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Procedure for 05-316-90

REACTOR VESSEL ASSEMBLY/DISASSEMBLY INSTRUCTIONS

1.0 PURPOSE

This procedure provides instruction for the assembly and disassembly of the reactor vessel including requirements for vessel preparation for and recovery from a refueling or fueling exercise.

2.0 PRECAUTIONS AND LIMITATIONS

2.1 GENERAL

2.1.1 Exercise care when handling equipment above the reactor.

2.1.2 Comply with instructions identified on the RWP for this job and be aware of the potential for high radiation levels.

2.1.3 Spotters and guide ropes should be used while lifting and moving large components.

2.1.4 A radiation survey must be completed prior to any work being conducted in a contaminated or potentially contaminated area for possible issuance of a Radiation Work Permit.

2.1.5 Personnel and material accountability shall be in accordance with Procedure 00254-C, "Plant Housekeeping/Material Condition Program". Small items such as pens, badges, binoculars, etc., shall be taped or secured to the person by lanyards and tools shall be tethered. Tools and equipment used in one operation should be cleared from the immediate area before proceeding to the next operation.

2.1.6 Steps involving cleaning operations or tool setup/breakdown may be accomplished at any time as long as it is completed prior to time needed.

FOR INFORMATION ONLY

2.2 INSTRUMENT PORT CONOSEALS

2.2.1 During disassembly some parts may have high quantities of loose surface contamination and should be treated as directed by the Health Physics Technician.

2.2.2 Handle all parts with particular care to prevent damage which would affect seal integrity.

2.2.3 Cleanliness is of the utmost importance in the conoseal joint. Assemble the joint using clean white lint free cloth and/or rubber gloves.

2.2.4 Ensure Health Physics monitoring of the immediate area for increases in airborne activity during this operation.

2.3 REACTOR VESSEL STUDS

2.3.1 Care should be exercised when taking elongation measurements during the stud tensioning process to eliminate time consuming corrections.

2.3.2 Do not detension studs until the vessel water and metal temperature is below 140°F and the pressure is reduced to 0 psig. The metal temperature must be equal to or greater than RT_{NDT} as calculated per Procedure 55023-C, "Incore Irradiation Specimens", but less than 140°F when studs are tensioned or detensioned.

2.3.3 Do not pressurize the stud tensioners unless the stud tensioner puller bar is completely engaged on the assembled stud.

2.3.4 All studs, nuts, and washers should be kept in matched numbered sets and shall be installed in the appropriate stud hole in the pressure vessel.

2.3.5 After setting of the reactor vessel head, the water level in the vessel should not be raised closer than 48 inches (ELEV. 190') to the vessel flange prior to tensioning the first six studs.

2.3.6 Measuring rods shall not be interchanged or replaced after the original depth readings have been recorded.

2.3.7 Maximum Stud Tensioner Hydraulic Pump Pressure shall not exceed 9500 psi unless approved by the cognizant Maintenance Foreman.

2.3.8 Constantly exercise care throughout all steps of this procedure to prevent damage to threads and surfaces of all parts and components and to ensure cleanliness at all times.

2.4 REACTOR VESSEL HEAD

CAUTION

Inadvertent containment ventilation isolation may occur during the movement of the Reactor Vessel head from the Reactor cavity to the head stand or from the head stand to the Reactor cavity. Ensure Health Physics and operations initiate compensatory actions to prevent inadvertent actuation.

2.4.1 Whenever raising or lowering the head, constantly monitor the load cell for changes which would indicate binding or interference.

2.4.2 All personnel should avoid exposure to the underside of the Reactor Vessel Head as much as possible.

2.4.3 All tools and equipment used in the cavity during the time the vessel head is removed must have lanyards attached and inventoried in and out of the cavity as per Procedure 00254-C, "Plant Housekeeping/Material Condition Program".

2.4.4 The O-rings shall be replaced with the head on the storage pedestal. The O-rings should be replaced before the head is lifted from the pedestal for installation. This will eliminate possible O-ring contamination from dust or foreign materials.

2.4.5 All personnel shall wear clean, white, lint-free cotton/rubber gloves for all cleaning and handling of the O-rings.

2.4.6 During movement of the reactor vessel head, the safe load path as outlined in Figure 5 shall be followed. Within the defined safe load path the specified load shall not be lifted greater than five feet above the operating deck (220 foot elevation).

2.4.7 The reactor vessel head and associated equipment shall be handled with care, to prevent inadvertent contact with other components.

2.4.8 Whenever the reactor vessel head is being raised or lowered the first and last foot onto the reactor vessel, the polar crane should be controlled at slow speed to preclude damage to closely mating components. Crane speed during other phases of handling shall be consistent with safe moving practices of critical components.

2.4.9 The reactor vessel head shall be maintained no closer than one foot to the refueling cavity water level.

2.4.10 A direct method of voice communications shall be provided between the polar crane operator and the person on the refueling floor directing the vessel head lift. A backup method of voice communications during reactor vessel head lifts is highly recommended.

2.4.11 Do not twist the knurled incore thermocouple connectors during disassembly or reassembly.

2.5 INTERNALS/LIFT RIG

2.5.1 Do not submerge the load cell at any time. If it is accidently submerged; thoroughly dry, check, and re-zero if necessary.

2.5.2 During movement of the reactor vessel upper internals, the safe load path as outlined in Figure 6 shall be followed. Within the defined safe load path the specified load shall not be lifted greater than 24.5 feet from its original position.

2.5.3 A direct method of voice communications shall be provided between the polar crane operator and the person on the refueling floor directing the internals lift. A backup method of voice communications during internals lifts is highly recommended.

3.0 PREREQUISITES AND INITIAL CONDITIONS

NOTE

Unless otherwise noted Section 3.1 applies to all instructions.

3.1 */* GENERAL PLANT CONDITIONS FOR PERFORMING VESSEL ASSEMBLY/DISASSEMBLY

3.1.1 Health Physics has issued the appropriate RWPs per Procedure 43007-C, "Issuance, Use, And Control Of Radiation Work Permits".

3.1.2 Verify that a Quality Control (QC) representative has signed the "Data Sheet" indicating QC review of procedure for HOLD POINTS. If HOLD POINTS are indicated, QC should be notified 4 hours prior to starting work.

3.2 */* The Polar Crane has been checked out in accordance with Procedure 27305-C, "Reactor Polar Crane Service Check".

3.3 */* All applicable equipment has been checked out in accordance with Procedure 93100-C, "Refueling Tools And Equipment Preservice Inspection/Checkout".

3.4 */* All sling, straps, and shackles to be used are in accordance with Procedure 20425-C, "Control Of Refueling Lifting And Rigging Equipment."

3.5 HEAD VENT PIPING

3.5.1 The reactor vessel water level is 6 inches (minimum) below the reactor vessel flange.

3.5.2 The reactor vessel head has been vented, per Procedure 13005-1 or 13005-2, "Reactor Coolant System Draining".

3.5.3 The reactor vessel head venting has been sampled per Procedure 43002-C, "Airborne Radioactivity Sampling And Evaluation".

3.6 REACTOR VESSEL STUD TENSIONING/DETENSIONING

3.6.1 The On-Shift Operations Supervisor (OSOS) has confirmed that plant conditions are in order for a mode change and has given approval for stud detensioning/tensioning.

3.6.2 The reactor vessel, vessel head, studs, nuts, and washers temperature is greater than RT_{NDT}, but less than or equal to 140°F.

3.6.3 The reactor vessel water level is 48 inches (minimum)/(Elev.190') below the vessel flange prior to any tensioning and 24 inches (minimum)/(Elev. 192) prior To detensioning operations.

3.6.4 Plant air (260 to 400 scfm at 100 psi recommended) for the stud tensioners is available.

3.6.5 The source range and audio count in Containment is on and operational.

3.7 */* REACTOR VESSEL O-RING INSTALLATION

New O-Rings have been stored in their container around the reactor vessel head storage stand.

4.0 */* INSTRUCTIONS

4.1 Assemble an access platform from the operating floor (Elevation 220 feet) to the missile shield.

4.2 */* SEISMIC TIE RODS

NOTE

With proper care, seismic tie rods may be disconnected and stored without the aid of the polar crane.

4.2.1 Attach a nylon strap to the seismic tie rod at a point close to the cavity wall.

4.2.2 With the appropriate rigging taking the weight off the tie rod, remove the cotter pin from the tie rod connecting pin and the connecting pin from the tie rod clevis-cavity wall lug.

NOTE

These rods may have to be pivoted downward and horizontally to clear the cavity walls prior to pivoting upward to engage with the supports on the missile shield.

4.2.3 Pivot the tie rod up into the tie rod support on the missile shield. Lock in place.

4.2.4 Replace the previously removed connecting pin and cotter pin into the uprighted tie rod clevis.

4.2.5 */* Repeat Steps 4.2.1 through 4.2.4 for each of the 6 seismic tie rods.

4.3 CABLE DISCONNECTS

NOTE

Subsection 4.3 may be accomplished now or any time prior to Step 4.15. If accomplished now, however, a 480V power cable will have to be connected to the receptacle at the bottom of the shroud to provide power to the radial arm hoists.

4.3.1 Ensure identification tags are on the cable connections for ease in reassembly.

4.3.2 Disconnect all cables at the outside of the connector plate. Document on Data Sheet 4.

4.3.3 Store all cables in the racks on the tray.

4.3.4 Unlatch the tray restraints at the shroud.

CAUTION

Carefully monitor the flexing of the cabling so that no excessive binding occurs.

4.3.5 Using the reactor head electric cable tray winches, pivot the cable tray upward into the supports on the Steam Generator wall.

NOTE

Should the cable tray winches become disabled, other means to lift the cable trays may be used.

4.3.6 Lock the cable tray in the stored position.

4.3.7 */* Repeat Steps 4.3.1 through 4.3.6 for the other cable tray.

4.3.8 */* Connect 480V power cable for the radial arm hoist if required.

4.4 REMOVAL OF REACTOR HEAD INSULATION*

NOTE

Subsection 4.4 may be accomplished now or at any time prior to Subsection 4.10.

4.4.1 Loosen and store attaching fasteners.

4.4.2 Using proper lifting equipment, carefully hand maneuver the section of insulation clear of the reactor vessel head.

4.4.3 Remove the section to a designated lay-down area.

4.4.4 */* Repeat Steps 4.4.1 through 4.4.3 for each of the 9 insulation sections.

4.5 */* Before proceeding with any further work in this procedure the Vessel (Reactor Coolant System) water level must be brought to a minimum of 24" (Elev. 192') inches below the reactor vessel (RV) flange and the RV head must have been vented and sampled to assure safe working conditions.

4.6 HEAD VENT PIPING

Prerequisites 3.1 and 3.5 apply to this section.

NOTE

Subsection 4.6 may be accomplished at any time after venting and sampling occur but must be completed prior to Subsection 4.10.

4.6.1 Using proper rigging equipment, attach nylon straps to the head vent removable spool piece located between the RV Head and the cavity floor.

4.6.2 Disconnect flanges and cover the pipe ends to keep interiors clean.

4.6.3 */* Move the spool piece to a designated lay-down area.

NOTE

The following work must be completed prior to Step 4.16.6.

4.6.4 Clean and coat each of the flange 1/2 inch nut and bolt threads and bolt head undersides with Never-Seez Pure Nickel Special.

4.6.5 Install the blind flange over the vent flange through the cavity floor at approximately the 328° azimuth for Unit 1 or the 211° azimuth for Unit 2. Use the old spiral wound gasket if possible.

4.6.6 */* Torque the 1/2 inch bolts in a three-step method cross pattern to 300 foot pounds.

4.7 REACTOR VESSEL LEVEL INSTRUMENTATION SYSTEM (RVLIS)

NOTE

Subsection 4.7 may be accomplished any time after venting and sampling occur but must be completed prior to Step 4.10.15.

4.7.1 Disconnect Swagelok fittings which attach the tube sections from the RV Head to the sensors. Cover all four ends of the tubing to keep their interiors clean.

4.7.2 */* Remove tubing to a designated lay-down area.

4.8 SEAL TABLE PREPARATION

NOTE

Subsection 4.8 may be accomplished any time after Step 4.5 has occurred but must be completed prior to Step 4.16.6.

4.8.1 */* The seal table system will be prepared for refueling in accordance with Procedure 93280-C, "Flux Thimble Withdrawal And Reinsertion For Refueling".

4.9 */* INSTRUMENT PORT-CONOSEAL DISASSEMBLY

NOTE

Subsection 4.9 may be accomplished any time after venting and sampling occur, but must be completed prior to Subsection 4.10.

4.9.1 Lower the thermocouple protective sleeves and all other necessary tools and equipment to the reactor flange elevation using proper rigging equipment

4.9.2 Unlatch and open the appropriate doors on the shroud (approximate azimuth 23°, 67°, 147°, 247°).

CAUTION

Do NOT twist the knurled thermocouple connectors during assembly.

4.9.3 Disconnect the thermocouple wiring making sure it is labeled for ease in later reconnections. Document on Data Sheet 4.

NOTE

Refer to Figures 3 and 4 for item numbers.

4.9.4 Remove lock wire (Item 13).

4.9.5 Loosen all six jack screws and remove at least two of the jack screws. (Item 5).

4.9.6 Remove the split ring (Item 4) and the jack screw plate (Item 3). Remove the remaining jack screws from the jack screw plate.

4.9.7 Remove the coupling assembly (Item 8) by completely removing one bolt and loosening the rest. Reinstall the bolt in the coupling assembly after removing the assembly from the flange.

4.9.8 Carefully remove male flange (Item 1).

4.9.9 Remove and discard upper conoseal gasket (Item 8).

4.9.10 Remove and discard lower conoseal gasket (Item 7) using the removal tool (Item 16) if required.

4.9.11 Place approved tape over top and bottom of the male flange to keep interior clean and protect sealing surface.

NOTE

Conoseals must be labeled for their original location or azimuth.

4.9.12 Package, protect, label and store, in a designated lay-down area, all components removed in Steps 4.9.4 through 4.9.8.

4.9.13 Install O-ring at the top of thermocouple column assembly.

NOTE

Neolube # 1 or # 2 or GE Versilube 392 may be used on the O-rings to enhance sealing capabilities.

4.9.14 Install the thermocouple protective sleeve.

CAUTION

In Step 4.9.17 it is possible to install the spring incorrectly; 180° from its proper position. When properly installed no part of the spring will protrude outside the diameter of the protective sleeve.

4.9.15 Install the protective sleeve holding spring.

4.9.16 */* Repeat Steps 4.9.1 through 4.9.15 for each of the four instrument ports.

4.9.17 Clean job area and remove all tools and equipment.

4.10 STUD DETENSIONING

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Prerequisites 3.1, 3.2, 3.3, 3.4 and 3.6 apply to this section.

NOTE

When setting and hooking up the stud tensioners, pay particular attention that tensioner Number 1 is hooked to the hydraulic pump for use in the #46 to #54 stud area. The remaining five tensioners are interchangeable in position. (See Figure 1.)

Sections 4.6 and 4.7 should be completed prior to proceeding with this section.

4.10.1 Lower the stud tensioners into the reactor cavity using the polar crane auxiliary hoist and transfer each to its associated radial arm hoist assembly.

4.10.2 Station each tensioner near its first setup position, i.e., tensioner #1 to stud #46, #2 to stud #37, #3 to stud #28, #4 to stud #19, #5 to stud #10, and #6 to stud #1.

4.10.3 Lower the hydraulic pump assembly into the reactor cavity using the polar crane auxiliary hoist, and station it in the southwest (northeast for Unit 2) corner of the 194 elevation area.

4.10.4 Lower the tensioner hose sets into the cavity and hook up as follows:

NOTE

Figures 1 and 2 may be used as an aid in hose hookup.

4.10.4.1 Connect the two, 12-foot long, 3/8-inch diameter, high pressure hydraulic hoses between the tensioners to couplings on either side of the cylinder. To connect the coupling, remove the dust cap which protects the body half and push the male tip into the body. Then screw on the collar until it bottoms. The collar is a free fit and should almost spin on, however, it must be bottomed for the hydraulic fluid to flow freely.

4.10.4.2 Connect the 12-foot long, 1/4-inch diameter, low pressure hydraulic hose (bypass valve signal) between the tensioners to the union adapters located just above the high pressure couplings.

4.10.4.3 Connect the black, 12-foot long, 1/4-inch diameter, air hose (piston return) between the tensioners to the couplings located on the front portion of the top plate.

4.10.4.4 Connect the red, 12-foot long, 1/4-inch diameter, air hose (air signal) between the tensioners to the couplings located on the top left and right hand side of the top plate.

4.10.4.5 Connect the single 12-foot long, 1/4-inch diameter, air hose (air signal) between tensioner #6 and tensioner #1.

4.10.4.6 Repeat Steps 4.10.4.1 through 4.10.4.4 for each of the five 12-foot long hose sets.

4.10.4.7 Connect each of the hoses in the 35-foot long set between tensioner #1 and the pumping assembly in the same manner as the interconnecting hoses in Steps 4.10.4.1 through 4.10.4.4.

4.10.5 Connect the plant air supply to the pumping assembly through the two 1-inch female pipe connections located on the upper left hand side of the pump. One or both connections may be used to provide an adequate supply however, if only one connector is used, the other must be plugged.

WARNING

DO NOT CLOSE THE PUMP RELEASE VALVE OR PUSH THE AIR VALVE UNLESS ALL TENSIONER HOSES ARE CONNECTED AND THE TENSIONERS ARE FULLY SEATED ON THE VESSEL FLANGE WITH THE WEIGHT OFF THE HOIST ENOUGH TO LOCK THE PULL SYSTEM TO THE STUD THERE-BY ACTIVATING THE LIMIT SWITCH.

NOTES

a. When lowering a tensioner onto a stud, it is best to use the buddy system, i.e., one man operating the hoist while the other man guides the tensioner over the stud by use of the two handles provided on the front of the tensioner.

b. Table 2 may be cut apart and taped securely to its respective tensioner to be used as a sequence guide in the detensioning operation.

4.10.6 Using the individual radial arm hoist assemblies, lower each tensioner over its first stud as seen on the sequence guide (Table 2).

4.10.7 Ensure that each tensioner is seated flush on the head flange and the tensioner pull system is locked to the stud.

NOTE

If adjustments to the tensioners are needed to cause the tensioner to latch, these adjustments may be made without generating a Maintenance Work Order.

NOTE

Detensioning is done in two passes with an intermediate pressure of 4700 psi for the first pass and 0 psi for the second pass. A pass consists of nine set-ups or nine sets of six studs each.

4.10.8 Notify the OSOS for approval to begin detensioning in accordance with Procedure 12007-C, "Refueling Entry".

4.10.9 Close the release valve on the pumping assembly, then depress and hold the air valve.

CAUTION

Maximum hydraulic pump pressure shall not exceed 9500 psi.

4.10.10 Continue pumping operation until all six spherical nuts can be moved. This can be accomplished by inserting the torque handle into one of the holes in the upper portion of the spherical nut and holding a slight pressure in the counter clockwise direction while pumping is in progress.

4.10.11 When all six nuts are loose, release the air valve, then back off at least one full turn (18 holes) on each nut.

4.10.12 Slowly open the release valve and allow the hydraulic pressure to be reduced to the intermediate pressure. Close the release valve.

NOTE

The torque handle is preset to deliver the required torque. It must be used in a vertical position with the marked pivot pin.

4.10.13 When the intermediate pressure has been obtained, insert the torque handle into each nut and turn clockwise until the nut bottoms, then apply force to the handle until an audible click is heard. This will seat the nut at the lower elongation value.

4.10.14 After all six nuts have been reseated, open the release valve and allow the hydraulic pressure to drop to zero.

4.10.15 Carefully raise the tensioners clear of the studs using the individual radial arm hoists attached.

NOTE

Section 4.7 must be completed before proceeding.

4.10.16 When all six tensioners are clear of their respective studs, move them to their next set-up.

4.10.17 Repeat Steps 4.10.7 through 4.10.16 for each of the nine set-ups of this pass.

4.10.18 */* If detensioning from a normal operating condition (two pass process), the intermediate pressure will be 4709 psi for the first pass. On the second pass, after the nuts have been backed off one full turn, do not reseat, but reduce pressure to zero leaving the nuts free for removal.

NOTE

It is sometimes necessary to go back and release a stuck or locked nut on a stud after the detensioning process is complete. Remember that all tensioners must be locked to a stud before raising the hydraulic pressure. This can be accomplished by locking on to an already detensioned stud or by hooking up the hoses to only as many tensioners as are required.

4.10.19 When all 54 spherical nuts are free to turn, the detensioning process is complete. Unhook and remove all tensioning equipment from the reactor cavity prior to starting the next operation.

4.11 STUD REMOVAL

NOTE

Any number (1-6) of tools can be used, (space and personnel dependent) or hand removal is allowed.

CAUTION

No stud should be threaded into or out of the vessel without the use of a weight compensating device, crane scale, etc., capable of a preload of at least 1/2 of the stud weight, to protect the stud and vessel threads.

NOTE

A chalk match mark on the vessel flange and stud may be used to detect stud rotation.

4.11.1 Move the stud turnout tools into the reactor cavity and hook them to their individual radial arm hoist.

4.11.2 Hook up a regulated air supply to the air compensator and adjust to approximately 55 psi.

4.11.3 Have available 51 stud hole plugs with handling fixture, 3 RV guide studs with sleeves, and the sleeve handling fixture.

NOTE

When ISI Vessel Inspection is required, 50 STUD Hole plugs and 4 RV guide studs with sleeves are needed.

4.11.4 If the studs are to be removed from the cavity separately from the head, then 6 stud storage racks should be available.

4.11.5 If the studs are to be removed from the cavity with the head, then one storage rack and 51 stud collars should be available.

4.11.6 Lower the individual spin out tools over their respective studs.

4.11.7 Remove the top stud plug and thread the lubricated (N5000) eyebolt into the top of the stud until the lower nut bottoms.

4.11.8 Align the eyebolt locking cap with the stud and lower the cap over the top of the stud.

4.11.9 Using the radial arm hoist, raise the weight compensator until its cylinder arm is extended approximately 9 inches.

CAUTION

Do not allow the cylinder arm to extend more than 10 inches. To maintain proper preload on the stud during removal, maintain cylinder arm between 8 to 10 inches by use of the radial arm hoist during stud removal.

4.11.10 Place the motor control switch on the tool to the REVERSE direction and, using the Variac to control the speed, unthread the stud.

4.11.11 When the stud is fully unthreaded from the vessel it should slowly rise automatically. If it does not, adjust the air compensator regulator to increase pressure. If it moves upward too quickly reduce pressure.

4.11.12 If studs are to be removed separately from the head, then move each stud, nut and washer away from the flange and place them into a storage rack (6 stud storage racks should be available).

4.11.13 If studs are to be lifted with the head, then temporarily move the stud, nut, and washer away from the flange hole (one stud storage rack and 51 stud collars should be available).

4.11.14 After the stud hole has been cleared, attach a stud hole plug onto the stud hole plug fixture using the installation adapter and insert the plug into the vessel flange through the head for all stud holes except 12, 28, 44.

NOTES

a. When ISI for Vessel Inspection is being performed, hole 30 will be utilized for mini guide stud.

b. Neolube #1 or #2 or GE Versilube 392 may be used on the stud hole plug O-rings to enhance sealing capabilities.

4.11.15 Remove the installation adapter.

4.11.16 When holding the stud hole plug fixture upper "T" handle, turn the lower "T" handle to the right, thereby compressing the two plates together and the O-ring out. This will lock the plug against the hole. When tight, lift the fixture by the lower "T" handle off of the now installed plug.

4.11.17 If studs are to be lifted with head, move the stud, nut, and washer back over the flange (except 12, 28, 44 and when ISI Vessel Inspection is being performed, Hole 3). Install into the head flange hole with a stud collar placed between the flange and the stud nut and washer. This will keep the stud bottom threads up inside the head for protection.

4.11.18 The stud spinout tool can now be disconnected from the stud by lifting the eyebolt locking cap above the top of the stud and unthreading the eyebolt.

4.11.19 */* Continue this process until all studs have been unthreaded from the vessel, all stud hole plugs (except 12, 28, 44 and when ISI Vessel Inspection is required 30) have been installed, and all studs, nuts, and washers have been stored in their respective places.

4.11.20 Stud holes 12, 28, 44 and when ISI Vessel Inspection is performed Hole 30, are used for the RV guide studs so the studs, nuts, and washers removed from the holes must now be stored in a stud rack.

4.11.21 To install the three guide studs, ensure that the guide stud sleeves have been cleaned and lightly lubricated with Fel Pro N5000 or approved lubricant.

4.11.22 Using the guide stud sleeve tool insert the sleeve through the head and carefully thread the sleeve into the vessel. When seated, back off 1/2 turn.

CAUTION

Use a chain fall between the polar crane and guide stud when threading the guide studs to prevent sleeve or guide stud thread damage.

4.11.23 */* After the sleeve is installed, the guide stud may be threaded into the sleeve using the polar crane auxiliary hook. Carefully lower the guide stud through the opening provided in the upper portion of the Integrated Head package for each of the three guide studs.

4.11.24 Remove stud racks (as applicable) and all tools used in Subsection 4.11 from the reactor cavity.

4.12 REACTOR VESSEL STUD CLEANING AND LUBRICATION

NOTE

This section may be performed on a needed basis anytime after 4.11 but before Section 4.24.

The studs may either be cleaned by hand using a nylon brush or the Baron and Associates Stud Cleaning Machine may be used. For the manual method, use Section 4.12.1, and for the machine method, use Section 4.12.2.

4.12.1 Manual Method

4.12.1.1 Remove a stud, nut and washer from the storage rack and/or head and move to the cleaning area.

4.12.1.2 Remove the bottom closing screw from the bottom of the stud and the stud lifting eyebolt from the top of the stud.

NOTE

Handle with extreme care to prevent thread damage.

4.12.1.3 Use a nylon brush to remove all significant rust or foreign matter from the stud, nut, washer, closing screw, and eyebolt. Stainless steel wire brushes may be used at the discretion of the cognizant Maintenance Foreman.

4.12.1.4 Using a nylon brush or lint-free rags and ethyl alcohol or acetone, thoroughly bathe and clean the threads on the stud, nut, and washer.

4.12.1.5 Check for cleanliness. Repeat Steps 4.12.2 and 4.12.3 as necessary in order to ensure cleanliness.

4.12.1.6 Lubricate the stud and nut threads very lightly with Fel-Pro N5000. Apply by brushing and then wiping off visible excess.

NOTE

A properly lubricated thread should be slippery but no lube should be visible to the naked eye. Over lubrication will cause binding.

4.12.1.7 Install the bottom closing screw in the bottom of the stud and the stud lifting eye bolt in the top of each stud (54 total). Lubricate threads with N5000.

4.12.1.8 Return the clean, lubricated stud and nut to the storage rack and/or head. Thread the nut then place the washer on the stud.

4.12.1.9 Cover the stud assemblies as required to maintain cleanliness.

4.12.2 Machine Method

4.12.2.1 Verify that the machine is connected to a HEPA vacuum clearer of at least 100 cfm capacity to avoid the spread of airborne contamination from the machine and to prevent accumulation of brushing debris in the machine.

4.12.2.2 Thread the ball bearing swivel hook into the stud to be cleaned and position the stud over the machine.

CAUTION

The machine rotates the reactor vessel stud under power. Use caution to avoid entangling loose clothing in the rotating stud.

This machine contains high speed wire brushes. Do not operate the machine without the top cover in place. Do not reach into, or work on the interior of the machine without disconnecting the power lead.

4.12.2.3 Using the ROTATE motor starter, start the power rollers. Verify that the red indicator lamp is lit.

4.12.2.4 Adjust the gear motor adjusting lever to grip and rotate the suspended stud and lock the lever with the lock knob.

4.12.2.5 Using the BRUSH motor starter, start the power brush. Verify that the red indicator lamp is lit.

NOTE

Use the minimum brush pressure necessary to clean the stud.

4.12.2.6 Adjust the brush motor adjusting lever to bring the power brush against the stud surface and lock the lever with the lock knob.

4.12.2.7 Using the slow speed of the crane (approximately 2.5 fpm), slowly lower the stud into the machine until all the threads have been cleaned. Then slowly raise the stud out of the machine. The brush motor position may have to be adjusted to clean all of the stud.

4.12.2.8 Stop the brush motor and the roller motor.

4.12.2.9 Clean the inside of the stud using the guidelines in Steps 4.12.1.3 and 4.12.1.4.

4.12.2.10 Return the stud to the appropriate storage location.

4.12.2.11 Complete Steps 4.12.2.2 through 4.12.2.10 for each stud to be cleaned.

4.13 REACTOR CAVITY SEALING

NOTES

a. This subsection may be completed in any order any time prior to Subsection 4.15.

b. After each opening is mechanically sealed, 732 RTV or equivalent may be applied as a backup seal.

4.13.1 Emergency Containment Spray Drain Lines

4.13.1.1 Remove the strainers from the two Emergency Containment Spray Drain lines located in the refueling cavity upender pit. Store the strainers for future operational use.

4.13.1.2 Clean and coat the threads and head underside of the 7/8 inch bolts with Never-Seez Pure Nickel Special.

4.13.1.3 Install two 3/16 inch thick full face EPDM gaskets, and blind flanges over the drains.

4.13.1.4 */* Torque the 7/8 inch bolts in a multi-step method cross pattern until gasket compression is achieved. Maximum allowable torque will be 400 ft-lbs.

4.13.2 Reactor Cavity Ventilation Openings

4.13.2.1 Install the 8 manufactured plates (solid plate down) with new 3/16 inch thick full face EPDM gaskets on the reactor cavity ventilation openings located circumferentially around the vessel.

4.13.2.2 Clean and coat the 1/2 inch bolt (16 each per plate) thread and head underside with Never-Seez Pure Nickel Special.

4.13.2.3 */* Torque the 1/2 inch bolts in a two-step method cross pattern with 50 to 60 percent of the final torque applied on the first step. Final torque will be 60 ft-lbs minimum.

4.13.3 ISI Ports

4.13.3.1 Unbolt the 8 ISI ports located circumferentially around the reactor vessel and remove the old gaskets.

4.13.3.2 Replace the old gasket material with new 3/16 inch thick EPDM gasket material. A full face gasket between the cover and the junction box, and a 2 3/8 inch wide gasket between the junction box and the cavity floor is required for each port.

4.13.3.3 Clean the 3/4 inch studs and nuts, then coat the threads and nut undersides with Never-Seez Pure Nickel Special.

4.13.3.4 */* Reinstall and torque the 3/4 inch-nuts in a two-step method cross pattern with 50 to 60 percent of the final torque applied on the first step. Final torque will be 120 ft-lbs minimum.

4.13.4 Permanent Cavity Seal Ring

4.13.4.1 */* Visually check the permanent cavity seal for nicks, cuts or other damage which could affect cavity sealing ability.

4.13.5 */* Remove all tools and equipment from the refueling cavity.

4.14 TRANSFER TUBE BLIND FLANGE

NOTE

The transfer tube blind flange may be removed at any time prior to Subsection 4.15.

4.14.1 */* Perform an "as found" Seal Integrity Check in accordance with Procedure 24960-1 for Unit 1 or 24960-2 for Unit 2, "Containment Penetration No. 89 - Local Leak Rate Test", prior to removing the blind flange.

CAUTION

Care must be exercised in removing the blind flange as water may have leaked into the tube from the spent fuel pit.

4.14.2 Remove and store the 20 blind flange bolts in a designated storage area.

4.14.3 Using the cavity arm, swing the blind flange up and away from the transfer tube tracks.

4.14.4 Remove and discard the two quad ring seals on the blind flange.

4.14.5 */* Install the two 1/16-inch brass plugs on the face of the bolted flange.

4.15 PREPARATION FOR FLOODING

CAUTION

Ensure that all previous steps have been completed and appropriate sign offs made.

4.15.1 Disconnect the temporary 480V power cable (if used) from the Integrated Head Package.

4.15.2 Close and latch all shroud doors except 4 adjacent to the conoseals, on the Integrated Head.

4.15.3 */* Remove all tools, equipment and material from the cavity to ensure that it is ready for flooding.

4.16 */* HEAD REMOVAL AND CAVITY FLOODING

CAUTION

Inadvertent containment ventilation isolation may occur during the movement of the Reactor Vessel head from the Reactor cavity to the head stand or from the head stand to the Reactor cavity. Ensure Health Physics and operations initiate compensatory actions to prevent inadvertent actuation.

NOTE

Prior to lifting the head ensure that a new set of head O-rings are in position around the head storage pad.

4.16.1 Attach the load cell to the polar crane main hook. The connecting pin should be a snug fit, however, no excessive force or metal to metal pounding is allowed.

4.16.2 Connect the load cell leads from the cell to the readout and place the readout at a convenient location for monitoring throughout the lift.

NOTE

Do not use feet or excessive force to crank the load cell connecting pin in or out.

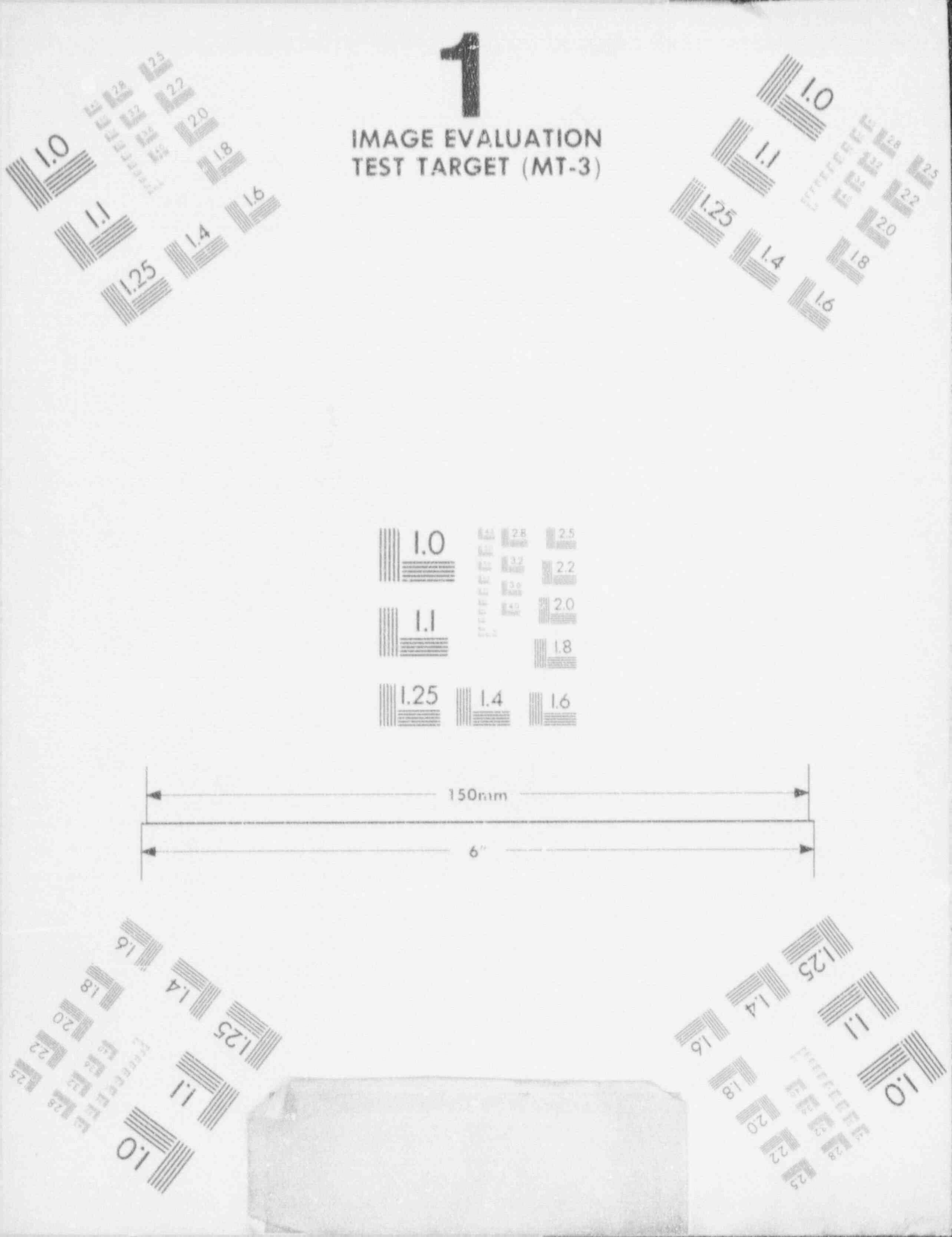
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IMAGE EVALUATION
TEST TARGET (MT-3)
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
150mm
6"

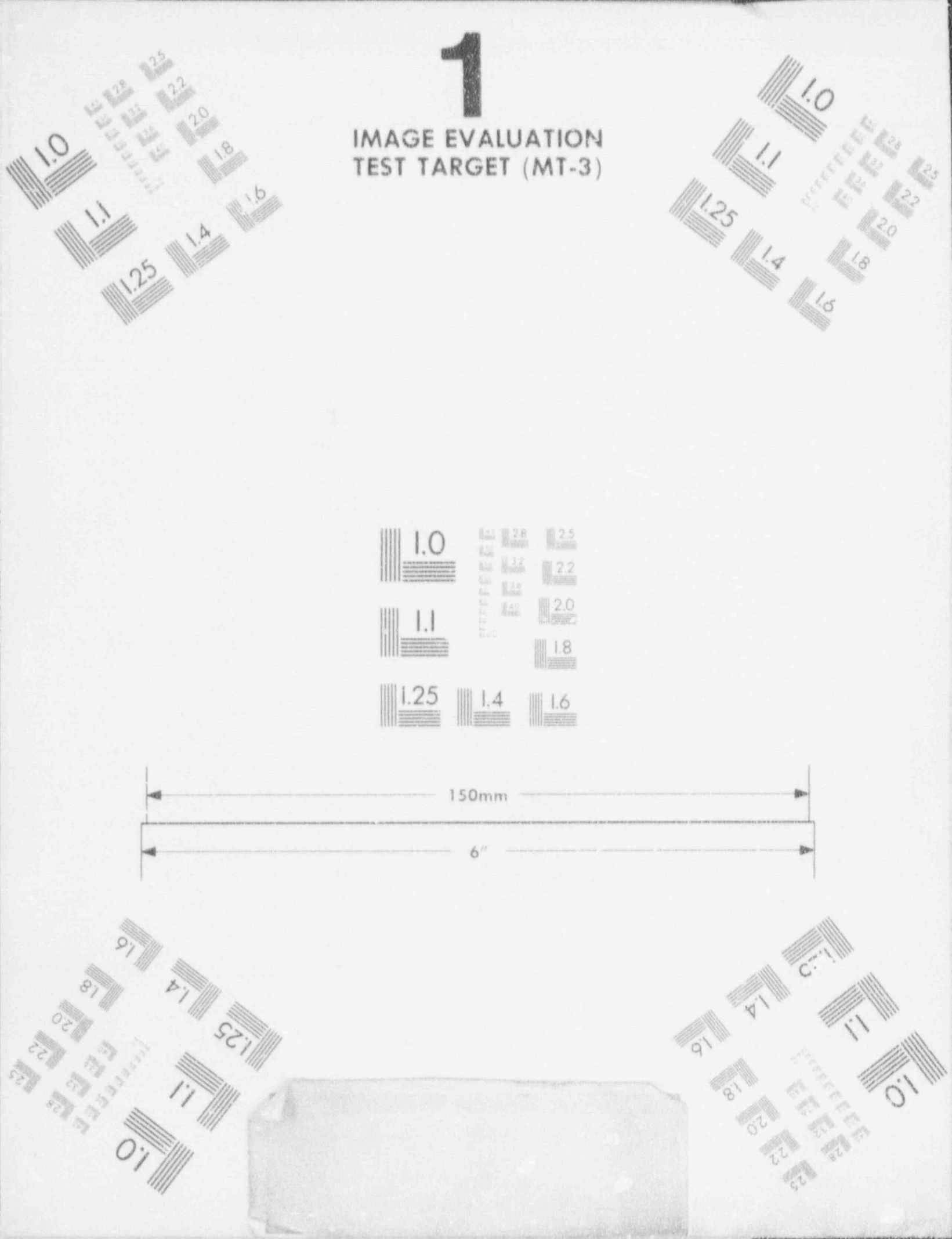
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IMAGE EVALUATION
TEST TARGET (MT-3)
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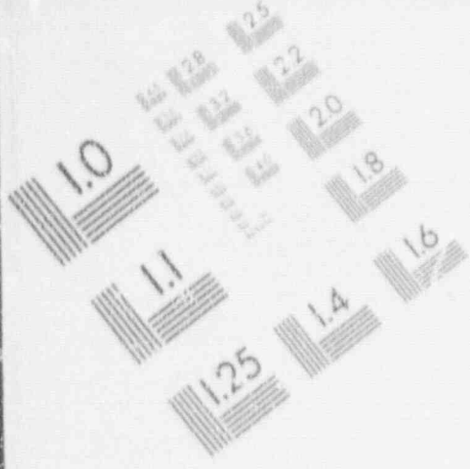
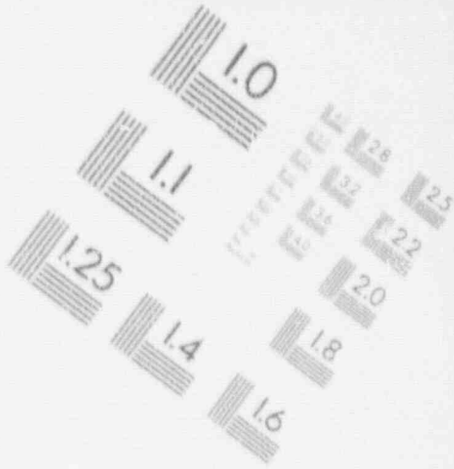
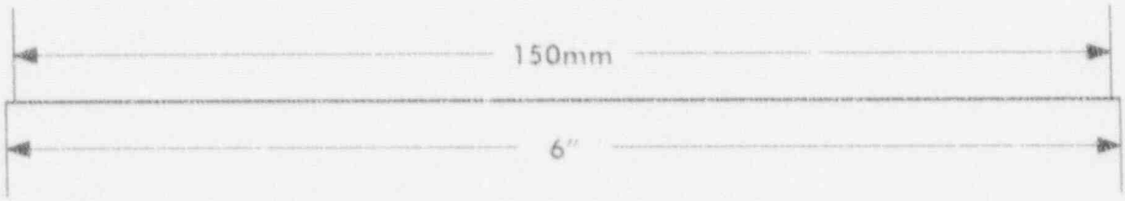
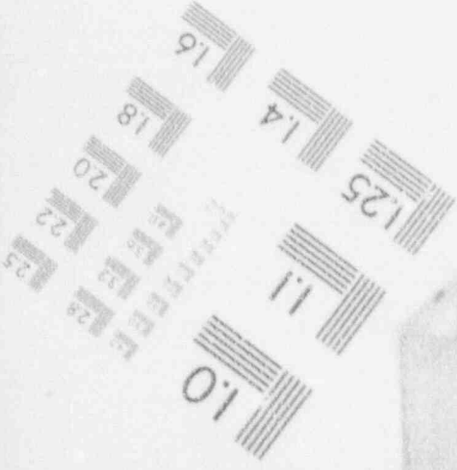
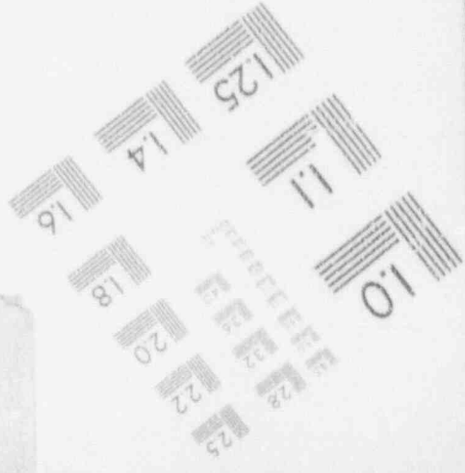
IMAGE EVALUATION TEST TARGET (MT-3)











4.16.3 Align the polar crane and load cell to the head lift rig and attach by hand cranking the connecting pin in. This pin is turned in by cranking left (counterclockwise).

4.16.4 Ensure that the head lift rig leg turnbuckles are disconnected after polar crane is attached to the lift rig.

CAUTION

No movement of the head shall be attempted without continuous voice communication between the crane operator and signal man. Hand signals are not allowed. If voice communications are lost, suspend movement of the head until the situation can be corrected.

4.16.5 Securely attach at least three levels to the top of the vessel head flange, approximately 120° apart.

CAUTION

Sections 4.2 through 4.11 must be completed before proceeding.

WARNING

DURING STEPS 4.16.6 AND 4.16.13 ONGOING RADIATION MEASUREMENTS MUST BE TAKEN TO ENSURE SAFE WORKING CONDITIONS.

4.16.6 Lift the head approximately 1 inch and check for levelness. If head is not level, slowly set it back on the vessel and adjust. Small adjustments should be made by movement of the radial arm hoists around the head circumference prior to any major adjustments involving the lift rig.

4.16.7 */* When the head is level, hold at the 1-inch position for ten minutes while visually checking the accessible welded and bolted lift rig and load cell connections.

4.16.8 Remove the levels from the vessel head.

4.16.9 Open applicable shroud doors and lift the head approximately 24 inches. Check with a flashlight to ensure that the instrument port column moves freely through the head and the head does not raise any RCCA drive shafts during the lift.

4.16.10 When it is apparent that the head is not binding on the thermocouple protective sleeves or RCCA drive shafts, evacuate all personnel from the reactor cavity and note the weight reading on the load cell monitor.

NOTE

The head may be lifted from a dry cavity or Operations may start flooding as desired.

CAUTION

Do not allow water to come in contact with the exterior surface of the head.

4.16.11 Continue lifting the head and if flooding the cavity maintain at least of 12 inches between head and water level. Constantly monitor the load cell readout for any sudden ± 5% change in the previously noted load cell readout which would indicate binding or interference.

4.16.12 Lift the head out of the cavity and place it on the head storage pad.

4.16.13 Request Operations to start or continue filling the cavity to the normal refueling level (elevation 218 feet 6 inches).

4.16.14 */* When the head is sitting on the head storage pads in a no load condition, reconnect the lift rig leg turnbuckles.

NOTE

Do not use feet or excessive force to crank the load cell connecting pin out.

4.16.15 Disconnect the load cell from the head lift rig by using the load cell and readout for determining the null load point for removing the connecting pin. Turn the crank by hand to the right (clockwise) to remove.

4.16.16 Attach the underwater light fixtures to their respective holders on the walls of the cavity liner.

CAUTION

Do not energize underwater lights until they are submerged in water for cooling purposes.

4.17 UNLATCHING OF RCCA DRIVE SHAFTS
/

NOTE

At any time the reactor cavity is flooded, water purity and clarity should be controlled by the Spent Fuel Cooling and Cleaning System and/or the Reactor Cavity Filtration System.

The unlatching of the RCCA drive shafts shall be accomplished in accordance with Procedure 93140-C, "Control Rod Drive Shaft Unlatching Tool Operating Instructions".

4.18 UPPER INTERNALS REMOVAL
/

4.18.1 At the discretion of the Outage Area Supervisor, and using a weighted tape measure, measure the distance from the top of the hand rail on the SIGMA refueling machine to the top of the internals flange. Measurements should be taken in at least 3 places and recorded on Data Sheet 2.
/

NOTES

a. Prior to removing the upper internals, the SIGMA Refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and the upper internals storage stand.

b. Do not use feet or excessive force to crank the load cell connecting pin in.

4.18.2 Align the polar crane main hook and load cell to the lift rig. Insert the connecting pin by hand cranking to the left (counterclockwise).

4.18.3 While monitoring the load cell readout, slowly raise the lift rig until it is at the elevation to clear the guide studs on the reactor vessel. Note the weight reading on the load cell monitor.

4.18.4 Move the lift rig over the reactor vessel and align it with respect to the vessel guide studs.

4.18.5 While monitoring the load cell readout for any sudden ±5 percent change in the previously noted load readout which would indicate binding or interferences, slowly lower the lift rig down until it is seated on the upper internals.

4.18.6 To engage the roto-locks into the internals; depress the foot pedal, rotate the "T" handle 60° clockwise from the lock position. Push the handle down to the bottom of the slot in the assembly housing and rotate it back 60° counterclockwise to the lock position. Release the "T" handle, then release the foot pedal.

4.18.7 Repeat Step 4.18.6 for the other two roto-lock operator assemblies.

NOTES

a. No movement of the upper internals shall be attempted without continuous voice communication between the crane operator and the signal man. Hand signals are not allowed. If voice communications are lost, suspend all internals movement until the situation can be corrected.

b. Refueling cavity water level must be raised to at least 218'6" elevation in accordance with Procedure 12007-C before lifting upper internals.

CAUTION

Visually monitor control rod drive shafts as upper internals are lifted. The drive shaft should drop slightly, indicating the shaft is no longer resting on the control rod spider.

4.18.8 While monitoring the load cell readout, slowly take a strain on the polar crane so that the entire weight of the upper internals and lift rig is on the crane.

4.18.9 */* Hold this condition for 10 minutes while visually checking all accessible lift rig bolted and welded connections. Note the weight reading on the load cell monitor.

CAUTION

As the upper internals clear the vessel flange, visually monitor beneath the internals for any unusual shadows indicating a lifted fuel bundle or RCCA.

4.18.10 Slowly lift the upper internals up out of the reactor until they clear the vessel and the guide bushing is clear of the guide studs. At all times monitor the load cell readout for any sudden ±5 percent change in the previously noted load readout which would indicate binding or interference.

4.18.11 Move the lift rig and internals over the upper internals storage stand and align them with respect to the storage stand guide studs.

4.18.12 */* While monitoring the load cell readout, slowly lower the upper internals and lift rig until they are seated on the storage stand.

NOTE

Do not use feet or excessive force to crank the connecting pin out.

4.18.13 Disconnect the polar crane and load cell from the internals lift rig. Use the load cell readout to determine null load point to remove the connecting pin. Turn the crank by hand to the right (clockwise) to remove.

4.18.14 Move the polar crane and load cell clear for refueling operations. If the main hook is to be used for other lifts then the load cell should be disconnected. When removing the load cell lift pin, use the polar crane weight indicator to determine null load point. No excessive force or metal to metal pounding is allowed.

4.19 */* UPPER INTERNALS INSTALLATION

NOTES

a. Prior to installing the upper internals, the SIGMA refueling machine must be moved to its eastern for Unit 1 or western for Unit 2 most position in order to have access to both the vessel and internals storage stands.

b. Do not use feet or excessive force to crank the connecting pin in.

4.19.1 Align the polar crane main hook with the load cell attached to the internals lift rig. Insert the connecting pin by hand cranking to the left (counterclockwise).

CAUTION

No movement of the upper internals shall be attempted without continuous voice communication between the crane operator and the signal man. Hand signals are not allowed. If voice communications are lost, suspend all internals movement until the situation can be corrected.

4.19.2 While monitoring the load readout, slowly take a strain on the polar crane so that the entire weight of the internals and lift rig is on the crane.

4.19.3 */* Hold this condition for 10 minutes while visually checking all accessible lift rig bolted and welded connections. Note the weight reading on the load cell monitor.

4.19.4 Slowly lift the upper internals to an elevation that will clear the guide studs on the vessel. At all times monitor the load cell for any sudden ±5 percent change in the previously noted load readout which would indicate binding or interference.

4.19.5 Move the internals over the vessel and align them with respect to the vessel guide studs.

4.19.6 */* While monitoring the load cell readout for any sudden ±5 percent change in the previously noted load readout which would indicate binding or interference, slowly lower the internals down over the guide studs until they are seated in the vessel.

NOTE

At the discretion of the Outage Area Supervisor, Step 4.19.1 may be performed at this time. This may require performance of Step 4.19.11. When the measurements are complete, the polar crane will be reconnected to the lift rig in accordance with Steps 4.19.1 and 4.19.2.

4.19.7 To disengage the roto-locks from the internals, depress the foot pedal, hold down on the "T" handle, and rotate it 60° clockwise from the lock position. Slowly release the pressure on the "T" handle and allow it to move to the top of the slot in the assembly housing, then rotate it back 60° counterclockwise to the lock position. Release the "T" handle, then release the foot pedal.

4.19.8 Repeat Step 4.19.7 for the other two roto-lock operating assemblies.

4.19.9 While monitoring the load cell readout, slowly raise the lift rig and protective ring out of the vessel and clear of the vessel guide studs.

4.19.10 */* Orient the lift rig with respect to the storage stand guide studs and lower it until it is seated on the storage stand.

NOTE

Do not use feet or excessive force to crank the connecting pin out.

4.19.11 Disconnect the polar crane and load cell from the lift rig. Use the load cell readout to determine null load point to remove the connecting pin. Turn the crank by hand to the right (clockwise) to remove the pin.

4.19.12 */* At the discretion of the Outage Area Supervisor, and using a weighted tape measure, measure the distance from the top of the hand rail on the SIGMA refueling machine to the top of the internals flange. Try to use the same locations as were used in Step 4.18.1, if applicable. Measurements should be taken in at least 3 places and recorded on Data Sheet 3.

4.19.13 */* If measurements were taken in Step 4.19.14, the Outage Area Supervisor shall evaluate the measurements and signify his concurrence with the proper installation of the internals on Data Sheet 3.

4.20 */* RCCA DRIVE SHAFT LATCHING

The RCCA drive shafts will be latched in accordance with Procedure 93140-C, "Control Rod Drive Shaft Unlatching Tool Operating Instructions".

4.21 */* HEAD AND O-RING INSTALLATION

4.21.1 Coordinate with Operations to begin cavity dewatering.

WARNING

AS THE WATER LEVEL GOES DOWN, ENSURE THAT THE UNDERWATER LIGHTS ARE DE-ENERGIZED BEFORE THE WATER LEVEL IS BELOW THE LIGHTS.

4.21.2 Cleaning The Vessel Flange

NOTE

Proper cleaning of the vessel and O-ring mating surfaces is a very important factor in making a leak free seal. All cleaning and rubbing upon the sealing surfaces shall be circumferential, not radial, with respect to the vessel centerline to prevent radial scratches.

4.21.2.1 When the water level reaches a minimum of 24 inches (Elev. 192') below the vessel flange, cleaning of the vessel O-ring mating surface can start.

4.21.2.2 The flange may be cleaned manually by polishing with Scotch brite #7447 and wiping using lint-free rags and either isopropyl alcohol or acetone, followed by demineralized water.

4.21.2.3 The flange may also be cleaned using the Reactor Vessel Flange O-Ring Seat Cleaning Machine.

4.21.2.3.1 For cleaning purposes, verify that the machine has the light cleaning and buffing disks (3M grade A-VFN) installed.

4.21.2.3.2 Connect a portable HEPA vacuum cleaner to the 1-1/2 inch tube on the front of the machine. Verify that there is sufficient hose to allow convenient travel of the machine around the reactor vessel flange O-ring seating groove.

4.21.2.3.3 Using the handles, place the machine on the reactor vessel flange, approximately centered over a capped stud hole. Place a clean pad under the machine to avoid picking up foreign material in the brush disks or rollers.

4.21.2.3.4 Engage the installation dolly in the slots in the front of the machine, and tilt the dolly handle down to pick up the unit.

4.21.2.3.5 Roll the dolly forward until the machine is over the reactor vessel flange O-ring seating groove, and gently lower the unit into the groove.

4.12.2.3.6 Varify the correct fit of the bumpers and brush hoods along the sides of the groove.

NOTE

LEFT and RIGHT directions are given on the control panel facing the machine, with the machine installed in the reactor vessel flange O-ring seating groove.

The travel direction toggle switch has a detent in the STOP position, which prevents changing direction without pausing at STOP, to protect the gear motor.

4.21.2.3.7 Operate the travel drive using the LEFT - STOP - RIGHT toggle switch and the TRAVEL SPEED knob on the remote control box. Guide the control cable and vacuum cleaner hose as the machine moves to prevent snags.

4.21.2.3.8 Operate the brush disks with the BRUSH MOTOR toggle switch on the remote control box.

CAUTION

Approach the guide studs slowly to avoid damage to the machine.

4.21.2.3.9 Using the above controls, move the machine around the vessel flange as required to clean the flange. Adjust the brushing pressure and/or replace the brush disk assemblies as required.

4.21.2.3.10 After cleaning a section of the vessel flange O-ring seating groove between the guide studs, position the machine for convenient removal using the installation dolly. Move the machine to the next section of the flange, and repeat the above process.

4.21.2.3.11 The machine will not clean O-ring flange behind the guide studs. This area must be cleaned manually using the methods outline in Step 4.21.2.2.

4.21.3 Visually check the vessel flange mating surface for cleanliness, nicks, scratches, or other undesirable conditions and visually check the vessel head flange mating surface for traces of raised metal. Small scratches or blemishes may be removed by hand rubbing with Scotch brite #7447 and/
or an Arkansas hard stone followed by cleaning with acetone and a demineralized water rinse. No other cleaning or polishing is allowed.

4.21.4 Concurrently with dewatering and/or vessel flange cleaning, head O-ring replacement may begin.

NOTES

a. Retainer bolts require a 5/32 Allen type wrench for loosening and removal.

b. The retainer bolts and clips may be totally removed from the head to ease O-ring removal, but care must be used so that they are not lost.

c. All personnel in contact with the O-rings shall wear lint free cotton and/or rubber gloves.

4.21.5 Supporting the old O-rings one at-a-time by hand, loosen the sixteen (16) O-ring retainer bolts and turn the associated retainer clips away from each O-ring.

4.21.6 Lower the old O-ring away from the head and cut it into several pieces. Place the pieces into approved containers and have Health Physics dispose.

4.21.7 Thoroughly clean the head flange sealing surfaces and O-ring grooves using lint-free rags and either isopropyl alcohol or acetone. Rinse with demineralized water.

4.21.8 Visually check the head flange mating surface as per 4.21.3.

4.21.9 Replace the inner O-ring as follows:

4.21.9.1 Pick up the O-ring using a minimum of four people equally spaced around the ring to prevent kinking or bending. Each person should hold his arms as far apart as is convenient so that in effect there are 8 support points.

NOTE

Any unwrapping or cleaning of the O-rings should be done by workmen other than those holding the O-rings. All personnel shall wear clean, white, lint-free cotton and/or rubber gloves for all cleaning and handling of the O-rings.

4.21.9.2 Carefully unwrap and clean the new O-ring with acetone or approved cleaning solvent and rinse thoroughly with demineralized water.

4.21.9.3 Visually check the O-ring for cleanliness, nicks, scratches, or other undesirable conditions.

4.21.9.4 Lift the O-ring to within one inch of the O-ring groove and line up the O-ring slots with the retainer clip slots in the vessel head.

4.21.9.5 Insert the O-ring into its groove and insert the stem of the retainer clips into the O-ring slots. Retighten or reinstall the retainer bolts through the eyes of the retainer clips. Tighten snugly with the Allen wrench.

NOTE

The O-ring retainer bolts shall be bottomed tightly on their shoulders to eliminate the possibility of the heads extending out beyond the mating surface and damaging the vessel mating surface upon contact.

4.21.10 Repeat Steps 4.21.9.1 through 4.21.9.5 for the outer O-ring.

4.21.11 */* Visually check the O-rings to ensure that they are properly fitted in their grooves and that the surfaces are clean.

4.21.12 Check the retainer bolts with a straight edge to ensure that they will not interfere with the mating surfaces.

4.21.13 Clean the job area and remove all tools.

NOTE

Do not use feet or excessive force to insert the connecting pin.

4.21.14 Align the polar crane and load cell to the head lift rig and attach by hand cranking the connecting pin in. The pin is inserted by cranking left (counterclockwise).

4.21.15 Ensure that the head lift rig leg turnbuckles are disconnected after the polar crane is attached to the lift rig.

CAUTION

No movement of the head shall be attempted without continuous voice communication between the crane operator and signal man. Hand signals are not allowed. If voice communications are lost, suspend movement of the head until the situation can be corrected.

4.21.16 Securely attach at least three levels to the top of the vessel head flange approximately 120° apart.

4.21.17 Take a strain with the polar crane and lift the head approximately one inch off the storage pad. Check for levelness. If not level, set it back on the storage pads and adjust. Small adjustment should be made by movement of the radial arm hoists around the head circumference prior to any major adjustments involving the lift rig.

4.21.18 */* Once the head is level hold it at the one inch position for ten minutes while visually checking the accessible welded and bolted lift rig and load cell connections. Note the weight reading on the load cell monitor.

4.21.19 Remove the levels from the head.

4.21.20 While monitoring the load cell readout for any sudden ±5 percent change in the previously noted load cell readout, slowly lift the head to an elevation that will clear all obstructions between the storage pad and reactor cavity.

4.21.21 Align the head over the vessel (guide studs in holes 12, 28, 44 and mini guide stud 30 when ISI Vessel Inspection is performed) and lower to within one foot of the water level, if the level is to be lowered with the head, or to the top of the guide studs.

CAUTION

Do not allow the head to come into contact with the water.

4.21.22 While constantly monitoring the load cell readout for any sudden ±5 percent change in the previously noted load cell readout which would indicate binding or interference, continue to lower the head.

4.21.23 Visually check to ensure proper drive shaft and thermocouple alignment as they enter the head guide funnels.

NOTE

Coordination with Operations will be required as the water level must be approximately 48" (Elev. 190') below the vessel flange before seating the head.

4.21.24 */* Lower the vessel head until it is seated on the vessel.

4.21.25 Assemble the access platform from the operating floor (elevation 220 feet) to the missile shield if necessary.

4.21.26 Reconnect the lift rig leg turnbuckles.

NOTE

Do not use feet or excessive force to crank the connecting pin out.

4.21.27 Using the load cell readout to determine null load point, disconnect the polar crane load cell from the head lift rig. Turn the crank to the right (clockwise) to remove the connecting pin.

4.21.28 The load cell may now be de-energized, disconnected, and stored.

4.21.29 Remove and store the underwater lights if not already completed during dewatering of the cavity.

4.22 REFUELING CAVITY DECONTAMINATION

Allow Health Physics to decontaminate the refueling cavity per Procedure 43301-C, "Decontamination Of Areas, Tools And Equipment".

4.23 INSTALLATION OF TRANSFER TUBE BLIND FLANGE

NOTE

This work may be accomplished at any time between Step 4.22 and completion of this procedure.

4.23.1 Remove the two 1/16-inch brass plugs from the face of the bolted flange. Store them for future use.

4.23.2 */* Clean and visually check the mating surfaces.

4.23.3 Install two new quad ring seals. These seal gaskets should be coated with GE Versilube 392.

4.23.4 Using the davit arm, swing the blind flange over the fuel transfer tracks and down into position.

4.23.5 Clean the 20 flange bolts. Lightly lubricate the bolt threads and head underside with Never-Seez Pure Nickel Special.

4.23.6 */* Install the bolts and hand tighten. Torque the bolts in a two-step method cross pattern to a value of 45 ft-lbs in the first pass and then to a final torque value of 80 ft-lbs ±2 ft-lbs.

NOTE

Seal integrity will be checked during the maintenance surveillance testing in accordance with Procedure 24960-1 for Unit 1 or 24960-2 for Unit 2, "Containment Penetration No. 89 - Local Leak Rate Test".

4.24 */* STUD INSTALLATION

CAUTION

Studs, nuts, washers, and stud holes are match-marked by number and must always be used together.

NOTE

At the discretion of the Outage Area Supervisor, a second head lift may be added at this time to ensure that cavity decontamination or stud hole cleaning did not force particles into the vessel O-ring sealing area. Section 4.24.1 governs activities to perform the second lift. If no second head lift is required, skip to Section 4.24.2.

4.24.1 Second Head Lift Prior To Stud Installation

4.24.1.1 Remove the stud hole plugs as follows:

4.24.1.1.1 Using the stud hole plug removal tool's lower "T" handle, insert the tool into the plug.

4.24.1.1.2 While holding the upper "T" handle in a fixed position, turn the lower "T" handle to the left. The two plates will be decompressed to unlock the plug from the hole.

4.24.1.1.3 Attach the installation-removal adapter by screwing the adapter onto the plug.

4.24.1.1.4 Lift the lower "T" handle and remove the plug from the hole.

4.24.1.1.5 Repeat Steps 4.24.1.1.1 through 4.24.1.1.4 until all stud hole plugs have been removed.

4.24.1.2 After each stud hole plug is removed, the stud hole must be inspected and dewatered and/or cleaned as necessary. The accessible holes may be cleaned manually, using Section 4.24.1.2.1, or may be power cleaned using Section 4.24.1.2.2.

4.24.1.2.1 Manual Cleaning Method

4.24.1.2.1.1 A power nylon brush may be used provided a protective sleeve is slipped through the head hole down to rest on the top threads. A stainless steel brush may be used at the discretion of the cognizant Maintenance Foreman. This will prevent the power brush from slinging debris onto the already cleaned O-ring and mating surfaces.

4.24.1.2.1.2 Ethyl alcohol or acetone may be used as a cleaning agent but do not attempt to lubricate threads through the head as excess lubrication will occur.

4.24.1.2.2 Power Cleaning Method

CAUTION

Do not attempt to operate the power brush or the vacuum cleaner unless the machine is firmly in place in a stud hole because:

a. The power brush is not supported for unrestrained operation and damage to the drive may result.

b. The power brush is not equipped with a guard, and may endanger the operator.

c. The vacuum cleaner may discharge partially filtered radioactive particles, creating an airborne contamination hazard.

NOTE

The brush drive and vacuum cleaner power are interlocked with a limit switch, so that they are de-energized if the machine is not firmly seated in a stud hole.

The cleaning machine should have nylon brushes installed. Use of the stainless steel brushes shall be approved by the cognizant Maintenance Foreman.

4.24.1.2.2.1 Verify that at least 3/4 inch of bristle remains on the strip brushes and that the setscrews holding the strip brushes are tight.

CAUTION

The stud hole to be cleaned must be free of water to avoid damage to the paper vacuum filter.

4.24.1.2.2.2 Remove the storage cap from the end of the machine.

4.24.1.2.2.3 Place the machine in a stud hole in the reactor head flange. Verify that the gasket sleeve is seated firmly in the reactor vessel head stud hole. Adjust the 3/8 inch hex head bolt support feet as required.

4.24.1.2.2.4 Verify that the junction box is positioned such that the limit switch on the bottom of the box opens when the machine is lifted 1/8 inch. Adjust the position of the box on the mounting bracket as required.

4.24.1.2.2.5 Using the control switches, verify operation of the vacuum cleaner and the power brush.

NOTE

The brush drive motor power is interlocked with the vacuum cleaner pushbutton switch (RUN), so that the vacuum cleaner and the brush drive operate together.

4.24.1.2.2.6 Press down on the T-handle swivel joint to extend the brush assembly down into the stud hole.

4.24.1.2.2.7 Using the UP/DOWN switch and the RUN switch, run the brush up and down the stud hole threads as required to clean the stud hole.

4.24.1.2.2.8 After cleaning the stud hole, pull up on the T-handle swivel joint to fully withdraw the brush assembly up into the brush tube.

4.24.1.2.2.9 The machine may then be moved to the next hole to be cleaned, and the cleaning performed per Steps 4.24.1.2.2.6 through 4.24.1.2.2.9.

4.24.1.2.2.10 After completion of cleaning operations, firmly replace the storage cap.

4.24.1.3 If desired, set the stud hole plugs back into the cleaned holes, but do not lock the plug in.

4.24.1.4 */* Lift the head by performing Steps 4.16.1 through 4.16.9.

4.24.1.5 When it is apparent that the head is not binding on the thermocouple protective sleeves or RCCA drive shafts, note the weight reading on the load cell monitor.

4.24.1.6 Continue to lift the head to a height determined by the Outage Area Supervisor. Constantly monitor the load cell readout for any sudden +/-5% change in the previously noted load cell readout which would indicate binding or interference.

4.24.1.7 Hold the head at the height determined above. Inspect the vessel flange and O-ring seating surface for cleanliness or any foreign objects or debris. Clean the flange, if necessary, in accordance with Section 4.21.2.

NOTE

Coordination with Operations will be required as the water level must be approximately 48" (Elev. 190') below the vessel flange before seating the head.

4.24.1.8 If the head was lifted above the top of the guide studs, align the head over the vessel (guide studs in holes 12, 28, 44 and mini guide stud 30 when ISI Vessel Inspections are being performed), and begin lowering the head. Constantly monitor the load cell readout for any sudden +/-5% change in the previously noted load cell readout which would indicate binding or interference.

4.24.1.9 Visually check to ensure that proper drive shaft and thermocouple alignment as they enter the head guide funnels.

4.24.1.10 Lower the vessel head until it is seated on the vessel.

4.24.1.11 Assemble the access platform from the operating floor (elevation 220 feet) to the missile shield.

4.24.1.12 Reconnect the lift rig turnbuckles.

NOTE

Do not use feet or excessive force to crank the connecting pin out.

4.24.1.13 Using the load cell readout to determine the null load point, disconnect the polar crane load cell from the head lift rig. Turn the crank to the right (clockwise) to remove the connecting pin.

4.24.1.14 The load cell may now be de-energized, disconnected, and stored.

NOTE

Use a chain fall between the polar crane and the guide studs.

4.24.1.15 Using the polar crane auxiliary hoist hook and a sling through the access hole in the upper portion of the integrated head, remove the three guide studs.

4.24.1.16 */* Using the guide stud sleeve tool, remove the three guide stud sleeves.

4.24.1.17 Clean the stud holes that the guide studs were removed from using one of the cleaning methods in Sections 4.24.1.2.1 or 4.24.1.2.2.

4.24.1.18 */* Remove all remaining stud hole plugs.

NOTE

Section 4.24.1 includes the requirements of 4.24.2. Proceed to 4.24.3.

4.24.2 Preparation For Stud Installation

NOTE

Use a chainfall between the polar crane and the guide studs.

4.24.2.1 Using the polar crane auxiliary hoist hook and a sling through the access hole in the upper portion of the integrated head, remove the guide studs.

4.24.2.2 */* Using the guide stud sleeve tool remove the guide stud sleeves.

NOTE

If the studs, nuts, and washers were stored in their storage racks, then all stud hole plugs should be removed at this time. If they were stored on the vessel head, then each stud hole plug must be removed individually after the stud has been lifted for stud collar removal.

4.24.2.3 */* Remove all stud hole plugs in accordance with Steps 4.24.1.1.1 through 4.24.1.1.5.

4.24.2.4 Clean the stud holes in accordance with Section 4.24.1.2.

4.24.3 Installation Of The Studs

4.24.3.1 Move the fast stud turnout tools, stud racks (if applicable), and necessary accessories into the cavity.

4.24.3.2 If the integrated head cable trays have not been lowered and the connector plate cables reconnected, connect a temporary 480V power source to the bottom of the shroud for the radial arm hoists.

4.24.3.3 Electric Tool Operation

NOTE

Any number (1-6) of tools can be used, (space and personnel dependent) or hand installation is allowed.

CAUTION

No stud should be threaded into or out of the vessel without the use of a weight compensator, crane scale or other device capable of a preload of at least 1/2 the stud weight. This will protect the stud and vessel threads.

4.24.3.3.1 Move the stud turnout tools into the reactor cavity and hook them to their individual radial arm hoists.

4.24.3.3.2 Hook up a regulated air supply to the air compensator and adjust to approximately 55 psi.

4.24.3.3.3 If the studs were stored on the head, attach the radial hoist with the turnout tool and weight compensator to a stud and lift the stud out of the head hole. Remove and store the stud collar and then remove the stud hole plug as instructed in Steps 4.24.1.1.1 through 4.24.1.1.4 above.

4.24.3.3.4 If the studs were stored in their storage racks then there will be no stud collar or stud hole plug to remove at this time. A stud, nut and washer can now be picked up out of the stud rack.

NOTE

The convex side of stud washers point up.

4.24.3.3.5 Position the individual stud in its match marked hole. Ensure the washer is placed between the head flange and the nut. The nut, if left on the stud, is positioned so as to not interfere with the threading operation.

4.24.3.3.6 Hand thread the stud into the vessel flange a minimum of three complete turns.

4.24.3.3.7 By use of the radial arm hoist control, adjust the height until the compensator cylinder arm is extended approximately one inch.

4.24.3.3.8 Verify that the eyebolt locking cap is properly aligned and seated on the top of the stud.

NOTE

While threading the stud into the vessel maintain the cylinder arm extension between 2 to 8 inches.

CAUTION

Use slow speed or a jogging motion as the stud almost bottoms. This will preclude locking the stud to the vessel or damaging the threads.

4.24.3.3.9 Place the motor control switch on the tool in the forward direction and, using the Variac to control the speed, thread the stud into the vessel flange.

4.24.3.3.10 When the stud has bottomed, back it off approximately 1/2 turn. This will help to preclude jammed studs after tensioning and heat cycling.

4.24.3.3.11 Disconnect the stud spinout tool by lifting the eyebolt locking cap above the top of the stud and unthreading the eyebolt.

4.24.3.3.12 When all studs have been installed, remove all tools, racks, etc., from the cavity prior to proceeding to the next subsection.

4.25 STUD TENSIONING

/

4.25.1 Remove and store the 54 stud eye bolts. Make sure that there is no foreign material on top of the stud which could fall into the measuring hole.

4.25.2 Install an elongation measuring rod in each stud. Do not allow rods to drop into the hole as rod damage and inaccurate measurements could result.

NOTE

The acceptance criteria for stud tensioning is based on stud elongation; 0.051 inch ±.002. QC must verify each reading taken for the initial and final (after adjustment) condition as recorded in columns 1 and 4 of Data Sheet 1. All other intermediate elongation data and/or tensioner pump pressures are for information to get to the required final elongation point.

4.25.3 */* After the temperature of the vessel, head, studs, and rods have stabilized and are approximately equal, take and record in column 1 of Data Sheet 1 the initial condition readings for all 54 studs.

NOTE

When setting and hooking up the stud tensioners, pay particular attention that tensioner #1 is hooked to the hydraulic pump and used in the #46 to #54 stud area. The remaining five tensioners are interchangeable in position (see Figure 1.).

4.25.4 Lower the stud tensioners into the reactor cavity using the polar crane auxiliary hoist and transfer each to its associated radial arm hoist assembly.

4.25.5 Station each tensioner near its first setup position, i.e., Tensioner #1 to stud #46, #2 to #37, #3 to #28, #4 to #19, #5 to #10, and #6 to #1.

4.25.6 Lower the hydraulic pump assembly into the reactor cavity using the polar crane auxiliary hoist and station it in the southwest corner for Unit 1 or northeast corner for Unit 2 of the elevation 194 floor area.

4.25.7 Lower the tensioner hoses into the cavity and hook up as follows:

NOTE

Figures 1 and 2 may be used as an aid to hose hook up.

4.25.7.1 Connect the two, 12-foot long, 3/8-inch diameter, high pressure hydraulic hoses between the tensioners to the couplings on both sides of the cylinder. To connect the coupling, remove the dust cap which protects the body half and push the male tip into the body. Then screw on the collar until it bottoms. The collar is a free fit and should almost spin on, however, it must be bottomed for the hydraulic fluid to flow freely.

4.25.7.2 Connect the 12-foot long, 1/4-inch diameter, low pressure hydraulic hose (bypass valve signal) between the tensioners to the union adapters located just above the high pressure couplings.

4.25.7.3 Connect the black, 12-foot long, 1/4-inch diameter, air hose (piston return) between the tensioners to the couplings located on the front portion of the top plate.

4.25.7.4 Connect the red, 12-foot long, 1/4-inch diameter, air hose (air signal) between the tensioners to the couplings located on the top left and right hand side of the top plate.

4.25.7.5 Connect the single, 12-foot long, 1/4-inch diameter, air hose (air signal) between tensioner #6 and tensioner #1.

4.25.7.6 Repeat Steps 4.25.7.1 through 4.25.7.4 for each of the five 12-foot long hose sets.

4.25.7.7 Connect each one of the hoses in the 35-foot long set between tensioner #1 and the pumping assembly in the same manner as the interconnecting hoses in Steps 4.25.7.1 through 4.25.7.4.

4.25.8 Connect an air supply to the pumping assembly through the two 1-inch female pipe connections located on the upper left hand side of the pump. One or both connections may be used to provide an adequate supply however, if only one connector is used, the other one must be plugged.

WARNING

DO NOT CLOSE THE PUMP RELEASE VALVE OR PUSH THE AIR VALVE UNLESS ALL TENSIONER HOSES ARE CONNECTED AND THE TENSIONERS ARE FULLY SEATED ON THE VESSEL FLANGE WITH THE WEIGHT OFF THE HOIST ENOUGH TO LOCK THE PULL SYSTEM TO THE STUD, THERE-BY ACTIVATING THE LIMIT SWITCH.

NOTES

a. When lowering a tensioner onto a stud, it is best to use the buddy system, i.e., one man operating the hoist while the other man guides the tensioner over the stud by use of the two handles provided on the front of the tensioner.

b. Table 2 may be cut apart and taped securely to its respective tensioner to be used as a sequence guide in the tensioning operation.

4.25.9 Using the individual radial arm hoist assemblies, lower each tensioner over its first stud as seen on the sequence guide (Table 2).

4.25.10 Ensure that each tensioner is seated flush on the head flange and that the tensioner pull system is locked to the stud.

NOTE

If adjustment of stud tensioners is required, adjustment may be performed without the need for a Maintenance Work Order.

4.25.11 Close the release valve on the pumping assembly then depress and hold the air valve.

CAUTION

Maximum hydraulic pump pressure shall not exceed 9300 psi.

4.25.12 Continue pumping operation until the pressure (Table 1) for that particular set and pass has been reached.

4.25.13 When the appropriate pump pressure has been reached, insert the torque handle into one of the holes in the upper portion of the spherical nut and rotate in the clockwise direction until the nut bottoms.

NOTE

To torque, the pivot pin on the torque handle must be in a vertical position. The torque handle is marked to indicate this proper position.

4.25.14 When the nut bottoms, apply force to the torque handle until an audible click is heard. This will seat the nut at a preset torque.

4.25.15 Open the release valve and allow the preasure to reduce to zero.

CAUTION

Pull system release of a stud is activated by taking up slack in the tensioner lift mechanism. Make sure pull system is released before continuing lift of tensioner.

4.25.16 Carefully raise the tensioners clear of the studs using the individually attached radial arm hoists.

4.25.17 When all tensioners are clear of their respective studs move all tensioners in unison to the next set-up.

4.25.18 */* Continue Steps 4.25.9 through 4.25.17 until all sets and all passes (Table 1) are completed.

4.25.19 When the two passes have been completed, move the six tensioners clear. Take and record elongation data in column 2 of Data Sheet 1.

4.25.20 Calculace the amount of residual elongation (column 3) for each stud.

NOTES

a. Studs and nuts not requiring adjustment but used for locking down tensioners during adjustment passes may be marked with a chalk line to allow detection of inadvertent movement.

b. If an adjustment pass is required, then a set sequence need not apply; however, all tensioners hydraulically connected must be locked to a stud before pressurization may start. If a tensioner is locked to a stud which does not need readjustment, pumping up and down without moving the spherical nut should leave its elongation within tolerance.

c. Steps 4.25.21 and 4.25.22 are to be used as a basic adjustment guide. Variation in pump pressure or nut position may be required to bring stud elongation into tolerance.

4.25.21 To adjust studs which are below required elongation, pump up to 7000 psi and set the nut with the torque handle.

4.25.22 To adjust studs which are above the required elongation; pump up until nuts are free. Back the nut off one full turn (18 holes), then return to 7000 psi and reset the nut using the torque handle.

NOTE

When adjustments are made to a particular stud it may affect the elongation of the adjacent studs.

4.25.23 */* After all out-of-tolerance studs have been adjusted and all 54 studs are within limits, contact QC. Take and record the final elongation readings in column 4 of Data Sheet 1.

4.25.24 When all studs have been tensioned within the specified limits , disconnect and remove all tensioning equipment from the cavity.

4.25.25 Remove and store the elongation measuring rods.

4.25.26 Lightly lubricate the 54 stud top screw inserts with N5000 and install.

4.26 SEAL TABLE PREPARATION
/

NOTE

Subsection 4.26 may be accomplished any time after 4.19 but must be completed prior to Subsection 4.32.

4.26.1 The seal table will be prepared for operation in accordance with Procedure 93280-C, "Flux Thimble Withdrawal And Reinsertion For Refueling".

4.27 INSTRUMENT PORT - CONOSEAL ASSEMBLY
/

NOTE

Step 4.27 may be accomplished any time after Step 4.25 but must be completed prior to Step 4.32.

CAUTION

In the assembly of the conoseal, cleanliness is of the utmost importance in the seal joint; therefore, QC should continuously monitor this operation for cleanliness and verify torquing requirements. Use clean lint-free cotton and/or rubber gloves for this installation.

4.27.1 Open the applicable shroud door. Remove and store the thermocouple protective sleeve spring, protective sleeve, and O-ring.

4.27.2 Clean the female flange and new lower conoseal gasket with acetone or isopropyl alcohol followed by demineralized water.

4.27.3 Ensure that the gasket and flange, especially the mating areas are clean and free of nicks or scratches.

4.27.4 Install the lower gasket on the female flange. Make sure that the apex of the cone formed by the gasket points toward the top of the containment building.

4.27.5 Clean the upper sealing surface of the thermocouple support column and the new upper console gasket with acetone or isopropyl alcohol followed by demineralized water.

4.27.6 Ensure that the gasket and sealing surface are clean and free of nicks or scratches.

4.27.7 Install the upper gasket on the support column. Make sure that the apex of the cone formed by the gasket points toward the bottom of the Containment Building.

4.27.8 Clean the male flange and weld ring (if used) with acetone or isopropyl alcohol followed by rinsing with demineralized water.

4.27.9 Ensure that the male flange, especially the mating areas are clean and free from nicks or scratches.

4.27.10 Place the weld ring (if used) on the female flange, and place the male flange on the female flange until the male flange rests on the lower gasket.

SEE ATTACHMENT pkm 9-6-90

4.27.11 Assemble the loading device and slip it down over the flanges. The loading device may be assembled before or after setting on the conoseal. Engage the locking flange of the loading device by rotating it approximately 15° such that the protrusions are inside the notches in the female flange.

4.27.12 Clean the coupling assembly and apply a thin coat of Neolube #1 or #2 to the bolt threads, the interior contact points of the clamp and the exterior contact points of the male and female flanges.

Add note between 4.27.10 and 4.27.11

NOTE

THE OLD STYLE HOLLOW LOADING RAM OR NEW STYLE LIGHTWEIGHT LOADING RAM MAY BE USED TO ASSEMBLE COMSEALS.

NOTES

a. When installing the coupling assembly be sure the bolts are in their proper location with respect to the loading device. About 1 inch between bolt and loading device should allow the loading device to be rotaced to the unlocked position.

b. When hand tightening the three coupling bolts, keep them approximately even so that all three will protrude far enough for future cotter pin installation.

4.27.13 Install the coupling assembly and hand tighten the three bolts. SEE ATTACHMENT SAME AS

4.27.14 Gradually apply pressure to the hydraulic cylinder using the hand pump. A pressure between 1275 to 1375 psi is required for proper sealing. This pressure can be read on the hand pump gage.

4.27.15 While maintaining the 1275 to 1375 psi on the loading device, torque the three bolts uniformly in increments of approximately 25 to 30 ft-lbs until a final torque of 50 to 60 ft-lbs is obtained.

4.27.16 When torquing is complete, release the hydraulic pressure. Rotate the loading device to the unlocked position and remove.

NOTE

The loading device may be disassembled in order to remove it.

4.27.17 Install cotter pins through the bolts and bend against the body of the clamp to prevent bolt rotation.

4.27.18 Clean and install the jack screw plate to the thermocouple column. Up to 4 jackscrews may be pre-installed prior to attachment to the thermocouple column.

4.27.14 SLOWLY PRESSURIZE THE HOLLOW CYLINDER LOADING RAM TO BETWEEN 1275 PSI AND 1375 PSI OR THE LIGHTWEIGHT LOADING RAM TO BETWEEN 5650 PSI AND 6100 PSI.

4.27.15 WHILE MAINTAINING THE CORRECT PRESSURE ON THE LOADING RAM, TORQUE THE THREE BOLTS UNIFORMLY IN INCREMENTS OF APPROXIMATELY 25 TO 30 FT-LBS UNTIL A FINAL TORQUE OF 50 TO 60 FT-LBS IS OBTAINED.

4.27.19 Clean and install the split ring to the thermocouple support ring.

.27.20 Clean and apply a thin coat of Neolube #1 or #2 to the jack screw, then install it through the jackscrew plate.

4.27.21 Tighten the jack screws uniformly in a cross pattern in approximately 30 in-lbs increments until a final torque of 95 to 105 in-lbs is obtained.

4.27.22 Install locking wire to prevent screw rotation.

4.27.23 */* Repeat Steps 4.27.1 through 4.27.22 until all four instrument port conoseals have been completed.

CAUTION

Do NOT twist the knurled thermocouple connectors during reassembly.

4.27.24 For thermocouples equipped with Conax-Style connectors, torque the 1/2-inch compression cap to 144-180 inches-pounds while holding the connector body with a wrench to prevent rotation.

4.27.25 Connect all thermocouple connectors. Close the shroud doors. Document on Data Sheet 4.

4.28 CAVITY PREPARATION

NOTE

Step 4.28 may be accomplished any time after Step 4.22 or any time prior to procedure completion.

4.28.1 */* Remove and store the two blind flanges on the emergency containment spray returns. Replace the drain screens by cleaning and coating threads on studs and nuts and underside of the nut with Never-Seez Pure Nickel Special. Torque nuts in a two-step cross pattern method with 50-60% of final torque applied on the first step. Final torque will be 60 ft-lbs minimum.

4.28.2 */* Invert and reinstall the eight refueling cavity ventilation opening cover plates (slotted plate down) using the same EPDM gasket which was previously installed. Coat threads with Never-Seez Pure Nickel Special. Tighten the 1/2" bolts to a snug tight fit.

4.29 HEAD VENT PIPING

4.29.1 Remove and store the blank flange on the cavity floor penetration for the RV head vent line.

4.29.2 */* Install the head vent lines using new 2500lb. spiral wound gaskets. Coat threads with Never-Seez Pure Nickel Special. The flange bolts, shall be torqued in a 3 pass cross pattern to a 300 ft-lbs.

4.30 */* REACTOR VESSEL LEVEL INSTRUMENTATION SYSTEM (RVLIS)

4.30.1 Install the RVLIS tubing. Swagelok fittings are tightened hand tight plus 1/4 turn.

4.31 INSTALLATION OF THE REACTOR HEAD INSULATION

NOTE

Head insulation may be installed anytime after Step 4.25.26.

4.31.1 Using appropriate rigging, hand maneuver each section of the Reactor Vessel Head insulation into place. Start with the section designated for azimuth 0°.

4.31.2 */* Continue placing sections around the head until all sections have been installed. Insert section fastener devices and tighten to a snug tight fit.

4.32 RV FILL AND VENT

NOTE

Reactor vessel filling can start at any time after Step 4.30.

4.32.1 RV filling and venting are accomplished in accordance with Procedure 13001-1 or 13001-2, "Reactor Coolant System Filling and Venting", as applicable.

4.33 CABLE RECONNECTION

NOTE

Lowering of cable trays and connection of all cables may occur any time after Step 4.22; however, due to interference around the head it is best to wait until late in this procedure to start this work.

4.33.1 Disconnect temporary 480V power cable (if used) from the integrated head shroud.

4.33.2 Unlatch the cable tray from its stored position.

4.33.3 Using the Reactor Head Electric cable tray winches, pivot the cable tray downward to the tray restraints at the shroud. Alternate lifting devices may be used to lower cable trays should the winches fail.

4.33.4 Latch the shroud cable tray restraints.

4.33.5 Repeat Steps 4.33.2 through 4.33.4 for the other cable tray.

4.33.6 */* Reconnect all cables from the cable tray to the outside of the connector plate. Document cable reconnection on Data Sheet 4.

4.34 */* SEISMIC TIE RODS

4.34.1 Unlock the tie rod from its stored position and lower it to its cavity wall lug.

4.34.2 Remove the cotter pin and connecting pin from the tie rod clevis and maneuver the clevis to the lug.

4.34.3 Install the connecting and cotter pins.

4.34.4 */* Repeat Steps 4.34.1 through 4.34.4 for each of the six tie rods.

4.35 Remove the access platform from the operating floor to the missile shield and all tools and materials used in this procedure.

4.36 */* Notify the Shift Supervisor the reactor has been re-assembled for operation.

5.0 REFERENCES

5.1 1X6AB02-70 (2X6AB02-145), Instruction Manual, Reactor Vessel Unit 1/2)

5.2 X6AB02-231, Technical Manual, Four-Loop Integrated Head Package

5.3 X6AB02-143, Operating and Maintenance Manual, Quick Acting Stud Tensioners Unit 1/2

5.4 X6AB02-207, Instruction Manual, Reactor Vessel Stud Removal Tool Unit 1/2

5.5 X6AN09-63, Technical Manual, Fuel Transfer System Unit 1/2

5.6 X6AQ02-19, Westinghouse F Specification F-2 Preoperation for Refueling Unit 1/2

5.7 X6AB06-86, Westinghouse Assembly Specification, Instrumentation Port Column Assembly Unit 1/2

5.8 X6AB02-171, 190, Drawing, Reactor Tophead Insulation Field Erection

5.9 X6AB02-153, 222, Technical Manual, 450A Load Cell System

5.10 PROCEDURES

5.10.1 00254-C, "Plant Housekeeping/Material Condition Program"

5.10.2 12007-C, "Refueling Entry"

5.10.3 13001-1, "Reactor Coolant System Filling And Venting"

5.10.4 13001-2, "Reactor Coolant System Filling And Venting"

5.10.5 13005-1, "Reactor Coolant System Draining"

5.10.6 13005-2, "Reactor Coolant System Draining"

5.10.7	20425-C,	"Control Of Refueling Lifting And Rigging Equipment"
5.10.8	27305-C,	"Reactor Polar Crane Service Check"
5.10.9	27315-C,	"Spent Fuel Cask Monthly And Annual Check Out"
5.10.10	24960-1,	"Containment Penetration No. 89 - Local Leak Rate Test"
5.10.11	24960-2,	"Containment Penetration No. 89 - Local Leak Rate Test"
5.10.12	43002-C,	"Airborne Radioactive Sampling And Evaluation"
5.10.13	43007-C,	"Issuance, Use, And Control Of Radiation Work Permits"
5.10.14	43301-C,	"Decontamination Of Areas, Tools, And Equipment"
5.10.15	55023-C,	"Incore Irradiation Specimens"
5.10.16	93100-C,	"Refueling Tools And Equipment Preservice Inspection/Checkout"
5.10.17	93140-C,	"Control Rod Drive Shaft Unlatching Tool Operating Instructions"
5.10.18	93280-C,	"Flux Thimble Withdrawal And Reinsertion For Refueling"

END OF PROCEDURE TEXT

TABLE 1
OPERATIONAL BOLT-UP

1	2	3	4	5	6
Set No.	Stud Numbers	First Pass Pump Pressure (psi)	Second Pass Pump Pressure (psi)	Adjustment Pass Pump Pressure (psi)	Desired Residual Elongation (inches)
	1,19,37	5200	7800	7000	0.051 ±.002
1	10,28,46				
	4,22,40				
2	13,31,49				
	7,25,43				
3	16,34,52				
	2,20,38	4950	7400		
4	11,29,47				
	5,23,41				
5	14,32,50				
	8,26,44				
6	17,35,53				
	3,21,39	4700	7000		
7	12,30,48				
	6,24,42				
8	15,33,51				
	9,27,45				
9	18,36,54				

TABLE 2

STUD TENSIONING-DETENSIONING SEQUENCE
Cut Apart and Tape to Individual Tensioners

TENSIONER 1 SEQUENCE		TENSIONER 2 SEQUENCE		TENSIONER 3 SEQUENCE	
SET-UP	STUD	SET-UP	STUD	SET-UP	STUD
1	46	1	37	1	28
2	49	2	40	2	31
3	52	3	43	3	34
4	47	4	38	4	29
5	50	5	41	5	32
6	53	6	44	6	35
7	48	7	39	7	30
8	51	8	42	8	33
9	54	9	45	9	36

TENSIONER 4 SEQUENCE		TENSIONER 5 SEQUENCE		TENSIONER 6 SEQUENCE	
SET-UP	STUD	SET-UP	STUD	SET-UP	STUD
1	19	1	10	1	1
2	22	2	13	2	4
3	25	3	16	3	7
4	20	4	11	4	2
5	23	5	14	5	5
6	26	6	17	6	8
7	21	7	12	7	3
8	24	8	15	8	6
9	27	9	18	9	9

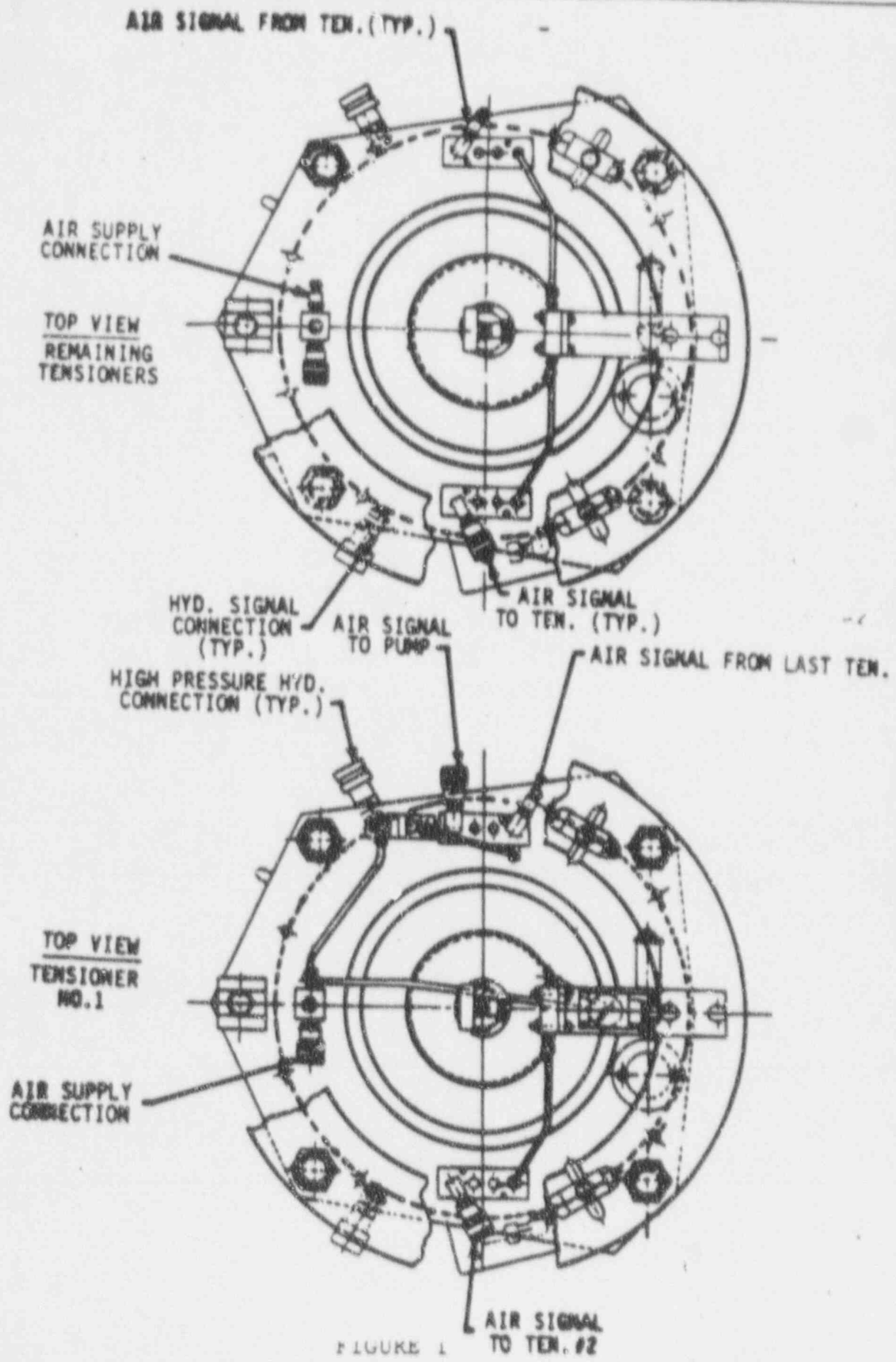

AIR SIGNAL FROM TEN. (TYP.)
AIR SUPPLY CONNECTION
TOP VIEW
REMAINING TENSIONERS
HYD. SIGNAL CONNECTION (TYP.)
AIR SIGNAL TO PUMP
AIR SIGNAL TO TEN. (TYP.)
AIR SIGNAL FROM LAST TEN.
HIGH PRESSURE HYD. CONNECTION (TYP.)
TOP VIEW
TENSIONER NO.1
AIR SUPPLY CONNECTION
AIR SIGNAL TO TEN. #2

FIGURE 1

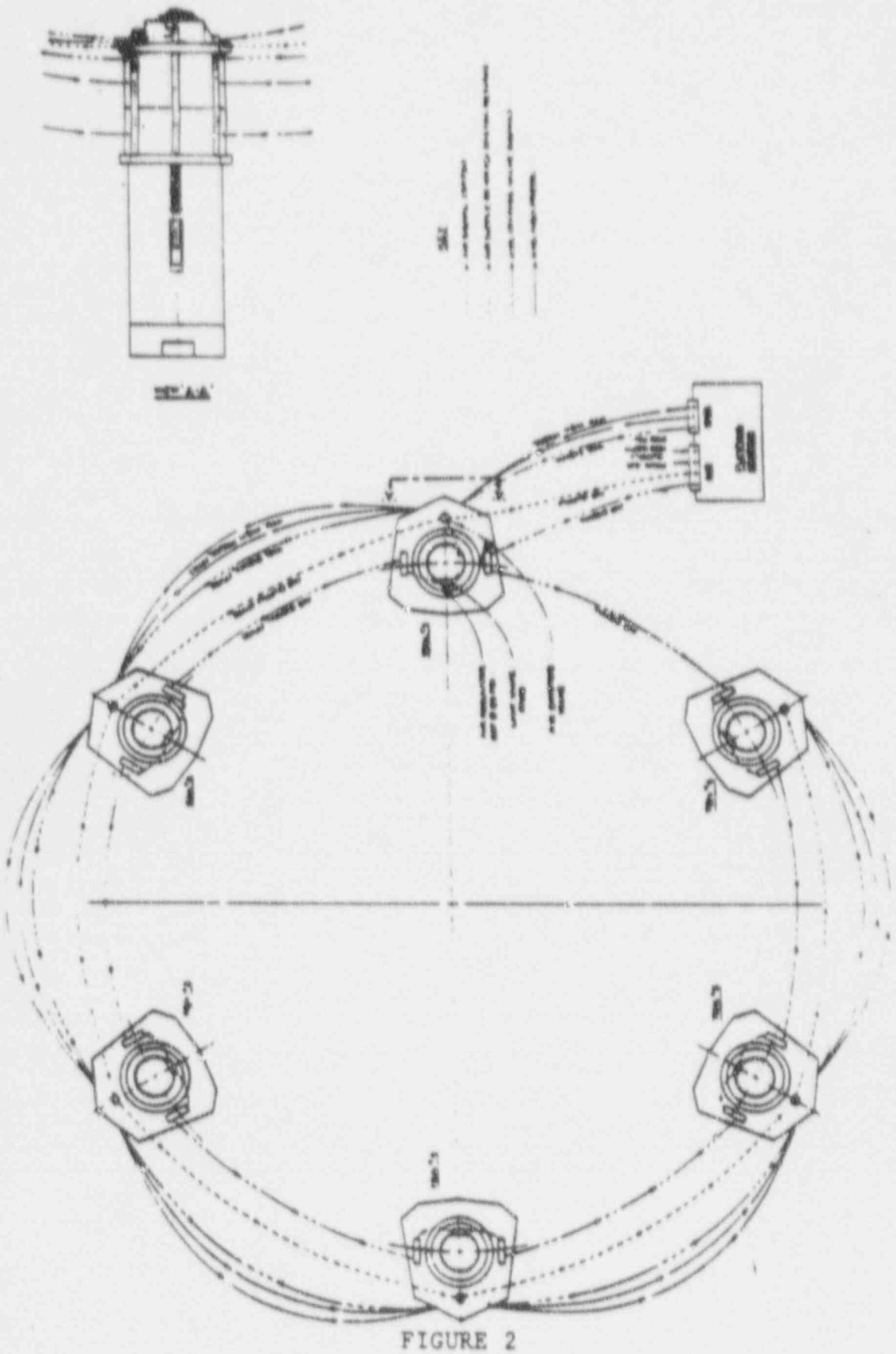


FIGURE 2

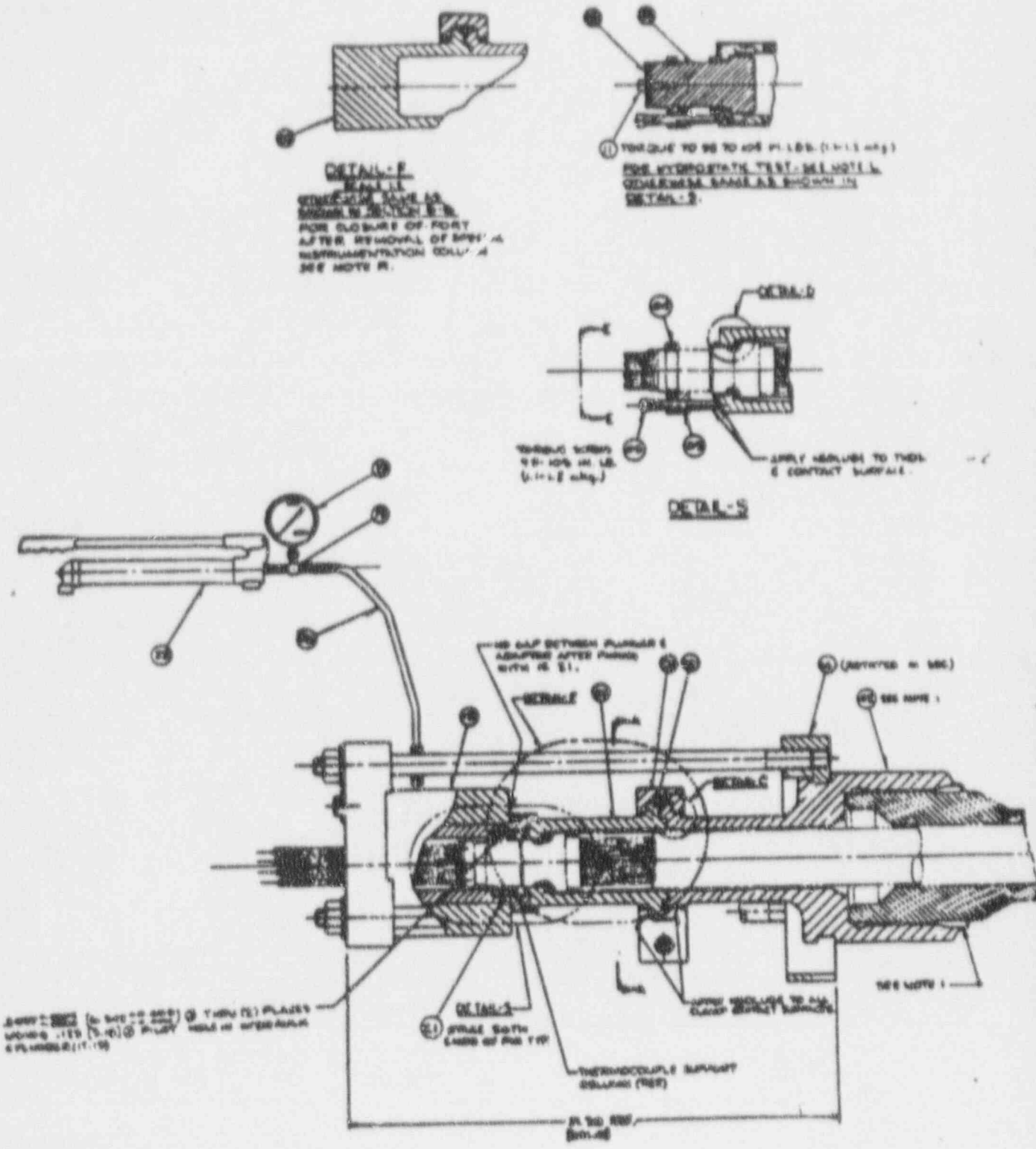
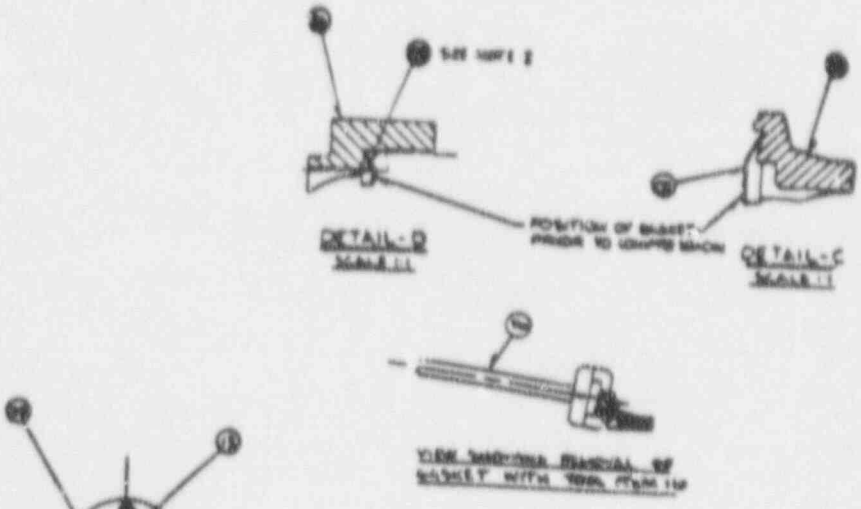
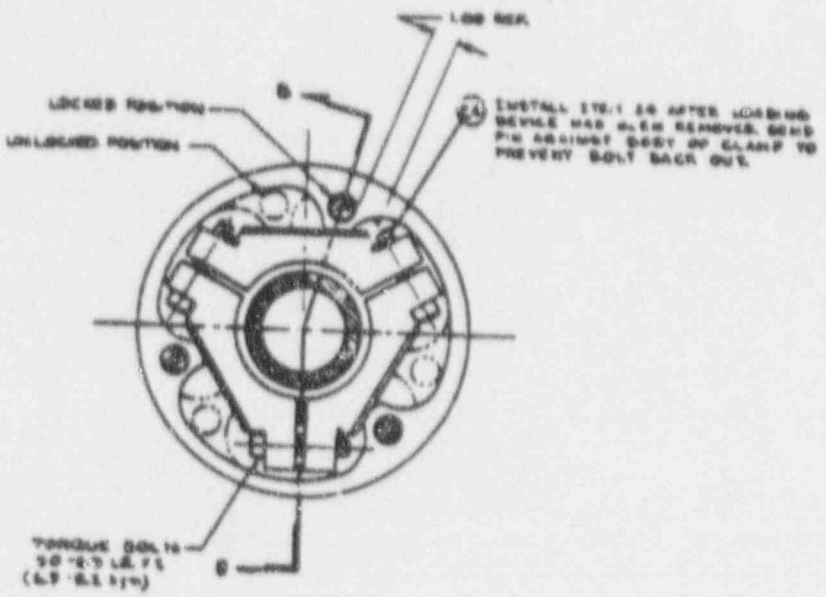


FIGURE 3





SECTION A-A
SCALE 1:1

FIGURE 4

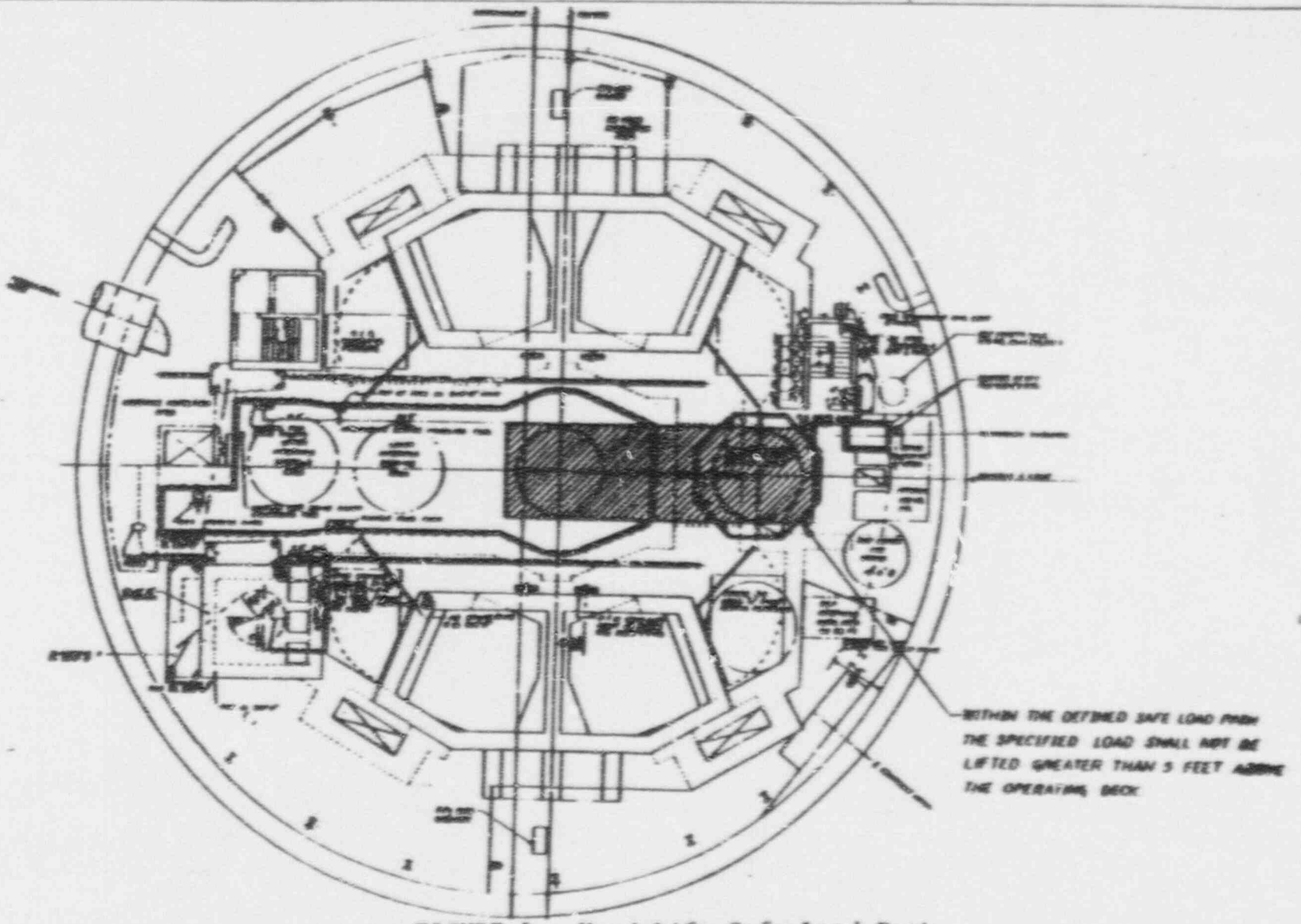


FIGURE 5 - Head Lift Safe Load Path

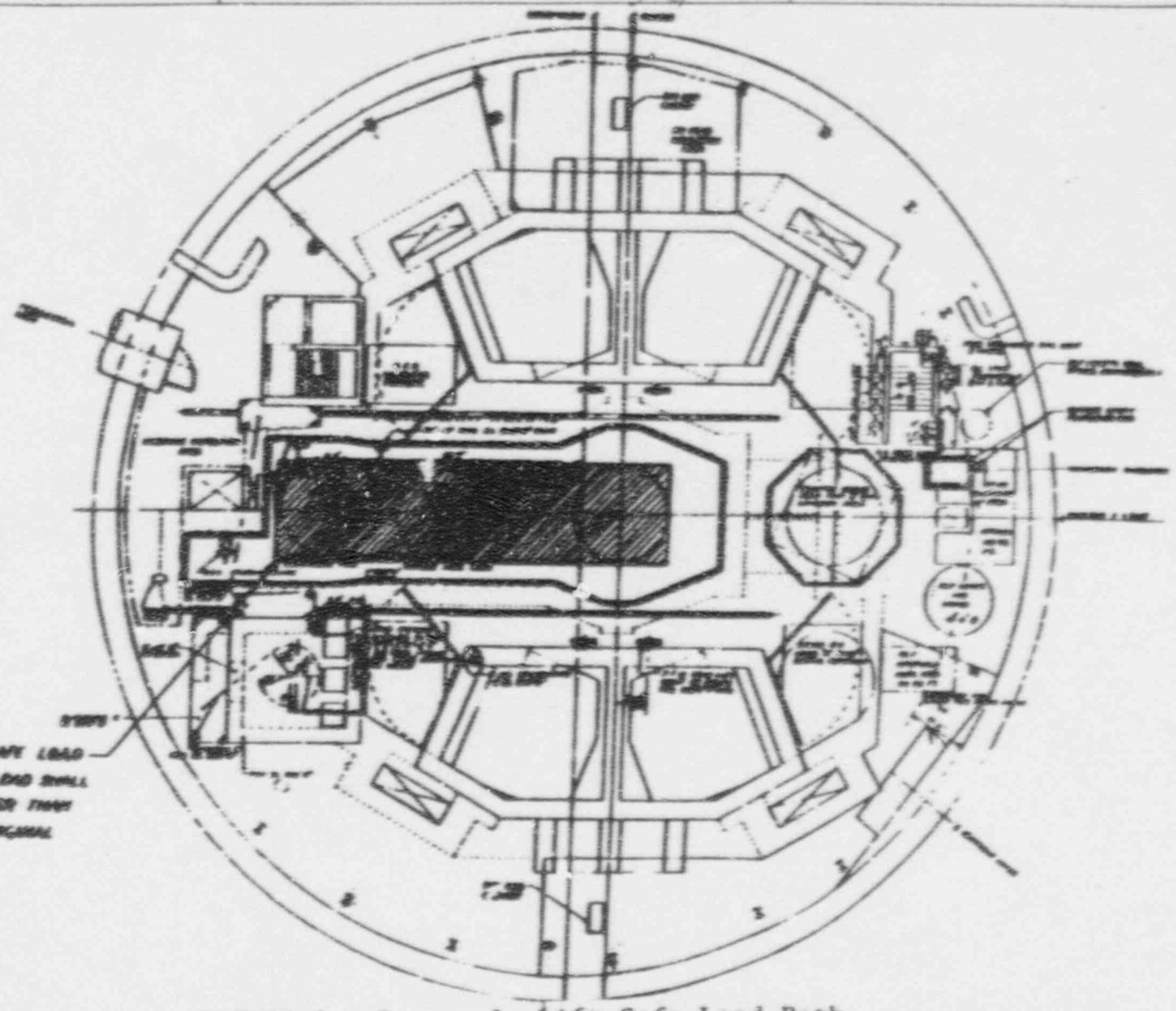


FIGURE 6 - Internals Lift Safe Load Path

Sheet 1 of 2

DATA SHEET 1

ELONGATION DATA SHEET FOR OPERATIONAL LOAD

	1	2	3	4	5
Stud No.	Initial Dial Indicator Reading	Dial Indicator Reading After 2nd Pass	Amount of Residual Elongation After 2nd Pass (Column 2-1)	Dial Indicator Reading After Adj. Pass	Amount of Res. Elong. After Adjustment (4-1)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					

DATA SHEET 1

ELONGATION DATA SHEET FOR OPERATIONAL LOAD

Stud No.	1 Initial Dial Indicator Reading	2 Dial Indicator Reading After 2nd Pass	3 Amount of Residual Elongation After 2nd Pass (Column 2-1)	4 Dial Indicator Reading After Adj. Pass	5 Amount of Res. Elong. After Adjustment (4-1)
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					

Dial Indicator used _____ Sum = _____

Calibration good until _____

Average Residual Elongation = $\frac{\text{Sum Col. 5}}{54}$ =

DATA SHEET 2

VESSEL DISASSEMBLY COMPLETION SHEET

NOTE

Place N/A in the SIGN-OFF space for those sections not applicable and note in the remarks section the reason for the N/A.

STEP	DESCRIPTION	SIGN-OFF	Q.C. VERIFICATION
4.0	Prerequisites and Initial Conditions for the procedure (3.1. and 3.4) have been completed (see Attachment 1, Item 5)	/	/
4.2	Equipment for this section (3.2) has been checked out and is available for use (see Attachment 1, Item 1)	/	
4.2.5	Seismic tie rod disconnected and locked in the upright position		
	45° azimuth	/	
	135° azimuth	/	
	225° azimuth	/	
	262° azimuth	/	
	278° azimuth	/	
	315° azimuth	/	
4.3.7	Cables disconnected and cable tray locked in stored position		
	0° azimuth	/	
	180° azimuth	/	
4.3.8	Temporary radial arm hoist power cable connected if required	/	
4.4.4	RV head insulation removed and stored	/	
4.5	RV water level 24 inches minimum below flange, vented and sampled	/	
4.6.3	Head vent spool piece removed and stored	/	
4.6.6	Head vent seal flange installed	/	

DATA SHEET 2

VESSEL DISASSEMBLY COMPLETION SHEET

STEP	DESCRIPTION	SIGN-OFF	Q.C. VERIFICATION
4.7.2	RVLIS interconnect tubing removed and stored	/	
4.8.1	Seal table has been prepared for refueling and the thimbles have been withdrawn 13 feet 8 inches or 22 feet 3 inches minimum (line out one)	/	
4.9	Applicable tools and equipment for this section have been checked out and are available for use (see Attachment 1, Item 2)	/	
4.9.16	Conoseal components removed, protected and stored. Protective sleeves installed		
	Core Location / Approximate Azimuth		
	A-5 247°	/	
	L-1 147°	/	
	L-15 23°	/	
	R-11 67°	/	
4.10	Prerequisites and Initial Conditions (3.6) for this subsection have been completed. (see Attachment 1, Item 2)	/	
4.10.18	Operational Pass 1	/	
	2	/	

DATA SHEET 2
VESSEL DISASSEMBLY COMPLETION SHEET

STEP	DESCRIPTION	SIGN-OFF	Q.C. VERIFICATION
4.11.19	All 54 studs removed from the vessel in racks with the head and all stud hole plugs installed except 12, 28, 44 and 30 if applicable.	/	
4.11.23	Guide studs installed in holes 12, 28, 44 and 30 if applicable.	/	
4.13.1.4	Emergency Containment Spray drains installed,		
	North	/	
	South	/	
4.13.2.3	Reactor cavity ventilation opening cover plates installed		
	Approximate Azimuth		
	22°	/	
	67°	/	
	112°	/	
	157°	/	
	202°	/	
	247°	/	
	292°	/	
	337°	/	
4.13.3.4	ISI Ports installed		
	Approximate Azimuth		
	0°	/	
	45°	/	
	90°	/	
	135°	/	
	180°	/	
	225°	/	
	270°	/	
	315°	/	
4.13.4.1	Reactor Vessel permanent cavity seal has been visually checked	/	
4.13.5	Reactor cavity sealing complete	/	

DATA SHEET 2

VESSEL DISASSEMBLY COMPLETION SHEET

STEP	DESCRIPTION	SIGN-OFF	Q.C. VERIFICATION
4.14.1	An "as found" Seal Integrity Test has been performed.	/	
4.14.5	Transfer tube blind flange prepared for refueling	/	
4.15.3	Preparation for cavity flooding complete	/	
4.16	Equipment (3.3) for this section have been checked out and are available for use (see Attachment 1, Item 4)	/	
4.16.7	Ten minute hold for visual checks of rigging completed	/	
4.16.14	Reactor Vessel Head is removed and stored	/	
4.17	RCCA drive shafts unlatched	/	
4.18	Equipment (3.3) for this section have been checked out and are available for use	/	
4.18.1	Optional internals measurements.		
	Location _____ Value _____	/	
	Location _____ Value _____	/	
	Location _____ Value _____	/	
4.18.9	Ten minute hold for visual check of rigging completed	/	
4.18.12	Upper Internals removed and stored	/	

Remarks: _____

The Reactor Vessel is ready for refueling operations to begin.

_____ / _____

MAINTENANCE FOREMAN DATE

REVIEWED BY: _____ / _____

OUTAGE AREA SUPERVISOR DATE

DATA SHEET 3

VESSEL ASSEMBLY COMPLETION SHEET

NOTE

Place an N/A in the SIGN-OFF space for those sections not applicable and note in the remarks section the reason for the N/A.

STEP	DESCRIPTION	SIGN-OFF	Q.C. VERIFICATION
4.19	The vessel is ready for reassembly and work is ready to commence, (3.1, 3.2, 3.3 3.4) complete (see Attachment 1, Item 5)	/	/
4.19.3	Ten minute hold for visual check of rigging completed	/	
4.19.6	Upper Internals installed in the RV	/	
4.19.10	The lift rig is stored on stand	/	
4.19.12	Optional internals measurements:		
	Location _____ value _____	/	
	Location _____ value _____	/	
	Location _____ value _____	/	
4.19.13	Outage Area Supervisor Evaluation:		
	Acceptable/Not Acceptable	/	
4.20	RCCA drive shafts latched	/	
4.21	Equipment (3.7) for this section have been checked out and are available for use (see Attachment 1, Item 4)	/	

DATA SHEET 3

VESSEL ASSEMBLY COMPLETION SHEET

STEP	DESCRIPTION	SIGN-OFF	Q.C. VERIFICATION
4.21.11	Vessel O-rings are installed in head	___/___	
4.21.18	Ten minute hold for visual check of rigging completed	___/___	
4.21.24	Head is seated on vessel	___/___	
4.23.2	Transfer tube mating surfaces checked for cleanliness.	___/___	___/___
4.23.6	Transfer tube blind flange installed	___/___	___/___
	Torque Wrench M&TE No. _____		
	Calibration good until _____		
4.24	Applicable tools and equipment (4.19) for this section have been checked out and are available for use (see Attachment 1, Item 3)	___/___	
4.24.1.4	From Step 4.16.7: Ten minute hold for visual checks of rigging completed	___/___	
4.24.1.16 or 4.24.2.2	Guide studs and sleeves removed	___/___	
4.24.1.18 or 4.24.2.3	All stud hole plugs have been removed	___/___	
4.24.3.4.12	All studs have been installed in the vessel	___/___	

DATA SHEET 3

VESSEL ASSEMBLY COMPLETION SHEET

STEP	DESCRIPTION	SIGN-OFF	Q.C. VERIFICATION
4.25	All applicable tools and equipment for this section (3.6) have been checked out and are available for use (see Attachment 1, Item 3)	/	
	Temperature conditions have been met.	/	/
4.25.3	Initial stud elongation measurements have been recorded	/	/
4.25.18	Stud Tensioning passes complete 1st pass 2nd pass 3rd pass (hydro only)	/ / /	
4.25.23	All studs have been tensioned to the required elongations	/	/
4.26	The seal table is ready for system filling	/	
4.27	All applicable conditions, tools, and equipment for this section (3.8) have been checked out and are available for use (see Attachment 1, Item 2)	/	

DATA SHEET 3

VESSEL ASSEMBLY COMPLETION SHEET

STEP	DESCRIPTION	SIGN-OFF	Q.C. VERIFICATION
4.27.23	Instrument port conoseals assembled		
	Core Location / Approximate Azimuth		
	A-5 247°	___/___	___/___
	L-1 147°	___/___	___/___
	L-15 23°	___/___	___/___
	R-11 67°	___/___	___/___
	Torque wrench		
	ft-lbs M&TE No._____ Calib. good until _____		
	in-lbs M&TE No._____ Calib. good until _____		
	Pump Gauge M&TE No. _____ Calib. good until _____		
4.28.1	Emergency containment spray drain blank flanges removed and stored. Screen replaced in drain		
	North	___/___	___/___
	South	___/___	___/___
4.28.2	All eight reactor vessel vent plates installed in the vent position.	___/___	
4.29.2	RV head vent spool piece installed	___/___	
4.30	RVLIS interconnect installed	___/___	
4.31.2	Reactor Head insulation installed	___/___	
4.33.6	Cable tray latch down and all cable reconnected	___/___	
4.34	Applicable tools and equipment for this section have been checked out and are available for use (See Attachment 1 Item 1).	___/___	

DATA SHEET 3

VESSEL ASSEMBLY COMPLETION SHEET

STEP	DESCRIPTION	SIGN-OFF	Q.C. VERIFICATION
4.34.5	Seismic Tie Rods installed		
	45° Azimuth	/	
	135° Azimuth	/	
	225° Azimuth	/	
	262° Azimuth	/	
	278° Azimuth	/	
	315° Azimuth	/	
4.36	Shift Supervisor notified work is completed and of system status	/	

Remarks: _____

The Reactor Vessel is assembled and ready for testing/plant operations (cross out one) to begin.

_____ / _____
MAINTENANCE FOREMAN DATE

REVIEWED BY: _____ / _____
OUTAGE AREA SUPERVISOR DATE

DATA SHEET 4

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

NOTES

a. Ensure that each cable/wire is marked so it can be uniquely identified with its termination point.

b. Original Data Sheet 5 should be included with the vessel disassembly package. A copy of the original will be used to sign off reconnects and be included in the assembly package.

c. Independent Verification is only required on Safety-Related equipment. Place N/A in that column for Non-Safety related equipment.

d. Panel Azimuth are as follows:
Unit 1: A-0° B-180°
Unit 2: A-180° B-0°

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	VERIFICATION INDEPENDENT
A	CRDM	C-K6			N/A
		C-K10			N/A
		D-M12			N/A
		D-M4			N/A
		C-P8			N/A
		Unit 1 C-H2 / Unit 2 C-H14			N/A
		SB-N9			N/A
		SB-N7			N/A
		B-K14			N/A
		B-K2			N/A
		Unit 1 SB-J3 / Unit 2 SB-J13			N/A

DATA SHEET 4

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
		Unit 1 Unit 2			
A	CRDM	SB-G3 SB-G13			N/A
		SE-M8			N/A
		Unit 1 Unit 2			
		SE-H4 SE-H12			N/A
		B-P10			N/A
		B-P6			N/A
		SA-M14			N/A
		SA-M2			N/A
		SD-N11			N/A
		SD-L3			N/A
		A-K8			N/A
		Unit 1 Unit 2			
		A-H6 A-H10			N/A
		SA-P12			N/A
		SA-P4			N/A
		SC-L13			N/A
		SC-N5			N/A
	DPRI	D-H8-B			N/A
		Unit 1 Unit 2			
	DMIMS	MIM-1 MIM-3			N/A
	DPRI	SE-D8-B			N/A
		SE-M8-B			N/A
		SE-H12-B			N/A
		SE-H4-B			N/A
		D-D12-B			N/A

DATA SHEET 4

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
A	DPRI	D-D4-B			N/A
		C-F10-B			N/A
		C-F6-B			N/A
		C-K10-B			N/A
		C-K6-B			N/A
		SD-E13-B			N/A
		SD-N11-B			N/A
		SB-G13-B			N/A
		SB-G3-B			N/A
		SB-N9-B			N/A
		SB-N7-B			N/A
		D-M12-B			N/A
		D-M4-B			N/A
		C-H14-B			N/A
		C-H2-B			N/A
		C-P8-B			N/A
		C-B8-B			N/A
		SD-L3-B			N/A
		SD-C5-B			N/A
		SB-J13-B			N/A
		SB-J3-B			N/A

DATA SHEET 4

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
A	DPRI	SB-C9-B			N/A
		SB-C7-B			N/A
		A-H10-B			N/A
		A-H6-B			N/A
		B-F14-B			N/A
		B-F2-B			N/A
		B-P10-B			N/A
		B-P6-B			N/A
		SC-L13-B			N/A
		SC-C11-B			N/A
		SA-D14-B			N/A
		SA-D2-B			N/A
		SA-P12-B			N/A
		SA-P4-B			N/A
		A-K8-B			N/A
		A-F8-B			N/A
		B-K14-B			N/A
		B-K2-B			N/A
		B-B6-B			N/A
		B-B10-B			N/A
		SC-E3-B			N/A
		SC-N5-B			N/A

DATA SHEET 4

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
A	DPRI	SA-M14-B			N/A
		SA-M2-B			N/A
		SA-B12-B			N/A
		SA-B4-B			N/A
	CRDM	C-F6			N/A
		C-F10			N/A
		D-D12			N/A
		D-D4			N/A
		C-B8			N/A
		Unit 1 C-H14 Unit 2 C-H2			N/A
		SB-C9			N/A
		SB-C7			N/A
		D-H8			N/A
		B-F14			N/A
		B-F2			N/A
		Unit 1 SB-J13 Unit 2 SB-J3			N/A
		Unit 1 SB-G13 Unit 2 SB-G3			N/A
		Unit 1 SE-H12 Unit 2 SE-H4			N/A
		SE-D8			N/A
		B-B10			N/A
		B-B6			N/A

DATA SHEET 4 -

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
A	CRDM	SA-D14			N/A
		SA-D2			N/A
		SD-E13			N/A
		SD-C5			N/A
		Unit 1 A-H10 Unit 2 A-H6			N/A
		A-F8			N/A
		SA-B12			N/A
		SA-B4			N/A
		SC-C11			N/A
		SC-E3			N/A
	Aux Pwr	Aux Pwr			N/A
	Cooling Fan Pwr	CF-4			N/A
		CF-3			N/A
		CF-2			N/A
		CF-1			N/A
	Thermo Couples	T-1-78A			
		T-27-78A			
		T-4-78A			
		T-29-78A			
		T-31-78A			
		T-32-78A			
		T-41-75A			

DATA SHEET 4

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
A	Thermo Couples	T-45-75A			
		T-20-76A			
		T-44-76A			
		T-43-76A			
		T-47-76A			
		T-48-76A			
		T-49-76A			
		T-5-75A			
		T-33-75A			
		T-30-75A			
		T-38-75A			
		T-7-77A			
		T-15-77A			
		T-13-77A			
		T-35-77A			
		T-39-77A			
		T-42-77A			
		T-46-77A			

DATA SHEET 4

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

NOTES

a. Ensure that each cable/wire is marked so it can be uniquely identified with its termination point.

b. Original Data Sheet 4 should be included with the vessel disassembly package. A copy of the original will be used to sign off reconnects and be included in the assembly package.

c. Independent Verification is only required on Safety-Related equipment. Place N/A in that column for Non-Safety related equipment.

d. Panel Azimuth are as follows:
Unit 1: A-0° B-180°
Unit 2: A-180° B-0°

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
B	DMIMS	MIM-1 (Unit 2 ONLY)			N/A
		MIM-2			N/A
		MIM-3 (Unit 2 ONLY)			N/A
		Ground			N/A
	Thermo couples	T-2-78B			
		T-6-78B			
		T-3-78B			
		T-8-78B			
		T-26-78B			
		T-28-78B			
		T-34-77B			
		T-40-77B			

DATA SHEET 4 -

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
B	Thermo Couples	T-18-76B			
		T-22-76B			
		T-19-76B			
		T-23-76B			
		T-24-76B			
		T-25-76B			
		T-50-76B			
		T-10-77B			
		T-16-77B			
		T-14-77B			
		T-21-77B			
		T-9-75B			
		T-12-75B			
		T-11-75B			
		T-17-75B			
		T-36-75B			
		T-37-75B			
	Cooling Fans	CFH-1			N/A
		CFH-2			N/A
		CFH-3			N/A
		CFH-4			N/A
		CFI-1 (Unit 2 ONLY)			N/A
		CFI-2 (Unit 2 ONLY)			N/A
		CFI-3 (Unit 2 ONLY)			N/A

DATA SHEET 4 -

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
B	COOLING FANS	CFI-4 (Unit 2 ONLY)			N/A
	DPRI	D-H8-A			N/A
		SE-D8-A			N/A
		SE-M8-A			N/A
		SE-H12-A			N/A
		SE-H4-A			N/A
		D-D12-A			N/A
		D-D4-A			N/A
		C-F10-A			N/A
		C-F6-A			N/A
		C-K10-A			N/A
		C-K6-A			N/A
		SD-E13-A			N/A
		SD-N11-A			N/A
		SB-G13-A			N/A
		SB-G3-A			N/A
		SB-N9-A			N/A
		SB-N7-A			N/A

DATA SHEET 4

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
B	DPRI	D-M12-A			N/A
		D-M4-A			N/A
		C-H14-A			N/A
		C-H2-A			N/A
		C-P8-A			N/A
		C-B8-A			N/A
		SD-L3-A			N/A
		SD-C5-A			N/A
		SB-J13-A			N/A
		SB-J3-A			N/A
		SB-C9-A			N/A
		SB-C7-A			N/A
		A-H10-A			N/A
		A-H6-A			N/A
		B-F14-A			N/A
		B-F2-A			N/A
		B-P10-A			N/A
		B-P6-A			N/A
		SC-L13-A			N/A
		SC-C11-A			N/A
		SA-D14-A			N/A

DATA SHEET 4

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
B	DPRI	SA-D2-A			N/A
		SA-P12-A			N/A
		SA-P4-A			N/A
		A-K8-A			N/A
		A-F8-A			N/A
		B-K14-A			N/A
		B-K2-A			N/A
		B-B6-A			N/A
		B-B10-A			N/A
		SC-E3-A			N/A
		SC-N5-A			N/A
		SA-M14-A			N/A
		SA-M2-A			N/A
		SA-B12-A			N/A
		SA-B4-A			N/A
Thermocouple Column L-15	Thermo Couple	T-5-75A (C-12)			
		T-9-75B (E-14)			
		T-11-75B (G-8)			
		T-12-75B (G-12)			
		T-17-75B (J-14)			

DATA SHEET 4 -

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
Thermocouple Column L-15	Thermo Couple	T-30-75A (C-14)			
		T-33-75A (E-12)			
		T-36-75B (G-10)			
		T-37-75B (G-14)			
		T-38-75A (H-15)			
		T-41-75A (J-12)			
		T-45-75A (L-14)			
R-11		T-18-76B (L-4)			
		T-19-76B (L-8)			
		T-20-76A (L-12)			
		T-22-76B (N-6)			
		T-23-76B (N-10)			
		T-24-76B (N-14)			
		T-25-76B (R-8)			
		T-43-76A (L-6)			
		T-44-76A (L-10)			
		T-47-76A (N-8)			
		T-48-76A (N-12)			
		T-49-76A (R-6)			
		T-50-76B (R-10)			
L-1		T-7-77A (E-6)			
		T-10-77B (G-4)			

DATA SHEET 4

POWER AND SIGNAL CABLE REMOVAL/REPLACEMENT

PANEL	TYPE	IDENTIFICATION	REMOVED	RECONNECT	INDEPENDENT VERIFICATION
Thermocouple Column L-1	Thermo Couple	T-13-77A (H-1)			
		T-14-77B (J-2)			
		T-15-77A (J-6)			
		T-16-77B (J-10)			
		T-21-77B (N-2)			
		T-34-77B (G-2)			
		T-35-77A (G-6)			
		T-39-77A (J-4)			
		T-40-77B (J-8)			
		T-42-77A (L-2)			
		T-46-77A (N-4)			
A-5		T-1-78A (A-6)			
		T-2-78B (A-10)			
		T-3-78B (C-4)			
		T-4-78A (C-8)			
		T-6-78B (E-2)			
		T-8-78B (E-10)			
		T-26-78B (A-8)			
		T-27-78A (C-2)			
		T-28-78B (C-6)			
		T-29-78A (C-10)			
		T-31-78A (E-4)			
		T-32-78A (E-8)			

ATTACHMENT 1

TOOLS AND EQUIPMENT LIST

The following tools and equipment should be available, properly functioning, clean and ready to use.

1. SEISMIC TIE RODS, HEAT VENT PIPING, AND UPPER INTERNALS

   a. Nylon Straps, one-ton capacity

   b. Polar Crane or appropriate Lifting Device

   c. Approved Duct Tape

2. INSTRUMENT PORT-CONOSEAL

   a. Instrument Column Protective Sleeves (4)

   b. Instrument Column Protective Sleeve O-rings (4)

   c. Protective Sleeve Holding Springs (4)

   d. Instrument Column Upper Conoseal Gaskets (4)

   e. Instrument Column Lower Conoseal Gaskets (4)

   f. Conoseal Gasket Removal Tool

   g. 0-150 Inch-Pound Torque Wrench (3/8" Drive)

   h. 5/8" Allen - Socket Wrench

   i. 0-150 Foot-Pounds Torque Wrench (1/2" Drive)

   j. 5/16" Allen - Socket Wrench

   k. Supply of Neolube (Nuclear Grade)

   l. Axial Loading Ram Assembly

   m. Hydraulic Pump with Cylinder

   n. 0-2,000 psi (minimum) calibrated gauge

   o. Cotter Pins

   p. Safety Wire

ATTACHMENT 1 (CONT'D.)

3. REACTOR VESSEL STUD

   a. Alignment Guide Pins (3)

   b. Eye-bolts (3)

   c. Guide Stud Turning Bar

   d. Stud Lifting Eyes (54)

   e. Measuring Rods (54)

   f. Depth Dial Indicator (Starrett #644J or equivalent)

   g. Nut Wrench Assembly

   h. Stud Wrench

   i. Stud Hole Plugs (51)

   j. Protective Sleeves (12)

   k. Chalk

   l. Stud Tensioners (6)

   m. Five sets of 12' Tensioner Hose (5 hoses per set)

   n. One set of 35' Tensioner Hose (5 hoses per set)

   o. One - six foot Air Signal Hose

   p. Pyrometer (IMC type or equivalent)

   q. Polar Crane

   r. Stud Racks (6)

   s. 50' sections of 1" Air Hose (3 minimum)

   t. RV Stud Removal Tools (6)

   u. Chain Fall, 1 ton capacity minimum.

4. Reactor Vessel Head

   a. Load Cell

   b. Polar Crane

ATTACHMENT 1 (CONT'D.)

c. Bubble Levels (3)

d. Metal O-Ring (outer)

e. Metal O-Ring (inner)

f. Allen type wrench set

g. Bolt Cutters

5. GENERAL USAGE

a. Lint-free rags

b. Isopropyl Alcohol (stainless steel surfaces)

c. Ethyl Alcohol (carbon steel surfaces)

d. Acetone (carbon and stainless surfaces)

e. Approved Bags for material collection and disposal

f. Nuclear grade Neolube, #1 or # 2

g. Fel-Pro N5000

h. GE Versilube 392.

i. Never-Seez pure nickel special

05-317-90

~~ORIGINAL~~ SECTION XI REPAIR / REPLACEMENT TRAVELER

Traveler: 90117 Rev. 0

__ Repair ✓ Replacement

---- Associated Documents -----

MWO: 1890586

OC:

OCP:

Other:

--------- Component ----------

Code Class: ASME 1

Tag. No: 1-1208-U6-036

Description: check valve

Serial No:

Work Description: Replace eight studs and nuts.

--------- Examination / Test Requirements ---------

___ VT-1 ✓ VT-2 ___ VT-3 ___ VT-4 Other

✓ Nominal Operating Pressure ___ Pneumatic ___ Hydrostatic

Pressure ____ Temperature: ____ Hold Time: none after shut UNUP+NOT

Evaluation of Suitability (IWA 7220)

Design/Construction Code Reconciliation

Repair / Replacement Organization GPC Maintenance

---------- INITIAL REVIEW ----------

	Signature	Date	Hold Points	
Maintenance Engineering	[signature]	3-20-90	__ Yes	✓ None
Quality Control	[signature]	3/20/90	✓ Yes	__ None
ANII	Joe Ray by H.N. Davis for Peterson 3-20-90	3-20-90	__ Yes	✓ None

---------- FINAL REVIEW ----------

	Signature	Date
Maintenance Engineering		
ISI		
Quality Control		
ANII		

Remarks:

ORIGINAL

Traveler No: 9017
MWO: 1.89052.86

SECTION XI TRAVELER INSTRUCTION SHEET
Page 2 of 3

Step No.	TRAVELER WORK INSTRUCTIONS	RWO	Q.C. W/H	Q.C. Init	ANII W/H	ANII Init
Q.C. HOLD POINT 1	QC To verify heat numbers or appropriate code identifiers and make entry on ballot materials	QC	H	DSW		
Q.C. HOLD POINT 2	Replace bonnet studs and nuts per procedure 26621-C, MWO 1890586, and Sect XI traveler 9017.	MRT	H	AKR		
Q.C. HOLD POINT 3	QC to perform VT-2 at nominal operating pressure and temperature.	QC	H	DSW		

ORIGINAL

Traveler 90117 MWO 18905286 Page 3 of 3

ASME SECTION XI BILL OF MATERIALS

Mat./Comp. Description	Reference Drawing	Item No.	Code Year Orig/Repl	Mat. Spec Orig/Repl	Heat & Ser. No.	Q.C. Field Verification
studs, bonnet	1X6AA06-363	12		SA 453 GR 660	GR. 660 B *	AKR 3/22/10
nuts, bonnet	1X6AX06-363	3		SA 194-GR 6	F54	[illegible] 4-16-10

Comments: * Heat # RNW 03-4-10

ORIGINAL ASME TEST VERIFICATION FORM

TVF No. 90017 MWO No. 18905286 Traveler No. N/A

Tag/ Weld No. 1-1208-U6-036

Item Description: 3" check valve with seal cap

Description of Work: Disassemble and assemble class one valve. Weld on seal cap.

QC Initial Review Howard A Gilyan 3/19/90

ANII Initial Review [illegible] 3/19/90

Required NDE/Testing		Q.C.		ANII	
TEST	ENTRY/ACCEPTABLE CRITERIA	A/R	REPORT #	W/H	A/R
ASME VT-1, 2, 3, 4	VT-2	A	N/A *		
SURFACE EXAM. VT, PT, MT	VT, ~~PT~~ (N/A) 3-19-90	A	* #3 4/17/90		
VOLUMETRIC EXAM. UT, RT	N/A				
OTHER	N/A				

REMARKS: * SEE TRAVELER 90-119 FOR THIS INSPECTION

Maintenance Engineering [signature] Date 4/18/90

ANII _____ Date ___/___/___

SECTION XI REPAIR / REPLACEMENT TRAVELER

Traveler: [illegible] Rev. ____

-- Repair -- Replacement

---- Associated Documents ----

MWO: [illegible]

DC: ____

DCP: N/A

Other: N/A

---------- Component ----------

Code Class: [illegible]

Tag. No: [illegible]

Description: [illegible]

Serial No: [illegible]

Work Description: [illegible]

---------- Examination / Test Requirements ----------

N/A

--- VT-1 --- VT-2 --- VT-3 --- VT-4 Other ____

--- Nominal Operating Pressure --- Pneumatic --- Hydrostatic

Pressure ____ Temperature: ____ Hold Time: ____

Evaluation of Suitability (IWA 7220) N/A

Design/Construction Code Reconciliation N/A

Repair / Replacement Organization [illegible]

---------- INITIAL REVIEW ----------

	Signature	Date	Hold Points
Maintenance Engineering	[illegible]	3/22/90	-- Yes -- None
Quality Control	[illegible]	3/22/90	-- Yes -- None
ANII	[illegible]	3-22-90	-- Yes -- None

---------- FINAL REVIEW ----------

	Signature	Date
Maintenance Engineering	[illegible]	4-12-90
ISI	____	____
Quality Control	[illegible]	4/12/90
ANII	____	____

Remarks: ____

ORIGINAL

Traveler No: 7605 MWO: [illegible]	SECTION XI TRAVELER INSTRUCTION SHEET Page 2 of [illegible]					
Step No.	TRAVELER WORK INSTRUCTIONS	RWO	Q.C.		ANII	
			W/H	Init	W/H	Init
01	[illegible]					
	[illegible]					
	[illegible]					
	[illegible]	Mand				
O.C. HOLD POINT	[illegible]	QC	H	CCG		
O.C. HOLD POINT	[illegible]					
	[illegible] 500806	Mand	H	CCG		
04	[illegible]					
	[illegible]	Mand				
O.C. HOLD POINT	[illegible]	QC	H	CCG		

Traveler 2011 MWO 1E10536 Page 1 of 1

ASME SECTION XI BILL OF MATERIALS

Mat./Comp. Description	Reference Drawing	Item No.	Code Year Orig/Repl	Mat. Spec Orig/Repl	Heat & Ser. No.	Q.C. Field Verification

Comments:

DEFICIENCY CARD

CARD # 1-90-254 UNIT 1 (✓) UNIT 2 ( ) COMMON ( )

COMPLETED BY INITIATOR

1: DESCRIPTION OF DEFICIENCY (ADDITIONAL SHEETS ATTACHED? YES NO)

Refer to MWO# 18905286 Valve 1-1208-4E-036 Traceability of Material is indeterminate due to NCR# 90-5017 Cut out studs for PO 89-7001508 issued, Yet all of the studs for P.O 89-7001508 are still in the warehouse location D-69-111

LOCATION OF THE DEFICIENCY? Material Traceability

WHAT IS AFFECTED BY THE DEFICIENCY? Material

HOW WAS THE DEFICIENCY DISCOVERED? during QC review of MWO

EVENT TIME 10:51 CST DATE 4/16/90 DISCOVERY TIME 10:51 CST DATE 4/16/90

DISCOVERED BY? Alan A. Simmons WORK # 3349 DEPT. QC

COMPLETED BY SS WITHIN 2 HOURS

2: SHIFT SUPERVISOR REVIEW

NAME OF SS REPORTED TO? TIME DATE

PLANT MODE/CONDITION:

IS IMMEDIATE NOTIFICATION REQUIRED? YES NO

IF YES, 1 HOUR, 2 HOUR, OR 24 HOUR REPORTED: DATE TIME

TECH. SPEC. REQUIRED ACTION TAKEN? YES NO N/A

LIST APPLICABLE TECH. SPEC. SECTION(S):

SUMMARIZE COMPENSATORY ACTION TAKEN:

LCO INITIATED: NO YES # TYPE: INFO LCO FIRE

WRT INITIATED: NO YES #

SIGNATURE OF SS TIME DATE

GEORGIA POWER COMPANY
VEGP QUALITY CONTROL

VISUAL LEAKAGE EXAMINATION

85060-C FIG 1
PAGE 1 OF 1

MWO/OTHER #	INSP PROCEDURE #	REV #	DRAWING #	REV #
1890586	85060-C	3	1X4DB111	17

LINE/EQUIP # 1-1205-U6-036

TEST CODE:
ASME Section XI [X] ANSI B31.1 [ ] OTHER ____

TYPE OF TEST:
System Leakage [X] System Inservice [ ] System Pneumatic [ ]
System Functional [ ] System Hydrostatic [ ] Other ____

COMPONENT OR SYSTEM:
Insulated [ ] Non-Insulated [X]

TEST CONDITIONS: (Complete as applicable)
Required NOP [X] NOT [X] Verified NOP [X] NOT [X]
Required ____ PSIG Verified ____ PSIG
Required ____ F Verified ____ F

TEST CONDITION VERIFIED BY:
Examiner [ ]
Other [X] Name CHESTER GUINN Time 1505 CDT ~~1305~~

TEST INSTRUMENTATION:
INSTRUMENT # N/A Cal. Due Date ___/___/___
INSTRUMENT # N/A Cal. Due Date ___/___/___
INSTRUMENT # N/A Cal. Due Date ___/___/___
* Cal. Data Not Required Except For Hydrostatic & Pneumatic Tests

TEST RESULTS:
SAT. [X] UNSAT. [ ] DC # ____

DESCRIPTION OF DEFICIENCY IF UNSAT: NONE

VISUAL EQUIPMENT USED: FLASHLIGHT, INSPECTION MIRROR

REMARKS: ____

EXAMINER: [signature] LEVEL II DATE 4/16/90

EVALUATOR: N/A [X] LEVEL DATE

ANII REVIEW: N/A [ ] DATE

ANII/ISI TEST VERIFICATION FORM

MWO NO. 1990 ~~2594~~ 5256	REV. 1ST 10/25/90	Traveler No. N/A	Rev.	Date 8-7-89

Description of Test/work Performed: DISASSEMBLY AND INSPECTION OF VALVES 1-1208-U-6-055 AND C34. VT-2 INSPECTION REQ'D. AFTER REASSEMBLY (CLASS 1)

ANII REVIEW [signature] 8-7-89

Prepared by: [signature]	Date 8-7-89	Maint. Eng. Review [signature]	Date 8/7/89	ISI Review [signature]	Date 8/7/89

Results of Test Accept [X] Reject [ ] Date _____

IF Rejected:

Proposed Retest: N/A

Supporting Document: _____

Review of Test Results

Maint. Eng. [signature] Date 4-23-90

ANI _____ Date _____

ISI _____ Date _____

Remarks: * VALVE 1-1208-U-6-055 WAS NOT DISASSEMBLED PER 4-23-90

Quality Control Inspection Report

VOGTLE GENERATING PLANT—UNITS 1 & 2

34083

Georgia Power

MWO/ODR/DR No.	Building	Procedure/Spec. No./Rev.
1890 5286	CTMT	26621-C R/1
Room No./Level No.	**Sys./Start-Up Designator**	**Tag No.**
C	1208	1-1208-U6-036
Drawing No./Rev.	**Vendor Manual Log No.**	**Other**
N/A	N/A	N/A

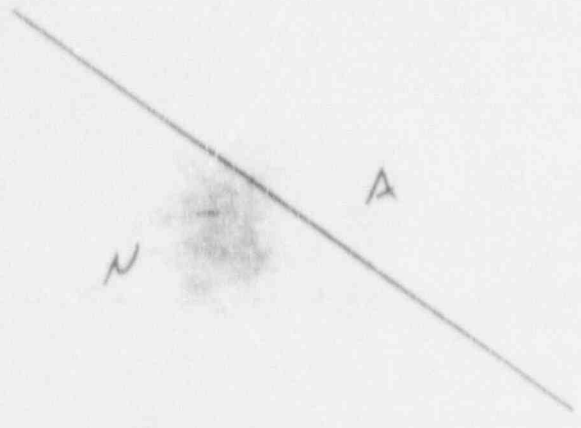
1. Inspector will use separate form for each completed inspection function(s) and insert original with work package, use continuation sheets when needed.
2. Use simple narrative type report procedure. Reference all applicable drawing numbers, specifications, special instructions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.
3. Upon completion of the inspection activity, enter results below and sign and date.

Remarks

VISUALLY VERIFY PROCEDURE STEPS 4.3.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2.F, 4.4.3, 4.4.12 - INTERNAL VALVE INSPECTIONS & STUD AND NUT TORQUE. VERIFIED & REPLACEMENT STUDS & GASKET MATERIAL BOTH ON MER # 5017. THESE ITEMS ARE ACCEPTABLE.

VISUAL EXAM ON BODY EXTERNAL SURFACE @ SEAL WELD REMOVAL AREA REVEALED A GRINDING GROOVE APPROX. 3/32" TO 1/8" IN DEPTH APPROX 200° AROUND BODY, WIDTH OF GROOVE APPROX 1/8".

Sketch



Inspection Results

☐ SAT. ☒ UNSAT—ODR/DR NO.(S): MWO 1890 5286

Inspector	Date
Andrew K Ross	3/22/90

7065 16A MCS191

WHITE—Work Package CANARY—Q.C. Supv. PINK—Inspector

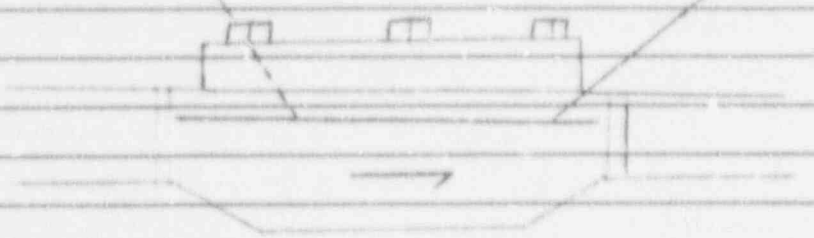
Quality Control Inspection Report (CONTINUATION SHEET)
VOGTLE GENERATING PLANT—UNITS 1 & 2

Georgia Power

IR# 34083

MWO/ORD No./Other MWO 18905286

Remarks #2
CONTINUOUS GROOVE ON BACKSIDE
FOR 20° APPROX SAME DIMENSIONS AS #1



VIEW FACING WALL

705517 MCS191

Inspector [signature]

Date 3/22/90

WHITE—Work Package CANARY—Q.C. Supv. PINK—Inspector

№ 1708

Liquid Penetrant Inspection Report

MWO 1896528G

Plant/Site/Project: VOGTLE / UNIT 1			
Procedure No.: 85062-C	Rev.: 0	Drawing No.: N/A	Rev.: N/A
Part No.: 1-1208-U6-036 CHECK VLV		Surface Condition: AS GROUND	
Pre-Clean (Method): SOLVENT WIPE			
Penetrant (Brand): MAGNAFLUX SKL-HF/S		Batch No.: 81A045	
Penetrant Removal (Brand): MAGNAFLUX SKL-S		Batch No.: 89F04K	
Emulsifier (Brand): N/A		Batch No.: N/A	
Developer (Brand): MAGNAFLUX SD-NF/ZP-9B		Batch No.: 88/4043	
Interpretation: ✓ Accept / N/A Reject	Repairs: N/A Accept / N/A Reject		See Report No.: L.P. 1682

Remarks: PERFORMED LIQUID PENETRANT TEST ON SEAL WELD REMOVAL AREAS ON BONNET AND BODY NOT COVERED ON PREVIOUS L.P.T. OF WELD REPAIR. REF. L.P. INSPECTION REPORT # 1682 DATED 3/22/90

Sketch: N/A

NDE Signature: Andrew K Ross	Level: III	Date: 3/22/90
Inspection Supervisor	Section	Date
Document Control		Date

7023838

№ 1682

Liquid Penetrant Inspection Report

M.W.O. 18905286

Plant/Site/Project: VOGTLE / UNIT 1			
Procedure No.: 85062-C	Rev.: 0	Drawing No.: N/A	Rev.: N/A
Part No.: 1-1208-U6-036 CHECK VALVE		Surface Condition: AS GROUND ; AS WELDED	
Pre-Clean (Method): SOLVENT WIPE			
Penetrant (Brand): MAGNAFLUX SKL-HF/S		Batch No.: 87A045	
Penetrant Removal (Brand): MAGNAFLUX SKC-S		Batch No.: 89F04K	
Emulsifier (Brand): N/A		Batch No.: N/A	
Developer (Brand): MAGNAFLUX SKD-NF/ZP-9B		Batch No.: 88H043	
Interpretation: Accept — ✓ SEE ② Below CCG Reject 3 22 90	Repairs: See ③ Below ✓ CCG Accept 3 22 90 — Reject	See Report No.: N/A	

Remarks:

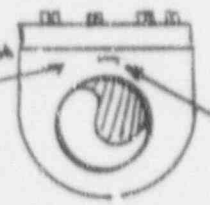
① PERFORMED L.P.T. OF THE GROOVE AREA PRIOR TO WELDING NO DISCREPANCIES NOTED.

② PERFORMED L.P.T. OF THE REPAIR AFTER WELDING & GRINDING. 3/8" LINEAR INDICATION NOTED.

③ RE-PERFORMED L.P.T. AFTER LIGHT GRINDING AND BUFFING. NO DISCREPANCIES NOTED.

Sketch:

CHECK VALVE U6 036



AREA OF P.T. @ 280° FROM EAST TO WEST

3/8" LINEAR INDICATION (REMOVED BY LIGHT GRINDING & BUFFING;) (2nd P.T. OF REPAIR AREA SHOWED COMPLETE REMOVAL)

VIEW: LOOKING EAST

NDE Signature: Christoph C. Bl	Level: II	Date: 3-22-90
Inspection Supervisor	Section	Date
Document Control		Date

7023838

Nuclear Plant Maintenance Work Order Continuation Sheet

MPL No. 1 12 08 46 036 MWO No. 1890528 6

Work Description BLOCK 27 CONTINUED

VALVE 1-1208-46-036 torqued, waited one hour and re-torqued at 170 Ft. lbs. Torque Wrench UP 3-2075 CAL. DUE DATE 7/3/90. Q.C. INSPECTED

JLR 3/22/90

Retained Seal Cap to warehouse from MRR 90-05016.

WHC 3/26/90

Vogtle Electric Generating Plant
Nuclear Plant Maintenance Work Order Continuation Sheet

MPL No. 1-1208-06-036	MWO No. 1890286

Work Description Block # 27 Cont'

Blended out weld on valve 1208-06-036 for P.T. After surface P.T was satisfied weld was made on body of valve using ER 308L 1/8" Ht # P0443 weld repaired area was prepared for final P.T. Monitored zone III Housekeeping. MPJ 3/22/90

Nuclear Plant Maintenance Work Order Continuation Sheet

MPL No. 1120846036 MWO No. 18905286

Work Description Block 27 continued

ALL tools needed to disassemble valve 1-1208-U6-036 are on ~~platform~~ directly in front of valve. The backside of valve next to concrete wall has been ground on top bottom side. The front side bottom half and center weld are left to grind. Scaffold in front needed to be modified and carpenters have completed this. Fire extinguisher is also on platform. George Brown is there for a hands on turnover. Class III cleanliness zone to housekeeping

Tommy Ollard
3/19/90

Block 27 continued

Grinded out front of valve 1-1208-U6-036 also inside cap on valve. Removed cap ~~tagged~~ measurement # 3-20-90 and took to Deacon. Took ~~measurement~~ of bonnet nut 1 1/16". Had about a gallon of water and cap. Left all tool & fire extinguisher and work area on platform. Class III cleanliness zone. Housekeeping.

Peter Ciccio 3/20/90

Nuclear Plant Maintenance Work Order Continuation Sheet

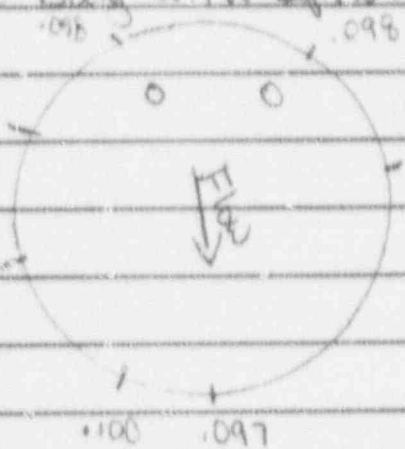
MPL No. 1-1209-46-C36 Dgw 3 2040 MWO No. 1 90 12286 Dgw 3 2040 FLANGES

Work Description BLOCK 27 CONT. REMOVED CAP AND FLANGES FROM 1-1209-46-C36. NUTS WERE WEIRRUED AND RESINGS RAISED FROM 110 FT LBS TO 135 FT LBS. THERE'S A DRAWING OF THE BOLT PATTERN WITH THE SPECS FOR EACH NUT IN A PLASTIC BAG ON THE PLATFORM. FLANGE AND OTHER PARTS ARE IN BAGS ON THE VALVE. THE VALVE HAS BEEN CLEANED AND THE THREADS GREASED WITH ANTI SEIZE. HEIGHT OF THE OLD STUDS WERE MEASURED BEFORE REMOVAL. LENGTH WAS 2½". USED TORQUE WRENCH VP-3-2368-9-2-90. USED DIAL CALIPER VP-3-2179-10-3-90. LEFT AT CCCOM.

Larry J Williams Sr.
3-19+20-90

Blok 27 3/21/90 had measurements taken on gasket seating surface on valve Body with Depth gauge. VP-3-2211 cal date 11-1-90

Measurements are:



Transported Bonnet to decon. Bonnet is tagged with Red tape with valve ID on it. machining of Bonnet will take place at hot machine shop. Bonnet has been decon'ed but still is now smearable contaminated Have to get that done over lathe HT 3/21/90

Nuclear Plant Maintenance Work Order Continuation Sheet

MPL No. L 117 MWO No. 19905166

Work Description Block HCV [signature] 3/21/90

When VALVE was Disassembled, we Ran A fiberscope in
Thru VALVE #036 & to see the INTERNALS of VALVE #035
DISC was in tact & internals Looked good. 3-20-90
Verified Disc was in tact only 1. Wayne R Jones 3-20-90
2. Paul W. Ryan 3-20-90
3. Tom Cucci 3-20-90

Nuclear Plant Maintenance Work Order Continuation Sheet

MPL No. 1208-V6-036 MWO No. 18905286

Work Description Block 22. Measured valve Bonnet Cap, Before machining 1.500. Set up Cap in Lathe machined To 250 cms Finish Thickness After machining 1.498 O.D. mic 1"-2" VP3-2456 Cal Due Date 8-2-90 CK 3-22-90 Maintained Zone III Housekeeping

Carl Lew

CFM used Jan II sticker dial indicator (0-.500) (Cal Due Date VP-3-2874) VP-3-2874 to set up bonnet cap in lathe prior to machining. Jan II 3/22/90

CFM

3-22-90

GEORGIA POWER COMPANY
VEGP QUALITY CONTROL

QC HOLD / WITNESS POINTS

B5010-C FIG. 1
PAGE 2 OF 2

WR/SI No: 5236 ~~5245~~ 01 | PROCEDURE & REV No: 26621-C N/1

VALVE: 1(2)CBU60-0210

NOTIFY QUALITY CONTROL PRIOR TO PERFORMING THE WORK ACTIVITY OR STEP ASSOCIATED WITH THE HOLD (H) OR WITNESS (W) POINT

DO NOT BYPASS QC HOLD OR WITNESS POINTS

STEP NO.	H/W	HOLD POINT / WITNESS POINT DESCRIPTION	ASSIGNED BY INIT	ASSIGNED BY DATE	NOTIFIED INIT	NOTIFIED DATE	QC ACTION INIT	QC ACTION I-W-N/A
4.3.1	H	NOTIFY Q.C TO PERFORM VISUAL INSPECTION OF DISC ASSEMBLY FOR CORROSION, CRACKS, EXCESSIVE WEAR, OR OTHER ABNORMALITIES.	DAM	7-21-89	AKR	3/22/90	AKR	I
4.3.2	H	NOTIFY Q.C TO INSPECT BODY FOR CORROSION, CRACKS, EXCESSIVE WEAR, OR OTHER ABNORMALITIES	DAM	7-21-89	AKR	3/22/90	AKR	I
4.3.3	H	NOTIFY Q.C. TO INSPECT BONNET FOR CORROSION, CRACKS, EXCESSIVE WEAR, OR OTHER ABNORMALITIES	DAM	7-21-89	AKR	3/22/90	AKR	I
4.4.1	H	NOTIFY Q.C. TO VISUALLY CHECK VALVE BODY AND ACCESSIBLE PIPE FOR CLEANLINESS	DAM	7-21-89	AKR	3/22/90	AKR	I
4.4.2	H	NOTIFY Q.C TO OBSERVE REASSEMBLY OF VALVE INTERNALS AND TO ENSURE THE DISC IS FREE TO OPEN AND CLOSE, AND THE DISC SEATS COMPLETELY AGAINST SEAT RING IN THE BODY	DAM	7-21-89	AKR	3/22/90	AKR	I
4.4.3	H	NOTIFY Q.C TO OBSERVE TORQUING OF ANY STUDS REMOVED FROM VALVE BODY	DAM	7-21-89	AKR	3/22/90	AKR	I
4.4.12	H	NOTIFY Q.C TO OBSERVE TORQUING OF FINAL PASS BY REMOVING 1 NUT AT A TIME ON MAIN FLANGE	DAM	7-21-89	AKR	3/22/90	AKR	I

COMMENTS & IR NUMBERS: (initial and date entries)

GEORGIA POWER COMPANY
VEGP QUALITY CONTROL

QC HOLD / WITNESS POINTS

85010-C FIG. 1
PAGE OF

MWO No: 18905286 (2)

PROCEDURE & REV No: N/A

NOTIFY QUALITY CONTROL PRIOR TO PERFORMING THE WORK ACTIVITY OR STEP ASSOCIATED WITH THE HOLD (H) OR WITNESS (W) POINT

DO NOT BYPASS QC HOLD OR WITNESS POINTS

1-1208-116-036

STEP No.	H/W	HOLD POINT / WITNESS POINT DESCRIPTION	ASSIGNED BY INIT	ASSIGNED BY DATE	NOTIFIED INIT	NOTIFIED DATE	QC ACTION INIT	QC ACTION I-W-N/A
①	H	NOTIFY Q.C. PER THE AS-						
		SIGNED HOLD POINTS IN						
		SECT. ~~XI~~ TRAVELER 9015						
		a) PT BLENDED AREAS	JE	3/22/90	CCG	3-22-90	CCG	I
		b) VISUALLY INSPECT	JE	3/22/90	CCG	3-22-90	CCG	I
		REPAIR WELD						
		c) PT WELD AREA	JE	3/22/90	CCG	3-22-90	CCG	I
		NOTE:						
		REF. WRS # 900868						

COMMENTS & IR NUMBERS: (Initial and date entries)

Nuclear Plant Maintenance Work Order Continuation Sheet

REASSEMBLY

MPL No. 1-1208-U6-036 MWO No. Dgn 3-22-90 1890 5286

Work Description Block 27 cont'd: Reassembled valve 1-1208-U6-036 installed 8 new studs and nuts and gasket. Torquing all studs was done per procedure 26621-C. Torquing for nuts was done per Westinghouse letter GP-14763 Gasket was measured with dial calipers VP-3-2179 - cal date 10-3-90. All measurements were within Westinghouse tolerances per procedure 26621-C GP 14763 Dgn 3-22-90 Stud height ranged from 2 7/8" to 2 9/16" with 6" scale. Torque wrench VP-3-2866 cal date 5-1-90 was used for first torque - 25 FT-LBS. VP-3-2075 was used for remainder 1-3-90 Dgn 3-21-90 of the steps including final step after a 2 hour wait. NER # 3-16-90-C05017 for studs nuts & gasket. Maintained ZONE III Housekeeping

Danny J. Williams Sr.

3-22-90

GEORGIA POWER COMPANY
VEGP QUALITY CONTROL VISUAL WELD INSPECTION REPORT

85050-C FIG 5
PAGE 1 OF 1

1. MWO/OTHER #	2. INSP PROCEDURE #	REV #	3. DRAWING #	REV #
18905286	85050-C	2	N/A	
4. TAG/EQUIP #	5. SYS. DESIGNATOR		6. BUILDING	ROOM/LEVEL
1120U6 036	1208		CTMT	C
7. WELD #	8. MATERIAL TYPE/HEAT #			
900868	P8 to P8			

9. TIME OF EXAMINATION:
FIT UP INSP ☑ IN PROCESS ☐ FINAL INSP ☑ INSERVICE ☐

Note: Enter weld inspection attributes accepted or rejected with reasons for rejection.

10. REMARKS:

VISUALLY INSPECTED THE BLENDED OUT GRINDING GROOVE PRIOR TO WELD OUT NO DISCREPANCIES NOTED
VISUALLY INSPECTED THE WELD REPAIR AREA PER CATEGORY 'D' REQUIREMENTS OF 85050-C R/2. NO DISCREPANCIES NOTED.

11. SKETCH:

12. DC/ODR #	13. INSPECTOR Christopher C. Bolt	LEVEL II	DATE 3-22-90
ACCEPT ☑ REJECT ☐	14. EVALUATOR N/A ☑	LEVEL	DATE

5286

WORK REQUEST NO. 1890-3-95

COMPLETION SHEET

Procedure No.	Revision	Sheet
26621-C	1	1 of 2

Tag No.	Description
1-1208-U6-036	Check Valves 3"-12"

Serial No.	Manufacturer	Model
N/A	Westinghouse	30-43 Style B

Test Equipment Used	M&TE No.	[-] Safety Related/QC Hold Points
Torque Wrench	VP-3 2386 cal due 5-1-90	
Dial Caliper	VP-3 3013 cal due 7-8-90	[ ] Non-Safety Related
D.M. Caliper	VP-3-2174 cal due 10-8-90	

PROCEDURE STEP	DESCRIPTION	MAINT. INIT/DATE	HOLD POINT (Yes/No)	QC INIT/DATE
4.1	Verify Prerequisites	[illegible] 3-22-90	No	[illegible] 4/31/90
4.2.1	Notify Shift Supervisor	[illegible] 3-22-90		
4.2.2	Clearance and Tagging	[illegible] 3-22-90		
4.3.1	Check Disc Assembly	[illegible] 3-22-90	Q.C. HOLD POINT	[illegible]
4.3.2	Check Body	[illegible] 3-22-90	Q.C. HOLD POINT	[illegible]
4.3.3	Check Bonnet	[illegible] 3-22-90	Q.C. HOLD POINT	[illegible]
4.4.1	Check Cleanliness	[illegible] 3-22-90	Q.C. HOLD POINT	[illegible]
4.4.2f	Disc Free	[illegible] 3-22-90	Q.C. HOLD POINT	[illegible]
4.4.3	Studs Torqued to 100 ft.lbs.	[illegible] 3-22-90	Q.C. HOLD POINT	[illegible]
4.4.7	Nuts Torqued to 35 ft.lbs (Level 1)	[illegible] 3-22-90	No	[illegible] 4/31/90
4.4.8	Nuts Torqued to 60 ft.lbs (Level 2)	[illegible] 3-22-90		

[illegible]

PROCEDURE STEP	DESCRIPTION	MAINT. INIT/DATE	HOLD POINT (Yes/No)	QC INIT/DATE
4.4.9	Nuts Torqued to 450 ft.lbs (Level 3)	[illegible]	No	[illegible]
4.4.12	Final Torque on flange Nuts 775 ft.lbs	[illegible]	HOLD POINT	[illegible]
4.4.13	Notify Shift Supervisor	[illegible]	No	[illegible]

Comments/additional hold points: _____

QC has reviewed this procedure for hold points [illegible] Signature

APPROVED (✓) DISAPPROVED ( ) FOREMAN	DATE
Wayne R. Jones	3-22-90

COMPLETED BY	DATE
[illegible]	[illegible]

Sheet 1 of 1

DATA SHEET 1

MAINTENANCE CLEANLINESS AND HOUSEKEEPING

Maintenance Work Order No. 1890528 6 Date 3-22-90

Maintenance Cleanliness and Housekeeping Standard Required

(B) C D (Circle one)

Name of system or component requiring cleaning

CLEANLINESS STANDARDS

(B)	C	D	INIT/DATE
Metal clean surface. Rust allowable 2 sq/in per 1 sq/ft.	Thin rust on carbon steel OK. Rust allowable 15 sq/in per 1 sq/ft.	Tight mill scale Carbon steel OK. Rust which resists brushing.	KWB/3-22-90

*** No particulates/particles removable by brushing. KWB/3-22-90

*** No oil, grease, or other organic films removable by brushing. KWB/3-22-90

*** Perform closeout Step 4.3.5.b.6. KWB/3-22-90

*** No contaminants removable in large amounts by wiping. KWB/3-22-90

*** Decon tools and equipment. KWB/3-22-90

*** Finish maintenance cleaning and housekeeping using Figure 1, "Maintenance Cleanliness and Housekeeping Handout". KWB/3-22-90

COMMENTS:

[signature] 3-22-90

MAINTENANCE PERSON SIGNATURE/DATE — DATE RESULTS REVIEWED

KWB [illegible] 3-22-90 — (✓) Approved

MAINTENANCE FOREMAN SIGNATURE/DATE — ( ) Disapproved

*** (for all cleanliness standards)

TASK 4 RECOMMENDATIONS

4.1 Disassembly and Inspection

Disassemble the check valves in accordance with the requirements covered in the Maintenance and Instruction Book 5710-99. PROCEDURE 26621-C LMB 3.5.4

Record the breakout torque values of the nuts.

Remove the cap.

Measure the height of the studs above the body flange.
If the stud height above the flange is less than 2.32 inches, the studs are fully engaged in the valve body.
If the stud height above the valve body flange is more than 2.32 inches, the stud is not fully engaged in the valve body.

Since the valve has been leaking, it is necessary to clean the studs before reassembly. To do so, it is recommended that all studs be removed from the body and cleaned to remove any boron deposits.

Q.C. HOLD POINT

If the stud height is more than 2.32 inches, remove the stud and use a bottoming tap (5/8 -11) to tap the stud holes to .96 to 1.00 inch. The holes are predrilled to 1.10 inches (see attached sketch). Clean the the tapped holes and the studs, and lubricate the studs in accordance instructions in the Instruction Book using Fel-Pro N-5000 or equivalvent.

Q.C. HOLD POINT

Dimensionally inspect the valve bonnet/cap to make sure there is no dishing or warping of the cap. If the cap is dished or warped, it must be evaluated before it is reused.

Inspect the seating surface of the cap to make sure there is no scratch marks or wear marks at the gasket seating area. If it is scratched or worn, take a skin cu of the surface (.001 inch to .003 inch) with a surface finish of 125-250 RMS.

Clean the gasket groove with acetone or suitable cleaning fluid making sure not to scratch the surface.

4.2 Installation

Install the studs in the valve body in accordance with ~~Instruction Book paragraph 6.2.9.~~

Measure the stud heights above the badge flange and confirm that the heights are less than 2.32 inches above the body flange face.

Obtain a new gasket from the warehouse and measure the gasket dimensions before installation. The gasket dimensions shall be:

O.D	4.49 + .000/- .047 inches
I.D	3.78 + .016/- .016 inches
Thickness	.125 + .010/- .000 inch

Install the cap and tighten the stud nuts in accordance with ~~Instruction~~ Book paragraph 6.2.11 (Table 6-2B) as modified below . The torquing sequence shall be:

Torque Level 1 25 ft -lb

Torque Level 2 60 ft -lb

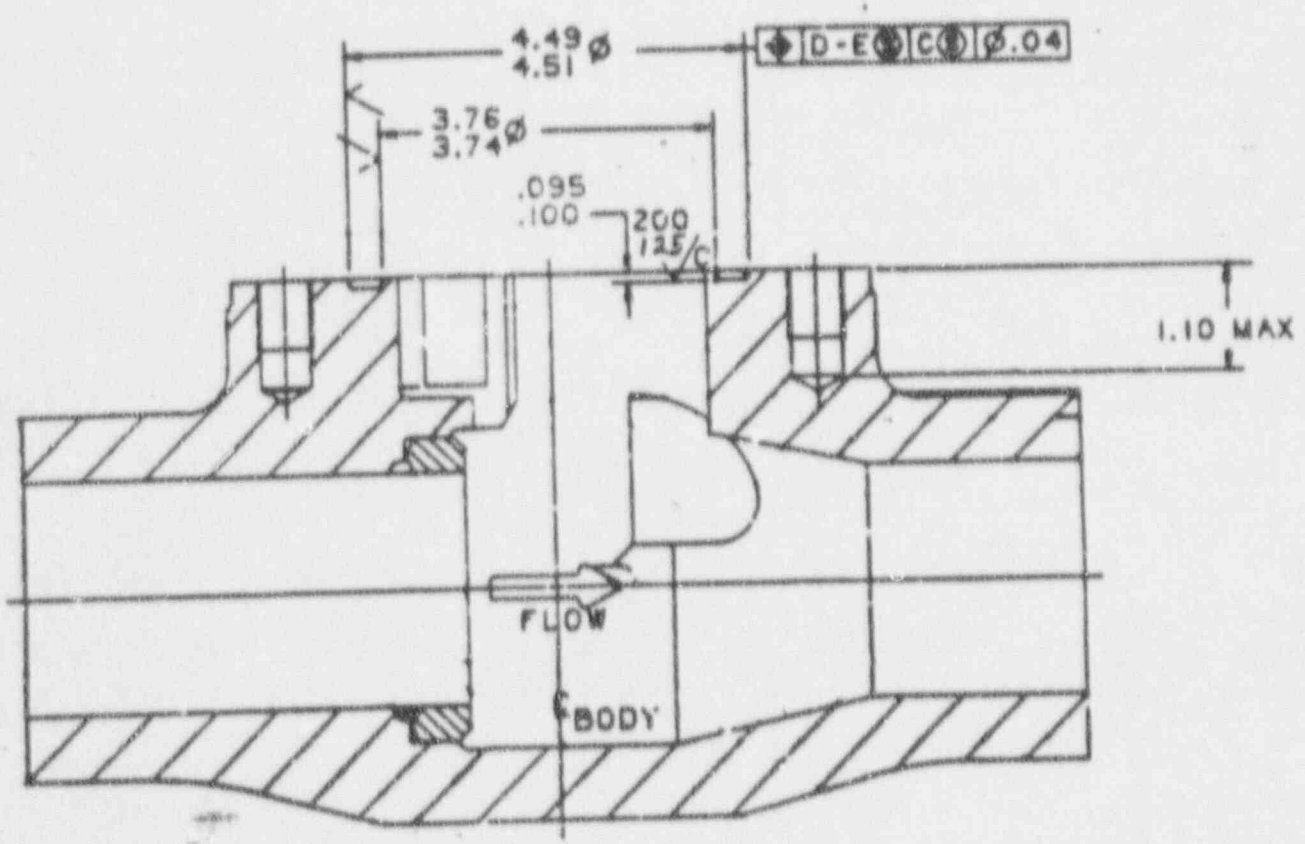
Torque Level 3 150 ft -lb

Torque Level 4 170 ft -lb

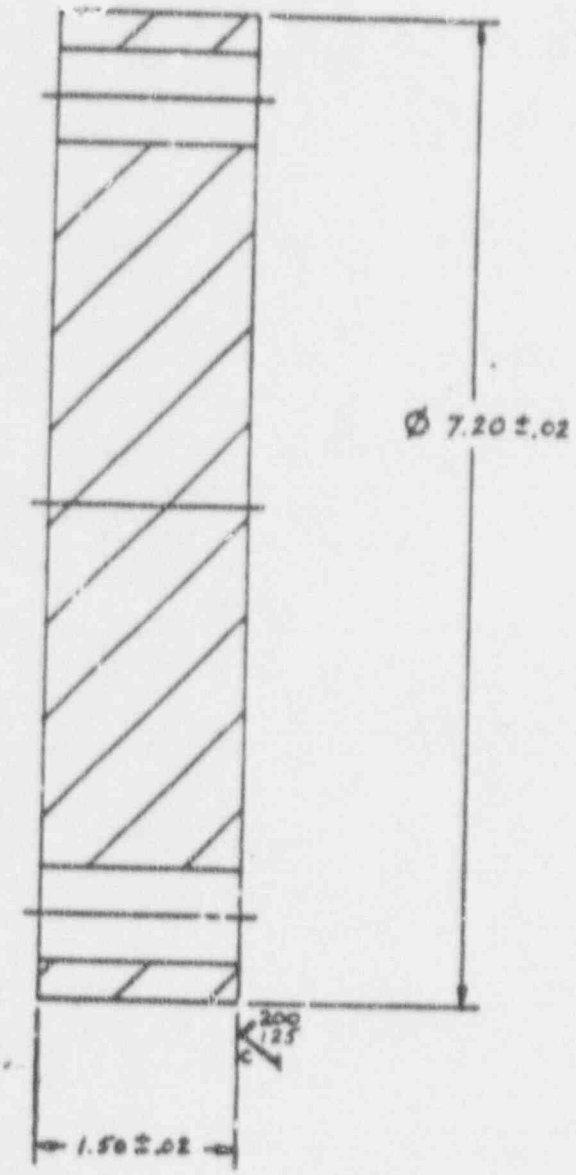
Q.C. HOLD POINT After completing the torquing sequence, repeat the sequence one more time at 170 ft-lb to assure that all the studs are well torqued.

***** NOTE *****

WAIT FOR 1 HOUR AFTER TORQUING ALL NUTS TO LEVEL 4 (SECOND TIME) TO ALLOW THE Q.C. HOLD POINT TORQUES TO STABILIZE. RECHECK TORQUE LEVEL 4 FOR ALL STUD NUTS AND RETORQUE AS NECESSARY TO 170 FT-LBS. THIS WILL BE THE THIRD CYCLE AT 170 FT-LBS.



Attachmnet 1: Check Valve Body



Attachment 2: Check Valve Bonnet/Cap

NUCLEAR PLANT MAINTENANCE WORK ORDER (CONTINUED) (2 OF 2)

CONTROL NO. 18905286 02

MPL/TAG NO.	SYSTEM	EQP CLS	DESCRIPTION	LOCATION
11208U6035	1208	111	CHECK VALVE 3.0,C88,1500	1RB184-SG1-4N3E21
11208U6036	1208	111	CHECK VALVE 3.0,C88,1500	1RB184-SG1-4N3E19

Block 26 E.M. [illegible] 3/19/90

PACKAGING INSTRUCTIONS

ZZZ:TOOLS. N/A

QQ: CAUTION: MID-LOOP AND NO RHR FLOW IS REQUIRED.

ERECT SCAFFOLDING.

REMOVE SHEETMETAL COVER AND INSULATION.

GRIND OUT WELD ON SEAL CAPS.

DISASSEMBLE VALVE.

INSPECT INTERNALS FOR ABNORMAL WEAR AND FULL SWING ON DISC ARM. IF ANY DEFECTS ARE FOUND NOTIFY SYSTEM ENG./MAINT. ENG. FOR INSPECTION. **

DO NOT REPLACE ANY PRESSURE BOUNDARY PARTS THAT'S NOT ON A SECTION XI TRAVELER. SECT. XI TRAVELER # 9017.

REASSEMBLE VALVE PER 26621-C.

MAINTAIN CLEANLINESS CLASS - B.

WELD ON NEW SEAL CAP PER WPCS (SEE MWO)

(PT BODY & BONNET WHERE SEAL CAP WELD WAS REMOVED.)

QC/ANII TO PERFORM A VT-II AT N.O.P./T.

REINSTALL INSULATION/SHEETMETAL LAGGING.

** WHEN VALVE IS DISASSEMBLED, INSERT A BOROSCOPE INTO THE LINE AND INSPECT THE INTERNALS OF THE OTHER CHECK VALVE

Document FINDINGS in Item 27

NUCLEAR PLANT MANAGEMENT INFORMATION SYSTEM
MAINTENANCE WALKDOWN INPUT FORM

MWO #: 18905286 RCN #: MEPM TAG #: 1120BU6036

PACKAGING INSTRUCTIONS

TO THE EXTEND POSSIBLE. THE OTHER VALVE NOT TO BE DISASSEMBLE WITHOUT A SEPERATE MWO AND SYSTEM ENGINEERING APPROVAL.

E:EST MAN/HRS. 60 MEOP

D:DUR. 30 HRS.

DATA SHEETS FOR 1-1208-U6-015 REMOVED AND PM CHECKLISTS CPC 3/15/90 SCANNED AS MARKED AS THEY ARE NOT APPLICABLE CPC 3/15/90

EQUIPMENT MAINTENANCE CHECKLIST

WO-NUMBER	CHECKLIST	CLASS	FREQUENCY	PAGE
1205286	SCL00497	C	N/A	1 OF 1
TAG NUMBER	REFERENCE MATERIAL			
1-1208-U6-036	26621-C			

MAINTENANCE REQUIREMENTS AND SPECIAL INSTRUCTIONS	SKILL AND INITIALS
WESTINGHOUSE STYLE B CHECK VALVE INSPECTION (COMMITMENT # 16052) (RER 89-0278)	
1. DISASSEMBLE AND INSPECT CHECK VALVE PER PROCEDURE 26621-C.	[illegible]
2. INSPECT FOR INDICATIONS OF WEAR, LEAKAGE, EROSION, CORROSION, DEFORMATIONS, MISSING PARTS OR OTHER ABNORMALITIES. PAY PARTICULAR ATTENTION TO INTERNAL VALVE COMPONENTS SUCH AS DISCS, DISC ARMS, HINGE PINS, ANTI-ROTATION LUGS, PISTONS, SPRINGS, LOCKING DEVICES, SEATING/SEALING SURFACES, ETC., AS APPLICABLE. DOCUMENT ANY FINDINGS.	[illegible]

MAINTENANCE ENGINEER/SUPV. APPROVAL H R VAUGHT

LAST MINOR CHANGE DATE 00/00/00

REV. 01
01/09/90

VOGTLE ELECTRIC GENERATING PLANT GEORGIA POWER CO.

MAINTENANCE WORK ORDER REVISION SHEET

1 CONTROL NO.	2 REVISION NO.	3 MPL TAC NO.	4 DATE
18905086	2	1-1205-U6 36	3/22/90

5 REASON FOR REVISION

The body Register Weld Repair where the seal cap was welded on.

Blk 23 pt: Work per Sect XI Traveler 90119

- Blend out area, prepare surface for PT.
- PT Area
- Repair Area by Welding WPCS # 900868
- Blend weld surface.
- PT weld repair

6 INITIATOR L. Jeanne Jenkins

REVIEW SIGNATURES

7 MAINTENANCE ENG	8 OPERATIONS	9 CLEARANCE REQUIRED
3.22.90	3-22-90	N/A
10 QC REVIEW	11 HOLD POINTS	
3/22/90	HOLD POINT ATTACHED	
12 HP REVIEW 3-22-90	13 NEW RWP REQUIRED 90-6604	
14 ANII REVIEW N/A per 3/22/90	15 HOLD POINTS N/A see Sect XI Traveler	3/23/90
16 WORK PLANNER 3-22-90	17 PROCEDURES	
18 FIRE PROTECTION REVIEW N/A	19 SHIFT SUPERVISOR 3/23/90	

20 REMARKS

T.A.

GENERATING PLANT

GEORGIA POWER CO.

MAINTENANCE WORK ORDER REVISION SHEET

1 CONTROL NO.	2 REVISION NO.	3 MPL TAG NO.	4 DATE
18905286	1	1120846 036	3-19-90

5 REASON FOR REVISION: ADDITIONAL WORK INSTRUCTIONS TO BE PERFORMED ON 1120846036 ONLY PER WESTINGHOUSE LETTER GP-1473.

Block 23: PERFORM SPECIAL INSTRUCTIONS PER ATTACHED CONTINUATION SHEETS. PERFORM REV 0 ON 1120846036 IF REQUIRED

6 INITIATOR: Jon Brogdon 3/19/90

REVIEW SIGNATURES

7 MAINTENANCE ENG: Kirkland 3-19-90

8 OPERATIONS: [illegible] 3-19-90

9 CLEARANCE REQUIRED: YES

10 QA REVIEW: [illegible] 3/19/90

11 HOLD POINTS: HOLD POINT ATTACHED

12 HP REVIEW: [illegible] 3-19-90

13 NEW RWP REQUIRED: 90-1604

14 ANII REVIEW: [illegible] 3-19-90

15 HOLD POINTS: JA [illegible] 3-19-90

16 WORK PLANNER: [illegible] 3-19-90

17 PROCEDURES: JA [illegible] 3-19-90

18 FIRE PROTECTION REVIEW: [illegible] 3-19-90

19 SHIFT SUPERVISOR: Jon Covington 3-19-90

20 REMARKS: SC Hall 3-20-90 (0830) - 3-21-90

VOGTLE ELECTRIC GENERATING PLANT — GEORGIA POWER CO.

MAINTENANCE WORK ORDER REVISION SHEET

1 CONTROL NO.	2 REVISION NO.	3 MPC TAG NO.	4 DATE
18905286	1	1120846036	3-19-90

5 REASON FOR REVISION: ADDITIONAL WORK INSTRUCTIONS TO BE PERFORMED ON 1120846036 ONLY PER WESTINGHOUSE LETTER GP-14763.

Block 23: PERFORM SPECIAL INSTRUCTIONS PER ATTACHED CONTINUATION SHEETS. PERFORM REV 0 ON 1120846036 IF REQUIRED

6 INITIATOR: Jon Baggett 3/19/90

REVIEW SIGNATURES

7 MAINTENANCE ENG: Kitteaton 3-19-90	8 OPERATIONS: 3/19/90	9 CLEARANCE REQUIRED: YES/NO
10 QA REVIEW: 3/19/90	11 HOLD POINTS: HOLD POINT ATTACHED	
12 [illegible]: 3-19-90	13 NEW RWP REQUIRED: 90-1604	
14 [illegible]: 3-19-90	15 HOLD POINTS: N/A 3.19.90	
16 [illegible]: 3-19-90	17 PROCEDURES: N/A 3-19-90	
18 FINAL EVALUATION REVIEW: N/A 3/19/90	19 SHIFT SUPERVISOR: 3-19-90 3.20.90	

20 REMARKS

VOGTLE ELECTRIC GENERATING PLANT — GEORGIA POWER CO.

MAINTENANCE WORK ORDER REVISION SHEET

1 CONTROL NO.	2 REVISION NO.	3 MPL TAG NO..	4 DATE
18905286	1	1120U6 036	3 19 90

5 REASON FOR REVISION: ADDITIONAL WORK INSTRUCTIONS TO BE PERFORMED ON 1120U6036 ONLY PER WESTINGHOUSE LETTER GP-14763.

Block 23: PERFORM SPECIAL INSTRUCTIONS PER ATTACHED CONTINUATION SHEETS. PERFORM REV 0 ON 1120U6036 IF REQUIRED.

6 INITIATOR: [illegible] 3/19/90

REVIEW SIGNATURES

7 MAINTENANCE ENG: S Ritleaton 3-1990	8 OPERATIONS: [illegible] 3-19-90	9 CLEARANCE REQUIRED: YES REQ'D
10 QC REVIEW: [illegible] 3/19/90	11 HOLD POINTS	
12 HP REVIEW: [illegible] 3-19-	13 NEW RWP REQUIRED: No add'l	
14 ANII REVIEW: [illegible] 3-19-90	15 HOLD POINTS: [illegible] 3-19-90	
16 WORK PLANNER: [illegible] 3-19-90	17 PROCEDURES: [illegible] 3-19-90	
18 FIRE PROTECTION REVIEW: [illegible] 3/19/90	19 SHIFT SUPERVISOR: [illegible] 3-19-90	SCHART 3-20-90

20 REMARKS

VOGTLE ELECTRIC GENERATING PLANT — GEORGIA POWER CO.

MAINTENANCE WORK ORDER REVISION SHEET

1 CONTROL NO.	2 REVISION NO.	3 MPL TAG NO.	4 DATE
18905286	1	1HV-5146-036	3/19/90

5 REASON FOR REVISION: ADDITIONAL WORK INSTRUCTIONS TO BE PERFORMED ON 1HV-5146-036 ONLY PER WESTINGHOUSE LETTER GP-14763

Work 23: PERFORM SPECIFIC INSTRUCTIONS PER ATTACHED CONTINUATION SHEETS. PERFORM REV 0 ON 1HV-5146-036 IF REQUIRED.

6 INITIATOR: [signature] 3/19/90

REVIEW SIGNATURES

7 MAINTENANCE ENG	8 OPERATIONS	9 CLEARANCE REQUIRED
[signature] 3-19-90	[signature] 3-19-90	YES/NO
10 QC REVIEW: [signature] 3/19/90	11 HOLD POINTS	
12 HP REVIEW: [signature] 3-19	13 NEW RWP REQUIRED	
14 ANII REVIEW: [signature] 3-19-90	15 HOLD POINTS: N/A DS 3-19-90	
16 WORK PLANNER: [signature] 3-19-90	17 PROCEDURES: N/A [signature] 3-19-90	
18 FIRE PROTECTION REVIEW: N/A DS 2/19/90	19 SHIFT SUPERVISOR: [signature] 3-19-90 / 3-20-90	

20 REMARKS: SCHALT 23 3/20/90

(63)

05-318-90

WYLE LABORATORIES SCIENTIFIC SERVICES & SYSTEMS GROUP

May 2, 1990

Reference No. 17133B-006

Georgia Power Company
40 Inverness Center Parkway
P. O. Box 1295
Birmingham, Alabama 35201

Attention: Kenneth S. Burr

Subject: Reliability Evaluation Testing of Calcon Model A3500-W3 Temperature Sensors

References: 1) Georgia Power Company Purchase Order No. 60031-1
2) Wyle Laboratories' Test Procedure 17133

Dear Mr. Burr:

Two new Calcon Model A3500-W3 Temperature Sensors (Serial Nos. OC3011 and OC3002 designated as Temperature Sensor 0 and 1, respectively) were subjected to the Reliability Evaluation Test Program described in Wyle Laboratories' Test Procedure 17133 with the following exceptions: 1) The As-Received Setpoint Determination Test was performed prior to removal of the sensors from their thermowells and inspection of their spacer-tubes, and 2) due to temperature sensor performance during Test Series 1 when the sensors were removed from their thermowells and inserted directly in the water bath, no tests were performed with loose spacer-tubes with the sensors removed from their thermowells and inserted directly in the water bath (tests originally specified for Test Series 3). In addition, it was determined prior to the test that the model number specified in the test procedure (A3501-W3) was taken from an incorrect manufacturer's document which has been corrected in a more recent release of the document, and A3500-W3 is the correct model number.

The test program was performed in the following sequence:

- Specimen identification and external visual inspection.
- As-Received Setpoint Determination Test
- Sensor removal from thermowells and inspection of and marking location of spacer-tubes.
- Calibration of specimens.
- Setpoint Repeatability Tests to determine the effects of varying rates of temperature change, varying input air pressure, vibration, varying ambient air temperature, thermowell setscrew tightness, spacer-tube looseness, etc.

The attached table contains a list of all tests performed including test conditions and results. The tests demonstrated that input air pressure variations of 5 psi or less, a rapid water temperature decrease (approximately 10°F/minute) from just below the setpoint, vibration typical of in-service vibration (excluding long-term effects), ambient air temperature variations of 20°F or less, and slightly noticeable bowing of the Viton O-ring/disk assembly have no significant effect on Temperature Sensor operation and calibration. The following paragraphs describe parameters that were shown to have a significant effect on the operation and/or calibration of the Temperature Sensors.

Insufficient Temperature Stabilization Period Prior to Calibration

Consecutive calibration checks indicated a slight upward shift in the setpoint apparently due to the failure to completely stabilize the temperature of all components of the specimens prior to the initial calibration. It was concluded that a minimum two-hour soak period at approximately 200°F prior to calibration (180°F for setpoint checks) is necessary to ensure consistent performance.

Contaminants on the Temperature Sensor

Tests performed with the Sensors removed from their thermowells and inserted directly in the water bath caused a downward shift of approximately 10°F in the setpoint of both specimens apparently due to mineral residue on the Viton O-ring/disk assembly (standard facility water and not demineralized water was used in the water bath). The Viton O-ring/disk assemblies were cleaned with Dow Corning 200 Fluid (silicone oil) and allowed to dry overnight. The specimens were then recalibrated and remained in calibration for the remainder of the tests prior to the intentional loosening of the spacer-tubes. It was concluded that the Sensors should not be immersed directly in water. All calibrations and tests should be performed with the Sensors installed in their thermowells.

Setpoint Reference Temperature

All tests were performed with a thermocouple used to monitor the internal temperature of a reference thermowell in the water bath along with the specimens. The temperature of the water was also monitored with a thermocouple. It was determined that due to the temperature indication lag of the thermowell thermocouple caused by the thermocouple not displacing as much air as the Sensors, the thermocouple not being as close to the thermowell wall as the Sensors, and the time constant of the thermocouple in still air, the water bath temperature is a more realistic reference for calibration and testing. The lag time for the thermocouple in the circulating water bath was insignificant.

Water Bath Heatup Rate

A slow water bath heatup rate (approximately 1°F per minute) was shown to allow the thermowell internal temperature to more closely follow the water bath temperature. A slow heatup rate causes the specimens to trip at a higher temperature (as measured in the thermowell) than a fast heatup rate. It should be noted that a slow heatup rate causes the specimens to trip at a lower water temperature than a fast heatup rate.

(6)

Thermowell Setscrew Tightness

The tests with the thermowell setscrews loose demonstrated that a loose setscrew causes an increase of approximately 2°F in the setpoint when measured with a heatup rate of 1°F per minute. This setpoint shift is apparently due to the loss of contact between the Sensor and the wall of the thermowell. All calibrations and testing should be performed with the thermowell setscrew tight.

Spacer-Tube Position

The tests performed with the spacer-tube loose demonstrated that the setpoint decreases approximately 80°F for each full turn. A thread-locking compound is recommended to ensure that the spacer-tube remains in its tightened position for all calibrations, tests, and in-service use.

A test report to be issued at a later date shall contain details of the inspections and tests, test results, photographs, equipment calibration data, etc.

Should you have any questions or require additional information, please contact the undersigned.

Sincerely,

WYLE LABORATORIES
Eastern Operations

Don Smith
Senior Engineer
Nuclear Environmental Qualification

Dawn K. Bates
Senior Contracts Administrator

Flavous R. Johnson, P.E.
Department Manager
Nuclear Environmental Qualification

for G. W. Hight
Manager, Quality Assurance

DS/DKB/grd

Attachment

ATTACHMENT

AS-RECEIVED TEST,
CALIBRATION,
AND
RELIABILITY EVALUATION TEST
SUMMARY

					TEMPERATURE SENSOR 0 SERIAL NO. 0C3011						TEMPERATURE SENSOR 1 SERIAL NO. 0C3002					
					TRIP		40 PSIG RESET		+/-1 PSIG RESET		TRIP		40 PSIG RESET		+/-1 PSIG RESET	
DATE	SERIES	RUN	RATE	LOC.	TW	W	TW	W	TW	W	TW	W	TW	W	TW	W
4/23/90	AR	1	1	IN	204.1	208.1	200.2	200.1	200.2	200.1	206.0	210.8	199.3	199.4	199.3	199.4
	AR	2	1	IN	205.7	209.3	201.4	201.7	201.4	201.7	207.2	210.9	200.7	201.0	200.7	201.0
	AR	3	*	IN	209.9	211.7	204.8	204.6	204.3	204.6	210.1	211.9	202.9	203.7	202.9	203.7
	VISUAL INSPECTION/TS-1 SPACER-TUBE SLIGHTLY LOOSE, TIGHTENED BEFORE CONTINUING															
	CALIBRATION AT 200°F															
	CC	1	1	IN	198.6	202.2	196.3	196.1	193.3	193.0	199.9	203.2	193.3	193.0	193.3	193.0
	CC	2	1	IN	198.7	202.1	196.5	196.5	193.6	192.6	200.3	203.5	193.6	192.6	193.6	192.6
4/24/90	1	1	1	IN	198.2	201.7	195.8	195.6	194.9	194.7	198.9	201.9	192.4	191.7	192.4	191.7
	1	2	1	OUT	186.4	190.2	180.6	180.3	180.6	180.3	187.6	191.3	181.7	181.3	181.7	181.3
	1	3	1	IN	186.3	190.1	181.6	181.6	181.4	181.2	185.2	188.7	179.7	179.5	179.7	179.5
	SEE NOTE 2.															
	---	3A	1	IN	187.1	190.7	182.5	182.3	182.3	182.1	192.6	196.7	187.2	187.2	187.2	187.2
	VISUAL INSPECTION/TS-0 SPACER-TUBE SLIGHTLY LOOSE, TIGHTENED BEFORE CONTINUING															
	1	4	1	OUT	186.6	190.4	182.5	182.3	182.4	182.2	186.6	190.4	181.1	181.3	181.3	181.3
	1	5	1	IN	187.4	191.3	184.2	184.0	183.8	183.6	184.7	188.4	177.7	177.5	177.7	177.5
	1	6	1	OUT	181.9	185.5	178.6	178.2	177.5	177.2	182.1	185.9	177.5	177.1	177.5	177.1
	RECALIBRATION AT 200°F															
	DURING RAMP TO 200°F	1	1	IN	194.5	188.3	N/A	N/A	N/A	N/A	181.2	184.7	N/A	N/A	N/A	N/A
	CC	1	1	IN	196.9	200.6	N/A	N/A	N/A	N/A	197.6	201.5	N/A	N/A	N/A	N/A
	RECALIBRATION AT 200°F															
4/25/90	CC	1	1	IN	196.9	200.9	193.7	193.7	192.2	192.4	197.1	200.8	189.6	189.6	189.6	189.6
	1	7	2	IN	194.0	199.8	195.0	195.9	193.0	190.9	197.2	203.2	191.8	190.7	191.8	190.7
	1	8	4	IN	189.3	197.6	194.2	189.2	193.0	188.5	196.3	205.8	194.0	189.4	194.0	189.4
	1	9	6	IN	186.6	196.8	193.9	186.3	193.9	186.3	196.3	208.3	194.4	187.3	194.4	187.3
	1	10	10	IN	184.1	199.5	195.8	184.7	195.6	184.7	196.9	211.4	195.8	186.6	195.6	184.7
	1	11	15	IN	183.8	201.1	196.3	179.2	196.3	179.2	196.7	210.9	199.7	188.5	199.5	187.7
	1	12	20	IN	181.8	202.1	197.2	175.7	197.2	175.7	197.5	211.2	200.8	185.8	200.8	185.8
	---	12A	1	IN	191.2	194.5	N/A	N/A	N/A	N/A	DID NOT TRIP AT 209.4°F TW/211.4°F W					
	THERMOWELLS AND EXTERNAL SURFACE OF SENSOR PROBES CLEANED WITH SILICONE OIL AND BRUSH.															

STOPPED

DATE	SERIES	RUN	RATE	LOC.	TEMPERATURE SENSOR 0 SERIAL NO. 003051 TRIP TW	TRIP W	40 PSIG RESET TW	40 PSIG RESET W	+/-1 PSIG RESET TW	+/-1 PSIG RESET W	TEMPERATURE SENSOR 1 SERIAL NO. 003002 TRIP TW	TRIP W	40 PSIG RESET TW	40 PSIG RESET W	+/-1 PSIG RESET TW	+/-1 PSIG RESET W
4/26/90	1	128	1	IN	198.7	202.3	192.3	192.4	192.3	192.4	205.5	209.2	198.9	199.2	198.9	199.2
	RECALIBRATION AT 200°F (NOTE: TS-0 AND TS-1 RING POSITIONS WERE APPROX. 6/32 AND 8/32 INCHES COUNTERCLOCKWISE FROM THEIR PREVIOUS POSITION AFTER THIS CALIBRATION.)															
	CC	1	1	IN	199.8	203.8	197.1	197.8	195.0	195.8	200.8	204.5	192.3	192.8	192.3	192.8
	CC	2	1	IN	200.0	203.9	197.8	198.2	195.5	196.7	200.8	204.6	192.3	193.3	192.8	193.3
	MOVED THERMOCOUPLE IN THERPOWELL FROM ITS ORIGINAL POSITION 1/2-INCH FROM THE BOTTOM TO TOUCHING THE BOTTOM OF THE THERMOWELL.															
	CC	3	1	IN	201.1	204.6	198.7	199.2	196.3	196.8	201.9	205.2	193.5	193.8	193.5	193.8
	RETURNED THERMOWELL THERMOCOUPLE TO ITS ORIGINAL POSITION.															
	SEE NOTE 1.															
	1	13	1	IN	199.8	204.1	197.0	198.4	195.0	196.1	198.8	203.0	192.0	192.9	192.0	192.9
	1	14	1	IN	203.3	207.6	199.6	201.3	199.6	201.3	203.5	207.9	194.0	194.2	194.0	194.2
	THE MOTOR USED TO TURN THE PROPELLER WHICH CIRCULATED THE WATER IN THE BATH AND WHICH CAUSED SOME SPECIMEN VIBRATION WAS TURNED OFF FOR THE FOLLOWING TEST AND THE SPECIMENS WERE TAPPED CONTINUOUSLY WITH SCREWDRIVERS AT THE RATE OF 2 TO 3 PER SECOND.															
	1	15	1	IN	202.6	207.5	200.0	180.8	199.4	160.6	200.6	204.7	19[illegible]	170.6	194.4	170.6
	SEE NOTE 3.															

					TEMPERATURE SENSOR 0 SERIAL NO. 0C3011						TEMPERATURE SENSOR 1 SERIAL NO. 0C3002					
					TRIP		40 PSIG RESET		+/-1 PSIG RESET		TRIP		40 PSIG RESET		+/-1 PSIG RESET	
DATE	SERIES	RUN	RATE	LOC.	TW	W	TW	W	TW	W	TW	W	TW	W	TW	W
4/27/90	SEE NOTE 4.															
	1	16	1	IN	200.3	203.9	196.5	196.6	196.5	196.6	201.8	205.8	193.0	193.1	193.0	193.1
	1	17	1	IN	202.1	206.6	197.1	197.7	197.1	197.7	202.6	207.2	193.3	193.8	193.3	193.8
	1	18	**	IN	---------- NO TRIP OCCURRED ----------						---------- NO TRIP OCCURRED ----------					
	SEE NOTE 5.															
	---	18A	20	IN	188.8	210.2	195.7	190.4	195.7	190.4	187.7	210.2	195.1	188.5	195.1	188.5
	---	18B	1	IN	201.1	204.8	198.2	199.0	198.2	199.0	202.2	206.6	194.1	194.2	194.1	194.2
	LOOSENED THERMOWELL SET SCREW															
	2	1	1	IN	203.7	207.8	201.9	202.5	201.9	202.5	203.9	208.1	199.8	200.3	199.8	200.3
	RETIGHTENED THERMOWELL SET SCREW															
	2	2	1	IN	201.2	205.4	198.3	199.2	198.3	199.2	203.0	207.2	195.9	196.1	195.9	196.1
4/30/90	THE FOLLOWING TESTS WERE PERFORMED TO DETERMINE THE EFFECTS OF VIBRATION ON THE SETPOINTS OF THE SPECIMENS. TEST RUNS 1 AND 2 WERE PERFORMED WITH THE ONLY VIBRATION PROVIDED BY THE MOTOR USED TO CIRCULATE THE WATER IN THE BATH. TEST RUN 3 WAS PERFORMED WITH ADDITIONAL VIBRATION AT 15 HZ AND TEST RUN 4 WAS PERFORMED WITH ADDITIONAL VIBRATION AT 30 Hz. THE ADDITIONAL VIBRATION SIMULATED IN-SERVICE VIBRATION CONDITIONS AT THE FREQUENCIES IN EACH AXIS WHERE THE HIGHEST VIBRATION LEVELS WERE MEASURED.															
	4	1	1	IN	197.5	201.2	193.7	193.8	193.7	193.8	198.2	202.3	188.3	188.1	188.3	188.1
	4	2	1	IN	198.3	202.1	194.6	194.9	194.5	194.7	198.5	202.1	189.5	189.4	189.5	189.4
	4	3	1	IN	198.6	202.5	195.8	195.7	195.8	195.7	198.7	202.4	190.3	190.3	190.3	190.3
	4	4	1	IN	198.3	202.3	196.4	196.8	196.4	196.8	198.9	202.6	190.8	190.7	190.8	190.7
5/01/90	SPACER-TUBES WERE LOOSENED 1/4-TURN/DURING WATER HEATUP TO 180°F (AT THE RATE OF APPROX. 20°F PER MINUTE), TS-0 TRIPPED AT 165.3°F TW/187.7°F W AND TS-1 TRIPPED AT 149.5°F TW/186.8°F W. THE TEMPERATURE WAS DECREASED TO RESET THE THE SPECIMENS AND WAS HELD AT 165°F FOR APPROXIMATELY 2 HOURS.															
	3	1	1	IN	179.1	182.9	175.9	177.3	175.9	177.3	178.4	182.4	168.8	168.1	168.8	168.1
	3	2	1	IN	179.0	182.8	176.5	176.6	176.5	176.6	179.1	182.9	168.7	168.9	168.7	168.9
	SPACER-TUBES WERE LOOSENED 1/2-TURN/TEMPERATURE WAS HELD AT 150°F FOR APPROXIMATELY 15 MINUTES.															
	3	3	1	IN	160.9	165.1	158.8	158.2	158.8	158.2	159.4	163.1	155.7	155.4	155.7	155.4

		TEMPERATURE SENSOR 0 SERIAL NO. OC3011						TEMPERATURE SENSOR 2 11SH19111						TEMPERATURE SENSOR 4 11SH19146					
		TRIP		40 PSIG RESET		+/-1 PSIG RESET		TRIP		40 PSIG RESET		+/-1 PSIG RESET		TRIP		40 PSIG RESET		+/-1 PSIG RESET	
DATE	TEST	TW	W	TW	W	TW	W	TW	W	TW	W	TW	W	TW	W	TW	W	TW	W
5/02/90	AR	198.0	202.4	194.4	195.4	194.4	195.4	188.7	192.8	178.7	178.7	178.7	178.7	196.6	199.7	192.4	193.0	187.5	188.1
	AR	198.5	204.0	194.1	196.2	194.5	196.2	189.1	194.7	179.6	180.6	179.9	180.6	195.1	199.6	192.4	193.5	187.2	188.7

		TEMPERATURE SENSOR 7 11SH19117					
		TRIP		40 PSIG RESET		+/-1 PSIG RESET	
	TEST	TW	W	TW	W	TW	W
5/02/90	AR	185.7	190.1	183.6	183.7	182.7	183.0
	AR	186.5	191.0	186.5	186.7	182.0	184.2

NOTES: 1. ALL TESTS WERE PERFORMED WITH SUPPLY AIR PRESSURE AT APPROX. 60 PSIG, WITH TEMPERATURE SENSORS INSTALLED IN THERMOWELLS, AND WITH WATER TEMPERATURE INCREASED AND DECREASED AT THE RATE OF 1°F PER MINUTE.

LEGEND: AR = AS-RECEIVED
CC = CALIBRATION CHECK
TW = THERMOWELL TEMPERATURE (°F)
W = WATER BATH TEMPERATURE (°F)

				TEMPERATURE SENSOR 0 SERIAL NO. 0C3011						TEMPERATURE SENSOR 1 SERIAL NO. 0C3002					
				TRIP		40 PSIG RESET		+/-1 PSIG RESET		TRIP		40 PSIG RESET		+/-1 PSIG RESET	
DATE	SERIES	RUN	RATE	LOC.	TW	W	TW	W	TW	W	TW	W	TW	W	TW	W

* 180°F FOR 5 MINS., 200°F FOR 33 MINS., THEN 1°F INCREASE EVERY 15 MINUTES

** TEMPERATURE WAS STABILIZED AT APPROXIMATELY 1°F BELOW SETPOINT AND WAS THEN DECREASED AT APPROXIMATELY 10°F PER MINUTE.

NOTES: 1. ALL TESTS WERE PERFORMED WITH SUPPLY AIR PRESSURE AT APPROX. 60 PSIG EXCEPT TEST RUN 13 (55 PSIG) AND TEST RUN 14 (65 PSIG).

2. AN EXCESSIVE AMOUNT OF COLD WATER APPARENTLY CAUSED A SHARP DECREASE IN WATER TEMPERATURE (FROM 179.2 TO 155.5°F IN ONE MINUTE). TWO MINUTES LATER THE TEMPERATURE HAD INCREASED TO 179.4°F AT A RATE OF APPROXIMATELY 10°F PER MINUTE. TS-0 TRIPPED AND TS-1 PRESSURE DROPPED AS LOW AS 48.5 PSIG. TEMPERATURE WAS HELD AT APPROXIMATELY 180°F FOR 86 MINUTES PRIOR TO TEST 3A.

3. UNIFORM WATER TEMPERATURE WAS NOT MAINTAINED DURING TEST RUN 15, ESPECIALLY DURING THE DOWN RAMP, SINCE THE WATER WAS NOT BEING CIRCULATED DURING THE TEST.

4. DURING PREVIOUS TESTING, THE AMBIENT TEMPERATURE IN THE AREA AROUND THE TEMPERATURE SENSOR HOUSINGS WAS MEASURED WITH THE WATER BATH AT 200°F AND WAS APPROXIMATELY 87°F. AN ENVIRONMENTAL ENCLOSURE WAS PLACED OVER THE SENSOR HOUSINGS AND THE AMBIENT TEMPERATURE WAS CONTROLLED TO 107°F (ORIGINAL AMBIENT TEMPERATURE + 20°F) FOR TEST RUN 16 AND TO 67°F (ORIGINAL AMBIENT TEMPERATURE - 20°F) FOR TEST RUN 17.

5. TEST RUNS 18A AND 18B WERE PERFORMED TO VERIFY THAT THE SETPOINT CHANGES THAT OCCURRED DURING TEST RUNS 7 THROUGH 12 WERE NOT CAUSED BY A RAPID TEMPERATURE CHANGE.

					TEMPERATURE SENSOR 0 SERIAL NO. OC3011						TEMPERATURE SENSOR 1 SERIAL NO. OC3002					
					TRIP		40 PSIG RESET		+/-1 PSIG RESET		TRIP		40 PSIG RESET		+/-1 PSIG RESET	
DATE	SERIES	RUN	RATE	LOC.	TW	W	TW	W	TW	W	TW	W	TW	W	TW	W

LEGEND:
- AR = AS-RECEIVED
- LOC. = LOCATION IN OR OUT OF THERMOWELL
- TW = THERMOWELL TEMPERATURE (°F)
- W = WATER BATH TEMPERATURE (°F)
- TS-0 = TEMPERATURE SENSOR 0
- TS-1 = TEMPERATURE SENSOR 1
- CC = CALIBRATION CHECK

05-319-1-90

SSINS No. 6835
IN 82-20

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

June 28, 1982

IE INFORMATION NOTICE NO. 82-20: CHECK VALVE PROBLEMS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or construction permit (CP).

Purpose:

This information notice is provided as a notification of potentially significant problems pertaining to check valves. It is expected that recipients will review the information for applicability to their facilities. No specific action or response is required at this time.

Description of Circumstances:

A number of problems were recently reported involving swing check valves supplied by two manufacturers. Palisades Nuclear Plant, which is an operating plant, reported severe damage to the internals of 6-inch Alloy Steel Products Company (ALOYCO) swing check valves used in the low-pressure safety injection system (LPSI).

Susquehanna Steam Electric Station, which is under construction, reported three separate problems with Pacific Company swing check valves that range in size from 6 inches to 20 inches installed in the residual heat removal (RHR), reactor core isolation cooling (RCIC), and core spray systems.

The valves are similar in design and service to numerous other swing check valves, manufactured by other companies, that have had similar problems in the past. (Ref. LER 50-298/77-18, 50-255/81-37; AO 50-331/75-23; IE Information Notices 80-41, 81-30 and 81-35)

Internal Damage to ALOYCO Valves:

During required modifications of the LPSI system at the Palisades Nuclear Plant, Consumers Power Co. of Michigan reported that two of the four LPSI swing check valves were found to have internal damage. In both valves the disc nut washer and the disc nut pin were missing and the valve body, clapper arm, disc clapper arm shaft, and clapper arm support were severely worn. The discs were still attached to their clapper arms; however, valve seat and disc sealing surfaces were damaged and leaks from the valves could have been excessive.

8204210389 HP

It was subsequently discovered that the remaining two LPSI check valves had similar internal damage. The four LPSI check valves at Palisades were manufactured by ALOYCO about 1968. They are 6-inch swing-type check valves with weld ends for attachment to Schedule 120 piping. All four valves were mounted vertically with the flow direction upward.

The swing check valves have an inline configuration with a ballooned or expanding area in the valve body for movement of the flapper-type disc. The disc is substantially larger than the nominal inside diameter of the pipe or valve. If the disc should become separated from the clapper arm, it would be trapped within the expanded portion of the valve body. This could lead to reduced LPSI flow or (with some small probability) the complete blockage of the line.

Operation of the swing check valve in the direction of flow (normal operation) causes the threaded shaft on the back of the valve disc to strike the valve body as it opens to the full-flow position. (The valve body is the ultimate limiter of disc opening.) During full-flow operation, there apparently is sufficient turbulence to cause the disc to chatter against the valve body. The valves at Palisades, which are used for extended periods during shutdown cooling, exhibited about 1/2 inch of wear of the threaded portion of the disc shaft (greater than the height of the disc nut). Although the disc nuts had been worn away, none of the discs had separated from its clapper arm because of the peening of the shafts to a larger diameter.

The ALOYCO check valves form the boundary between the LPSI and high-pressure safety injection (HPSI) systems at Palisades. The abnormal wear of the check valves was discovered during modifications of the LPSI piping to add leak-testing capability as required by NRC order, dated April 20, 1981, for Event V valve configurations. This order required the licensee to perform periodic leak-testing of check valves that form the interface between a high-pressure system connected to the reactor coolant system (RCS) and a low pressure system whose piping leads outside containment. Event V is defined as the failure of two in-series check valves to function as a pressure isolation barrier between a high-pressure system connected to the RCS and a lower pressure system extending beyond containment. This failure could cause an overpressurization and rupture of the low-pressure system, which would result in a LOCA that bypasses containment and simultaneously render inoperable some of the equipment needed to mitigate a LOCA.

Problems With Pacific Valves :

During start-up testing at the Susquehanna Steam Electric Station Unit 1, Pennsylvania Power and Light reported three problems with Pacific check valves: (1) disc assembly to body interference and excessive packing friction, (2) excessive wear at hinge arm/disc stud interface, and (3) disc stud breakage. The Pacific check valves are used in many non-safety systems as well as the residual heat removal, reactor core isolation cooling, and core spray systems.

1. Disc Assembly to Body Interference and Excessive Packing Friction

   The interference problem was attributed to tolerance buildup by the valve manufacturer. Undetected, a deficiency of this type could render the valve unable to perform its safety function. The valves were subsequently reworked at Susquehanna. The packing friction problem was solved by changing packing type.

2. Excessive Wear at Hinge Arm/Disc Stud Interface

   The excessive wear at the hinge arm/disc stud interface was identified on non-safety related valves. The hinges and discs involved in the excessive wear problem have been replaced in the safety related valves. The licensee will re-inspect the safety related valves to confirm that the modifications have been effective in reducing wear. These inspections will be performed after the valves have operated for a sufficient time period that wear might be expected.

3. Disc Stud Breakage

   The problem with the fractured stud, which is an integral part of the disc/stud casting, appears to be similar to a earlier failure of an Anchor/Darling valve (50-298/77-18). Although these failures were similar, the cause of the Susquehanna failures appears to be a metallurgical problem that is limited to the Pacific valves in this case. In the safety related valves, the licensee is replacing the CA15 discs with discs manufactured from A516 Grade 70 plate with a stud fabricated from the same material threaded and welded to the disc. In the RCIC and HPCI exhaust systems, the swing check valve is being replaced by a lift check valve. The inherent damping action of this type valve is believed by the licensee to make it more able to withstand the erratic steam flow conditions.

If you have any questions regarding this matter, please contact the Regional Administrator of the appropriate NRC Regional Office, or this office.

E. L. Jordan, Director
Division of Engineering
and Quality Assurance

Technical Contact: M. S. Wegner
301-492-4511

Attachment:
List of Recently Issued IE Information Notices

Attachment
IN 82-20
June 28, 1982

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
82-19	Loss of High Head Safety Injection Emergency Boration and Reactor Coolant Makeup Capability	6/18/82	All power reactor facilities holding an OL or CP
82-18	Assessment of Intakes of Radioactive Material by Workers	6/11/82	All power reactor facilities holding an OL or CP, other specified licenses
82-17	Overpressurization of Reactor Coolant System	6/10/82	All power reactor facilities holding an OL or CP
82-16	HPCI/RCIC High Steam Flow Setpoints	5/28/82	All power reactor facilities holding an OL or CP
82-15	Notification of the Nuclear Regulatory Commission (NRC)	5/28/82	All NRC licensees and all power reactor facilities holding a CP
82-14	TMI-1 Steam Generator/Reactor Coolant System Chemistry/ Corrosion Problem	5/12/82	All power reactor facilities holding an OL or CP
82-13	Failures of General Electric Type HFA Relays	5/10/82	All power reactor facilities holding an OL or CP
82-12	Surveillance of Hydraulic Snubbers	4/21/82	All power reactor facilities holding an OL or CP
82-11	Potential Inaccuracies in Wide Range Pressure Instruments used in Westinghouse Designed Plants	04/09/82	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit

05-319-2-90

SSINS No.: 6835
IN 86-09

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

February 3, 1986

IE INFORMATION NOTICE NO. 86-09: FAILURE OF CHECK AND STOP CHECK VALVES SUBJECTED TO LOW FLOW CONDITIONS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This notice is provided to alert recipients of a potentially significant safety problem pertaining to check and stop check valves failing under low flow conditions. It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem occurring at their facilities. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Between late November 1985 and early January 1986, Florida Power and Light's Turkey Point facility experienced numerous failures of the 12 stop check valves in the steam supply system to the auxiliary feedwater pumps. The stop check valves are located upstream and downstream of a motor-operated valve (MOV) that opens when required to initiate auxiliary feedwater flow. The stop check valves are normally open and thus allow steam flow to the pumps while at the same time preventing backflow through the steam line in the event of a steam line break.

The mode of failure of the valve was degradation of the disc and disc nut assembly (see attached sketch) due to low steam flow conditions caused by slight leakage past the normally closed MOV. The low steam flow rate was not sufficient to keep the disc open and the disc assembly then vibrated and chattered causing excessive wear and damage to the valve internals, in particular, the disc assembly. In many cases (three in November and four in January), the disc guide stud had broken off from the disc. This allowed the disc to become cocked in the valve and prevented full closure (thus defeating both the check and stop features of the valve) and full opening (thus restricting steam flow). In addition, the broken disc guide stud was free to travel downstream with steam flow and could have caused damage to equipment and components in the flow path.

 4pp

The licensee performed a failure analysis of the disc assembly to verify the acceptability of a higher strength material being used in a redesigned disc guide. In addition, the licensee committed to a program of regular radiographic examination of the valves on Unit 3 for the remainder of the refueling cycle. However, the licensee considers this to be an interim repair pending the completion of the study underway by its AFW Enhancement Task Force.

A related series of events was discussed in IE Information Notice 82-26, "RCIC and HPCI Turbine Exhaust Check Valve Failures." In this case the low steam flow rates were the result of testing the RCIC and HPCI turbines at less than rated load. The corrective actions consisted of changes to test procedures, changes to the exhaust system design, and changing to a different check valve style.

The information herein is being provided as an early notification of a possibly significant matter that is still under review by the NRC staff. Recipients should review the information for possible applicability to their facilities. If NRC evaluation so indicates, further licensee actions may be requested.

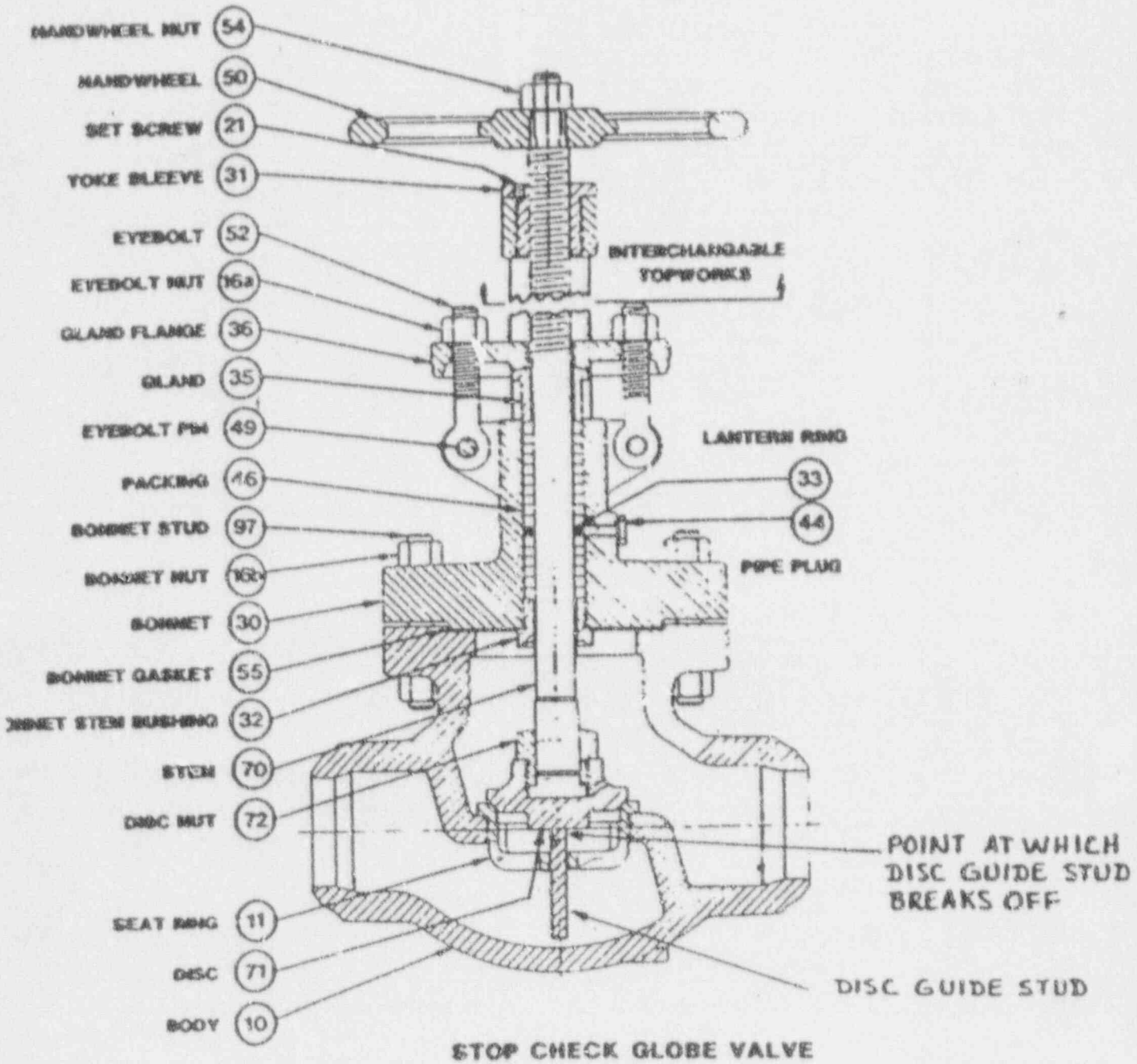
No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contacts: George A. Schnebli, RII
(404)331-4875

Richard J. Kiessel, IE
(301)492-8119

Attachments:
1. Sketch of Stop Check Globe Valve
2. List of Recently Issued IE Information Notices



STOP CHECK GLOBE VALVE

Attachment 2
IN 86-09
February 3, 1986

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-08	Licensee Event Report (LER) Format Modification	2/3/86	All power reactor facilities holding an OL or CP
86-07	Lack Of Detailed Instruction And Inadequate Observance Of Precautions During Maintenance And Testing Of Diesel Generator Woodward Governors	2/3/86	All power reactor facilities holding an OL or CP
86-06	Failure Of Lifting Rig Attachment While Lifting The Upper Guide Structure At St. Lucie Unit 1	2/3/86	1 power reactor facilities holding an OL or CP
86-05	Main Steam Safety Valve Test Failures And Ring Setting Adjustments	1/31/86	All PWR facilities holding an OL or CP
86-04	Transient Due To Loss Of Power To Integrated Control System At A Pressurized Water Reactor Designed By Babcock & Wilcox	1/31/86	All power reactor facilities holding an OL or CP
86-03	Potential Deficiencies In Environmental Qualification Of Limitorque Motor Valve Operator Wiring	1/14/86	All power reactor facilities holding an OL or CP
86-02	Failure Of Valve Operator Motor During Environmental Qualification Testing	1/6/86	All power reactor facilities holding an OL or CP
86-01	Failure Of Main Feedwater Check Valve Causes Loss Of Feedwater System Integrity And Water-Hammer Damage	1/6/86	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit

05-319-3-90

SSINS No.: 6835
IN 83-17

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, DC 20555

March 31, 1983

INFORMATION NOTICE NO. 83-17: ELECTRICAL CONTROL LOGIC PROBLEM RESULTING IN INOPERABLE AUTO-START OF EMERGENCY DIESEL GENERATOR UNITS

Addressees:

All nuclear power reactor facilities holding an operating licensee (OL) or construction permit (CP).

Purpose:

This information notice is provided as a notification of a potential problem in the control logic circuitry which could adversely affect the auto-start feature provided for diesel generators at nuclear facilities. It is expected that recipients will review the information for applicability to their facilities. No specific action or reference is required.

Description of Circumstances:

Recently the licensee performed a loss of offsite power test at the North Anna Unit 2 Station. The test is conducted periodically and is a technical specification requirement. Specifically, this test is performed to verify the capability of the emergency diesel generators (EMDs) to load-shed and reload the essential emergency busses following loss of an EMD when offsite power is unavailable.

Briefly, the selected emergency bus was "set up" to simultaneously receive electrical power from the offsite power source and the associated EMD. A safety injection test signal was then initiated and the diesel generator unit was manually shut down. These actions were followed by opening the offsite power supply feeder breaker to the selected emergency bus. Given these conditions, the associated EMD did not respond to an auto-start call upon resetting its shutdown relay.

When the licensee investigated the event, he found that the periodic test procedure used to conduct this test did not specifically address a 60-second time delay feature in the diesel generator's restart circuitry. The purpose of this time delay is to allow the diesel generator to come to a complete stop before attempting a restart. This time delay prevents fuel from being supplied to the diesel generator for 60 seconds after the shutdown relay has been manually reset by a remote pushbutton located in the control room.

Further review of this event determined that when the shutdown relay was manually reset (because of the presence of the safety injection signal mentioned above), the compressed starting air was admitted to start the diesel even though no fuel was admitted during the 60-second delay period. At the end of this delay,

fuel was admitted but the supply of compressed air used to rotate the engine for a restart attempt had been consumed. Thus, the diesel unit effectively became inoperable until the air storage tanks were repressurized.

This licensee's action taken to preclude this event from recurring included modifying the test procedures so as to require the control selector switch for the diesel generator being tested to be placed in the "local" position before the shutdown relay is reset. This action, in effect, blocks the auto-start diesel signal from activating the air start solenoid for the diesel generator being tested. Following this action, the shutdown relay may be manually reset and the time delay permitted to run out. Subsequently, the control selector switch may be returned to its normal "remote" position at which time the diesel generator unit being tested should auto-start and reload its associated emergency busses in accordance with design requirements.

During an in-depth study of the control logic circuitry for the diesel generator units at Hatch Unit 1 Station, a potential control logic problem was identified which is identical to the problem at North Anna Unit 2 Station. Subsequently, the licensee implemented a design change which now allows fuel to be supplied into the diesel unit concurrent with the logic signal calling for diesel generator "re-start."

Since North Anna Unit 2 is a pressurized water reactor power plant and Hatch Unit 1 is a boiling water reactor power plant, the control logic problem, as discussed, has strong generic implications and may affect many of the addressees of this information notice. Licensees should be aware that since the local/remote control switch is located in the control room and is placed in the "remote" position during normal plant operation, it will require direct immediate operator corrective action to preclude failure of the diesel generator to re-start under the set of conditions discussed above. On this basis, we suggest these addressees review this information for applicability to the control logic circuitry of diesel generator units in use at their plant.

No written response to this notice is required. If you have questions regarding this matter, please contact the Regional Administrator of the appropriate NRC Regional Office, or this office.

William D. Mills FOR
Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

CONTACT: V. D. Thomas
301-492-4755

Attachment:
List of Recently Issued Information Notices

Attachment
IN 83-17
March 31, 1983

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
83-16	Contamination of the Auburn Steel Property with Cobalt-60	03/30/83	All Material licensees
83-15	Falsified Pre-Employment Screening Records	03/25/83	All power reactor facilities holding an OL or CP
83-14	Dewatered Spent Ion Exchange Resin Susceptibility to Exothermal Chemical Reaction	03/21/83	All power reactor facilities holding an OL or CP
83-13	Design Misapplication of Bergen-Paterson Standard Strut Restraint Clamp	03/21/83	All power reactor facilities holding an OL or CP
83-12	Incorrect Boron Standards	03/18/83	All power reactor facilities holding an OL or CP
83-11	Possible Seismic Vulnerability of Old Lead Storage Batteries	03/14/83	All power reactor facilities holding an OL or CP
83-10	Clarification of Several Aspects Relating to Use of NRC-Certified Transport Packages	03/11/83	All NRC-licensed facilities and registered users of NRC-Certified transport packages
83-09	Safety and Security of Irradiators	03/09/83	All power reactor facilities holding an OL or CP
83-08	Component Failures Caused by Elevated DC Control Voltage	03/09/83	All power reactor facilities holding an OL or CP
83-07	Nonconformities with Materials Supplied by Tube Line Corporation	03/07/83	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

05-319-4-90

SSINS No.: 6835
IN 83-51

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

August 5, 1983

IE INFORMATION NOTICE NO. 83-51: DIESEL GENERATOR EVENTS

Addressees:

All nuclear power facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This information notice is provided to bring to the attention of licensees and construction permit holders some events and experience of generic diesel generator problems and corrective action taken. It is expected that recipients will review the information for applicability to their facilities. No other action or response is required.

Description of Circumstances:

In its continuing review of licensee event reports (LERs), NRC has identified during the past five months more than 100 LERs pertaining to diesel generator problems. Most of these appear to be material, equipment, or component failures. No single common trend can be identified.

NRC is concerned about the large number of diesel generator events. During discussions with diesel manufacturers and licensees, it appears that many of these events could have been eliminated or prevented by implementation of a conscientious maintenance and inspection program as well as monitoring equipment through a plant's trend program. Some licensees have instituted such a program to determine the underlying cause of the failures (see IE Information Notice 82-10) and to prevent their recurrence. Components or materials that have experienced failures are monitored or inspected more frequently. Many affected items are repaired or replaced before actual breakdown. For example, cooling water heat exchangers that were found to be ineffective after a certain period of time because of tube fouling were replaced. Cooling jacket circulating water pump bearings are inspected for wear and replaced in certain intervals. Pressure switches and timers have been found with drifting setpoints and were recalibrated or replaced frequently.

Because of the large number of diesel generator events it is not feasible to describe all the events reported. However, Attachment 1 to this information notice gives several representative examples and corrective actions taken.

If there are any questions regarding this matter, please contact the Regional Administrator of the appropriate NRC Regional Office, or this office.

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contact: Wolfgang Laudan, IE
301-492-9759

Attachments:
1. Selected Examples of Licensee Event Reports Related to Emergency Diesel Generators
2. List of Recently Issued IE Information Notices

SELECTED EXAMPLES OF LICENSEE EVENT REPORTS AND VENDOR REPORTS RELATED TO EMERGENCY DIESEL GENERATORS

QUAD-CITIES 2, OCTOBER 6, 1982

During the monthly preventive maintenance testing of Unit 2 diesel generator, the diesel tripped on high temperature 10 minutes after loading. The cause was determined to be fouling in the cooling water heat exchanger. The heat exchanger was replaced and the diesel testing was satisfactorily completed. The licensee placed the heat exchanger on a preventive maintenance schedule for cleaning.

SEQUOYAH 2, OCTOBER 20, 1982

During a performance test of diesel generator 2B-B, the cooling jacket circulating water pump on the diesel generator was found to be inoperable as a result of a ball bearing failure in the pump. The bearing was replaced and the diesel generator was returned to service.

SUSQUEHANNA, OCTOBER 27, 1982

During a performance test of a diesel generator, the diesel generator tripped on high vibration. It was postulated that a vibration switch and a pressure regulator were both involved in the trip. Both were repaired and the diesel generator was returned to service. The equipment will be monitored through the plant's trend program.

BRUNSWICK 1, NOVEMBER 5, 1982

During a quick start testing program of diesel generator No. 4, the diesel generator tripped on "low lube oil pressure." The same problem occurred 2 days later on the same unit. Both events resulted from intermittent failures of the "low lube oil pressure start time relay" (STR). The relay timed out before actual pressure was above the low trip setpoint. The relay was replaced and the diesel testing was satisfactorily completed.

DRESDEN 3, NOVEMBER 9, 1982

During a Unit 3 diesel generator surveillance test, the diesel generator tripped on low cooling water pressure. A defective low cooling water pressure switch caused this event. The switch was replaced and the testing was satisfactorily completed.

RANCHO SECO, MAY 25, 1983

During startup testing, the diesel generator would not reach full operating speed. The Woodward governor speed adjustment on the unit stopped at about 650 rpm. It was found that the pointer disk was hanging up behind the dial plate. The manufacturer recommended filing about 1/16-inch off the pointer disk to allow free movement. After that the diesel achieved proper speed.

CALVERT CLIFFS, APRIL 7, 1983

During a routine inspection of the intake air check valve of No. 11 diesel generator, the licensee found a check valve holding pin sheared and the check valve loose. The same valve on two other diesel generators at Calvert Cliffs had been found to be cracked when inspected during 1982. The disk of one of these valves was found broken in two pieces. The engines in question are Fairbanks Morse Model 38TD81/8.

Because these failures did not render the diesel generators inoperable, as evidenced by successful completion of weekly operational tests, no LER was issued. The licensee pointed out that there were internal baffles between the check valves and the diesel turbocharger which made it unlikely to have a piece of the check valve enter the diesel's turbocharger. The check valve in question diverts air between the diesel turbocharger and integral air-blower. Failure of the check valve would result in air being available through the turbocharger at low loads and would affect the load control.

SHOREHAM, OCTOBER 15, 1982; APRIL 15, 1983; APRIL 20, 1983; MAY 4, 1983

During preoperational testing of Shoreham's three Transamerica Delaval, Inc. emergency diesel generators, the following mechanical problems were identified in the past 9 months and reported by the licensee under 10 CFR 50.55 (e):

October 15, 1982 - The jacket waterpump shaft failed.
April 15, 1983 - The engine head cracked.
April 20, 1983 - The fuel injection line failed.
May 4, 1983 - The rocker arm bolt failed.

Approximately 2 years before these problems occurred, the licensee discovered the following:

1. Loose hardware in cam gears during initial onsite inspection.
2. Multiple broken cylinder head exhaust bolts resulting from insufficient pipe guide clearances in the exhaust manifold.
3. Cracks in the fuel oil ejector that connects to the fuel oil drip line.
4. Absence of a drilled passageway for the relief valve on one lube oil pump line as required by design.
5. Leaky lube oil cooler tubes resulting from improper rolling in the tube sheet.
6. Cracks in rocker arm push rod socket (or cup).
7. Cam gear fitted bolts not installed at the factory as required.

The problems were corrected under the surveillance of vendor representatives. Nuclear sites with Transamerica Delaval diesel generators are listed on page 4 of this attachment.

LOUIS ALLIS REPORTED TWO DIFFERENT POTENTIAL PROBLEMS, MAY 20, 1983

(Louis Allis is the successor to Belouit Power Systems, Inc., and to Colt-Fairbanks Engine Division)

1. At the diesel generator in the Clinton Nuclear Plant, a three-phase rectifier assembly in the exciter was not connected in parallel, which could cause field winding insulation to deteriorate. Louis Allis field service took corrective action by making the necessary connections.

2. Detroit Edison experienced high vibration on its diesel generator. The cause was loose pole wedges. Louis Allis performed a detailed engineering evaluation of this problem and found that in 1976 a material change from HRS 1020 steel to 1045 steel was made. This means that diesel generators manufactured before this change may experience the same loose pole wedge problem. The affected plants are Fermi, Millstone Unit 2, and Hatch. These plants were notified by copy of the Part 21 report dated May 20, 1983.

TRANSAMERICA DELAVAL - 1981 TO 1983

The manufacturer reported the following turbocharger thrust bearing lubrication problem:

The design of the lubricating oil system permits the oil flow to the turbocharger bearing only when the diesel generator is running. When the diesel generator is in the standby mode, the turbocharger bearing lube oil system is bypassed to prevent a possible fire hazard should pressurized oil leak around the bearing seals onto hot impellers. Therefore, during startup, a sufficient amount of oil would not be available to adequately lubricate the turbocharger bearing. Because diesels are started once a month and run for a short length of time, premature bearing wear was experienced because of insufficient lubrication.

At San Onofre, the wear rate for this condition after 100 hours of operation was equivalent to 15,000 to 20,000 hours of continuous operation.

To ensure proper lubrication during startup, a design modification in the form of a lubrication oil drip system causing the lubricating oil to drip on the bearings through an orifice at a given rate was proposed, installed, and tested. An alternate method to this design modification is a change in the operating procedure. Before a monthly start, an operator would manually run the auxiliary lube oil pump for 30 to 60 seconds and confirm lube oil pressure. In the event of an emergency start, the bearings will function until oil pressure is developed.

Transamerica Delaval reported that the following nuclear sites were affected:

Shoreham	Perry	WPPSS 4
Grand Gulf	Bellefonte	Midland 1 & 2
Catawba	WPPSS 1	Hartsville
San Onofre	Comanche Peak 1 & 2	Phipps Bend

The licensees of the above plants were notified by copy of Transamerica Delaval Part 21 report dated September 19, 1980.

Attachment 2
IN 83-51
August 5, 1983

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
83-50	Failure of Class 1E Safety-Related Switchgear Circuit Breakers to Close on Demand	8/1/83	All power reactor facilities holding an OL or CP
83-49	Sampling and Prevention of Intrusion of Organic Chemicals into Reactor Coolant Systems	07/25/83	All power reactor facilities holding an OL or CP
83-48	Gaseous Effluent Releases of Radioactive Iodine-125 and Iodine-131 in Excess of NRC Limits	07/14/83	NRC licensed byproduct material licensees, including medical and academic institutions, radiopharmaceutical suppliers, and industrial research
83-47	Failure of Hydraulic Snubbers as a Result of Contaminated Hydraulic Fluid	07/12/83	All power reactor facilities holding an OL or CP
83-46	Common-Mode Valve Failures Degrade Surry's Recirculation Spray Subsystem	07/11/83	All power reactor facilities holding an OL or CP
83-45	Environmental Qualification Test Of General Electric Company "CR-2940" Position Selector Control Switch	07/01/83	All power reactor facilities holding an OL or CP
83-44	Potential Damage to Redundant Safety Equipment as a Result of Backflow Through the Equipment	07/01/83	All power reactor facilities holding an OL or CP
83-43	Improper Settings of Intermediate Range (IR) High Flux Trip Setpoints	06/24/83	All power reactor facilities holding an OL or CP
83-42	Reactor Mode Switch Modifications	06/23/83	All BWR facilities holding an OL or CP

OL = Operating License
CP = Construction Permit

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US NRC
IE-DIV EMER PREP & ENG RESPON
DIVISION DIRECTOR
EWS-3058
WASHINGTON DC 20555

05-319-5-9D

SSINS No.: 6835
IN 85-28

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, DC 20555

April 9, 1985

IE INFORMATION NOTICE NO. 85-28: PARTIAL LOSS OF AC POWER AND DIESEL GENERATOR DEGRADATION

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This notice is provided to inform recipients of a potential problem with diesel generator voltage regulation that might prevent the diesel generators from loading on to their safety buses. It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On January 31, 1985, WNP 2 was at 100 percent power when a lockout relay, used in the offsite power supply fast transfer logic, spuriously tripped. This was an abnormal partial actuation that caused the 500 kV generator output breaker to open and the circuit breakers from the startup transformer to close on the plant buses even though the normal auxiliary transformers were not disconnected from the same plant buses. The opening of the 500 kV output breaker initiated the digital-electrohydraulic control system overspeed protection circuit which closed the turbine control valves. The turbine control valve fast closure caused a reactor scram as designed.

As a result of this abnormal condition, the generator remained connected to the 230 kV grid via the auxiliary and startup transformers. (See attached simplified diagram illustrating abnormal breaker alignment during the first seconds of this transient.) After 4 seconds, a breaker in the 230 kV line to the startup transformer opened, leaving the plant without non-safety-related power. Two of the buses without power, SM-1 and SM-3, ordinarily feed safety-related buses SM-7 and SM-8. As a result of losing power to two safety-related buses, the backup transformer, which is powered by a 115 kV line, was automatically connected to the safety-related buses and the diesel generators for these buses started, but were not required to assume load.

In the control room, there were false indications such as high containment pressure and valid indications of vessel low level (level 2, -50 inches). The high pressure core spray (HPCS) and reactor core isolation cooling system (RCIC) started on the low level signal.

Eventually, the main generator's protective circuits actuated the balance of the fast transfer logic, causing the auxiliary transformer to separate from the plant buses.

Discussion:

After the event, it was found that the output voltage had been set incorrectly on diesel generators DG-1 and DG-2. If the backup transformer or its supply had failed, the diesel generators would not have loaded on the safety buses because the voltage regulators were set at their lowest voltage set point. The safety buses have protective relaying that prevents the diesel generators from loading on the safety-related buses if their output voltage deviates too much from nominal. There was no control room alarm indicating the diesel generator output voltage was too low to permit loading diesel generators on their safety-related buses.

The condition was caused during troubleshooting of the voltage regulators for DG-1 and DG-2. These voltage regulators have a manual "raise/lower" handle in the control room which permitted their output voltage to be adjusted even though the diesel was not running. If the diesels were not running, as was the case during the troubleshooting, there was no indication of the generator output voltage and, thus, no indication of the voltage setting of the voltage regulator. The type of voltage regulator used on DG-1 and DG-2 allowed for inadvertent degradation without indication or alarm in the control room. This situation did not exist on DG-3, which is dedicated solely for the HPCS and has an automatic voltage set point reset upon start of the diesel generator.

A number of corrective measures have been or will be taken as a result of this event. The licensee has modified the voltage regulators for DG-1 and DG-2 so that the output voltage of the diesel generators can be adjusted only while the diesels are running. The licensee is pursuing an automatic voltage set point reset feature for these diesel generators. The licensee will evaluate the efficacy of control room annunciation for high/low diesel generator output voltage. The licensee also has modified the offsite power supply fast transfer logic so that if a partial spurious actuation occurs again, then the balance of the logic will actuate. The licensee has modified procedures and training to reflect the lessons learned from this event.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate NRC regional office or this office.

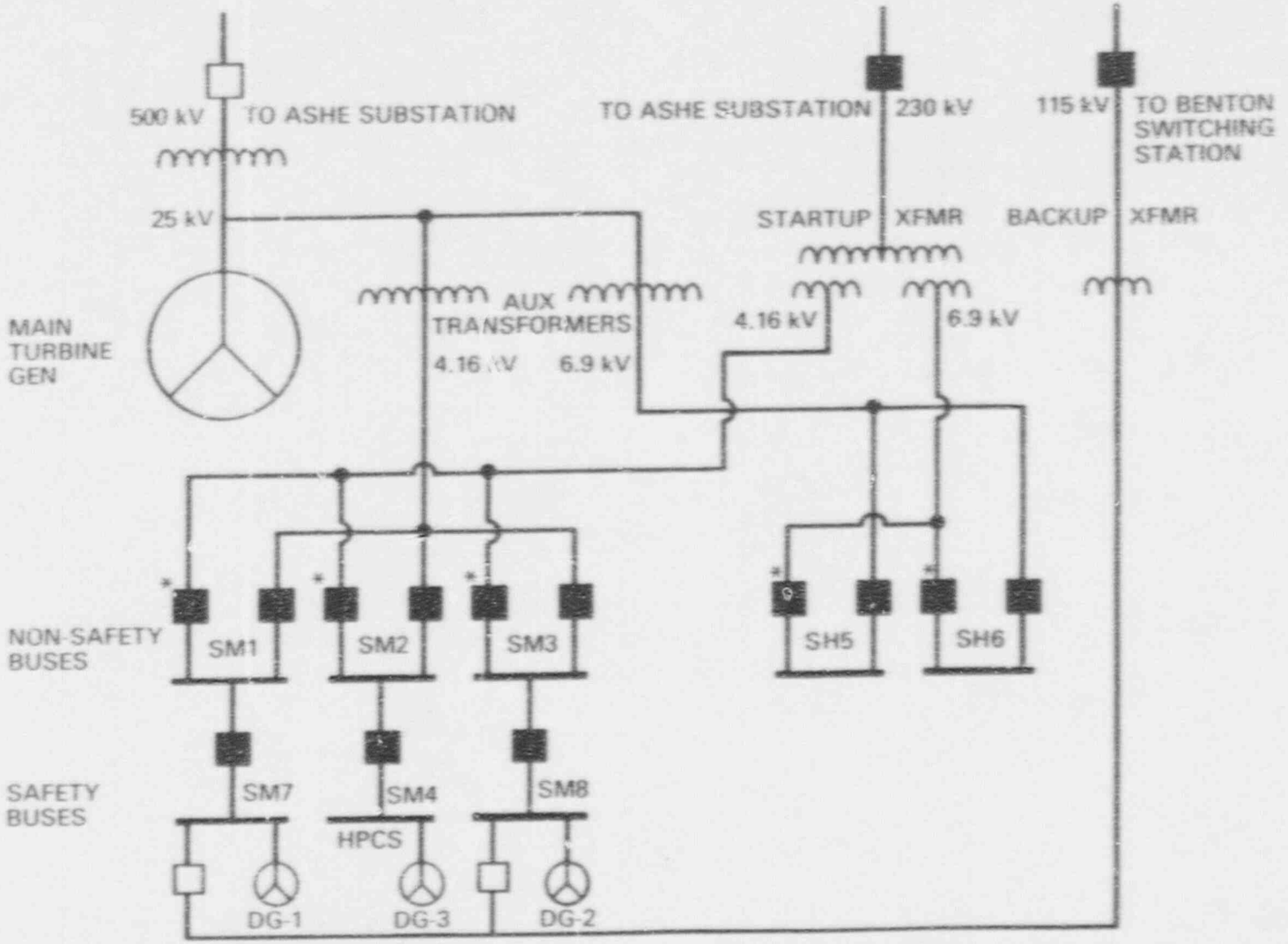
Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contact: Eric W. Weiss, IE
(301) 492-9005

Attachments:
1. Simplified Diagram Illustrating Abnormal Breaker Alignment
2. List of Recently Issued IE Information Notices

WNP-2*

(SIMPLIFIED ONE LINE DIAGRAM)



* Abnormal breaker alignment caused by partial spurious actuation of the Offsite Power Supply Fast Transfer Logic

Attachment 1
IN 85-28
April 9, 1985

Attachment 2
IN 85-28
April 9, 1985

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-27	Notifications To The NRC Operations Center And Reporting Events In Licensee Event Reports	4/3/85	All power reactor facilities holding an OL or CP
85-26	Vacuum Relief System For Boiling Water Reactor Mark I And Mark II Containments	4/2/85	All BWR facilities having a Mark I or Mark II containment and holding an OL or CP
85-25	Consideration Of Thermal Conditions In The Design And Installation Of Supports For Diesel Generator Exhaust Silencers	4/2/85	All power reactor facilities holding an OL or CP
85-24	Failures Of Protective Coatings In Pipes And Heat Exchangers	3/26/85	All power reactor facilities holding an OL or CP
85-23	Inadequate Surveillance And Postmaintenance And Post-modification System Testing	3/22/85	All power reactor facilities holding an OL or CP
85-22	Failure Of Limitorque Motor-Operated Valves Resulting From Incorrect Installation Of Pinon Gear	3/21/85	All power reactor facilities holding an OL or CP
85-21	Main Steam Isolation Valve Closure Logic	3/18/85	All PWR facilities holding an OL or CP
85-20	Motor-Operated Valve Failures Due To Hammering Effect	3/12/85	All power reactor facilities holding an OL or CP
85-19	Alleged Falsification Of Certifications And Alteration Of Markings On Piping, Valves And Fittings	3/11/85	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit

05-319-6-90

SSINS No.: 6835
IN 85-73

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

August 23, 1985

IE INFORMATION NOTICE NO. 85-73: EMERGENCY DIESEL GENERATOR CONTROL CIRCUIT LOGIC DESIGN ERROR

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This information notice is to alert recipients of a potentially significant emergency diesel generator (EDG) control logic error that could prevent transfer to the emergency bus while the EDG is in the "maintenance shutdown" mode. It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description Of Circumstances:

According to the design, the EDGs at Rancho Seco Nuclear Power Generating Station enter the maintenance shutdown control mode whenever they are normally shut down from the control room or the remote EDG control panel. On June 1, 1985, the plant was shut down for refueling, an EDG was in the maintenance shutdown control mode after being secured from an operational condition (idling at 600 rpm with the output breaker open), when an emergency bus was de-energized for planned work on a parallel bus. This created an undervoltage condition equivalent to a loss of offsite power (LOOP) on the emergency bus. The diesel generator sped up to the design speed but the EDG output breaker continuously cycled open and closed, thereby rendering the EDG set inoperable.

Investigation by the licensee indicates that the cycling of the EDG output breaker was the result of a design error in the EDG control circuit logic. According to the licensee, the design deficiency affects proper response of the EDG set when it is operating in the maintenance shutdown control mode. Normal surveillance testing would not discover the control circuit design error because surveillance is not done in the maintenance shutdown control mode. The June 1, 1985 event at Rancho Seco represents the first time in the life of the plant that an undervoltage signal occurred with an EDG in the maintenance shutdown control mode.

When an EDG is secured from operation, the control circuit logic places it in the maintenance shutdown control mode. In this mode, the control logic opens its output breaker and reduces its speed from 900 to 600 rpm. The EDG then idles at 600 rpm for 15 minutes before coasting down to rest.

If a LOOP should occur while an EDG is in the maintenance shutdown control mode, the undervoltage signal causes it to speed back up to 900 rpm and to close its output breaker. This would cause the undervoltage signal to drop out. However, the maintenance shutdown control mode does not drop out for 30 seconds after the receipt of the undervoltage signal because of the control circuit design error. Thus, the maintenance shutdown control logic senses that the EDG output breaker is closed, opens the breaker, and resets the 15-minute timer for the maintenance shutdown control mode. As soon as the EDG output breaker opens, the undervoltage signal recurs and the EDG output breaker closes in response to the LOOP. The EDG output breaker continues to cycle open and closed as this process repeats itself. At Rancho Seco, this control circuit logic design error has been corrected by installing a relay to de-energize the maintenance shutdown control logic immediately upon receipt of an undervoltage signal.

The Rancho Seco plant utilizes General Motors (GM) Model 20-465-E4 diesel generators with a 2750 kw nameplate rating. According to the licensee, the design error was in the interface provided by the Architect-Engineer (Bechtel) to the shutdown control logic provided by GM. Bechtel has advised the NRC that the Rancho Seco diesel generator control logic is unique and other plants designed by them are not affected.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

E. J. Jordan

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contact: W. Swenson, NRR
(301) 492-7876

R. Singh, IE
(301) 492-8985

Attachment: List of Recently Issued Information Notices

Attachment 1
IN 85-73
August 23, 1985

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-72	Uncontrolled Leakage Of Reactor Coolant Outside Containment	8/22/85	All power reactor facilities holding an OL or CP
85-71	Containment Integrated Leak Rate Tests	8/22/85	All power reactor facilities holding an OL or CP
85-70	Teletherapy Unit Full Calibration And Qualified Expert Requirements (10 CFR 35.23 And 10 CFR 35.24)	8/15/85	All material licensees
85-69	Recent Felony Conviction For Cheating On Reactor Operator Requalification Tests	8/15/85	All power reactor facilities holding an OL or CP
85-68	Diesel Generator Failure At Calvert Cliffs Nuclear Station Unit 1	8/14/85	All power reactor facilities holding an OL or CP
85-42 Rev. 1	Loose Phosphor In Panasonic 800 Series Badge Thermo-luminescent Dosimeter (TLD) Elements	8/12/85	Materials and fuel cycle licensees
85-67	Valve-Shaft-To-Actuator Key May Fall Out Of Place When Mounted Below Horizontal Axis	8/8/85	All power reactor facilities holding an OL or CP
85-66	Discrepancies Between As-Built Construction Drawings And Equipment Installations	8/7/85	All power reactor facilities holding an OL or CP
85-65	Crack Growth In Steam Generator Girth Welds	7/31/85	All PWR facilities holding an OL or CP

OL = Operating License
CP = Construction Permit

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05-319-7-90

SSINS No.: 6835
IN 85-91

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

November 27, 1985

IE INFORMATION NOTICE NO. 85-91: LOAD SEQUENCERS FOR EMERGENCY DIESEL GENERATORS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This information notice is provided to advise licensees and applicants of potential design deficiencies that could bypass load sequencers, thereby causing loss of redundant emergency diesel generators (EDGs). Recipients are expected to review the information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On August 22, 1985, the licensee for the Duane Arnold nuclear plant discovered that an accident signal and the loss of the standby transformer (a source of offsite electric power) would cause engineered safety feature (ESF) loads to be applied as a single block load onto the EDGs (the sources of onsite electric power), which would likely cause loss of both EDGs.

Pending replacement of the unit auxiliary transformer (lost in a transformer fire in October 1984), the licensee was operating the plant with the non-safety-related loads on the station startup transformer and the safety-related loads on the station standby transformer. The plant design objective was to sequence the ESF loads onto the EDGs if offsite power to the ESF buses should be lost and an accident signal was present. The licensee's training staff realized that the logic and sensors used to determine the availability of off-site power were such that the offsite power feeder breakers to the ESF buses could be tripped, but offsite power would be indicated as being still available. Under these conditions the design would cause the ESF diesel generator load sequencers to be bypassed.

To justify continued safe operation, the licensee has temporarily placed certain sequencer test switches in the test position, which forces the sequencers to function even though offsite power is sensed as being available.

For the longer term, the licensee is developing a permanent design change which is to be reviewed by the NRC.

Discussion:

The design of the electric power system at the Duane Arnold nuclear plant includes features to sequence ESF loads onto the EDGs, but not to sequence loads onto offsite power. In a sense, these design objectives are in conflict; that is, one is for sequencing and the other is for not sequencing. When design objectives are potentially conflicting, careful analysis is necessary to ensure that failures of various types do not result in implementation of the improper objective. In this case, the logic was designed so that if any source of offsite power is "available" (such as at either the standby transformer or the startup transformer) the ESF load sequencers would be bypassed. Thus, if the standby transformer were lost, causing a loss of power to the safety-related loads, the logic would still indicate offsite power as available. This design was provided by Bechtel Corporation.

The result was the potential for an interaction between the offsite electric power system and the onsite electric power system that could have caused the loss of redundant sources of onsite power. Such an interaction is incompatible with the requirements of 10 CFR 50, Appendix A, General Design Criterion No. 17, "Electric Power Systems." The Duane Arnold original design was such that the availability of offsite electric power was determined indirectly; that is, by an upstream measurement rather than directly at the ESF buses. This deficiency existed in the original plant design and was not discovered when the design was reviewed again by the licensee after the loss of the unit auxiliary transformer in October 1984.

No specific action or written response is required by this information notice. If you have questions about this matter, please contact the Regional Administrator of the appropriate NRC regional office or this office.

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contacts: J. T. Beard, NRR
(301) 492-7465

Eric Weiss, IE
(301) 492-9005

Attachment: List of Recently Issued IE Information Notices

Attachment 1
IN 85-91
November 27, 1985

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-58 Sup. 1	Failue Of A General Electric Type AK-2-25 Reactor Trip Breaker	11/19/85	All power reactor facilities designed by B&W and CE holding an OL or CP
85-90	Use Of Sealing Compounds In An Operating System	11/19/85	All power reactor facilities holding an OL or CP
85-89	Potential Loss Of Solid-State Instrumentation Following Failure Of Control Room Cooling	11/19/85	All power reactor facilities holding an OL or CP
85-88	Licensee Control Of Contracted Services Providing Training	11/18/85	All power reactor facilities holding an OL or CP
85-87	Hazards Of Inerting Atmospheres	11/18/85	All power reactor facilities holding an OL or CP; and fuel facilities
85-86	Lightning Strikes At Nuclear Power Generating Stations	11/5/85	All power reactor facilities holding an OL or CP
85-85	Systems Interaction Event Resulting In Reactor System Safety Relief Valve Opening Following A Fire-Protection Deluge System Malfunction	10/31/85	All power reactor facilities holding an OL or CP
85-84	Inadequate Inservice Testing Of Main Steam Isolation Valves	10/30/85	All power reactor facilities holding an OL or CP
85-83	Potential Failures Of General Electric PK-2 Test Blocks	10/30/85	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit

Forchen

SSINS No.: 6835
IN 84-69

05-319-8-90

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

August 29, 1984

IE INFORMATION NOTICE NO. 84-69: OPERATION OF EMERGENCY DIESEL GENERATORS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or construction permit (CP).

Purpose:

This notice is provided to alert recipients of potentially significant safety problems that can arise when one or more emergency diesel generators (EDGs) are operated in modes (such as in parallel with the offsite power sources) other than the prescribed standby service mode. Experience has shown that such a practice can lead to a complete loss of ac power to safety buses. It is expected that recipients will review this information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems occurring at their facilities. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On May 17, 1983, at Fort St. Vrain Unit 1, with the reactor in a shutdown condition and one of the two EDGs out of service for maintenance, the offsite power system started experiencing problems as a result of high winds and snow. As a precautionary measure, the available EDG was started and tied to the associated safety bus in parallel with the offsite power source. Approximately half an hour later, all offsite power to the plant was lost and the output breaker of the operating EDG tripped, apparently on overload. As a result, the plant was without all ac power, except for the inverter ac power off the dc power system, for approximately half an hour until the EDG was restored. The offsite power was restored after another hour.

Grand Gulf Nuclear Station Unit 1 was in a startup mode on May 7, 1984, when a partial loss of offsite power occurred as a result of heavy winds and rain. This caused automatic starting and loading of the Division III EDG. While paralleling the EDG with the offsite power grid in order to restore normal power lineup, the EDG tripped on reverse power. Later, the site entered a tornado watch and all three EDGs were started and loaded on their respective buses in parallel with the offsite power grid. An hour and a half later, the Division II EDG tripped on reverse power, apparently as a result of the grid voltage fluctuations during the storm and a low reverse power trip set point.

Discussion

The EDGs are provided as sources of standby onsite electric power in the event that offsite power is lost. Regulatory requirements have long been to minimize the probability of losing the onsite sources when power from the offsite transmission network (grid) is disturbed or lost. More specifically, the NRC Standard Review Plan prohibits the use of EDGs for purposes other than supplying standby power, when needed, and permits interconnection of the onsite and offsite sources only for short periods of time for the purpose of EDG load testing. During such testing, only one of the redundant EDGs is to be paralleled at any one time, leaving the other EDG(s) available in standby service.

Although operators may be tempted to start the EDGs when offsite power is threatened or undergoing disturbances, running the EDGs is likely to be more o a hindrance than a help. If an EDG is paralleled with the offsite power system, it is vulnerable to loss from any of the normal protective features such as overload or reverse power, especially at the moment that offsite power is interrupted. Such a practice is contrary to the intent of General Design Criterion 17. To serve as a dependable backup power source, the EDGs must be kept separate from the offsite source.

One scheme suggested was to start the EDGs in anticipation of the loss of offsite power. If dummy loads are not included in the plant design, the operator is forced either to load the EDG or leave it at no-load idle. Operating experience reported some years ago in NUREG/CR-0660, "Enhancement of Onsite Diesel Generator Reliability," indicates that running an EDG at no-load or light loads may cause other EDG problems.

Another scheme suggested was to run the EDGs on the safety buses but to isolate these buses from the offsite power system. While this appears, on the surface, to achieve the desired independence, licensees need to consider other aspects of the situation. In most plant designs, safety loads (needed for either an accident situation or safe shutdown without an accident) will not be automatically sequenced onto the EDG if the bus is isolated and the EDG is providing power to the bus.

Applicants and licensees are expected to review this information for applicability to the onsite power system at their facilities and to initiate appropriate actions such as management directives and training to preclude similar problems from occurring at their facilities.

If you have any questions regarding this matter, please contact the Regional Administrator of the appropriate regional office, or this office.

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contacts: J. T. Beard, NRR
(301) 492-7465

R. N. Singh, IE
(301) 492-0868

Attachment: List of Recently Issued IE Information Notices

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
84-68	Potential Deficiency in Improperly Rated Field Wiring to Solenoid Valves	08/21/84	All power reactor facilities holding an OL or CP.
84-67	Recent Snubber Inservice Testing with High Failure Rates	08/17/84	All power reactor facilities holding an OL or CP.
84-66	Undetected Unavailability of the Turbine-Driven Auxiliary Feedwater Train	08/17/84	All power reactor facilities holding an OL or CP.
84-65	Underrated Fuses Which May Adversely Affect Operation of Essential Electrical Equipment	08/16/84	All power reactor facilities holding an OL or CP.
84-64	BWR High-Pressure Coolant Injection (HPCI) Initiation Seal-In and Indication	08/15/84	All BWR licensees and applicants for an OL.
84-63	Defective RHR Replacement Piping	08/13/84	All power reactor facilities holding an OL or CP.
84-62	Therapy Misadministrations To Patients Undergoing Cobalt-60 Teletherapy Treatments	08/10/84	All NRC licensees authorized to possess and use sealed sources in teletherapy units.
84-61	Overexposure of Diver in Pressurized Water Reactor (PWR) Refueling Cavity	08/08/84	All power reactor facilities holding and OL or CP.
84-60	Failure of Air-Purifying Respirator Filters To Meet Efficiency Requirement	08/06/84	All power reactor facilities holding an OL or CP.
84-59	Deliberate Circumventing of Station Health Physics Procedures	08/06/84	All power reactor facilities holding an OL or CP.

OL = Operating License
CP = Construction Permit

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SSINS No.: 6835
IN 84-69, Supplement 1

05-319-9-90

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, DC 20555

February 24, 1986

IE INFORMATION NOTICE NO. 84-69, SUPPLEMENT 1: OPERATION OF EMERGENCY DIESEL GENERATORS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

Information Notice 84-69, issued on August 29, 1984, was provided to alert recipients of potentially significant safety problems that can arise when one or more emergency diesel generators (EDGs) are operated in modes other than the prescribed standby service mode, such as loaded on non-emergency buses parallel with offsite power sources. The purpose of this supplement is to reemphasize the need for licensees to review the information provided in IN 84-69, in addition to the information contained herein, for applicability to their facilities and consider actions, if appropriate, to preclude similar problems at their facilities. However, suggestions contained in this supplement do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Following a 10 CFR 50.72 report made to the NRC Headquarters Operations Center on August 12, 1985, it was discovered that Crystal River Unit 3 was continuously running the one operable EDG loaded in parallel with the grid while the other EDG was declared inoperable. Crystal River Technical Specifications require fast starting of the operable EDG (i.e., verifying that the diesel starts from ambient conditions and accelerates to the required speed within a required period of time) within 1 hour after the declaration of an inoperable EDG and every 8 hours thereafter. Because of a concern about increased EDG wear and reduced overall EDG reliability, the licensee chose to keep the EDG running loaded parallel to the offsite grid rather than fast starting the EDG every 8 hours.

The licensee believed that continuous running was an acceptable alternative to the test starts required by the Technical Specifications and that the EDG was operable per Technical Specifications while running in parallel with the offsite power system. The licensee indicated also that it was aware of IN 84-69 and had implemented procedures that prohibited operating the EDG parallel to the grid during inclement weather (e.g., lightning, heavy winds).

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Discussion:

When an EDG is operated connected to offsite or nonvital loads, the emergency power system is not independent of disturbances on the nonvital and offsite power systems that can adversely affect emergency power availability. The situation is of particular concern when the onsite emergency power system is already in a degraded condition due to an EDG being inoperable and the operable EDG is loaded on non-emergency loads. In this condition, a disturbance in the non-emergency power system could result in both a loss of offsite power and a disabling of the remaining emergency power source. Although the events described in IN 84-69 occurred due to weather conditions, the concerns of the IN apply to parallel operation of EDGs with non-emergency loads at all times.

If a fault develops while the EDG is connected to non-emergency buses, EDG availability for subsequent emergency demands may be affected. In some design configurations, the EDG would trip as a result of overcurrent or reverse power, actuate a lockout device, and require local operator action to reset the lockout. In such cases, the EDG is recoverable, but the timeliness of its availability is not comparable to that of having the EDG in its normal standby service.

In other design configurations the EDG may not trip, but the operation of the load sequencer may be adversely affected. The load sequencer timers are often linked with the closing of the EDG output breaker or with detection of loss of voltage on the bus. If the EDG does not trip, conditions are not proper for the designed operation of the load sequencers. Consequently, the EDG cannot perform automatically in a manner comparable to that of having the EDG in its normal standby mode.

Another potential concern deals with the vulnerability of the EDG to trip signals which are bypassed for emergency demands but are operable for manual starts and during running for test purposes. The EDG would be more vulnerable to such trips.

The licensee's concern regarding excessive test starts is valid. In this particular case, the licensee was encouraged to address that concern more directly by submitting changes to the plant Technical Specifications. Such changes were approved for North Anna Unit 2 on April 25, 1985.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contacts: Joseph G. Giitter, IE
(301) 492-9001

J. T. Beard, NRR
(301) 492-7465

Attachment: List of Recently Issued Information Notices

Attachment 1
IN 84-69, Supplement 1
February 24, 1986

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-10	Safety Parameter Display System Malfunctions	2/13/86	All power reactor facilities holding an OL or CP
86-09	Failure Of Check And Stop Check Valves Subjected To Low Flow Conditions	2/3/86	All power reactor facilities holding an OL or CP
86-08	Licensee Event Report (LER) Format Modification	2/3/86	All power reactor facilities holding an OL or CP
86-07	Lack Of Detailed Instruction And Inadequate Observance Of Precautions During Maintenance And Testing Of Diesel Generator Woodward Governors	2/3/86	All power reactor facilities holding an OL or CP
86-06	Failure Of Lifting Rig Attachment While Lifting The Upper Guide Structure At St. Lucie Unit 1	2/3/86	All power reactor facilities holding an OL or CP
86-05	Main Steam Safety Valve Test Failures And Ring Setting Adjustments	1/31/86	All PWR facilities holding an OL or CP
86-04	Transient Due To Loss Of Power To Integrated Control System At A Pressurized Water Reactor Designed By Babcock & Wilcox	1/31/86	All power reactor facilities holding an OL or CP
86-03	Potential Deficiencies In Environmental Qualification Of Limitorque Motor Valve Operator Wiring	1/14/86	All power reactor facilities holding an OL or CP
86-02	Failure Of Valve Operator Motor During Environmental Qualification Testing	1/6/86	All power reactor facilities holding an OL or CP

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05-319-10-9D

SSINS No.: 6835
IN 86-73

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

August 20, 1986

IE INFORMATION NOTICE NO. 86-73: RECENT EMERGENCY DIESEL GENERATOR [illegible] EMS

Addressees:

All nuclear power reactor facilities holding an operating license or a construction permit.

Purpose:

This notice is to alert addressees to vibration-induced fuel line wear and of a deficiency in the design of the field flash circuitry on nuclear plant emergency diesel generators. Recipients are expected to review the information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Nine Mile Point Unit 2

While conducting diesel generator testing in early May 1986, it was discovered that diesel fuel lines had experienced extensive wear and fuel leaks in the area of the clamps that mount the fuel lines to the diesel engine. The diesels are Cooper-Bessemer model KSV-16-T, 600 rpm, 4 stroke, 16 cylinder units with low total operating hours.

Fuel line damage was caused by vibration from the diesel engine and fuel system pulsation induced by rapid, repeated cycling of a fuel system relief valve. This valve relieves from the low pressure fuel system via a cooler to the fuel day tank to control low pressure fuel system pressure. The manufacturer proposes to correct the problem by inserting plastic sleeves between the fuel line and its hold down clamps and installing a dashpot on the relief valve to dampen its operation.

Watts Bar Units 1 and 2

In April 1986 a deficiency was identified which affects all five standby diesel generators (DGs) at Watts Bar Nuclear Plant and could prevent the DGs from developing a voltage output when required in an emergency. The affected DGs are tandem 16-645 E4 units supplied by Morrison-Knudson Co. The normal shutdown cycle of the DG includes a 10-minute cooldown run at about 450 rpm. If during

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this idle period an emergency start signal were received, the DG would accelerate to the normal 900 rpm operating speed, but the generator field would not be flashed and an output voltage therefore would not be developed.

This problem has also been determined to exist on the HPCS DG at Grand Gulf Nuclear Station. This unit was supplied by General Motors Corporation.

The root cause of this deficiency has been found to be a design error by the manufacturer. During a normal or emergency start, as the DG accelerates past 475 rpm, logic is completed to flash the generator field. When output voltage has built up, the field flash circuitry is automatically disabled. The logic design is such that engine speed must go below 200 rpm to re-enable the field flash circuitry, thus no field flash will occur if an emergency start signal is received during the 450 rpm cooldown period. Field flash would be needed under these circumstances because the self-excitation path is interrupted early in the shutdown sequence.

The corrective action proposed by the DG manufacturer is to modify the control circuitry to eliminate the speed dependence of field flash reset.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contact: Kevin Wolley, IE
(301) 492-8373

Attachment: List of Recently Issued IE Information Notices

Attachment 1
IN 86-73
August 20, 1986

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-72	Failure 17-7 PH Stainless Steel Springs In Valcor Valves Due to Hydrogen Embrittlement	8/19/86	All power reactor facilities holding an OL or CP
86-71	Recent Identified Problems With Limitorque Motor Operators	8/19/86	All power reactor facilities holding an OL or CP
86-70	Spurious System Isolation Caused By The Panalarm Model 86 Thermocouple Monitor	8/18/86	All GE BWR facilities holding an OL or CP
86-69	Scram Solenoid Pilot Valve (SSPV) Rebuild Kit Problems	8/18/86	All BWR facilities holding an OL or CP
86-68	Stuck Control Rod	8/15/86	All BWR facilities holding an OL or CP
86-67	Portable Moisture/Density Gauges: Recent Incidents And Common Violations Of Requirements For Use, Transportation, And Storage	8/15/86	All NRC licensees authorized to possess, use, transport, and store sealed sources
86-66	Potential For Failure Of Replacement AC Coils Supplied By The Westinghouse Electric Corporation For Use In Class 1E Motor Starters And Contractors	8/15/86	All power reactor facilities holding an OL or CP
86-65	Malfunctions Of ITT Barton Model 580 Series Switches During Requalification Testing	8/14/86	All power reactor facilities holding an OL or CP
86-64	Deficiencies In Upgrade Programs For Plant Emergency Operating Procedures	8/14/86	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit

05-319-11-90

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

September 16, 1988

NRC INFORMATION NOTICE NO. 88-75: DISABLING OF DIESEL GENERATOR OUTPUT CIRCUIT BREAKERS BY ANTI-PUMP CIRCUITRY

Addressees:

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose:

This information notice is being provided to alert addressees to potential problems where the capability to either automatically or manually close diesel generator circuit breakers from the control room may be lost. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On June 5, 1988, operators at Browns Ferry Unit 3 were unable to reclose the diesel generator output breakers to the 4-kV shutdown boards from the control room during a loss-of-power/loss-of-coolant-accident (LOP/LOCA) test. During the test, the output breakers connected the diesel generators to their respective 4-kV shutdown boards after the LOP signal was generated; however, the breakers tripped and remained open after receiving the LOCA signal. Operators diagnosed the output breaker lockout problem using system electrical configuration drawings. An operator was sent to the 4-kV shutdown board to manually transfer output breaker control power to its alternate source. This momentarily removed power, enabling the breaker to close when the power was restored.

On October 14, 1987, an operator at Wolf Creek Generating Station manually tripped the output circuit breaker of the emergency diesel generator (EDG) from the control room. At the time, the EDG was supplying a vital bus. When the operators tried to reenergize the vital bus from the still-operating EDG, they found that they could not close the EDG output breaker from the control room. The vital bus was finally reenergized from the offsite power supply. Through examination of the breaker control schematics the licensee later found that the EDG circuit breaker could be closed by cycling the EDG mode switch at the EDG local control station.

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Discussion:

The anti-pump circuit configuration will protect large breakers from rapid cycling and, under certain circumstances, will prevent breaker closure. At Browns Ferry Unit 3, a unique sequence of events, a LOP signal followed within 6 seconds by a LOCA signal, led to the discovery of a design deficiency of this circuit configuration. Contacts from the undervoltage relay will seal in the breaker anti-pump relay until the undervoltage condition on the 4-kV boards clears.

The circuit is designed such that following a LOP, the undervoltage condition must exist for at least 5 seconds and the diesel must reach rated speed before the diesel generator output breaker will close on the bus. Once the breaker has closed, the closure spring recharge motor and the breaker anti-pump relay will be energized. A fully discharged closure spring requires 2 seconds for the spring to be fully recharged. During this 2 second window the anti-pump coil will remain energized via contacts sensing spring position, and if an undervoltage condition exists on the 4-kV bus it will seal in and lock open the breaker.

During the Browns Ferry event, the EDG output breaker closed 5 seconds after the LOP signal, the undervoltage condition was eliminated, and the undervoltage relay began its 5 second cycle to reset from the undervoltage condition. About 1.5 seconds later, the LOCA signal retripped the breaker and created another undervoltage condition on the 4-kV bus. At this point, because the undervoltage relay had not completed its reset cycle, the undervoltage relay remained in its undervoltage state. Therefore, the undervoltage relay sealed in the still-energized anti-pump relay because the undervoltage condition occurred before the breaker charging spring was fully charged. Thus, the breaker could not be closed from the control room either manually or automatically until control power was removed, which deenergized the anti-pump relay.

The Browns Ferry licensee modified the breaker control logic to prevent the anti-pump relay from sealing in during a LOCA condition by adding a time-delay relay in the breaker trip coil circuitry. This relay will be energized by a LOCA signal and its contact in the anti-pump coil seal-in path will open after a 2-to 5-second delay to prevent anti-pump coil seal-in and breaker lockout.

The Wolf Creek EDG output circuit breaker has automatic closing logic to close the circuit breaker when the following five permissives are satisfied:

(1) Both offsite circuit breakers are open.
(2) The EDG mode switch is in the automatic mode.
(3) Lockout relays are deenergized.
(4) A 3-second time delay has elapsed.
(5) The EDG has reached operating speed and voltage.

This logic sends a constant close signal to the circuit breaker that keeps the breaker's internal anti-pump relay energized as long as the logic permissives are satisfied. The anti-pump relay prevents the circuit breaker from cycling if attempts are made to hold the breaker closed against a valid trip signal.

When the Wolf Creek operator manually tripped the EDG output breaker, the automatic closing logic permissives remained satisfied. Therefore, the anti-pump relay remained energized, preventing reclosure of the circuit breaker. Cycling the EDG mode control switch at the local control station allowed the circuit breaker to reclose by momentarily interrupting the automatic close signal, thereby resetting the anti-pump logic. When the mode switch contact was reclosed by returning the switch to the "auto" position, the circuit breaker's automatic closing logic closed the breaker.

The Wolf Creek licensee modified the EDG breaker control switch located in the control room to enable the operator to reclose the EDG circuit breaker from the control room. This switch was originally intended only as a means of paralleling the EDG with the offsite power supply. With the current modification, the switch can be used to reset the anti-pump logic and allow the automatic circuit to reclose the breaker. The modification added a contact that is closed in the "normal" position and open in the "trip" and "pull to lock" positions of the control switch. When operators manually trip the EDG circuit breaker from this control switch, the contacts open to interrupt the close circuit and reset the circuit breaker anti-pump relay. If the operator wishes to keep the breaker open, he must put the switch in the "pull to lock position. Returning the switch to the "normal" position completes the automatic close circuit and the breaker recloses.

It should be noted that although the above discussion has dealt only with EDG output circuit breakers, anti-pump circuit problems could also apply to other breakers that use automatic closing logic, such as load-sequencing breakers and offsite supply breakers to the emergency buses.

The information herein is being provided as an early notification of a potentially significant matter that is still under consideration by the NRC staff. If NRC evaluation so indicates, specific licensee actions may be requested.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact one of the technical contacts listed below or the Regional Administrator of the appropriate regional office.

Charles E. Rossi

Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contacts: James Lazevnick, NRR
(301) 492-0814

Carl Schulten, NRR
(301) 492-1192

Fred Burrows, NRR
(301) 492-0783

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
88-74	Potentially Inadequate Performance of ECCS in PWRs During Recirculation Operation Following a LOCA	9/14/88	All holders of OLs or CPs for W and B&W-designed nuclear power reactors.
88-73	Direction-Dependent Leak Characteristics of Containment Purge Valves	9/8/88	All holders of OLs or CPs for nuclear power reactors.
88-72	Inadequacies in the Design of dc Motor-Operated Valves	9/2/88	All holders of OLs or CPs for nuclear power reactors.
88-71	Possible Environmental Effect of the Reentry of COSMOS 1900 and Request for Collection of Licensee Radioactivity Measurements Attributed to That Event	9/1/88	All holders of OLs or CPs for nuclear power reactors, fuel cycle licensees, and Priority 1 material licensees.
88-70	Check Valve Inservice Testing Program Deficiencies	8/29/88	All holders of OLs or CPs for nuclear power reactors.
88-69	Movable Contact Finger Binding in HFA Relays Manufactured by General Electric (GE)	8/19/88	All holders of OLs or CPs for nuclear power reactors.
88-48, Supplement 1	Licensee Report of Defective Refurbished Valves	8/24/88	All holders of OLs or CPs for nuclear power reactors.
88-68	Setpoint Testing of Pressurizer Safety Valves with Filled Loop Seals Using Hydraulic Assist Devices	8/22/88	All holders of OLs or CPs for nuclear power reactors.
88-67	PWR Auxiliary Feedwater Pump Turbine Overspeed Trip Failure	8/22/88	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

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NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

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DIRECTOR
MNBB-3302
WASHINGTON DC 20555

05-319-12-90

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

December 19, 1989

NRC INFORMATION NOTICE NO. 89-87: DISABLING OF EMERGENCY DIESEL GENERATORS BY THEIR NEUTRAL GROUND-FAULT PROTECTION CIRCUITRY

Addressees:

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose:

This information notice is intended to alert addressees to possible unconsidered failure modes in which emergency diesel generators could be rendered inoperable as a result of their neutral ground-fault protection circuitry. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On May 25, 1989, a plant engineering design review at Perry Unit 1 revealed a design anomaly whereby ground faults on emergency diesel generator loads coincident with loss of offsite power during a seismic event or fire could lead to the inoperability of more than one emergency diesel generator. As a result, the Perry staff declared several of the emergency diesel generators inoperable until temporary modifications could be made to disable the neutral ground-fault relay contacts that were designed to trip the emergency diesel generators.

Discussion:

At Perry Unit 1, each emergency diesel generator was designed with a neutral ground circuit consisting of a high impedance path from the neutral to ground, which limits ground-fault current to no more than 2 amperes (see typical network in Figure 1). The purpose of providing this grounding path (in lieu of an ungrounded system) is to limit the buildup of high voltage stress during certain ground-fault conditions that could ultimately result in the breakdown of the insulation of such components as motors and cables. It also provides a convenient means of detecting a ground in the system so that a search can be made to eliminate the ground before a second ground occurs and causes a phase-to-phase fault.

Ground faults are detected by sensing the voltage that is developed in the emergency diesel generator grounding circuit whenever a ground fault exists in the electrical distribution system supplied by the emergency diesel generator. In the Perry design, a voltage sensing relay would initiate a trip of the corresponding emergency diesel generator whenever this voltage exceeded the relay's pickup value. This relay's contacts are bypassed by the automatic response to a loss-of-coolant accident. For non-LOCA events, however, a ground fault in any component, including non-Class 1E components, would have the undesirable result of shutting down the emergency diesel generator. This raises the concern that a seismic event or fire could have resulted in simultaneous ground faults in non-safety components supplied by all of the redundant emergency diesel generators. Action by the protection circuitry at Perry could then have shut down all of the emergency diesel generators, preventing them from performing their intended safety functions.

The Perry staff has temporarily disabled the neutral ground-fault relays to prevent them from shutting down the emergency diesel generators. Permanent modifications are planned to replace the ground-fault emergency diesel generator trip function with ground-fault alarms in the control room. These modifications will be supported by alarm response procedures requiring that the operators determine the location and safety significance of ground faults and take appropriate action.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.

Charles E Rossi

Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: F. Burrows, NRR
(301) 492-0833

Attachments:
1. Figure 1
2. List of Recently Issued NRC Information Notices

TYPICAL HIGH RESISTANCE NEUTRAL GROUNDING SYSTEM

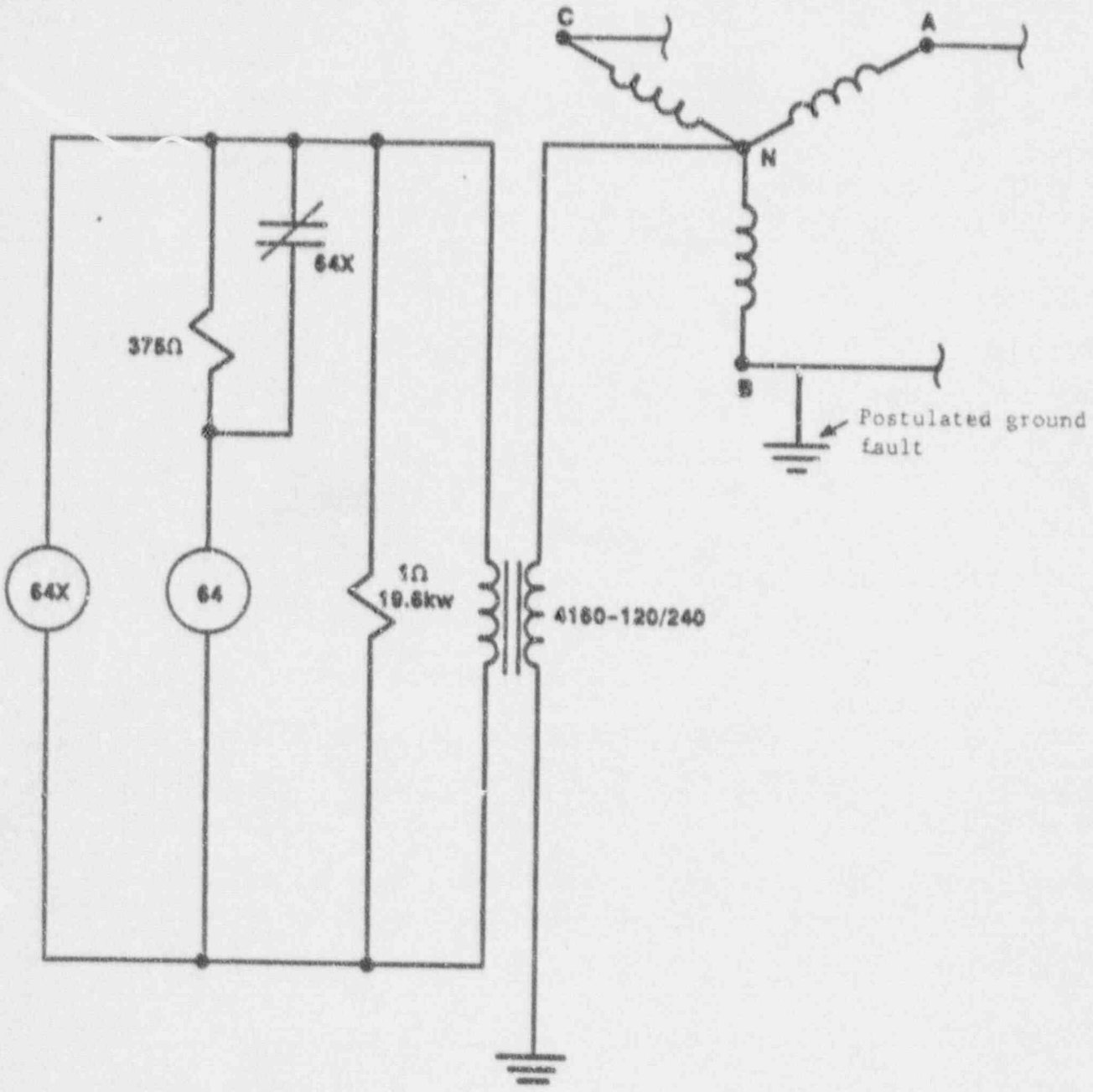

FIGURE 1

LEGEND

64 - Voltage sensing relay, provides alarm actuation or trip.

64X - Provides overvoltage protection for the 64 relay.

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
89-45, Supp. 2	Metalclad, Low-Voltage Power Circuit Breakers Refurbished with Substandard Parts	12/15/89	All holders of OLs or CPs for nuclear power reactors.
89-86	Type HK Circuit Breakers Missing Close Latch Anti-Shock Springs.	12/15/89	All holders of OLs or CPs for nuclear power reactors.
89-85	EPA's Interim Final Rule on Medical Waste Tracking and Management	12/15/89	All medical, academic, industrial, waste broker, and waste disposal site licensees.
89-84	Failure of Ingersoll Rand Air Start Motors as a Result of Pinion Gear Assembly Fitting Problems	12/12/89	All holders of OLs or CPs for nuclear power reactors.
89-83	Sustained Degraded Voltage on the Offsite Electrical Grid and Loss of Other Generating Stations as a Result of a Plant Trip	12/11/89	All holders of OLs or CPs for nuclear power reactors.
89-82	Recent Safety-Related Incidents at Large Irradiators	12/7/89	All NRC licensees authorized to possess and use sealed sources at large irradiators.
89-59, Supp. 1	Suppliers of Potentially Misrepresented Fasteners	12/6/89	All holders of OLs or CPs for nuclear power reactors.
89-81	Inadequate Control of Temporary Modifications to Safety-Related Systems	12/6/89	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

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WASHINGTON DC 20555

05-320-90

NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D. C. 20555

IE BULLETIN 77-01
Date: April 29, 1977

PNEUMATIC TIME DELAY RELAY SETPOINT DRIFT

DESCRIPTION OF CIRCUMSTANCES:

Millstone Unit 2 and North Anna Unit 1 facilities experienced repeated diesel-generator starting failures several of which investigation revealed were caused by setpoint drift on the pneumatic time delay relays used in the control circuitry for the diesel-generator. The relays involved are identified as ITE Imperial, Catalog Nos. J20T3/J13P20 and J20T3/J13P30. The affected diesel-generators are Fairbanks Morse Units by Colt Industries.

These types of time delay relays are used in several different applications in the control circuitry for the diesel-generator. One of these relays is used to bypass the normal low oil pressure shutdown functions during diesel-generator startup. At Millstone Unit 2 the relay had drifted approximately 10 seconds from the required 20 second delay which allowed the low oil pressure trip circuit to shut down the diesel-generator before the oil pressure had time to build up. At North Anna Unit 1, excessive drift of similar ITE time delay relays was also observed during preoperational testing of the diesel-generators.

ITE Imperial has identified the time delay relays involved at Millstone Unit 2 as coming from the 1972 and 1973 production runs. The catalog specification for this vintage of relays requires a trip-point setting repeat accuracy of ± 15 percent. Units manufactured in 1974 or later have demonstrated a repeat accuracy of ± 3 to 4 percent, well within the catalog specification of ± 15 percent.

7909050210 3pp

Month and year of production for the time delay relays in question can be determined by the six or seven digit bold white number on the timer head. The first two or three digits indicate the month and year or production. (The last four digits provide other coded information.) For example: 124056 indicates a production date of January 1972; 1234056 indicates a production date of December 1973.

According to the time delay relay manufacturers, the potential for setpoint drift is a common characteristic of most pneumatic relays, irrespective of manufacturer. The magnitude of setpoint drift is related to the repeat accuracy specified for the device and the mode in which it will operate, that is, energized or de-energized. In most cases energized units tend to be susceptible to greater deviations from setpoint because of the temperature effects on the internal parts of the unit.

ACTION TO BE TAKEN BY LICENSEES AND PERMIT HOLDERS:

For all power reactor facilities with an operating license or construction permit:

1. If you have been notified of the potential problem, describe the actions taken regarding corrective measures to identify and resolve any setpoint drift problems with the ITE time delay relays.

2. In addition to Item 1 above, pneumatic time delay relays intended for use in safety related systems and specifying a repeat accuracy range of ± 15 percent or greater should be demonstrated to provide satisfactory operation. You are requested to provide your basis for concluding that existing pneumatic time delay relays are functioning as required, or provide your plans to assure satisfactory operation.

Reports for facilities with operating licenses should be submitted within 30 days after receipt of this Bulletin, and reports for facilities with construction permits should be submitted within 60 days after receipt of this Bulletin. Your report should include the date when the above actions were or will be completed.

Reports should be submitted to the Director of the NRC Regional Office and a copy should be forwarded to the NRC Office of Inspection and Enforcement, Division of Reactor Inspection Programs, Washington, D. C. 20555.

Approval of NRC requirements for reports concerning possible generic problems has been obtained under 44 U.S.C 3152 from the U. S. General Accounting Office. (GAO Approval B-180255 (R0072), expires 7/31/77)

05-327-90

NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

December 9, 1977

IE Circular 77-16

EMERGENCY DIESEL GENERATOR ELECTRICAL TRIP LOCK-OUT FEATURES

Description of Circumstances:

On June 15, 1977, Duquesne Light Company (Beaver Valley 1) reported that during the performance of a test of the diesel-generator (D/G) trip lock-out features in the emergency mode of operation, the D/G output circuit breaker opened when the field voltage trip interlock was tested. This is contrary to a requirement for this facility that, in the emergency mode, all D/G output breaker trips except generator differential and overcurrent be automatically disabled. The engine overspeed trip, which shuts down the diesel engine (but does not affect breaker operation) is also expected to be operable during the emergency mode of operation.

An investigation conducted by the licensee disclosed that the unexpected opening of the output breaker was due to deenergizing a field voltage sensing relay which was supplied by the vendor but had not been disconnected during the on-site acceptance testing of the D/G nor disabled by the protection circuitry logic. A redundant field voltage relay which was supplied by the licensee is correctly by-passed during fast start conditions and emergency operation.

7911130450 5pp

A design change was initiated by the licensee which removed the field voltage trip feature. This was accomplished by disconnecting the set of relay contacts to the trip circuitry of the D/G output breaker. Subsequent testing of the D/G was performed by the licensee which demonstrated satisfactory operation.

This is an example of an event which resulted from inadequate test procedure performance. The procedures as performed had not previously identified the type of deficiency described in this circular.

The safety significance of this situation is that the premodified protection circuitry would have opened the circuit breaker if a loss of field voltage occurred while running in the emergency mode of operation.

The D/G Units for the above facility were supplied by the Electro Motive Division (EMD) of General Motors. The model numbers for the D/G Units are:

Engine Model No. 20-645-E4

Generator Model No. A-20-C7

Control Panel Model No. 999-20

All holders of operating licenses or construction permits should assure that the appropriate D/G protection trip circuits are provided with automatic by-pass features that prevent them from negating automatic starting or tripping of D/Gs during fast start or emergency operations. It is recommended that the following be considered in your reviews of this matter:

1. Facility procedures should specifically determine whether the protection circuitry that trips the D/G set or the associated output breaker is in accordance with the facility Technical Specifications.

2. Test procedures for your D/G sets (e.g. acceptance preoperational and surveillance tests) should be reviewed to assure that D/G system performance is demonstrated by these tests to be in accordance with related operational requirements specified in the facility Technical Specifications.

3. Strengthening of management controls should be reviewed as necessary to assure adherence to D/G test procedures by plant personnel.

No written response to this circular is required. If you require additional information regarding this matter, contact the Director of the appropriate NRC Regional Office.

LISTING OF IE CIRCULARS ISSUED IN 1977

CIRCULAR NO.	SUBJECT	FIRST DATE OF ISSUE	ISSUED TO
77-01	Malfunctions of Limitorque Valve Operators	1-4-77	All holders of OLs or CPs
77-02	Potential Heavy Spring Flooding	2-15-77	All affected holders of OLs
77-02A	Potential Heavy Spring Flooding	2-16-77	All affected holders of CPs
77-03	Fire Inside a Motor Control Center	2-28-77	All holders of OLs and CPs
77-04	Inadequate Lock Assemblies	3-17-77	Safeguard Group I, II, IV, V, Licensees
77-05	Liquid Entrapment in Valve Bonnets	3-24-77	All holders of OLs and CPs
77-06	Effects of Hydraulic Fluid on Electrical Cable	4-1-77	All holders of OL's and CPs
77-07	Short Period During Reactor Startup	4-12-77	Holders of BWR OLs
77-08	Failure of Feedwater Sample Probe	4-13-77	All holders of OLs
77-09	Improper Fuse Coordination In BWR Standby Liquid Control System Control Circuits	5-25-77	All holders of BWR OLs or CPs
77-10	Vacuum Conditions Resulting in Damage to Liquid Process Tanks	7-15-77	All holders of OLs

LISTING OF IE CIRCULARS ISSUED IN 1977 (Continued)

CIRCULAR NO.	SUBJECT	FIRST DATE OF ISSUE	ISSUED TO
77-11	Leakage of Containment Isolation Valves with Resilient Seats	9-6-77	All holders of OLs and CPs
77-12	Dropped Fuel Assemblies at BWR Facilities	9-15-77	All holders of BWR OLs or CPs
77-13	Reactor Safety Signals Negated During Testing	9-22-77	All holders of OLs and CPs
77-14	Separation of Contaminated Water Systems From Noncontaminated Plant Systems	11-22-77	All Power and Test Reactor, Fuel Cycle, and major By-product material processor facilities with OLs or CPs
77-15	Degradation of Fuel Oil Flow to the Emergency Diesel Generators	12/1/77	All holders of OLs and CPs

CA [redacted] UNIT-1 350-C MEOP

Nuclear Plant Maintenance Work Order Georgia Power

1. Control No. 18808316	2. Date 11/17/88	3. Unit 1 05-322-90
4. System/Component 1204 / MOV	5. MPL/Tag No. 1HV-8808D	

6. Problem/Work Requested

SUBJECT VALVE HAS BEEN REPORTED AS LEAKING BY THE SEAT. MOVATS TEST DATA OBTAINED UNDER MWO 18808134 INDICATES A DEFORMATION DURING VALVE SEATING AND CONFIRMS REPORTED SEATING CONCERNS.

Rm to Bldg. level C at Col. 15/16. (5 Right of Col. 15 + 20 ft inward. ☐ Cont

7. Initiator Raymond L. Gunnon X-4160	8. Supervisor Kevin L. Gunnon X-4160	
9. Classification (Safety) III	10. Unit Status Required	11. Fire Protection System
12. DCR ☐ No. N/A	13. NCR/DR ☐ No. N/A	
14. Type Maintenance Plant ☑ Facility ☐	15. Duration of Maintenance 20	

16. Est/Act Man Hours Summary	Mech.	Elect.	I&C	Other
Hrs.	24 / [illegible]	16	N/A	N/A
Exp.				

17. Clearance Required ☑ ETD List 1901548 1901543 1901545

18. Permits Required ☑ Hot Work Permit 90-6600 Rev 2/17/90

19. Q.C. Hold Pts. ☐ Q.C. Reviewed By [signature] Date 11/25/88

20. Procedure No. 26610-C/26659-C/26616-C 21. Priority E3 22. LCO ☐ T.S. 3.8.4.2

23. Work Instruction ~~SEE~~ ~~11/29~~

~~REWORK~~ VALVE AS NECESSARY TO ENSURE PROPER VALVE ~~SEATING~~. WORK REQUIRES MIDLOOP OPERATION OR INSTALLATION OF FREEZE SEAL ON RCS WITH ACCUMULATOR

24. Initiation Review

OPS [signature]	Date 11-17-88	MNT [signature]	Date 11/17/88	25. Special Review Required ☑	SEE CONT
HP [signature]	Date 11-17-88	ENG [signature]	Date 11-25-88	26. MWO Release For Work Signature R. Neal White	Date 2-25-90

27. Actual Work Performed

Block #27 Determined wires at Valve # 1HV-8808D could not remove flex fittings on valve. See the lifted lead data sheet Proc. 250.96-C, dated 2-25-90 Work stopped and Maintained Zone IV Cleanliness Date 2-25-90

History Summary

28. Material Required ☐ MSS 105198 ☐ Cont.

29. Person Performing Work (Name) [signature]	Date 2-20-90	30. Maintenance Foreman [signature]	Date 3-20-90
31. Inspection Performed By [signature]			Date 4.14.90

32. Method of Functional Test VC-1-1 PROVE VALVE SEATING PER PVII to perform VT-II at N.O.P/P. T.P 3/24/90

33. Procedure No. [illegible]	34. Performed By [signature]	35. Date 4.14.90	
36. Proves Operability Yes ☐ No ☐ N/A	37. Method Used To Prove Operability* N/A		
38. Satisfactory ☐ Unsatisfactory ☑	39. If Unsatisfactory, Corrective Action Taken PCI-88-729 Issues NEW MWO for seat leakage		
40. Unit Status At Time of Failure NPRD N	41. Type of Failure N	42. Mode of Failure N	
43. Cause of Failure N	44. Detection By N	46. Effect on System N	
46. Effect on Plant N	47. MWO Status Code N	48. Cause Description N	49. Corrective Action Code N
50. New MWO No. 18808134	51. Operation Accepted By NEW MWO [signature]		Date 4/4/90
52. DSOS Approval N/A			Date
53. Special Review Completed ☐ N/A	Date N/A	Meeting Number N/A	Date N/A
55. Close-out Approval By QC Leonard L. Kyle	Date 4-17-90		

B-TRAIN

708 1M0 MC3101

Nuclear Plant Maintenance Work Order Continuation Sheet

MPL No. 1HVB80BD MWO No. 18808316

Work Description

BLOCK 23 CONTINUED:

NUMBER # 4 DRAINED. IF A Freeze seal Required in lieu of draining Sys. Initiate A Seperate MWO/PO For A Vendor to Freeze seal line OR initiate A Temp procedure with MWO to provide instruction for Freeze sealing A 10 inch pipe.

MEOP

- Coordinate with H.P.
- DISAssemble valve per procedure 26610-C (VALVE 10GM88)
- Maintain Cleanliness Class B.
- Verify that operator and bonnet can be removed together from body. All determ to be document in 26610-C.
- (ISI HOLD POINT) - Inspect Disc., seat Ring, internals. Contact I.S.I Group for Insp
- IF ANY pressure boundary parts require Replacement and/or Rework, except for minor Lapping Return MWO to WPG for Section XI Traveler. *
- Reassemble valve per 26610-C, including Return *** & Repeat 25036-C (3rd Req.)
- Restt valve ~~per 26836-C~~ Re-MOVAT per 26859-C **
- ~~Page 1 of 2~~ No ~~of~~ valve STROKE TIME, Valve NOT LLRT Valve.
- No Leakage to be performed by QC/ANII (VT-2) at NOP/T under F/T Block 32.

*** Notify QC Prior to Return For Holdpoints

* Pressure Boundary Parts; Body, Bonnet, Disc., STEM or VALVE Main Flange STUDS/Nuts.

** Ref mwo 1890292 for movats

NUCLEAR PLANT MAINTENANCE WORK ORDER CONTINUATION SHEET

MPL NO. 1HV 8808D MWO NO. 18808316

WORK DESCRIPTION BLOCK 23 - MAINTAIN CLASS "B" CLEANLINESS, AND ZONE III HOUSEKEEPING. BJC 2-22-90

Block 27) Disconnected flexible conduit of control cable and motor leads Maintained Containment Cleanliness F22570

Block 26 E.M. [illegible] for 3/19/90

Block 27

Disassembled valve as per procedure 26610-C. cleaned disc + Body to bonnet surface + seat MAINTAINED CLASS B Cleanliness and ZONE III Housekeeping

Mike D. Langston 3/19/90

Block 27 - BLUE Checked valve, tested sat, installed new gasket, called QC for check and ~~and~~ lowered Bonnet on valve, installed nuts

[signature]

Block 27 - Torqued main flange bolts with torque wrench VP-3-2372 Due 6-11-90 and multiplier VTR-42-006 called QC to witness final torque. Maintained Class "B" cleanliness 3-20-90 and zone III housekeeping

[signature] 3-20-90

VALVE WAS DISASSEMBLED AT MAIN FLANGE ONLY, REPACK NOT REQUIRED. BJC 3-21-90

Nuclear Plant Maintenance Work Order Continuation Sheet

MPL No. 1 HV 8808D MWO No. 18808316

Work Description Blk 26: SC Heet 3-20-90

Blk(27) Completed the determination of all external cables of 1HV8808D per 2523Sect 8/8 data sheet MOAT TESTING TO BE PERFORMED UNDER MWO 18902972 Marked Cont cleanliness F 3-21-90

blk 29) ~~FAILED~~ PASSED 3-21-90

Block 30: James E Beasley 3-21-90

Block 50: WRT 1050 generated for seat leakage. M E Chance 4/11/90

BLOCK 27: THE LEAKAGE IDENTIFIED ON VT-2 INSPECTION BY D.C. Lewis ON 4-14-90 WAS FOUND TO HAVE BEEN COMING FROM VALVE 1-1204-44-025, THIS VALVE TO BE REPAIRED UNDER MWO 19000543. THE VT-2 INSPECTION FOR 1HV-8808D HAS BEEN REPERFORMED ON 4-15-90 BY RALPH WEBB (QC) AND FOUND TO BE SATISFACTORY. INSPECTION ~~REPORT~~ ATTACHED.

4-15-90

BLOCK ~~32~~ 34: ~~(4-15-90)~~ Rhejs A Check (CARRIED ON VT-2 REPORT DATED 4-15-90) 4/15

Block 32: VT-2 is complete and satisfactory at NDP/NOT.

Seat Leakage still exist accordding to M. Chance MWO 19001895 was written to correct this problem. W Stevenson 4/15/90

~~32~~ LDO 4/15/90 EST

Block 50: 19001895 - W Stevenson 4/15/90

GEORGIA POWER COMPANY
VEGP QUALITY CONTROL

VISUAL LEAKAGE EXAMINATION

85060-C FIG 1
PAGE 1 OF 1

NWO/OTHER #	INSP PROCEDURE #	REV #	DRAWING #	REV #
1BB09316	85060-C	3	126AA06-656	R1

LINE/EQUIP # 1-HV-8808D

TEST CODE: ASME Section XI ☑ ANSI B31.1 ☐ OTHER ____

TYPE OF TEST:

System Leakage ☑ System Inservice ☐ System Pneumatic ☐

System Functional ☐ System Hydrostatic ☐ Other ____

COMPONENT OR SYSTEM:

Insulated ☒ Non-Insulated ☐

TEST CONDITIONS: (Complete as applicable)

Required NOP ☒ NOT ☒ Verified NOP ☒ NOT ☒

Required N/A PSIG Verified N/A PSIG

Required N/A F Verified N/A F

TEST CONDITION VERIFIED BY:

Examiner ☒ 4/15/90

Other ☒ Name FRED HOWARD Time 15:30

TEST INSTRUMENTATION:

INSTRUMENT # N/A Cal. Due Date __/__/__

INSTRUMENT # N/A Cal. Due Date __/__/__

INSTRUMENT # N/A Cal. Due Date __/__/__

* Cal. Data Not Required Except For Hydrostatic & Pneumatic Tests

TEST RESULTS:

SAT. ☒ UNSAT. ☐ DC # ____

DESCRIPTION OF DEFICIENCY IF UNSAT: NONE

VISUAL EQUIPMENT USED: FLASH LIGHT

REMARKS: 557°F 2235 PSIG DER FRED HOWARD

VT 2 PERFORMED BASED ON DC-190-207

EXAMINER: [signature] LEVEL II DATE 4-15-90

EVALUATOR: N/A ☒ LEVEL DATE

ANII REVIEW: N/A ☐ DATE

FOR USE WITH CONTROL NO. 18809316

Procedure No.	Revision	Page No.
VEGP 25036-C	8	21 of 26

Sheet 1 of 1

POWER AND SIGNAL REMOVAL/REPLACEMENT DATA SHEET

[1] Safety Related/QC Holdpoints [ ] Non-Safety Related

NOTES

a. To install jumpers and/or lift wires, other than those directly associated with the equipment tag(s)/scheme number(s) listed on the Work Order, notify the Shift Supervisor and comply with his instructions.

b. Ensure that each lead (wire) is marked so it can be uniquely identified with its termination point.

c. Independent verification is only required on safety related equipment. Place N/A in independent verification block for non-safety related equipment.

d. If the worker leaves the immediate proximity of the work or the work is interrupted, complete and install a "Jumper and Lifted Wire" tag per 00306-C, "Temporary Jumper And Lifted Wire Control". Instead of Control Number use the Procedure number on the tag.

Q.C. HOLD POINT

e. If holdpoints do not apply, NA QC Verification block.

		REMOVAL			RECONNECTION		
IDENTIFY LEADS LIFTED, JUMPERS INSTALLED, LINES OPEN, ETC.	LOCATION PANEL OR JUNCTION BOX	PERFORMED BY/DATE	INDEPENDENT VERIFICATION BY/DATE	QC VERIF. BY/DATE	PERFORMED BY/DATE	INDEPENDENT VERIFICATION BY/DATE	QC VERIF. BY/DATE
1BBE19LA	1-HV-8808D	DAE 2-25-90	RHM 2/25/90				
Motor Lead BLK To TB1					F 3-21-90	RB 3-21-90	RCM 3/21/90
" " Red To TB2					F 3-21-90	RB 3-21-90	RCM 3/21/90
" " WHT To TB3					F 3-21-90	RB 3-21-90	RCM 3/21/90
1BBE19SC							
RED To BKR #2 (Cont. Sch 38)	✓				F 3-21-90	RB 3-21-90	RCM 3/21/90
BLK To BKR #3 (Cont. Sch 28)	✓				F 3-21-90	RB 3-21-90	RCM 3/21/90
GRN To Term. Strip Pt. 21	✓				F 3-21-90	RB 3-21-90	RCM 3/21/90
GRN/BLK To BKR (Cont. 1c) (10)	✓				F 3-21-90	RB 3-21-90	RCM 3/21/90
BLK/WHT To Term Strip Pt 18	✓ 1-HV-8808D	DAE 2-25-90	RHM 2/25/90		F 3-21-90	RB 3-21-90	RCM 3/21/90

FOR USE WITH CONTROL NO. 18802316

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Procedure No.	Revision	Page No.
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Sheet 1 of 1

POWER AND SIGNAL REMOVAL/REPLACEMENT DATA SHEET

[ ] Safety Related/QC Holdpoints [ ] Non-Safety Related

NOTES

a. To install jumpers and/or lift wires, other than those directly associated with the equipment tag(s)/scheme number(s) listed on the Work Order, notify the Shift Supervisor and comply with his instructions.

b. Ensure that each lead (wire) is marked so it can be uniquely identified with its termination point.

c. Independent verification is only required on safety related equipment. Place N/A in independent verification block for non-safety related equipment.

d. If the worker leaves the immediate proximity of the work or the work is interrupted, complete and install a "Jumper and Lifted Wire" tag per 00306-C, "Temporary Jumper And Lifted Wire Control". Instead of Control Number use the Procedure number on the tag.

Q.C. HOLD POINT

e. If holdpoints do not apply, NA QC Verification block.

		REMOVAL			RECONNECTION		
IDENTIFY LEADS LIFTED, JUMPERS INSTALLED, LINES OPEN, ETC.	LOCATION PANEL OR JUNCTION BOX	PERFORMED BY/DATE	INDEPENDENT VERIFICATION BY/DATE	QC VERIF. BY/DATE	PERFORMED BY/DATE	INDEPENDENT VERIFICATION BY/DATE	QC VERIF. BY/DATE
1BBEMSC.	1-HV-8808D	RBE 2-25-90	[illegible] 2/25/90				
blu. to Rel. #4 (contact 13) (57)	✓				F 3-21-90	RB 3-21-90	[illegible] 3/21/90
Org to Rel #4 (contact 14) (61)	✓				F	RB 3-21-90	[illegible] 3/21/90
Org/bk to Term Strip pt. 36	✓				F	RB 3-21-90	[illegible] 3/21/90
Wht to Rel #4 Contact 15) (65)	✓				F	RB 3-21-90	[illegible] 3/21/90
Wh/bk. Rel #3 (contact 11) (19)					F	RB 3-21-90	[illegible] 3/21/90
bk to Rel #3 (contact 14) (20)					F	RB 3-21-90	[illegible] 3/21/90
bk/Wht. Rel #4 (contact 15) (49)	✓				F 3-21-90	RB 3-21-90	[illegible] 3/21/90
1BBEMSD							
Blk Rel #3 (contact 12) (30)	1-HV-8808D	RBE 2-25-90	[illegible] 2/25/90		F 3-21-90	RB 3-21-90	[illegible] 3/21/90

FOR USE WITH CONTROL NO. 1880316

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Procedure No.	Revision	Page No.
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Sheet 1 of 1

POWER AND SIGNAL REMOVAL/REPLACEMENT DATA SHEET

[ ] Safety Related/QC Holdpoints [ ] Non-Safety Related

NOTES

a. To install jumpers and/or lift wires, other than those directly associated with the equipment tag(s)/scheme number(s) listed on the Work Order, notify the Shift Supervisor and comply with his instructions.

b. Ensure that each lead (wire) is marked so it can be uniquely identified with its termination point.

c. Independent verification is only required on safety related equipment. Place N/A in independent verification block for non-safety related equipment.

d. If the worker leaves the immediate proximity of the work or the work is interrupted, complete and install a "Jumper and Lifted Wire" tag per 00366-C, "Temporary Jumper And Lifted Wire Control". Instead of Control Number use the Procedure number on the tag. Q.C. HOLD POINT

e. If holdpoints do not apply, NA QC Verification block.

		REMOVAL			RECONNECTION		
IDENTIFY LEADS LIFTED, JUMPERS INSTALLED, LINKS OPEN, ETC.	LOCATION PANEL OR JUNCTION BOX	PERFORMED BY/DATE	INDEPENDENT VERIFICATION BY/DATE	QC VERIF. BY/DATE	PERFORMED BY/DATE	INDEPENDENT VERIFICATION BY/DATE	QC VERIF. BY/DATE
1BBE19SJ	1-HV-8808D	BBE 2-25-90	[illegible] 2/25/90				
Wht to Rel #3 Contact 9	✓	↑			F 3-21-90	RB 3-21-90	RRay 3/21/90
1BBE19A							
BK to Rel #4 Contact 14	✓	↓	↓		F 3-21-90	RB 3-21-90	RRay 3/21/90
Wht to Rel #4 Contact 14	✓ 1-HV-8808D	BBE 2-25-90	[illegible] 2/25/90		F 3-21-90	RB 3-21-90	RRay 3/21/90

COMPLETION SHEET

PROCEDURE NO.	REVISION	SHEET
25036-C	8	1 of 5
TAG NO. 1HV-8808D	DESCRIPTION	
SERIAL NO.	MANUFACTURE	MODEL
TEST EQUIPMENT USED	M&TE [ ] Safety Related/QC hold points [ ] Non-Safety Related	

PROCEDURE STEP	DESCRIPTION	MAINT. INIT/DATE	HOLD POINT (Yes/No)	QC INIT/DATE
3.5	Special indicator MOV/MAC [] Applies (Post test assigned) [] Does not apply	N/A	NO	1/2/89
4.1.1	Prerequisites and Initial Conditions verified	/		/
4.1.2	Shift Supervisor Notified	/		/
4.1.3	Clearance and Tagging Verified	/		/
4.1.5	Thermal Overload Protection effect With any Jumpers Lifted/Document on "Power and Signal Removal/Replacement Data" Sheet or Temp. Mod. as Required.	/		/
4.1.6	Record MWO NO. _____ VALVE TAG NO. _____	/		/
4.2.1	Visual Check of Stuffing Box Complete with any Abnormalities recorded as Comments. [ ] SATISFACTORY [ ] UNSATISFACTORY	/	NO	1/2/89

COMPLETION SHEET (cont'd)

PROCEDURE STEP	DESCRIPTION	MAINT. INIT/DATE	HOLD POINT (Yes/No)	QC INIT/DATE
4.2.2	Visual Check of Stem Complete with Any Abnormalities Recorded as Comments. [ ] SATISFACTORY [ ] UNSATISFACTORY	N/A	NO	[illegible] 7/2/87
4.2.3	Check for Cleanliness	/		/
4.3.2	PACKING SIZE _____ PACKING TYPE(S) _____ _____ SUPPORTING DOCUMENT AND PAGE NUMBERS IF VENDOR REQUIREMENTS DIFFER FROM THIS PROCEDURE. _____	/		/
4.3.6	Packing Configuration top Material Type / Ring Type _____ bottom Final compression or gland nut torque _____	/	NO	[illegible] 7/3/87

COMPLETION SHEET (cont'd)

PROCEDURE STEP	DESCRIPTION	MAINT. INIT/DATE	HOLD POINT (Yes/No)	QC INIT/DATE
4.3.8	NAME OF PERSON CONTACTED FOR DECONTAMINATION.			
	DECON FOREMAN _____ DATE _____ TIME _____			
5.1.1	Verify operations concurrence	N/A	NO	[illegible] 1/12/89
5.1.2	Check valve operation	/	NO	/
5.3	If Running Current Can Not Be Reduced Below Threshold Limits Of 130% of Rated Nameplate Current, Name of Maint. Engineer Contacted			
	_____ (Name Of Person Notified)	(Date)	(Time)	
		/	NO	/
5.4	Phase to Phase Line Voltage			
	_____ Volts A to B			
	_____ Volts B to C			
	_____ Volts A to C			
	Lowest Steady State Running Current			
	_____ Amps Opening at _____ Location			
	_____ Amps Closing at _____ Location			
	Measured Valve Stroke Times			
	Actual Stroke Times			
	Open _____ seconds			
	Close _____ seconds			
	[ ] Satisfactory			
	[ ] Unsatisfactory	/	NO	[illegible] 1/12/89

COMPLETION SHEET (cont'd)

PROCEDURE STEP	DESCRIPTION	MAINT. INIT/DATE	HOLD POINT (Yes/No)	QC INIT/DATE
5.5	Stroke Air Operated valves several times to assure valve operates properly	N/A	NO	12/12/89
5.5.1	AOV STROKE TIME REQUIRED ACTUAL OPEN _____ _____ CLOSE _____ _____	/		/
5.7	Slide Wire Potentiometer Reconnected/Recalibrated As Required.	/		/
5.8	Any Required Thermal Overload Jumpers Verified Reinstalled or Temp. Mod. In Force To Ensure Replacement. [ ] Jumper Removal N/A [ ] Jumpers Reinstalled as Required [ ] Temp. Mod. No. _____ in force to ensure Reinstallation of Jumpers.	/		/
5.9	Shift Supervisor Notified that required Maintenance is complete.	/	NO	12/13/89
	(Name of Person Notified)	(Date)		(Time)

Sheet 5 of 5

COMPLETION SHEET (cont'd)

Comments/Additional Holdpoints: None

Used for lifted leer sheet only - 3.21.90

SEE IR # 34061 Rev 3/21/90

Q.C. has reviewed this procedure for holdpoints [signature] 3/21/90
Signature

APPROVED [✓]	DISAPPROVED [ ]
FOREMAN [signature]	DATE 3/21/90

COMPLETED BY:	DATE
[signature]	3.21.90

FOR USE WITH CONTROL NO. 88 0534

Procedure No.	Revision	Page No.
VEGP 26610-C	3	18 of 20

Sheet 1 of 1

POWER AND SIGNAL REMOVAL/REPLACEMENT DATA SHEET

[ ] Safety Related/QC Holdpoints [ ] Non-Safety Related

NOTES

a. To install jumpers and/or lift wires, other than those directly associated with the equipment tag(s)/scheme number(s) listed on the Work Order, notify the Shift Supervisor and comply with his instructions.

b. Ensure that each lead (wire) is marked so it can be uniquely identified with its termination point.

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e. If holdpoints do not apply, NA QC Verification block.

REMOVAL					RECONNECTION			
IDENTIFY LEADS LIFTED, JUMPERS INSTALLED, LINES OPEN, ETC.	LOCATION PANEL OR JUNCTION BOX	PERFORMED BY/DATE	INDEPENDENT VERIFICATION BY/DATE	QC VERIF. BY/DATE	PERFORMED BY/DATE	INDEPENDENT VERIFICATION BY/DATE	QC VERIF. BY/DATE

COMPLETION SHEET

Procedure No. 26610-C	Revision 3	Sheet 1 of 2
Tag No. 1HV8358D	Description Westinghouse Gate Valves	
Serial No.	Manufacturer Westinghouse	Model
Test Equipment Used Torque Wr VP-3-227R DUE 6-11-90	M&TE #	[X] Safety Related/QC Hold Points [ ] Non-Safety Related

PROCEDURE STEP	DESCRIPTION	MAINT. INIT/DATE	HOLD POINT (Yes/No)	QC INIT/DATE
4.1.1	Verify Prerequisites	13-19-90	NO	2HV 3/21/90
4.1.2	Notify Shift Supervisor	B-19-90	NO	2HV 3/21/90
4.1.3	Verify Clearance and Tagging	13-19-90	NO	RAH 3/21/90
4.2.1	Visually Check Sealing Surfaces	13-19-90	QC HOLD POINT	WRP 3/20/90
4.2.2	Check Sealing Surface of Disc	13-19-90	QC HOLD POINT	WRA 3/20/90
4.2.3	Check Sealing Surface of Seat	13-19-90	QC HOLD POINT	WRP 3/20/90
4.2.4	Check Stem Pin	N/A 3/20/90	QC N/A HOLD POINT	3/20/90 1
4.2.5	Check Stem Head and Bearing Blocks	N/A 3/20/90	QC N/A HOLD POINT	3/20/90 1
4.3.4	Lock Pins Welded	N/A 3/20/90	QC N/A HOLD POINT	3/20/90 1
4.3.10	Check Cleanliness	13-19-90	QC HOLD POINT	WRP 3/20/90
4.3.12 * N/A Exp 2.21.90	Torqued Yoke-Bonnet Nuts To ~~660.0~~ ft.lbs	N/A 3/20/90	QC HOLD POINT	1
4.3.1. See comments *	Torqued Operator Capscrews To _____ ft.lbs.	N/A 3/20/90	QC HOLD POINT	1

PROCEDURE STEP	DESCRIPTION	MAINT. INIT/DATE	HOLD POINT (Yes/No)	QC INIT/DATE
4.3.37	Locating pins and guide slots aligned	[illegible] 3/20/90	NO HOLD POINT	I
4.3.42	Torqued Main Flange Bolts To 2100 ft.lbs	[illegible] 3/20/90	QC HOLD POINT	AKRB 3/21/90
4.3.44	Torqued Packing Nuts To _____ ft.lbs	[illegible] 3/20/90	N.O	RAH 3/21/90
4.3.46	Notify Shift Supervisor	[illegible] 3/20/90	NO RAF	RAH 3/21/90

Comments/additional hold points: IR# 33273, WEP, 3/20/90

SEE 25036-C FOR LIFTED LEADS JA 3/21/90

* ONLY MAIN FLANGE REQUIRES TORQUE, VALVE WAS DISASSEMBLED AT MAIN FLANGE NO REPACK REQUIRED. BJC 3-21-90

QC has reviewed this procedure for hold points R A Fuller 3/21/90
Signature

APPROVED ( ) DISAPPROVED ( ) FOREMAN	DATE
[illegible]	3-20-90

COMPLETED BY	DATE
[illegible]	3/22/90

Sheet 1 of 1

DATA SHEET 1
MAINTENANCE CLEANLINESS AND HOUSEKEEPING

Maintenance Work Order No. 1808316 Date 3-17-90

Maintenance Cleanliness and Housekeeping Standard Required

(B) C D (Circle one)

Name of system or component requiring cleaning

1 HV 8808D

CLEANLINESS STANDARDS

(B)	C	D	INIT/DATE
Metal clean surface. Rust allowable 2 sq/in per 1 sq/ft.	Thin rust on carbon steel OK. Rust allowable 15 sq/in per 1 sq/ft.	Tight mill scale Carbon steel OK. Rust which resists brushing.	BSB 3-19-90
*** No particulates/particles removable by brushing.			BSB 3-19-90
*** No oil, grease, or other organic films removable by brushing.			BSB 3-19-90
*** Perform closeout Step 4.3.5.b.6.			* 1
*** No contaminants removable in large amounts by wiping.			BSB 3-19-90
*** Decon tools and equipment.			BSB 3/19/90
*** Finish maintenance cleaning and housekeeping using Figure 1, "Maintenance Cleanliness and Housekeeping Handout".			BSB 3/19/90

COMMENTS:

X [signature]
MAINTENANCE PERSON SIGNATURE/DATE

[signature] 3-20-90
MAINTENANCE FOREMAN SIGNATURE/DATE

DATE RESULTS REVIEWED
(✓) Approved
( ) Disapproved

*** (for all cleanliness standards)

* Supvr initials

Sheet 1 of 1

DATA SHEET 1
MAINTENANCE CLEANLINESS AND HOUSEKEEPING

Maintenance Work Order No. 1840836 Date 2-22-90

Maintenance Cleanliness and Housekeeping Standard Required

(B) C D (Circle one)

Name of system or component requiring cleaning

1204 - 1 HV 8808D

CLEANLINESS STANDARDS

(B)	C	D	INIT/DATE
Metal clean surface. Rust allowable 2 sq/in per 1 sq/ft.	Thin rust on carbon steel OK. Rust allowable 15 sq/in per 1 sq/ft.	Tight mill scale Carbon steel OK. Rust which resists brushing.	BRC 2-22-90 / N/A / BRC 2-22-90

*** No particulates/particles removable by brushing. → KRE 3/20/90

*** No oil, grease, or other organic films removable by brushing. → KRE 3/20/90

*** Perform closeout Step 4.3.5.b.6. → KRE 3/20/90 DM 3-20-90

*** No contaminants removable in large amounts by wiping. → KRE 3/20/90

*** Decon tools and equipment. → KRE 3/20/90

*** Finish maintenance cleaning and housekeeping using Figure 1, "Maintenance Cleanliness and Housekeeping Handout". → KRE 3/20/90

COMMENTS: *

* Mark A. Stuckart 3/20/90
MAINTENANCE PERSON SIGNATURE/DATE

Edward M. Elliott 3-20-90
MAINTENANCE FOREMAN SIGNATURE/DATE

DATE RESULTS REVIEWED
( ) Approved
( ) Disapproved

*** (for all cleanliness standards)

GEORGIA POWER COMPANY
VEGP QUALITY CONTROL

VISUAL LEAKAGE EXAMINATION

85060-C FIG 1
PAGE 1 OF 1

NSWO/OTHER #	INSP PROCEDURE #	REV #	DRAWING #	REV #
1880831L	85060-C	3	1X4AA04-654-1	

LINE/EQUIP # 1HV8838D

TEST CODE: ASME Section XI ☑ ANSI B31.1 ☐ OTHER ____

TYPE OF TEST:

System Leakage ☑ System Inservice ☐ System Pneumatic ☐

System Functional ☐ System Hydrostatic ☐ Other ____

COMPONENT OR SYSTEM:

Insulated ☑ Non-Insulated ☐

TEST CONDITIONS: (Complete as applicable)

Required NOP ☑ NOT ☑ Verified NOP ☑ NOT ☑

Required ____ PSIG Verified ____ PSIG

Required ____ F Verified ____ F

TEST CONDITION VERIFIED BY:

Examiner ☐

Other ☑ Name JEFF GASSER Time 9:30 EDT

TEST INSTRUMENTATION:

INSTRUMENT # ____ Cal. Due Date ___/___/___

INSTRUMENT # ____ Cal. Due Date ___/___/___

INSTRUMENT # ____ Cal. Due Date ___/___/___

° Cal. Data Not Required Except For Hydrostatic & Pneumatic Tests

TEST RESULTS:

SAT. ☐ UNSAT. ☑ DC # 1-90-207

DESCRIPTION OF DEFICIENCY IF UNSAT: Water On Top Of Bonnet, Water Under Valve On Floor, Valve Body insulated

VISUAL EQUIPMENT USED: Flashlight

REMARKS: ____

EXAMINER: D C Lewis LEVEL II DATE 4.14.90

EVALUATOR: N/A ☑ LEVEL DATE

AMII REVIEW: N/A ☐ DATE

NUCLEAR OPERATIONS QUALITY CONTROL
HOLD POINT SHEET

MWO NO: 18808316

WHEN THE WORK HAS REACHED THE INDICATED HOLD POINT(S) NOTIFY NUCLEAR OPERATIONS QUALITY CONTROL FOR VERIFICATION OF THE HOLD POINT ACTIVITY

DO NOT WORK PAST THE HOLD POINT WITHOUT QC APPROVAL

NO:	HOLD POINTS	ASSIGNED BY	ASSIGNED DATE	NOTIFIED INITIAL	NOTIFIED TIME	NOTIFIED DATE	WAIVER BY	WAIVER D
1	Notify QC For Hold Points on procedure 26610-C Completion sheet.	AP	4/6/88	[illegible]	0900	4/6/88		
2	Notify QC to perform VT-2	AP	4/12/88	[illegible] DA	0900 10CFR EDT	4/14/88		

QUALITY CONTROL INFORMATION/COMMENTS
(INITIAL AND DATE EACH ENTRY)

TO BE FILLED OUT BY AUTHORIZED PERSONNEL ONLY

Quality Control Inspection Report

VOGTLE GENERATING PLANT—UNITS 1 & 2

34061

Georgia Power

Page 1 of 1

MWO/ODR/DR No.	Building	Procedure/Spec. No./Rev.
1980831	CONTAINMENT	25036C R/B
Room No./Level No.	**Sys./Start-Up Designator**	**Tag No.**
LEVEL "C"	1204	1HV8808D
Drawing No./Rev.	**Vendor Manual Log No.**	**Other**
N/A	N/A	N/A

1. Inspector will use separate form for each completed inspection function(s) and insert original with work package, use continuation sheets when needed.
2. Use simple narrative type report procedure. Reference all applicable drawing numbers, specifications, special instructions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.
3. Upon completion of the inspection activity, enter results below and sign and date.

Remarks METHOD OF INSPECTION - VISUAL
VERIFIED CABLES/WIRES RELANDED PER LAYOUT
LEAD DATA SHEET ON 25036C R/B

Sketch

[redacted]

Inspection Results

☑ SAT. ☐ UNSAT—ODR/DR NO.(s):

7986.90A MCS161

Inspector Robert R McCoy

Date 3/21/90

WHITE—Work Package CANARY—Q.C. Supv. PINK—Inspector

Quality Control Inspection Report

Georgia Power

VOGTLE GENERATING PLANT--UNITS 1 & 2 33273 Page 1 of 1

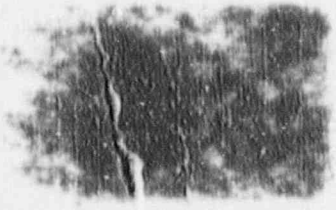
MWO/ODR/DR No. 18808316	Building UNIT 1 CNTMT	Procedure/Spec. No./Rev. 26610-C, R/3
Room No./Level No. level C	Sys./Start-Up Designator 1204	Tag No. 1HV8808D
Drawing No./Rev. N/A	Vendor Manual Log No. N/A	Other N/A

1. Inspector will use separate form for each completed inspection function(s) and insert original with work package, use continuation sheets when needed.
2. Use simple narrative type report procedure. Reference all applicable drawing numbers, specifications, special instructions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.
3. Upon completion of the inspection activity, enter results below and sign and date.

Remarks Performed a visual examination for the following procedure steps, 4.2.1 verified sealing surfaces of body and bonnet are clean, smooth and not damaged. 4.2.2 Ducted disc sealing surfaces for nicks, scratches or other abnormalities. 4.2.3 Visually checked seating surface of seat rings for nicks, scratches or other abnormalities. 4.3.10 Visually checked valve body and accessible piping for cleanliness.

Sketch

MER #90-5199, 10" flex gasket



Inspection Results

☒ SAT. ☐ UNSAT--ODR/DR NO.(s):

705516A MC5191	Inspector W. R. Podlucky Jr	Date 3/20/90

WHITE--Work Package CANARY--Q.C. Supv. PINK--Inspector

Quality Control Inspection Report

VOGTLE GENERATING PLANT—UNITS 1 & 2

33274

Georgia Power

Page 1 of 1

MWO/ODR/DR No.	Building	Procedure/Spec. No./Rev.
18908316	Maint	N/A
Room No./Level No.	**Sys./Start-Up Designator**	**Tag No.**
Cal Room	1204	1-HV-8808D
Drawing No./Rev.	**Vendor Manual Log No.**	**Other**
N/A	N/A	N/A

1. Inspector will use separate form for each completed inspection function(s) and insert original with work package, use continuation sheets when needed.
2. Use simple narrative type report procedure. Reference all applicable drawing numbers, specifications, special instructions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.
3. Upon completion of the inspection activity, enter results below and sign and date.

Remarks Using The visual method, verified Torque using VP-3-2656 Torque Wrench (Cal Due Date 8/1/90) with Multiplier VTR-42-018 275 Ft/lbs = 969.0 Ft/lbs

Insp. On Torque wrench calibrator VP-3-2774, Cal Due Date 5/1/90

Sketch

N/A

Inspection Results

☒ SAT. ☐ UNSAT—CDR/DR NO.(S):

Inspector W.R. Rockhaus Jr

Date 3/20/90

7055 16A MC5191

WHITE—Work Package CANARY—Q.C. Supv. PINK—Inspector

Quality Control Inspection Report

Georgia Power

VOGTLE GENERATING PLANT—UNITS 1 & 2

33823

Page _____ of _____

MWO/ODR/DR No.	Building	Procedure/Spec. No./Rev.
1880836	MAINT.	N/A
Room No./Level No.	Sys./Start-Up Designator	Tag No.
CAL. ROOM	1204	1-HV-8808D
Drawing No./Rev.	Vendor Manual Log No.	Other
N/A	N/A	

1. Inspector will use separate form for each completed inspection function(s) and insert original with work package, use continuation sheets when needed.
2. Use simple narrative type report procedure. Reference all applicable drawing numbers, specifications, special instructions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.
3. Upon completion of the inspection activity, enter results below and sign and date.

Remarks

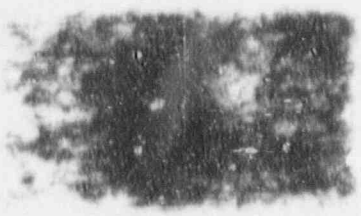
VISUALLY VERIFY TORQUE VALUES USING TORQUE WRENCH VP-3-2272 DWG 6-11-90 WITH MULTIPLIER VTR-42-006

SET 140 FT/LBS = 2,584 FT/LBS.

SET 109 FT/LBS = 2,125 FT/LBS.

Sketch

N/A



Inspection Results

☒ SAT. ☐ UNSAT—ODR/DR NO.(s):

	Inspector	Date
7055-16A MCB/HR	Andrew R Ross	3/20/90

WHITE—Work Package CANARY—Q.C. Supv. PINK—Inspector

Quality Control Inspection Report

VOGTLE GENERATING PLANT—UNITS 1 & 2

33827

Georgia Power

Page _____ of _____

MWO/ODR/DR No.	Building	Procedure/Spec. No./Rev.
188083110	CTMT	26610-C 12.3
Room No./Level No.	Sys./Start-Up Designator	Tag No.
C 171'	1204	1HV-8808D
Drawing No./Rev.	Vendor Manual Log No.	Other
N/A	N/A	N/A

1. Inspector will use separate form for each completed inspection function(s) and insert original with work package, use continuation sheets when needed.
2. Use simple narrative type report procedure. Reference all applicable drawing numbers, specifications, special instructions, etc., connected with your inspection. Use sketches, when applicable, showing dimensions checked, alignment, physical location of defects found, etc. N/A all blocks not used.
3. Upon completion of the inspection activity, enter results below and sign and date.

Remarks

ALH 3/21/90

VISUALLY VERIFIED TORQUE PER STEP 4.3.32.42

2,100 FT/LBS. REF. I.R.# 33823 3/20/90

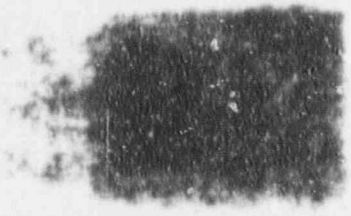
VALVE # 1-HV-8808D

Sketch

MITE

T.W.# VP-3-2272

MULT. VTR-42-006



Inspection Results

☒ SAT. ☐ UNSAT—ODR/DR NO.(s):

	Inspector	Date
7056/16A MCS191		3/21/90

WHITE—Work Package CANARY—Q.C. Supv. PINK—Inspector

GEORGIA POWER COMPANY
VEGP QUALITY CONTROL

QC HOLD / WITNESS POINTS

85010-C FIG. 1
PAGE OF

MWO NO: 19808316

PROCEDURE & REV NO: 26610-C Revision 3

NOTIFY QUALITY CONTROL PRIOR TO PERFORMING THE WORK ACTIVITY OR STEP ASSOCIATED WITH THE HOLD (H) OR WITNESS (W) POINT

DO NOT BYPASS QC HOLD OR WITNESS POINTS

STEP NO.	H/W	HOLD POINT / WITNESS POINT DESCRIPTION	ASSIGNED BY INIT	ASSIGNED BY DATE	NOTIFIED INIT	NOTIFIED DATE	QC ACTION INIT	QC ACTION I-W-N/A
	H	Prior to reassembly notify QC to						
		inspect the following:						
4.2.1	H	Sealing surfaces of body to bonnet	[illegible]	2-8-90	WRP	3/20/90	WRP	I
4.2.2	H	Sealing surfaces of disc					WRP	I
4.2.3	H	Sealing surfaces of seat rings					WRP	I
4.2.4	H	Stem and disc pin for smothness					WRP	N/A
4.2.5	H	Stem head and bearing blocks for					WRP	N/A
		smothness						
4.3.4	H	Weld on lock pins at both ends					WRP	N/A
		(308 ss wire)						
4.3.10	H	Valve body and accessible piping for			WRP	3/20/90	WRP	I
		cleanliness						
4.3.12	H	Witness torque of yoke-bonnet nuts on			N	A		
		final pass						
4.3.15	H	Witness torque of operator cap screws			N	A		
		on final pass						
4.3.37	H	Locating pin to ensure it is inserted			N	A		
		into its hold and the disc is						
		properly positioned with the guide						
		slots						
4.3.42	H	Witness torque of mainflange bolts on			AKR	3/21/90	AKR	I
		final pass	↓	↓				

COMMENTS & IR NUMBERS: (initial and date entries)
Step 4.2.1 Thru 4.3.10 IR# 33273 WRP 3/20/90

THIS FORM TO BE COMPLETED BY QUALITY CONTROL PERSONNEL ONLY

GEORGIA POWER COMPANY
VEGP QUALITY CONTROL

QC HOLD / WITNESS POINTS

85010-C FIG. 1
PAGE 1 OF 1

WO NO: 1880816

PROCEDURE & REV NO: 26822-C Revision 0

NOTIFY QUALITY CONTROL PRIOR TO PERFORMING THE WORK ACTIVITY OR STEP ASSOCIATED WITH THE HOLD (H) OR WITNESS (W) POINT

DO NOT BYPASS QC HOLD OR WITNESS POINTS

STEP NO.	H/W	HOLD POINT / WITNESS POINT DESCRIPTION	ASSIGNED BY INIT	ASSIGNED BY DATE	NOTIFIED INIT	NOTIFIED DATE	QC ACTION INIT	QC ACTION I-W-N/A
QC HOLD POINT		NOTIFY QC PER THE FOLLOWING HOLD						
		POINTS ASSIGNED TO PROCEDURE 26822-C						
4.6.5	H	Wires relanded and jumpers removed	[illegible]	8-8-89				
4.6.6	H	Thermal overload reinstalled	[illegible]	8-8-89				

COMMENTS & IR NUMBERS: (initial and date entries)

THIS FORM TO BE COMPLETED BY QUALITY CONTROL PERSONNEL ONLY

FLORIDA POWER COMPANY
REQ QUALITY CONTROL

QC HOLD / WITNESS POINTS

PROCEDURE & REV NO: 25036-C Revision 8

WORK NO: 188083/6

NOTIFY QUALITY CONTROL PRIOR TO PERFORMING THE WORK ACTIVITY OR STEP ASSOCIATED WITH THE HOLD (H) OR WITNESS (W) POINT

DO NOT BYPASS QC HOLD OR WITNESS POINTS

STEP NO.	H / W	HOLD POINT / WITNESS POINT DESCRIPTION	ASSIGNED BY INIT	ASSIGNED BY DATE	NOTIFIED INIT	NOTIFIED DATE	QC ACTION INIT	QC ACTION I-W-N
4.3.7	H	Notify QC prior to relanding any safety related conductors	[illegible]	9-3-89				

COMMENTS & IR NUMBERS: (Initial and date entries)

GEORGIA POWER COMPANY
VEGP QUALITY CONTROL

VISUAL INSPECTION REPORT

85051-C FIG 1
PAGE 1 OF 1

MWO/OTHER #	INSP PROCEDURE #	REV #	DRAWING #	REV #
18808316	85051-C	R10	1K4-1204-123-02	R47

TAG # 1-HV-8808D

INSPECTION METHOD: VT-1 ☐ VT-3 ☒

TYPE OF COMPONENT:
BOLTS ☐ STUDS ☐ WASHERS ☐ NUTS ☐ FLANGES ☐
PUMP ☐ VALVE ☒
FLANGES: ASSEMBLED ☐ DISASSEMBLED ☐
ATTACHMENT WELDS: INTERNAL ☐ EXTERNAL ☐
REACTOR INTERNALS: WELDS ☐ COMPONENTS ☐

COMPONENT CONDITION:	SAT	UNSAT	N/A
a. Cracks			
b. Thead damage			✓
c. Pitting	✓		
d. Corrosion	✓		
e. Erosion	✓		
f. Gouges	✓		
g. Bending, twisting, or deformed			✓
h. Fractured			✓
i. Evidence ofleakage			✓
j. Missing or loose fasteners			✓
k. Displacement/alignment of components			✓
l. Wear of mating surfaces	✓		
m. Foreign material	✓		

EXAMINATION RESULTS: Sat ☑ Unsat ☐ DC # _____

DESCRIPTION OF DEFICIENCY IF UNSAT/REMARKS: NONE

METHOD OF EXAMINATION:
Direct Examination ☒ Remote Examination ☐

EQUIPMENT USED: Flashlight

NOTE: Refer to IR # 33273 for ORIGINAL Documented Inspection of Valve, This IR ISSUED FOR ISI REQUIREMENTS

INSPECTOR W.R. Roskosky FOR W.R. ROSKOSKY		LEVEL III	DATE 4/17/90
EVALUATOR David R. Smith	N/A ☐	LEVEL II	DATE 4-17-90
ANII REVIEW	N/A ☐	DATE	

Material/Equipment Request—NUCLEAR OPERATIONS
VOGTLE ELECTRIC GENERATING PLANT

Q Vogtle 2 22 90

COPY 2

Department/Contractor	Design Change No.	Date	Stores Register No.
MEOP		5-30-89	004918

Description/Tag	Stock Number	Location	Quantity Ord	Quantity Filled	Quantity U/M	P.O. No.	MIR No.	Maint. Work Order	Unit	Account Number	[redacted]	Acty. Code
Disc Disc 60690	[redacted]	D.36.A	1	1	ea	PAV2 35363 71.34	58 3098	18808316	1		[redacted]	

6-5-89

1229

~~Material on order VP64-15522~~

Ordered By	Approved By	Filled By	Received By	Date
Phil Cole	[illegible]	Sarah Howard	R M Nowell	3-16-90

MCS122

1 of 2

EQ EVALUATION CHECKLIST

FOR USE ON PROJECT CLASSES Q111, Q212, Q313, Q013, Q015, Q11E, Q11J, Q12E, 61J

MWO NO. 1880336

SECTION I

PART A ORIGINAL PART		PART B REPLACEMENT PART	
1. DESCRIPTION	MOV	1. DESCRIPTION	
2. TAG NO.	1-HV-8810	2. MEB NO.	
3. PROJECT CLASS	11	3. STOCK NO.	
4. SPECIFICATION (EQDP) NO.	2AP11	4. SPECIFICATION (EQDP) NO.	
5. MANUFACTURER	(W)	5. MANUFACTURER	
6. MODEL NO.	NA	6. MODEL NO.	N/A
7. PART NO.		7. PART NO.	
		8. PO NO.	

COMMENTS SEE SHEET 2

SECTION II WORK PLANNING

1. ARE PROCEDURES, VENDOR MANUALS, DRAWINGS OR INSTRUCTIONS AVAILABLE TO DISASSEMBLE/REWORK COMPONENT? ✓ YES ___ NO
   CAC 12/17/90 (Init. Date)
2. ARE SPECIFICATION NUMBERS FOR ORIGINAL AND REPLACEMENT ITEMS THE SAME? ___ YES ___ NO
3. ARE MANUFACTURER MODEL/PART NUMBERS OF THE ORIGINAL AND REPLACEMENT PARTS THE SAME? ___ YES N/A ___ NO
4. IS BULK MATERIAL LISTED ON ATTACHMENT ACCEPTABLE? ✓ YES ___ NO
   LIST ITEM NO. FROM ATTACHMENT IF "NO" IS CHECKED. NA (Item No.)
   KH 12-22-90 (Init. Date)

NOTE

If items 2, 3, or 4 are checked No, the Checklist must be reviewed by the EQ Group.

[✓] PART(S) ARE ACCEPTABLE FOR USE
[ ] SEND TO EQ GROUP

BWeston 12-22-90
WG DATE

SECTION III EQ GROUP EVALUATION

[ ] PART IS ACCEPTABLE FOR USE [ ] PART IS UNACCEPTABLE FOR USE

JUSTIFICATION FOR ACCEPTANCE: N/A

EQ ENGINEER DATE

FIGURE 3

EQ EVALUATION CHECKLIST
FOR BULK MATERIAL

MWO NO 1840936

1. DESCRIPTION OF ITEM 10" GATE VALVE BONNET GASKET
   MER 5199 PO 10387
2. DESCRIPTION OF ITEM _____
   MER _____ PO _____
3. DESCRIPTION OF ITEM _____
   MER _____ PO _____
4. DESCRIPTION OF ITEM _____
   MER _____ PO _____
5. DESCRIPTION OF ITEM _____
   MER _____ PO _____
6. DESCRIPTION OF ITEM _____
   MER _____ PO _____
7. DESCRIPTION OF ITEM _____
   MER _____ PO _____
8. DESCRIPTION OF ITEM _____
   MER _____ PO _____

KSH 3-22-90

REMARKS:

FIGURE 3 (CONT'D.)

Orig
3-20-90

Material/Equipment Request—NUCLEAR OPERATIONS
VOGTLE ELECTRIC GENERATING PLANT

COPY 2

Department/Contractor	Design Change No.	Date	Stores Register No.
N/B MAINT		3-20-90	MAR 7 [illegible] 198

Description/Tag	Stock Number	Location	Quantity Ord.	Quantity Filled	Quantity U/M	P.O. No.	MIR No.	Maint. Work Order	Unit	Account Number	Resp. Center	Anly. Code
10" FLG GASKET 2342	11010 23T9	D-38H	1	1	EA	PRV-10387	85 0788	1880 8316	1			

Ordered By	Approved By	Filled By	Received By	Date
L M Powell	L M Powell	Cecil Coles	J A McBride	3-20-90

70M69R NIC5122

VEGP FIRE PROTECTION CHECKLIST

1. MWO NO. 285-5316 2. MPL/TAG NO. 1-71-5851-D
3. LOCATION Containment

4. WILL THE WORK INSTALL, IMPAIR, MODIFY, ISOLATE, DEFEAT, OR REMOVE ANY OF THE FOLLOWING? IF THE ANSWER IS "YES" CHECK THE BOX, AND INDICATE APPROPRIATE DETAILS.

( ) SPRINKLER SYSTEM _____
( ) INTERIOR HOSE STATION _____
( ) HALON SYSTEM _____
( ) DETECTION SYSTEM _____
( ) EMERGENCY LIGHTING SYSTEM _____
( ) PERMANENT COMBUSTIBLES (CABLE, WOOD, PLASTIC, ETC.) _____
( ) STRUCTURAL STEEL, OR RACEWAY FIREPROOFING _____
( ) FIRE SUPPRESSION SUPPLY SYSTEM (PUMPS, TANKS, ETC.) _____
( ) CONDUIT SEALS OR EQUIPMENT ENCLOSURE (CABINET HOUSING) _____
( ) FIRE EXTINGUISHER _____
( ) COMMUNICATIONS SYSTEM _____
( ) RCP OIL COLLECTION SYSTEM _____
( ) SEISMIC STANDPIPE SYSTEM _____

5. WILL THE WORK DEFEAT, MODIFY OR IMPAIR ANY OF THE FOLLOWING FIRE SEPARATION FEATURES? IF THE ANSWER IS "YES" CHECK THE BOX, AND INDICATE APPROPRIATE DETAILS.

( ) A. FIRE AREA BOUNDARY (WALL, ETC.) _____
( ) B. PASSIVE AREA BOUNDARY PENETRATION SEAL ASSEMBLY.
PENETRATION SEAL _____
WALL BLOCKOUT _____
FLOOR PLUG OR HATCH _____
CABLE TRAY OR CONDUIT WRAP _____
RADIANT ENERGY SHIELD _____
( ) C. ACTIVE FIRE AREA BOUNDARY PENETRATION SEAL.
FIRE DOOR _____
FIRE DAMPER _____

6. IF ALL THE ANSWERS IN BLOCKS 4 and 5 ARE "NO", STOP THE EVALUATION HERE, AND ENTER "NO" IN BLOCK 11 OF THE MWO FORM.
IF ANY QUESTIONS WERE ANSWERED "YES", ENTER "YES" IN BLOCK 11 OF THE MWO FORM.
EVALUATOR [signature] DATE 2/12/90

POST WORK REVIEW (COMPLETE "A, B, OR C" BELOW)

(A) THE CONDITION IMPACTING THE FIRE PROTECTION COMPONENTS LISTED ABOVE HAS BEEN REMOVED. FPE _____ DATE _____

(B) THE FIRE PROTECTION COMPONENT IS STILL IMPAIRED.
FPE _____ DATE _____

(C) RESTORATION OF THE IMPAIRMENT HAS BEEN TRANSFERRED (Ref: _____) AND THE FIRE PROTECTION LCO LOG HAS BEEN CHANGED TO REFERENCE THE NEW MWO FOR THIS IMPAIRMENT. FPE _____ DATE _____

FIGURE 1