** seal ring (71) onto main guide (42).

- 4.5.4 Using soft-faced vise or clamp, SECURE main disc (48) with threaded end up.
- 4.5.5 INSTALL main guide (42) onto main disc (48).
- 4.5.6 INSTALL main piston spanner tool onto piston (102).
- 4.5.7 Using Never-Seez or equivalent, LUBRICATE threads of main disc (48).
- 4.5.8 Using low-lint cloths, CLEAN off any excess lubricant.
- 4.5.9 Using main piston spanner tool, INSTALL piston (102) onto main disc (48).

NOTE

Step 4.5.10 constitutes an Inspection Hold Point. Cognizant FLS may elect to waive inspection as applicable to specific activity.

- 4.5.10 REQUEST independent verification, and TORQUE piston (102) to 100 ft•lbs (95 to 105 ft•lbs).
- 4.5.11 RECORD the following on Attachment 6:
 - Torque value
 - Torque wrench serial number
 - Calibration due date
- 4.5.12 REMOVE main piston spanner tool.
- 4.5.13 INSTALL main internal lift tool.
- 4.5.14 Refer To Attachment 1, and INSTALL nut (103) and TORQUE to 20 ft•lbs (15 to 25 ft•lbs).
- 4.5.15 Using Never-Seez or equivalent, LUBRICATE main guide (42).



CAUTION



Main stage internal subassembly must be properly oriented during installation for correct alignment of main guide (42) drain hole with mating passage located in body. This alignment must be visually verified during installation. Drain groove on ID of main guide (42) should be in line with axial centerline of inlet nozzle and at closest possible location towards inlet side of valve.

- 4.5.16 Using main internal lift tool, **INSTALL** main stage internal subassembly.
- 4.5.17 Visually **ENSURE** main stage internal subassembly is aligned with mating passage in body.
- 4.5.18 **REMOVE** nut (103) and main internal lift tool.
- 4.5.19 **INSTALL** *new* tab washer (101).
- 4.5.20 **INSTALL** nut (103).

NOTE

Step 4.5.21 constitutes an Inspection Hold Point. Cognizant FLS may elect to waive inspection as applicable to specific activity.

- 4.5.21 Using main piston spanner tool, **HOLD** piston (102) stationary, and **TORQUE** nut (103) to 50 ft•lbs (45 to 55 ft•lbs).
- 4.5.22 **RECORD** the following on Attachment 6:
 - Torque value
 - Torque wrench serial number
 - Calibration due date
- 4.5.23 **REMOVE** main piston spanner tool.
- 4.5.24 Refer To Attachment 1, and **BEND** tab washer (101) into cutout at piston (102) and onto one side of nut (103).

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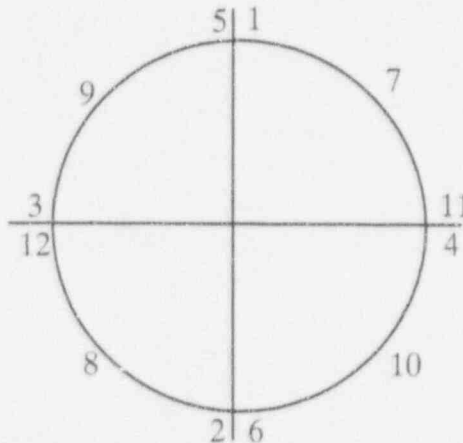
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4.6 Base Assembly Installation

- 4.6.1 Refer To Attachment 6, and RECORD serial number of base assembly.
- 4.6.2 REMOVE protective covers or wrap.
- 4.6.3 Refer To Attachment 1, and INSTALL *new* gaskets (133, 134, and 135 or 136).
- 4.6.4 INSTALL main spring (100).
- 4.6.5 INSTALL two drawbars located 180° diametrically opposite.
- 4.6.6 Refer To Attachment 2, and for the appropriate valve condition, RIG hoist and slings to base assembly.
- 4.6.7 LIFT base assembly and align match marks for mating components.
- 4.6.8 LOWER or SLIDE base assembly along drawbars.
- 4.6.9 SUPPORT weight of base assembly.
- 4.6.10 Using Never-Seez or equivalent, LUBRICATE threads of bolts (107), and studs (83).
- 4.6.11 INSTALL two bolts (107) and nuts (115) 180° apart and TIGHTEN until body and base make contact with spring.
- 4.6.12 INSTALL remaining bolts (107), studs (83) and nuts (115) and REMOVE drawbars.

- a. Refer To Figure 3, and uniformly TIGHTEN bolts (107) and nuts (115) wrench tight, two turns at a time, in the sequence shown and COMPRESS spring (100).

Figure 3.
Base to Main Body Tightening Sequence



4.6.13 REMOVE slings and hoist.

NOTE

Steps 4.6.14 and 4.6.16 constitute an Inspection Hold Point. Cognizant FLS may elect to waive inspection as applicable to specific activity.

4.6.14 REQUEST independent verification, and TORQUE bolts (107) and nuts (115) as follows:

- a. Refer To Figure 3, and using the tightening sequence shown, TORQUE bolts and nuts to 710 ft•lbs (675 to 745 ft•lbs).

4.6.15 RECORD the following on Attachment 6:

- Torque value
- Torque wrench serial number
- Calibration due date

4.6.16 REQUEST independent verification, and SECURE studs (83) as follows:

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- a. Refer To C MP 715C, "Installation of Lockwire and Lockplates," and LOCKWIRE studs (83).
- b. Refer To Attachment 6, and RECORD installation of lockwire.

4.7 Main Stage Seat Tightness Evaluation

- 4.7.1 Refer To MP 717.7, "Target Rock Safety Relief Valve—Topworks Changeout," and INSTALL topworks on base assembly.
- 4.7.2 Refer To Attachment 5, and PERFORM the following:
 - a. INSTALL blind flange, with centrally located inlet connection for pressurization of valve with nitrogen gas, on valve inlet.
 - b. Refer To MP 717.9, "Gagging Target Rock Safety/Relief Valves," and GAG topworks assembly.
- 4.7.3 PERFORM leak test as follows:



CAUTION



Pressurize valve body at a maximum of 50 psi per second.

- a. PRESSURIZE valve body to 400 psig.
- b. ISOLATE nitrogen supply to prevent increase in pressure to inlet.



CAUTION



Apply fluid and view main disc-to-seat area as indirectly as possible to avoid injury in the event of inadvertent opening of valve.

- c. APPLY approved leak detector to main disc-to-seat area.
- d. EVALUATE main disc-to-seat tightness as follows:
 - 1) INSPECT circumferential interface of disc and seat for bubbles.

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- 2) IF circumferential interface of disc and seat emits *no* bubbles or a slow generation of fine foam like bubbles, Go To step 4.7.3.f and DEPRESSURIZE valve body.
- 3) IF circumferential interface of disc and seat emits a constant generation of large bubbles, Go To step 4.7.3.e and INCREASE valve body pressure.

e. PRESSURIZE valve body as follows:



CAUTION



Valve body pressure must *not* exceed 875 psig.

- 1) IF a 100 psi. increase in valve body pressure exceeds 875 psi., Go To step 4.7.3.f. and CONSULT FLS.
 - 2) IF valve body pressure will *not* exceed 875 psig, INCREASE valve body pressure by 100 psi., and Go To step 4.7.3.d. and EVALUATE seat tightness.
- f. DEPRESSURIZE valve body inlet to 0 psig.
 - g. Refer To Attachment 6, and RECORD main stage seat tightness.
 - h. Refer To Attachment 5, and REMOVE blind flange.
 - i. Refer To MP 717.9, "Gagging Target Rock Safety/Relief Valves," and REMOVE gagging tool from topworks assembly.
 - j. Refer To MP 717.7, "Target Rock Safety Relief Valve—Topworks Changeout," and REMOVE topworks from base assembly.

4.8 Safety Relief Valve Assembly Installation

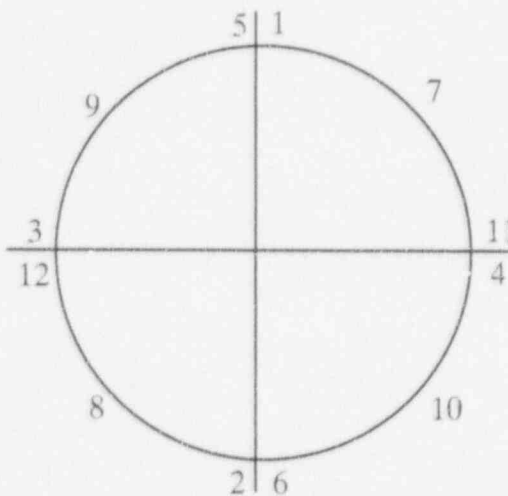
- 4.8.1 Refer To Attachment 6, and RECORD main body serial number.
- 4.8.2 VERIFY serial number of main body matches AWO.
- 4.8.3 MAINTAIN valve as upright as possible, and TRANSPORT valve assembly to second floor of dry well.
- 4.8.4 REMOVE protective covers and wrap.
- 4.8.5 RIG hoist and slings to valve assembly.
- 4.8.6 MAINTAIN valve as upright as possible, and LIFT and POSITION valve close to piping inlet flange.
- 4.8.7 Refer To Attachment 1, and INSTALL *new* inlet flange gasket (130).
- 4.8.8 INSTALL valve into main steam system.
- 4.8.9 INSTALL and finger TIGHTEN inlet flange studs (105) and nuts (114).
- 4.8.10 INSTALL and finger TIGHTEN four outlet flange studs and nuts.
- 4.8.11 INSTALL *new* outlet flange gasket (132).
- 4.8.12 INSTALL and finger TIGHTEN remaining outlet flange studs and nuts.

NOTE

1. Steps 4.8.13 and 4.8.14 constitute an Inspection Hold Point. Cognizant FLS may elect to waive inspection as applicable to specific activity.
2. Due to physical configuration of valve body, bolts in sequence positions 2 and 6 must be tightened using a slugging wrench.
3. Compression of gasket from initial thickness of 0.125 inch to final thickness of 0.090 to 0.100 inch is required. Tightening the fasteners approximately $1\frac{1}{2}$ turns-of-the-nut (equivalent to the required torque) will produce the 0.025 to 0.035 inch of bolt stretch necessary for the proper gasket compression.

4.8.13 Refer to Figure 4, and TORQUE or TIGHTEN equivalent turns-of-the-nut, inlet flange nuts (114) in the sequence shown as follows:

Figure 4. Inlet Flange Torque Sequence



Sequence 2 and 6 occur in the area where outlet and inlet flanges meet.

- a. REQUEST dual verifier for torquing and tightening.
- b. MARK stud and nuts at position 1, and TORQUE nuts to 25 ft•lbs (20 to 30 ft•lbs).
- c. OBSERVE amount of nut travel required to obtain torque value.
- d. Using slugging wrench at position 2, TIGHTEN nut to same turn-of-the-nut travel observed in step 4.8.13.c.

- e. Uniformly TORQUE nuts in positions 3, 4, and 5 to 25 ft•lbs (20 to 30 ft•lbs).
- f. Using slugging wrench at position 6, TIGHTEN nut to same turn-of-the-nut travel observed in step 4.8.13.c.
- g. Uniformly TORQUE remaining nuts to 25 ft•lbs (20 to 30 ft•lbs).

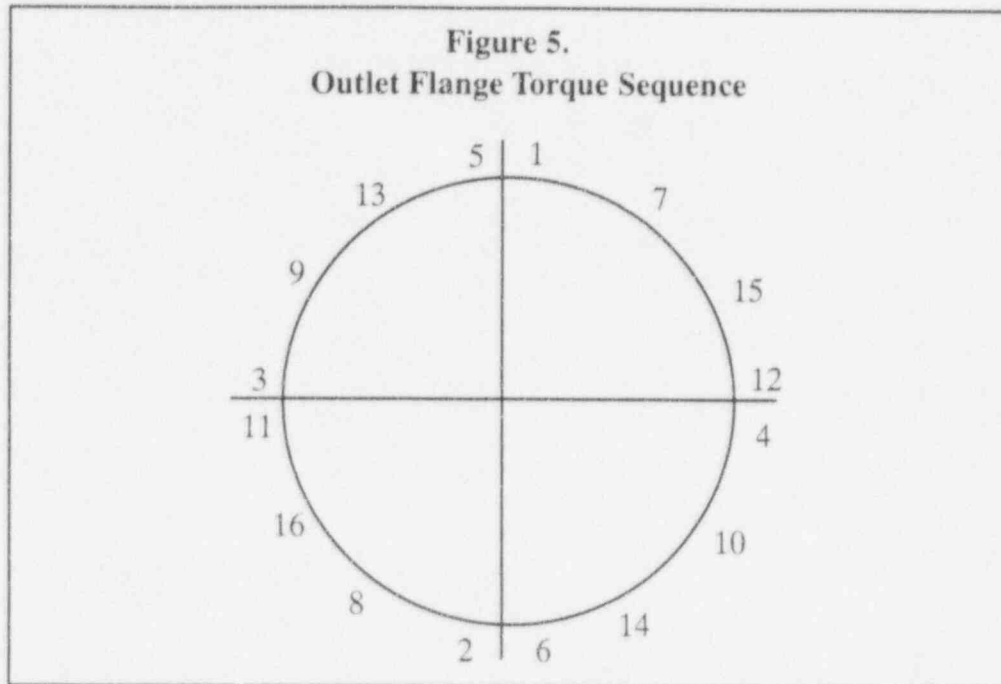
4.8.14 Refer To step 4.8.13 for sequence, and using the following increments TORQUE inlet flange nuts:

- a. 250 ft•lbs (240 to 260 ft•lbs)
- b. 500 ft•lbs (475 to 525 ft•lbs)
- c. 750 ft•lbs (715to 785 ft•lbs)
- d. 1020 ft•lbs (970 to 1070 ft•lbs)

4.8.15 RECORD the following on Attachment 6:

- Torque value
- Torque wrench serial number
- Calibration due date

4.8.16 REQUEST independent verification, and TORQUE outlet flange nuts as follows:



- a. Refer To Figure 5, and using the tightening sequence shown, TORQUE bolts and nuts to 25 ft•lbs (20 to 30 ft•lbs).
- b. Using the tightening sequence shown, TORQUE bolts and nuts to 100 ft•lbs (95 to 105 ft•lbs).
- c. Using the tightening sequence shown, TORQUE bolts and nuts to 175 ft•lbs (165 to 195 ft•lbs).
- d. Using the tightening sequence shown, TORQUE bolts and nuts to 225 ft•lbs (235 to 245 ft•lbs).
- e. Using the tightening sequence shown, TORQUE bolts and nuts to 350 ft•lbs (335 to 365 ft•lbs).

4.8.17 RECORD the following on Attachment 6:

- Torque value
- Torque wrench serial number
- Calibration due date

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5. REVIEW AND SIGN-OFF

- 5.1 The review and sign-off of this procedure is satisfied by the review and sign-off of Attachment 6 and the AWO.

6. REFERENCES

6.1 NNECo Accident Prevention Manual

6.2 Drawings

- 6.2.1 NUSCo Drawing 25202-29121, sheet 42 "Outline Drawing For 1-MS-3A, 1-MS-3B, 1-MS-3C, 1-MS-3D, 1-MS-3E, 1-MS-3F Model 7567F 6 X 10 Relief Valve" Revision 1
- 6.2.2 NUSCo Drawing 25202-29121, sheet 43 "Outline Drawing For 1-MS-3A, 1-MS-3B, 1-MS-3C, 1-MS-3D, 1-MS-3E, 1-MS-3F Model 7567F 6 X 10 Relief Valve" Revision 2
- 6.2.3 NUSCo Drawing 25202-29121, sheet 44 "Part List Model 7567F 6 X 10 Safety Relief Valve" Revision 1
- 6.2.4 NUSCo Drawing 25202-29121, sheet 45 "Part List For 1-MS-3A, 1-MS-3B, 1-MS-3C, 1-MS-3D, 1-MS-3E, 1-MS-3F Model 7567F 6 X 10 Relief Valve" Revision 2
- 6.2.5 NUSCo Drawing 25202-29121, sheet 46 "Part List Model 7567F 6 X 10 Safety Relief Valve" Revision 1
- 6.2.6 NUSCo Drawing 25202-29121, sheet 47 "Part List Model 7567F 6 X 10 Safety Relief Valve" Revision 1

6.3 Vendor Manuals

- 6.3.1 25202-726-001A, Target Rock Corp, "Safety/Relief Valve Model 7567F Technical Manual"

6.4 Administrative Procedures

- 6.4.1 CC 1, "Control of Chemical Consumable Products"
- 6.4.2 U1 WC 1, "Unit 1 Work Control Process"
- 6.4.3 WC 3, "ASME Section XI Repair and Replacement Program"

6.4.4 WC 8, "Control and Calibration of Measuring and Test Equipment"

6.5 Maintenance Procedures

6.5.1 C MP 715C, "Installation of Lockwire and Lockplates"

6.5.2 MP 717.7, "Target Rock Safety Relief Valve—Topworks Changeout"

6.5.3 MP 717.8, "Main Steam Safety Relief Valve—Solenoid Changeout (EQ)"

6.5.4 MP 717.9, "Gagging Target Rock Safety/Relief Valves"

6.6 Other Documents

6.6.1 GEI 30077F, "GE Industrial & Power Systems Steam Turbine – Metallic Spiral Wound Gaskets"

6.6.2 US NRC IEB 80–25

6.6.3 GE Service Information Letter, SIL #196, Supplement 6

6.6.4 GE Service Information Letter, SIL #196, Supplement 12

7. SUMMARY OF CHANGES

7.1 Revision 12 modifies the procedure to incorporate new format criteria specified in Rev. 1 of DC 2, "Developing and Revising Millstone Procedures and Forms."

7.2 Revision 12 modifies the procedure to refer to MP 717.8, "Main Steam Safety Relief Valve—Solenoid Changeout (EQ)," for removal and installation of solenoid.

7.3 Revision 12 deleted Maint. Form 717.1–1 and created Attachment 6. Data previously recorded on Maint. Form is now recorded on Attachment 6.

7.4 Revision 12 added main stage seat tightness evaluation.

7.5 Revision 12 modifies and improves upon graphics.

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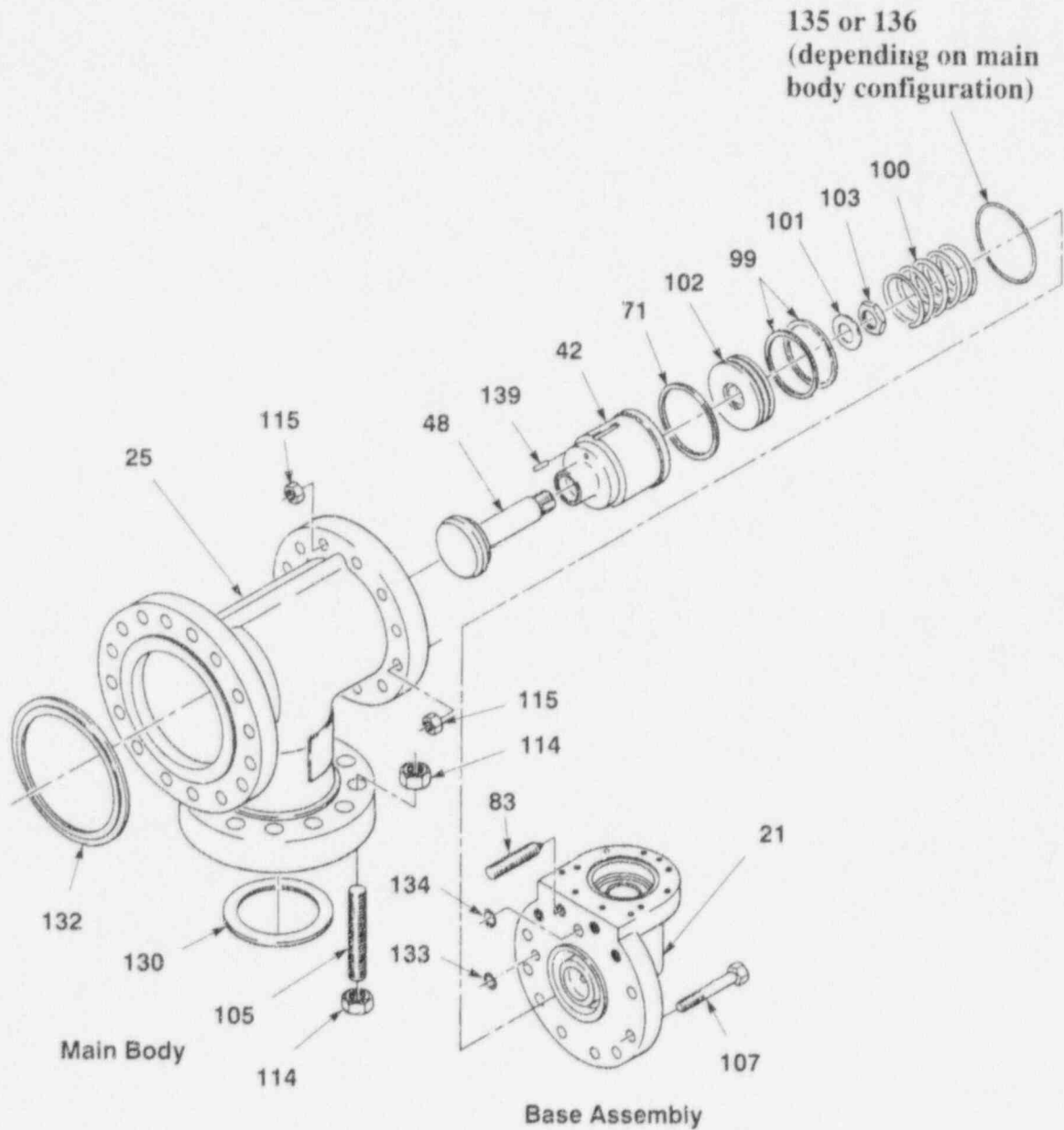
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Attachment 1

Valve Assembly Exploded View

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Attachment 1
Valve Assembly Exploded View

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ITEM #	DESCRIPTION
21	BASE ASSEMBLY
25	BODY
42	MAIN GUIDE
48	MAIN DISC
71	SEAL RING
83	STUD
99	PISTON RING
100	MAIN SPRING
101	TAB WASHER
102	PISTON
103	NUT
105	STUD
107	BOLT
114	NUT
115	NUT
130	INLET GASKET
132	OUTLET GASKET
133	GASKET
134	GASKET
135	GASKET
139	DOWEL PIN

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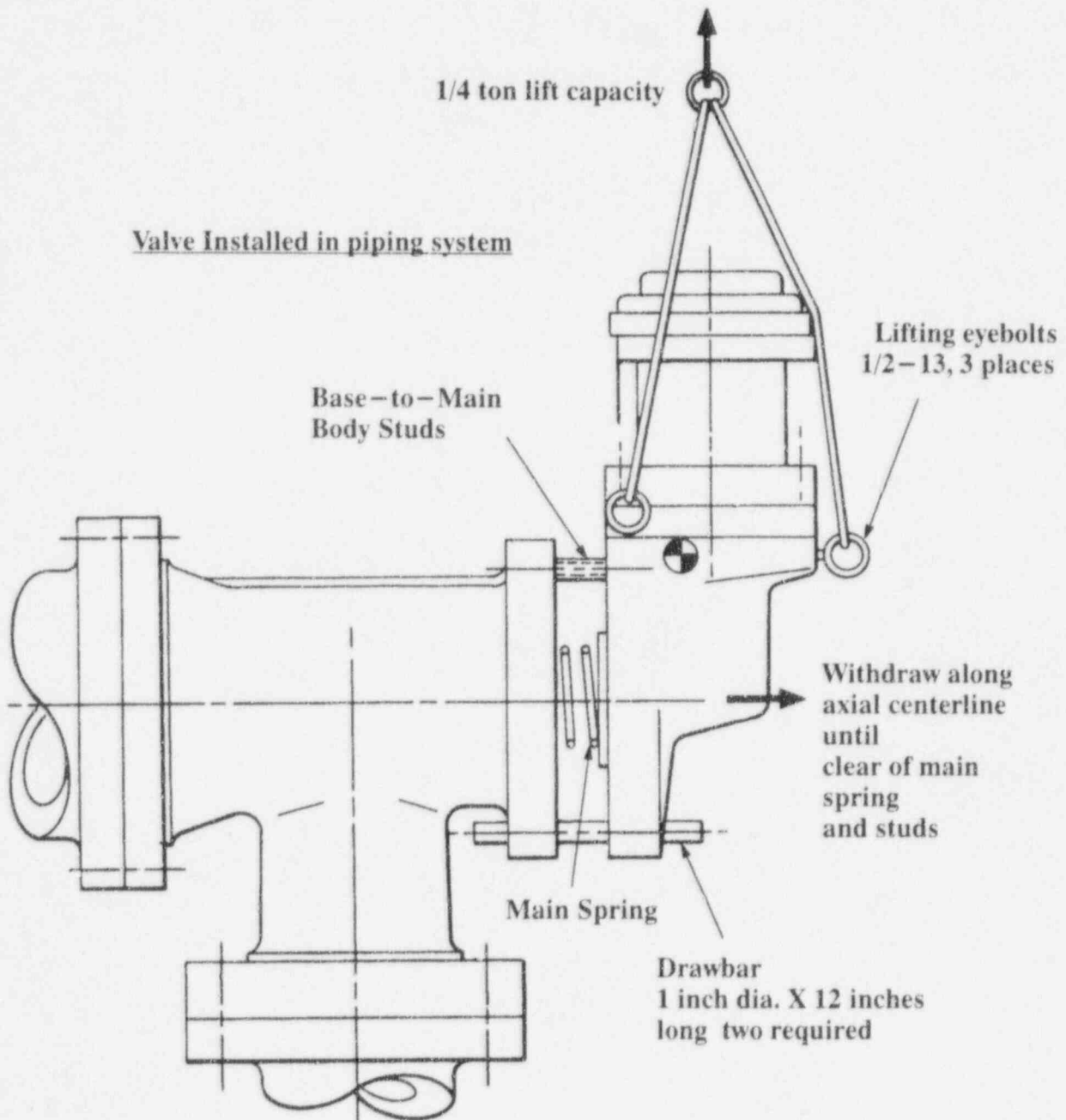
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Attachment 2
Base Assembly Hoisting
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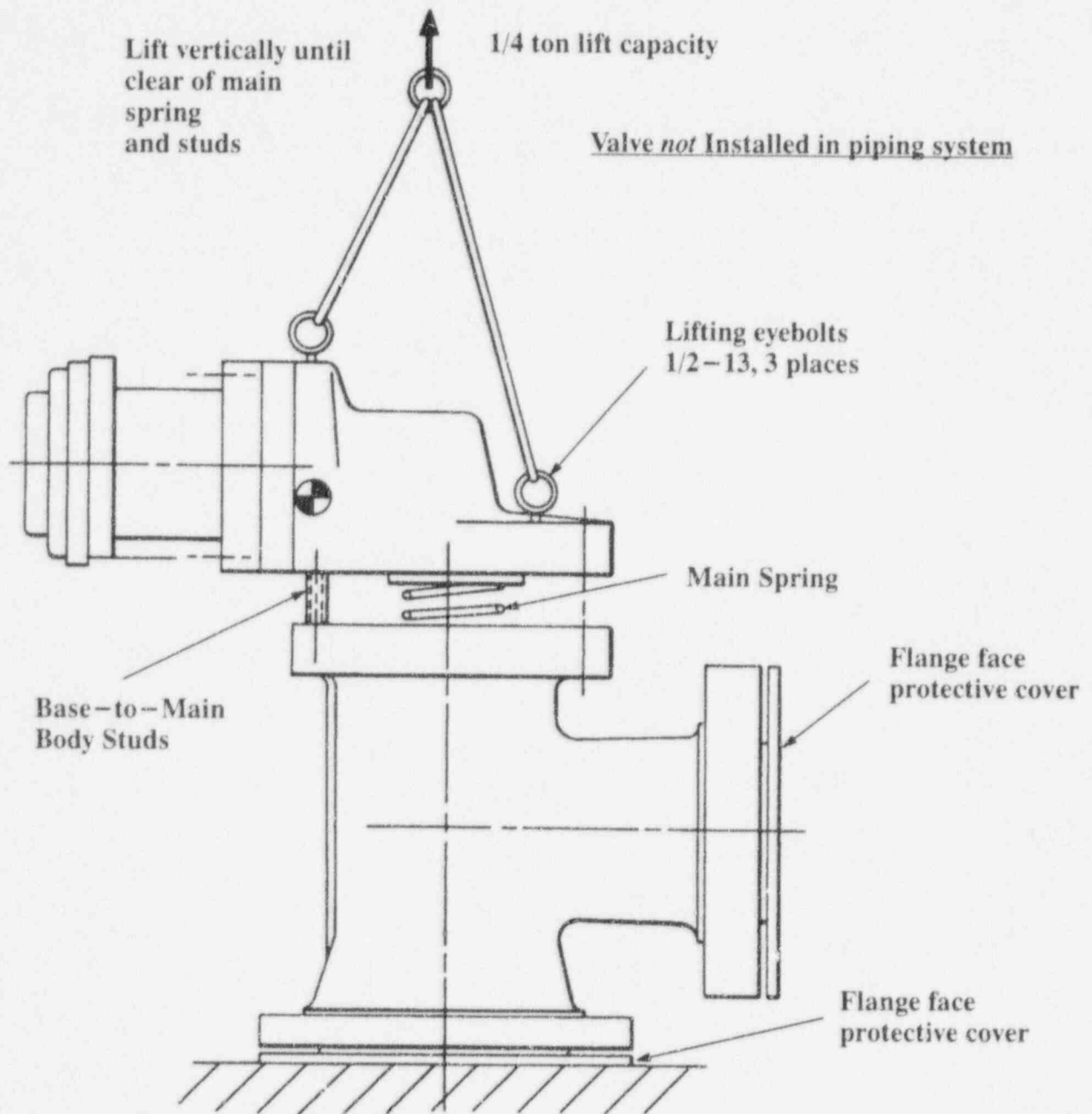
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Attachment 2
Base Assembly Hoisting
(Sheet 2 of 2)



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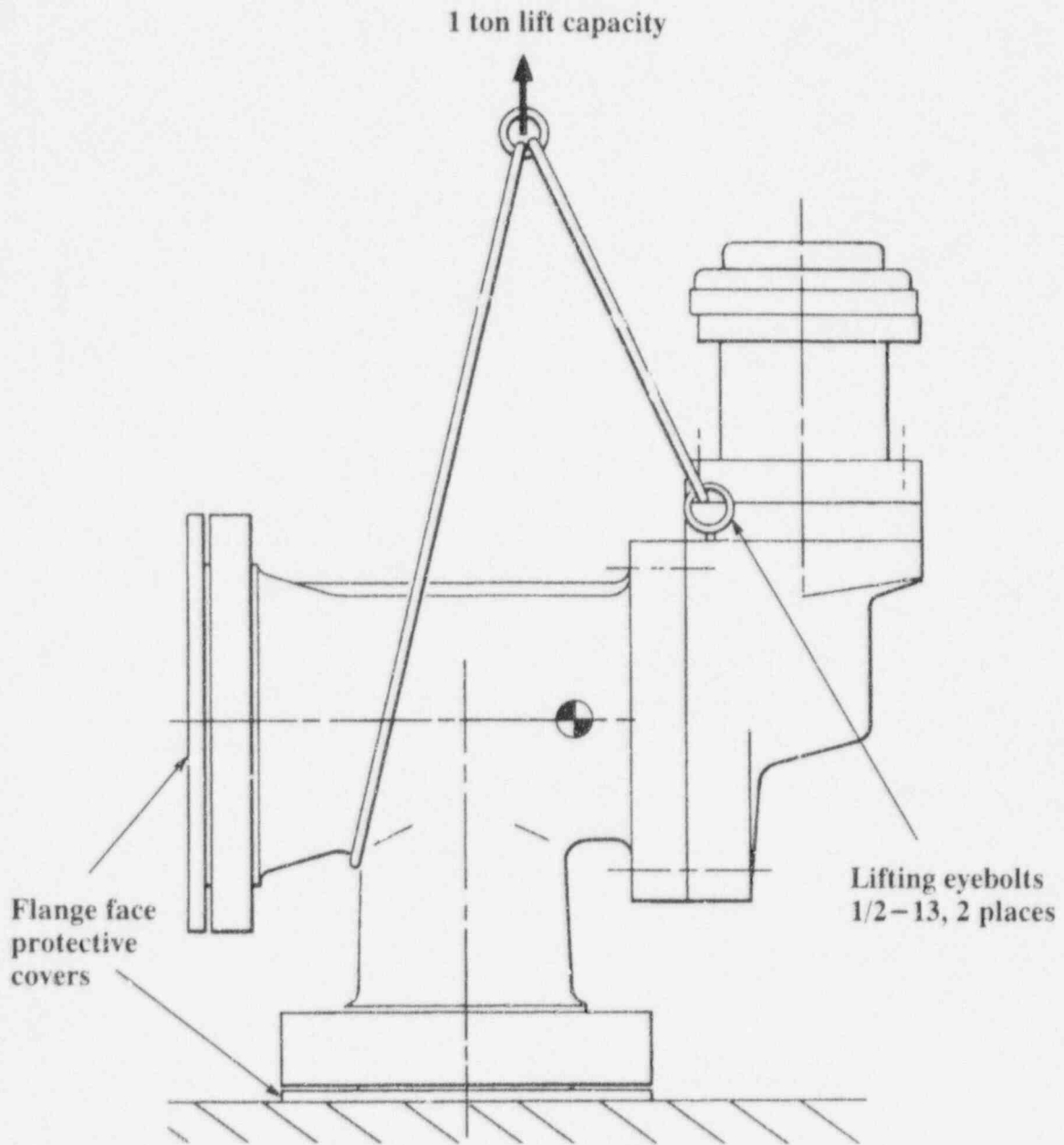
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Attachment 3
Valve Assembly Hoisting
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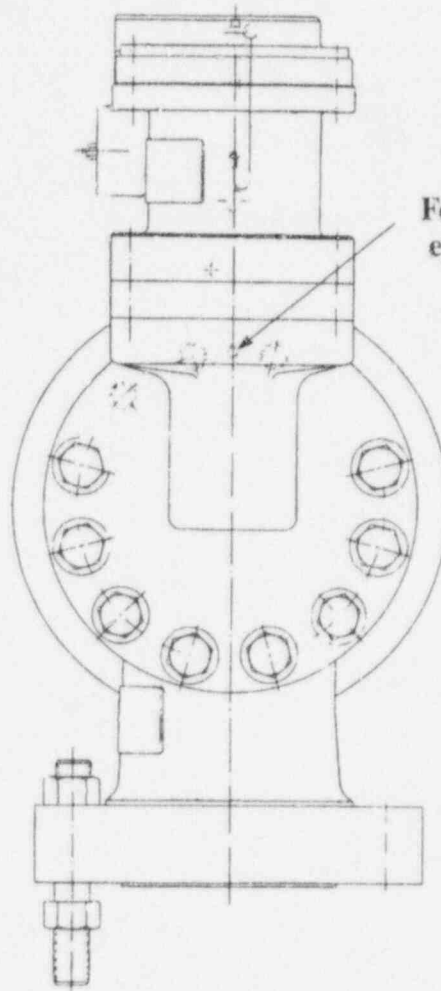
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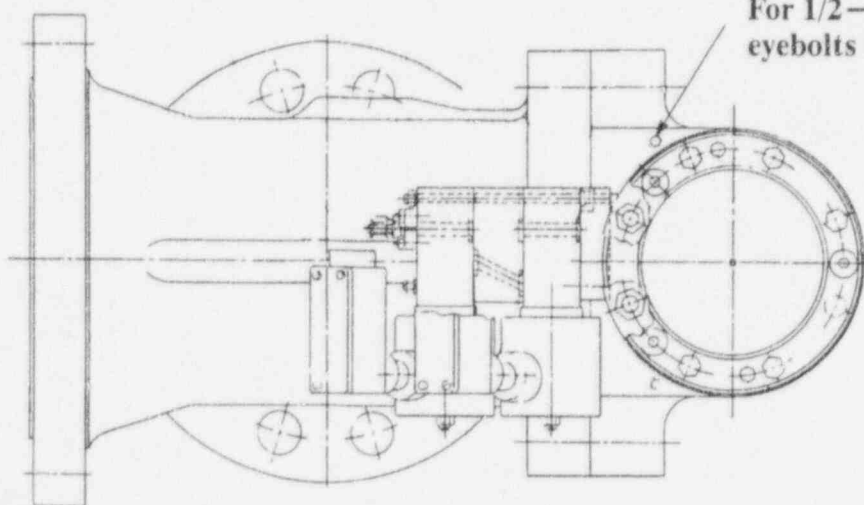
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Attachment 3
Valve Assembly Hoisting
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For 1/2-13 lifting
eyebolts (3 places)



For 1/2-13 lifting
eyebolts (2 places)

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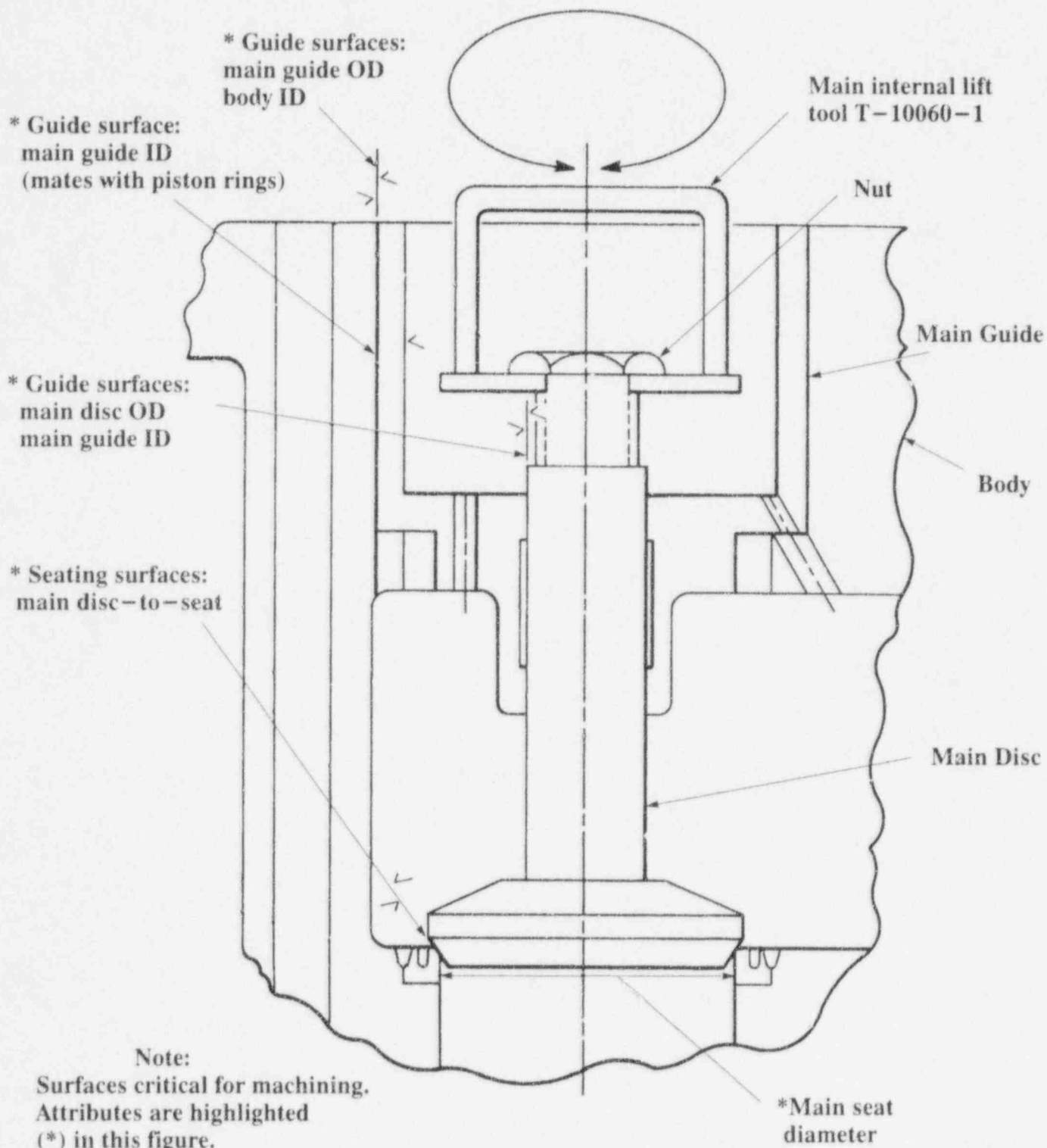
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Attachment 4 Main Stage Lapping (Sheet 1 of 1)



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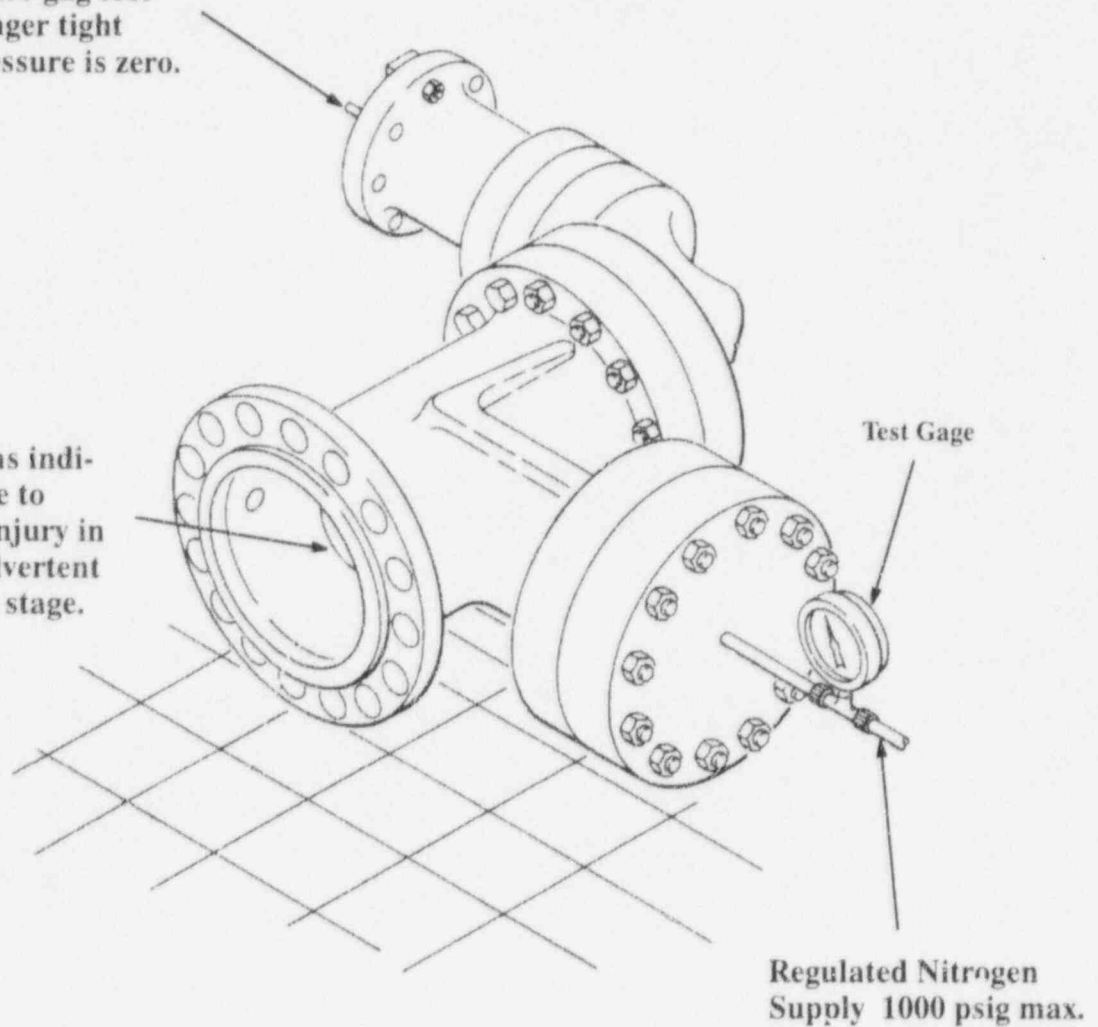
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Attachment 5
Main Stage Leak Test Setup
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CAUTION
Pilot Gag Tool must be installed. Secure gag tool-center stud finger tight when inlet pressure is zero.

CAUTION
View main seat as indirectly as possible to avoid personal injury in the event of inadvertent opening of main stage.



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Attachment 6
Inspection Data Record
(Sheet 1 of 3)

AWO NO. _____

LOCAL ID _____

STEP NO.	INSPECTION	ACCEPTANCE CRITERIA	INSPECTION RESULTS	PERFORMED BY / DATE	INDEPENDENT VERIFICATION BY / DATE
4.1.13	Inlet and Outlet Flange Studs and Nuts Labeled and Location Stored	N/A	Labeled items: _____ _____ Location stored: _____	_____	N/A
4.1.19	Main Body Serial Number removed	N/A	Main body Serial No. _____	_____	_____
4.2.9	Base Assembly Items Labeled and Base Assembly Serial Number	N/A	Labeled items: _____ _____ _____ Base assembly Serial No. _____	_____	N/A
4.3.12	Main Body Items Labeled	N/A	Labeled items: _____ _____ _____ _____ _____	_____	N/A
4.4.11	Liquid Dye Penetrant Inspection of Main Seat Ring and Seal Weld	No unacceptable indications	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT	_____	_____

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Attachment 6
Inspection Data Record
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STEP NO.	INSPECTION	ACCEPTANCE CRITERIA	INSPECTION RESULTS	PERFORMED BY / DATE	INDEPENDENT VERIFICATION BY / DATE
4.4.12	Liquid Dye Penetrant Inspection of Valve Body Welds	No unacceptable indications	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT	_____	_____
4.5.1.c	If Required Mismatch Between Top Face of Guide and Flange Face of Body	0.000 to 0.005 inch below body flange face	_____ inch	_____	_____
M&TE Serial No. _____ Cal. Due Date _____					
4.5.11	Piston-to-Main Disc Torque	100 ft•lbs (95 to 105 ft•lbs)	_____ ft•lbs	_____	_____
M&TE Serial No. _____ Cal. Due Date _____					
4.5.22	Nut-to-Piston Torque	50 ft•lbs (45 to 55 ft•lbs)	_____ ft•lbs	_____	_____
M&TE Serial No. _____ Cal. Due Date _____					
4.6.1	Installed Base Assembly Serial Number	N/A	Base assembly Serial No. _____	_____	N/A
4.5.15	Base Assembly Bolt and Nut Torque	710 ft•lbs (675 to 745 ft•lbs)	_____ ft•lbs	_____	_____
M&TE Serial No. _____ Cal. Due Date _____					
4.6.16.b	Installation of Lockwire	Lockwire installed.	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT	_____	_____

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Attachment 6
Inspection Data Record
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STEP NO.	INSPECTION	ACCEPTANCE CRITERIA	INSPECTION RESULTS	PERFORMED BY / DATE	INDEPENDENT VERIFICATION BY / DATE
4.7.3.g	Main Seat Tightness	Zero bubbles or slow generation of fine foam like bubbles	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT	_____	_____
4.8.1	Installed Main Body Serial Number	N/A	Main Body Serial No. _____	_____	N/A
4.8.15	Inlet Flange Nut Torque	1020 ft•lbs (970 to 1070 ft•lbs)	_____ ft•lbs	_____	_____
M&TE Serial No. _____ Cal. Due Date _____					
4.8.17	Outlet Flange Nut Torque	350 ft•lbs (335 to 365 ft•lbs)	_____ ft•lbs	_____	_____
M&TE Serial No. _____ Cal. Due Date _____					

COMMENTS _____

JOB SUPERVISOR _____

DATE _____

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DC 1 Attachment 7

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