PSEG

Public Service Electric and Gas Company 80 Park Place Newark, N.J. 07101 Phone 201/622-7000

Regulatory File Cy.

March 25, 1977

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, Maryland 20014

Attention: Mr. George Lear, Chief
Operating Reactors, Branch #3
Division of Operating Reactors

Dear Mr. Lear:

SALEM GENERATING STATION - UNIT NO. 1
OVERPRESSURIZATION PROTECTION
DOCKET NO. 50-272

Public Service has elected Option No. 2 as described in your letter of February 4, 1977, for the installation of hardware improvements to prevent reactor vessel overpressurization. The interim hardware will be installed and made operable by December 31, 1977. Permanent long-term improvements which will comply to the design criteria established at the November 4, 1976 meeting in Bethesda, will be installed during the first refueling outage scheduled for the first quarter of 1979.

Attached is the additional information requested in Enclosure No. 1 of the February 4, 1977 letter.

Sincerely yours,

Frank P. Librizzi
General Manager -
Electric Production

The Energy People

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ANSWERS TO THE QUESTIONS CONTAINED IN

ENCLOSURE NO. 1
STAFF POSITION AND INFORMATION REQUESTS
SALEM NUCLEAR GENERATING STATION - UNIT NO. 1
DOCKET NO. 50-272

1a) The material will be presented as part of the "Current Topic" subject matter in the Licensed Operator Requalification Program. Based on the current schedule, the material will be presented starting April 25, 1977, and will have been discussed with all shifts by June 30, 1977.

b) The discussion will be conducted in a formal classroom training session. An outline of the lesson plan follows:

<u>Overpressurization Lesson Plan</u>

I. Discuss Technical Specification limits on RCS Pressure/ Temperature.

a. Review NDTT
b. Effects of neutron exposure over vessel life.
c. Discuss basis for Technical Specification limits.
d. Review Overpressure Alarm and printout based on the Pressure/Temperature limits curve (Fig. 3-4-2) of Technical Specifications.

II. Discuss administrative steps taken at Salem to reduce the possiblity of an overpressurization of the RCS. Emphasize the importance of using the applicable procedure.

<u>Procedure No.</u>

II-1.3.4 - Final step in the RCS Fill & Vent Procedure allows the option of forming a bubble in the pressurizer.

II-1.3.1 - An RCS pressure spike may result from starting a RCP if all pumps are off and RCS or SG temperature is significantly above seal injection temperature. Precautions must be taken to limit the pressure excursion, particularly if the RCS is solid.

II-6.3.2, 6.3.3 - Initiating and Terminating RHR - Review the applicable precautions and steps, i.e., pressure excursions when starting and stopping pumps, leaving letdown orifices open even though letdown is from RHR, and the use of the RHR system while forming a bubble in the pressurizer.

I-3.2 - Cold Shutdown to Hot Standby

3.1.1 Precaution - When the RCS is solid, an increase in RCS pressure should be expected whenever an RHR pump is stopped.

5.2.3 A bubble must be formed prior to commencing heatup.

5.20, 21 Placing the SI accumulators, SI pumps, and the centrifugal charging pumps back in service.

I-3.6 - Hot Standby to Cold Shutdown

5.18, 21,24 Removing the SI accumulators, SI pumps, and centrifugal charging pumps from service.

3.1.4, 6 Observe precautions when starting and stopping RHR and Reactor Coolant Pumps.

III. Discuss Most Likely Causes of Overpressurization:

a. Charging/Letdown flow mismatch.
b. Loss of RHR relief path protection.

   (1) Improper operation
   (2) Control interlock

c. Inadvertent safety injection
d. Pump starts with nonuniform temperature distribution.
e. Improper use of pressurizer heaters.

Include in discussion the means of minimizing the above possiblities, review incidents as outlined in the RCS Overpressurization Protection Meeting outline, emphasize the need for careful review of any tests or instrument checks to be run, especially when in a solid water condition.

IV. Discuss future plans for minimizing the possibility of RCS Overpressurization.

c) A review of the past PWR Appendix G violations indicates that all are credible events for the Salem plant.

d) The likelihood of an overpressurization event is reduced by maintaining a steam bubble in the pressurizer at all times. The only exception is when the Reactor Coolant System is filled and vented. After the Reactor Coolant System is filled and vented, a steam bubble is formed and maintained through Operational Mode-5 to 1. The following excerpt from OI II-1.3.4, reflects this change:

5.25 A pressurizer bubble may be formed, if desired, as follows:

5.25.1 Increase reactor coolant pressure as desired for formation of a bubble in the pressurizer by adjusting the Letdown Pressure Control Valve 1CV18. Adjust charging flow to minimum.

5.25.2 Energize all pressurizer heaters to begin pressurizer heatup and bubble formation. Observe precaution 3.13.

5.25.3 Place the Pressurizer Level Controls in automatic.

Enclosed are Diagram Nos. 220413 and 205201 which include the piping and instrument drawing requested.

2a) The reactor coolant system is charged solid following a refueling operation in order to vent entrapped air from the RCS in accordance with OI II-1.3.4, "Filling and Venting RCS". Immediately upon completion of fill and vent procedures, a steam bubble is formed in the pressurizer. In addition, OI I-3.7 "Cold Shutdown to Refueling", is under revision to more accurately reflect the desire to maintain a pressurizer bubble. A pressurizer steam bubble will be maintained at all times except when venting the RCS. Therefore, it is not necessary to use other means of maintaining a bubble.

b) Enclosed is OI II-1.3.4, "Filling and Venting the RCS", and the Reactor Coolant Piping Diagram #205201-A-8760-8.

3a) The Safety Injection System piping diagram #205234-A-8761-9 indicates the flow path to the RCS from the SI pumps. A copy of that diagram is included.

The following pumps and valves will be closed and/or de-energized:

Pumps - No. 11, 12 - Charging Safety Injection Pumps
No. 11, 12 - Safety Injection Pumps

Valves - ISJ12, 13
11SJ40, 134
12SJ40, 134

b) The head-flow characteristics for each of the safety injection pumps are provided in Attachment #1.

c) On-the-spot changes are to be made by March 28, 1977, to OI I-3.6, "Hot Standby to Cold Shutdown", and OI I-3.2, "Cold Shutdown to Hot Standby". These changes will deenergize the proper pump and valves during cold shutdown operation.

d) The SIS pumps and valves may not be isolated and deenergized under the following circumstances:

   1) Valve stroking and pump operation following scheduled maintenance that is required for in-service testing of valves and pumps.

   2) Valve stroking and pump operation required by the Safety Technical Specifications valve and pump in-service testing program.

   3) An inoperative positive displacement pump requiring the operation of a centrifugal pump as required by the Technical Specifications.

Adequate precaution in the appropriate Operating Instructions will be included to prevent inadvertent operation of SIS under the above circumstances.

e) SIS Breaker Location

No. 11 - Charging Safety Injection Pump - 1B - 4kv Vital Bus
No. 12 - Charging Safety Injection Pump - 1C - 4kv Vital Bus

No. 11 - Safety Injection Pump - 1A - 4kv Vital Bus
No. 12 - Safety Injection Pump - 1C - 4kv Vital Bus

Valve No. 11SJ-40	1A East	Valve	and	Misc.	Control	Center
12SJ-40	1C West	"	"	"	"	"
11SJ-134	1A East	"	"	"	"	"
12SJ-134	1C West	"	"	"	"	"
1SJ-12	1B West	"	"	"	"	"
1SJ-13	1C East	"	"	"	"	"

All pumps and valves can be operated from the control room.

f) No position indication or status signal will be lost in the control room on 11SJ-40 and 12SJ-40. It will be lost on the other valves and pumps. In accordance with safety tagging procedures, console bezel plastic covers denote the valve or pump status when tagged out.

g) Administrative Procedure No. 5 "Operating Practices" addresses the use of check-off sheets that are a part of the Operating Instructions that assure proper valve line up of the SIS. The Shift Supervisor and/or Shift Foreman are responsible.

h) The overall impact of lowering the pressure on the SIS accumulators would be a need for additional manpower to vent and refill the accumulators. The venting of the nitrogen inside containment could be a health hazard, due to the quantity vented off. The additional cost of manpower, nitrogen and time dealys would make it unfeasible.

The SIS accumulators are normally maintained while in cold shutdown at the Technical Specification pressure with 11-14SJ-54 valves closed and tagged shut in accordance with OI I-3.6, "Hot Standy to Cold Shutdown".

4a) Operating the plant in a cold shutdown condition with a bubble in the pressurizer precludes an overpressurization event. The bubble is normally maintained at Salem. Also see answers to Question 2.

5a)
b)
c) The unit's computer (Westinghouse Prodac-250) is programmed to continuously monitor reactor coolant temperatures and pressure and compare these parameters with the limits of the Technical Specification curve (Fig. 3-4-2). If the pressure exceeds the allowable value the computer will activate an alarm which will be printed on the alarm typewriter and displayed on the operator's control consol CRT. The punched alarm will be accompanied by an audible alarm bell.

The equations for the pressure temperature limit for heatup rates up to 60°F/Hr curve (Fig. 3-4-2) in the Technical Specifications, was determined by a standard curve fit program used on a Univac Computer and was subsequently programmed into the Salem No. 2 Unit Prodac-250 Computer for checkout. Following the checkout the program was locked into the Salem No. 1 Unit Prodac-250 Computer and is currently in service. The inputs are adequately isolated from all safety-related instrumentation to have no adverse affects on that instrumentation.

The security of the software for the computer program is maintained by:

1) Programmer's console is locked and may be used only by authorized trained personnel.

2) The computer has diagnostic programs which print errors detected with software.

3) A program exists which can be called on demand from the programmer's console which will print any changes in the bulk memory. Since all programs reside on disc, any change made to a program would be printed.

6a) The design pressure of the RHR system is 2485 psi up stream of 1RH2 and down stream of 1RH26, 450 psi down stream of 1RH2 and 600 psi up stream of 1RH26. A piping diagram of the Residual Heat Removal No. 205232-A-8761-5 is enclosed to answer the rest of Question 6a.

b) 1RH1 and 1RH2 are interlocked with RCS pressure and cannot be open when pressure is greater than 390 psi, and will automatically close at a RCS pressure of 600 psi.

c) The normal stroke time of isolation valves are: 1RH1 and 1RH2, 1 minute 45 seconds - 1RH26 - 53 seconds.

d) The setpoint and capacity of RHR relief and safety valves are:

1RH3	-450 psi	900 gpm
1RH25	-600 psi	20 gpm

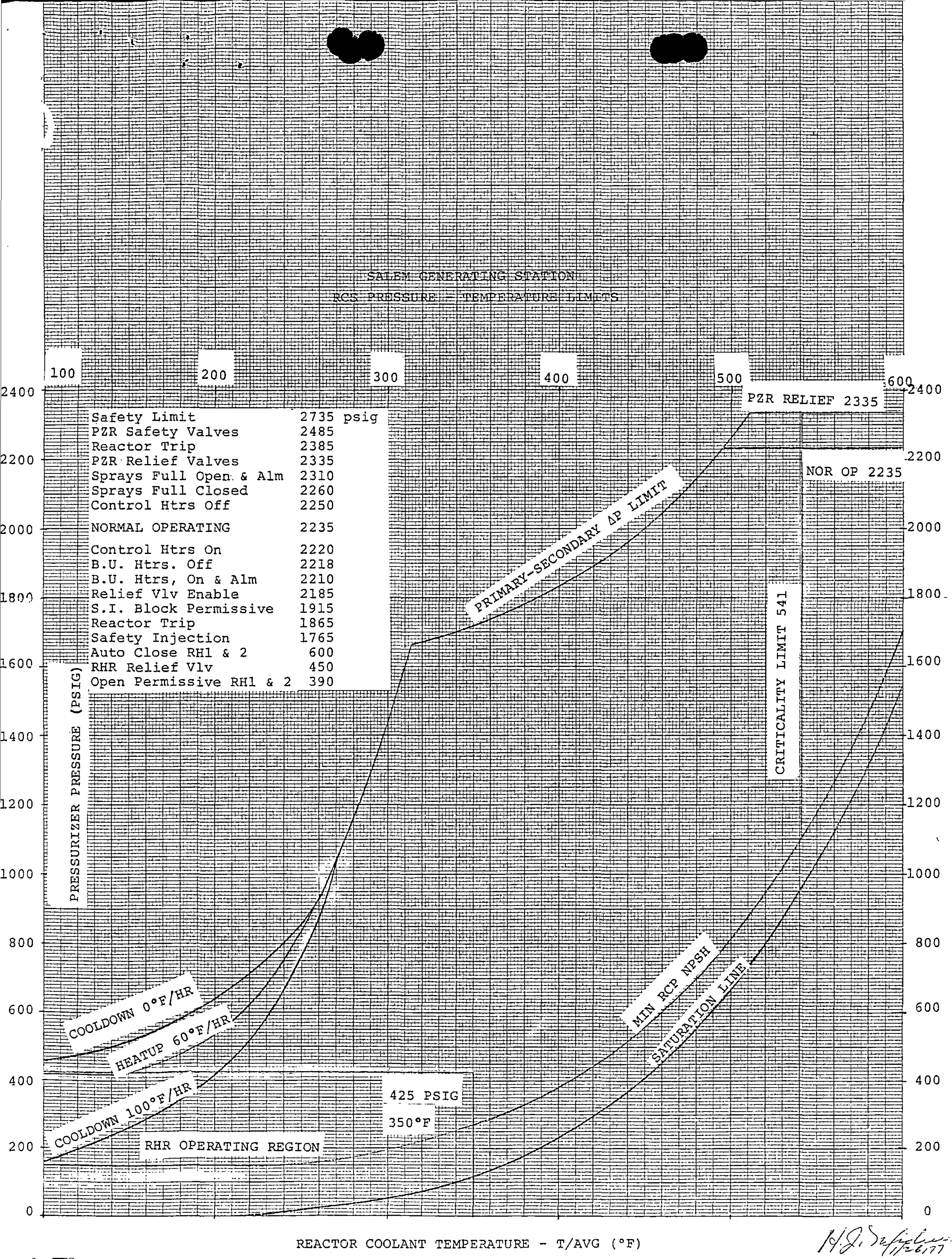
e) The residual heat removal pump high discharge pressure alarm is set at 600 psi (+0-12 psi) and will alarm in the control room.

7a) The Appendix G pressure limit is 410 psi and the minimum pressure needed for RCP operation is a pressure sufficient to maintain a minimum of 285 PSID across No. 1 RCP seal. Enclosed is the operating curve for Salem No. 1.

b)
c) Operating Instruction II 1.3.1, "Reactor Coolant Pump Operation", II-6.3.2, "Initiating Residual Heat Removal", and III-6.3.3, "Terminating Residual Heat Removal": answer these questions in detail and are enclosed.

d) The instrumentation used to monitor RCS temperatures are wide and narrow range RTD's. The narrow range (530° to 630°F) is used while operating and the wide range (100° to 600°F) when in a shutdown condition.

The criteria for the plant to be in an isothermal state is a no-load condition with $\Delta T = 0$



H.J. [signature] 11/26/77

OPERATING INSTRUCTION
II-1.3.1
REACTOR COOLANT PUMP OPERATION

1.0 PURPOSE

1.1 This instruction outlines the precautions to be observed and the steps required when placing a Reactor Coolant Pump in service.

2.0 INITIAL CONDITIONS

2.1 The RCS has been filled and vented IAW OI II-1.3.4, "Filling and Venting the RCS".

NOTE

Intermittent operation of the RCP's is allowed during the venting procedure.

2.2 Seal injection flow is being supplied IAW OI II-3.3.1, "Establishing Charging, Letdown, and Seal Injection Flow".

2.3 Component cooling flow has been established to the pump to be started.

2.4 Reactor Coolant System pressure is sufficient to maintain a minimum No. 1 Seal ΔP of 285 psid.

2.5 VCT pressure is at least 15 psig to provide lubrication for No. 2 Seal.

2.6 Fire protection to the RCP motor(s) is operable.

3.0 PRECAUTIONS

3.1 An RCS pressure spike may result from starting a Reactor Coolant Pump if all pumps are off and RCS or Steam Generator temperature is significantly above seal injection temperature. Precautions must be taken to limit the pressure excursion, particularly if the RCS is "SOLID".

3.2 Maintain > 15 psig in the VCT to insure an effective back pressure on the RCP No. 2 Seal to maintain lubrication of that seal.

3.3 At all times during RCP startup and operation, a ΔP of at least 285 psid must be maintained across No. 1 Seal.

3.4 During RCP operation, flow shall be maintained through No. 1 Seal bypass line whenever No. 1 Seal leakage flow is less than 1 gpm to insure cooling flow to radial bearing(s).

3.5 Loss of Component Cooling water, Seal Injection water, or both:

3.5.1 Loss of Seal Injection:

1) Pump may be operated if one of the following conditions exist:

a) Reactor Coolant System temperature is < 150°F, or

b) No. 1 Seal leak rate is < 5 gpm and at least 40 gpm Component Cooling water is being supplied to the RCP thermal barrier heat exchanger.

3.5.2 Loss of Component Cooling to Motor Bearing Oil Coolers and Thermal Barrier:

1) Pumps must be stopped before bearing temperature reaches 200°F ($\approx$ 2 min.).

3.5.3 Loss of Component Cooling Water and Seal Injection Water:

1) RCP(s) must be stopped within one minute, if neither Component Cooling or Seal Injection can be restored within that time.

NOTE

Either Seal Injection or Component Cooling must be restored within 2 minutes of loss to prevent damage to radial bearing.

3.6 Reactor Coolant Pumps are not designed for frequent starting and stopping, as this may damage motor windings. The starting duty listed below must be adhered to:

3.6.1 A Reactor Coolant Pump may only be started providing the motor has remained at rest for a minimum of 1/2 hour.

3.6.2 RCP starts should be minimized and should not average more than six per day throughout the life of the motor.

3.6.3 Only one Reactor Coolant Pump is to be started at any one time.

3.7 Reactor coolant stand pipe level must be above Low Level Alarm to ensure that No. 3 Seal does not operate dry.

3.8 The following temperature limits must be observed during Reactor Coolant Pump operation:

3.8.1	Pump Bearing Temperature	205°F max.
	Lower Motor Bearing Temperature	200°F max.
	Upper Motor Bearing Temperature	200°F max.
	Motor Windings Temperature	248°F max.

3.9 The maximum allowable Reactor Coolant Pump vibration measured at the motor flange at running speed is 5 mils.

3.10 The maximum allowable RCP vibration, measured at the shaft below the coupling, is 20 mils.

4.0 CHECK OFF SHEET

4.1 None

5.0 PROCEDURE

5.1 Start the Reactor Coolant Pump Oil Lift Pump and allow to operate for two (2) minutes to establish oil pressure above the permissive (> 500 psi).

5.2 Start the Reactor Coolant Pump.

5.2.1 Monitor pump running current, RC loop flow, RCP bearing temperature, seal leak off flows and Component Cooling water flows and temperature.

5.3 Stop the Oil Lift Pump after the Reactor Coolant Pump has run for one (1) minute.

5.4 Read and record on Control Console Reading Sheet, the vibration for the pump which was placed in service.

6.0 FINAL CONDITIONS

6.1 Reactor Coolant Pump(s) running under normal conditions.

Prepared by B. N. Young (NSS)

SORC Meeting No. 18-77

Manager - Salem Generating Station

OPERATING INSTRUCTION

II-1.3.4

FILLING AND VENTING THE RCS

1.0 PURPOSE

1.1 This procedure describes the filling and venting of the Reactor Coolant System and connected systems where applicable, including the reactor vessel head and Pressurizer, with primary grade borated water following a maintenance or refueling shutdown wherein the RCS has been depressurized and drained.

2.0 INITIAL CONDITIONS

2.1 The RCS is aligned IAW Check Off Sheet 4.1, except that a level indicator is installed on #13 loop drain, 13RC13 and 13RC15 which are open.

2.2 Water level has been reduced in the system for refueling or maintenance work. This level will normally be between the reactor head flange and the top of the reactor nozzles.

2.3 The reactor vessel head is bolted in place.

2.4 The Residual Heat Removal System is in service IAW OI II-6.3.2, "Initiating Residual Heat Removal".

2.5 CVCS is aligned to supply RCS makeup, charging and letdown and RCP seals IAW OI II-3.3.1, "Establishing Charging, Letdown and Seal Injection Flow".

2.6 The refueling level instrument is in place and indicating level IAW OI II-1.3.6, "Draining the Reactor Coolant System".

2.7 The RWST contains a minimum of 200,000 gallons (≈ 23.6 feet) of borated water with a concentration ≥ 2000 ppm.

2.8 The Waste Gas System is in service IAW OI II-12.3.1, "Gaseous Waste Disposal System - Normal Operation".

2.9 The gas analyzer is operable to sample PRT gases IAW OI II-10.3.2, "Gas Analyzer Operation".

3.0 PRECAUTIONS

3.1 When the RHR System is aligned to the RCS, do not pressurize the RCS above 425 psig.

3.2 Observe MPT limits of the Technical Specifications.

3.3 Do not vent the RCS, if coolant temperature is > 200°F.

3.4 Observe the requirements of the Radiation Exposure Permits (REP's) when venting radioactive vapor and gases.

3.5 Provisions must be made for collecting reactor coolant released from open vent and drain valves.

3.6 The Control Rod Drive Mechanisms do not require venting unless it is intended to operate these mechanisms with a Reactor Coolant System pressure of less than 50 psi. If necessary to vent the CRDM's, take precaution against wetting the operating coils.

3.7 One Pressurizer Safety Valve must be operable.

3.8 Monitor Source Range neutron level while filling the RCS. If count rate doubles, stop filling and determine the cause before resuming the filling operation.

3.9 When the Reactor Coolant System is drained, the head temperature shall be monitored twice a shift until the head is unbolted. The reactor head should not be cooled below 100°F without reducing the tension on the studs.

3.10 When using the temporary tygon hose connected to the loop as a level indication, any nitrogen pressure present within the Reactor Coolant System will indicate a false high level in relation to the pressure applied.

3.11 RCP seal injection must be in service while filling the RCS.

3.12 Makeup controls must be set for a concentration equal to or greater than that in the RCS.

3.13 During formation of a Pressurizer bubble, plot on Operations Log No. 5 the Pressurizer heatup rate on at least a 30 minute interval maintaining the heatup rate $\leq$ 200°F/hour. This plot of the Pressurizer heatup rate is required to satisfy Technical Specification surveillance SP(O)4.4.9.2.

3.14 The Pressurizer sprays must not be used if the temperature differential between the Pressurizer and the spray fluid is greater than 320°F.

4.0 CHECK OFF SHEETS

4.1 Reactor Coolant System Valve Lineup

5.0 PROCEDURE

5.1 Start one Charging Pump and initiate seal flow to the Reactor Coolant Pumps IAW OI II-3.3.1, "Establishing Charging, Letdown and Seal Injection Flow", if it is not in service.

5.2 Open Pressurizer Spray Valves PS1 and PS3; and open Auxiliary Spray Valve CV75.

5.3 Close the PRT Nitrogen Supply Valve NT25.

5.4 Open one Power Operated Relief Valve, PR1 or PR2.

5.5 Open PRT Vent Valve PR15.

5.6 Open Charging Pump Suction Valves from RWST, SJ1 and SJ2; close VCT Outlet Valves CV40 and CV41.

5.7 Adjust charging flow to maximum and close Letdown Pressure Control Valve CV18.

5.8 When the Cold Calibrated Pressurizer Level Channel indicates 5 to 10%, vent the reactor vessel head through valves RC1 and RC35 until a solid stream of water is obtained. Isolate the refueling level indicator by closing Loop 13 Cold Leg Drain Valves 13RC13 and 13RC15.

5.9 Allow the Pressurizer to fill until a level increase occurs in the Pressurizer Relief Tank.

5.10 Close Pressurizer Power Operated Relief Valves PR1 and PR2.

5.11 Open VCT Outlet Valves, CV40 and CV41, then close RWST to Charging Pump Valves SJ1 and SJ2.

5.12 Adjust Letdown Pressure Control Valve CV18 and charging flow to maintain RCS pressure about 400 psig.

5.13 Visually inspect the RCS for leakage.

5.14 Run one Reactor Coolant Pump for about 30 seconds IAW OI II-1.3.1, "Reactor Coolant Pump Operation", then stop the RC Pump.

5.15 Reduce RCS pressure to as low as practicable (less than 50 psig), then, at least 10 minutes after stopping the pump, vent the reactor vessel head through RC1 and RC35. Collect all drainage.

5.16 Repeat steps 5.12, 5.14 and 5.15 above for each of the other Reactor Coolant Pumps.

5.17 Run one Reactor Coolant Pump for about 1 to 1-1/2 minutes IAW OI II-1.3.1, "Reactor Coolant Pump Operation". Stop the RC Pump. Repeat for each of the other Reactor Coolant Pumps.

5.18 Reduce RCS pressure as low as possible (less than 50 psig) then, at least 30 minutes after stopping the pumps, vent the reactor vessel head through RC1 and RC35. Collect all drainage.

5.19 Repeat steps 5.17 and 5.18 until no air is evident.

5.20 Open one Power Operated Relief Valve, PR1 or PR2.

5.21 Close Letdown Pressure Control Valve CV18 until a level increase in the PRT is observed. Close the power relief valve. Adjust RCS pressure to 50 psi with CV18.

5.22 Close Pressurizer Spray Valves PS1 and PS3; and close Auxiliary Spray Valve CV75.

5.23 Purge the PRT, as necessary, and place in service IAW OI II-2.3.3, "Pressurizer Relief Tank - Normal Operation".

5.24 Place a blind flange on the reactor vessel vent line and check RC1 and RC35 closed.

5.25 A Pressurizer bubble may be formed, if desired, as follows:

5.25.1 Increase reactor coolant pressure as desired for formation of a bubble in the Pressurizer by adjusting the Letdown Pressure Control Valve 1CV18. Adjust charging flow to minimum.

5.25.2 Energize all Pressurizer heaters to begin Pressurizer heatup and bubble formation. Observe precaution 3.13.

5.25.3 Place the Pressurizer Level Controls in automatic.

6.0 FINAL CONDITIONS

6.1 RCS is filled and vented.

6.2 RHR is in operation with RCS pressure about 50 psi.

6.3 The Pressurizer Relief Tank is in service IAW OI II-2.3.3, "Pressurizer Relief Tank - Normal Operation".

6.4 A visual inspection for leakage from the RCS has been conducted.

6.5 Charging, Letdown and Seal Injection are in operation.

Prepared by B. N. Young (NSS)

SORC Meeting No. 18-77

Manager - Salem Generating Station

Rev. 3
1/29/77

OPERATING INSTRUCTION

II-6.3.2

INITIATING RESIDUAL HEAT REMOVAL

1.0 PURPOSE

1.1 This instruction outlines the sequence of placing the RHR system in service to remove decay heat from the core during plant cooldown and refueling operations. It also describes the procedure for determining and correcting the boron concentration in the RHR system.

1.2 In the event plant conditions require a delay during some part of this procedure, the Watch Engineer will retain the data sheets until the procedure is continued or terminated.

1.3 If this procedure is terminated prior to completion, the Watch Engineer will note the termination time and date on each data sheet which has been started. He will then file these data sheets in the normal manner.

1.4 All steps of this instruction with an asterisk are to be signed off on the appropriate check off sheets.

1.5 Procedural steps must be completed in sequence, initial conditions may be satisfied in any order.

2.0 INITIAL CONDITIONS

*2.1 Reactor Coolant System is less than 350°F and between 350 and 375 psig (pressure requirement only if RCP is in operation).

*2.2 Component cooling water is available to the RHR heater changers and RHR pump mechanical seal heater changers IAW OI II-7.3.2, "CCW System - Normal Operation".

*2.3 CVCS - Charging and Letdown System is in operation IAW OI II-3.3.1, "Establishing Charging, Letdown and Seal Injection Flow".

*2.4 RHR System is aligned for power operation IAW OI II-6.3.3, "Terminating Residual Heat Removal".

3.0 PRECAUTIONS

3.1 The RHR System shall not be aligned to the reactor coolant system when reactor coolant is greater than 425 psig or 350°F. (Relief valve RH3 is set at 450 psig)

3.2 Before placing the RHR system in service, its boron concentration must be such that if the RCS was at that concentration, the minimum shutdown margin requirements would be met.

3.3 Reactor coolant system pressure and temperature must be within the limits of Technical Specifications, Figure 3.4-3.

3.4 Maximum component cooling water temperature is 120°F.

3.5 RHR pump maximum seal water temperature is 180°F.

3.6 Flow through the RHR system must be initiated slowly to avoid thermal shock. A warmup period of five to ten minutes at low flow is required before flow is increased through the heat exchanger.

NOTE

To further reduce the thermal shock problem, it is recommended that low temperature on the component cooling side be avoided.

3.7 Do not allow the water level in the reactor vessel to drop below the center line of the hot leg pipe while RHR pumps are in operation.

3.8 Do not allow RHR system pressure to exceed 600 psig at any time.

3.9 During RCS heatup and cooldown with the RHR system valved to a solid RCS starting of a reactor coolant pump, if all pumps are stopped, can result in overpressurizing the RHR system. A quantity of cold seal injection water will accumulate in the RCP volute and upon starting, this water will be heated in the steam generator causing a significant pressure surge. To preclude this problem, special attention must be given the precautions given in OI II-1.3.1, "Reactor Coolant Pump Starting".

3.10 During RHR operation, observe the RCP minimum No. 1 seal pressure differential of 285 psig when operating a RC pump.

3.11 If the RCS is solid and letdown is from RHR, the Letdown Pressure Control Valve CV18 must be adjusted immediately upon starting an RHR pump to prevent dropping RCS pressure below the minimum required for RCP operation.

NOTE

Letdown pressure control valve is to be in manual control when starting pump.

3.12 Prior to starting an RHR pump, verify that its minimum flow valve is open.

4.0 CHECK OFF SHEETS

4.1 Initiating Residual Heat Removal.

5.0 PROCEDURE

*5.1 Remove administrative controls from the following valves:

5.1.1 Remove blocking tags and close breaker for valve 1SJ69.

5.1.2 Select "Valve Operable" position on control power lockout switch for valves 11SJ49 and 12SJ49.

*5.2 Establish component cooling water flow through RHR heat exchanger by opening valves 11CC16 and 12CC16, RHR Heat Exchanger CCW Outlet Valves.

*5.3 Verify 1SJ69, RHR Suction From RWST valve open.

*5.4 Verify 11RH4 and 12RH4, RHR Pump Suction valves and 11RH29 and 12RH29, RHR Pump Min. Flow valves open.

*5.5 Open 11RH12 and 12RH12, RHR Heat Exchanger Bypass Iso valves.

*5.6 Verify 11RH17 and 12RH17, RHR System Letdown Isolation valves open.

*5.7 Close 11RH18 and 12RH18, RHR Heat Exchanger Outlet valves.

*5.8 Close 11SJ49 and 12SJ49, RHR Discharge to Cold Legs.

*5.9 Verify 11RH19 and 12RH19, Heat Exchanger Cross Discharge valves open.

*5.10 Verify 1RH20, RHR Heat Exchanger Bypass valve closed.

*5.11 Start one, or both, RHR pump(s) and recirculate through their respective minimum flow valves 11RH29 and 12RH29.

*5.12 After approximately ten (10) minutes, obtain a water sample for boron analysis IAW PD-3.5.046, "RHR Heat Exchanger Outlet Sampling".

*5.13 If the boron concentration is lower than required, borate the RHR system as follows:

5.13.1 Adjust the charging rate to minimum charging.

5.13.2 Bypass the mixed bed demineralizer by switching 1CV21 Diversion valve to the "MB Diversion to VCT" position.

5.13.3 Divert letdown to the CVCS holdup tanks by switching 1CV35 Diversion valve to the "Flow to HUT" position.

NOTE

If during the next step of this procedure the VCT requires makeup, switch valve 1CV35 to "Flow to VCT" position until level is returned to normal.

5.13.4 While opening 1CV18 Letdown Pressure Control valve to maintain RCS letdown, open 1CV8 Letdown Flow From RHR until the total combined letdown is $\approx$ 100 gpm.

5.13.5 After 30 minutes, stop letdown from the RHR system and resample RHR system.

5.13.6 Repeat steps 5.13.1 through 5.13.5 above until RHR boron concentration is adequate.

*5.14 Open 1RH1 and 1RH2, RHR Common Suction valves. (Requires RCS pressure ≤ 360 psig.)

*5.15 Close valve 1SJ69, RHR Suction From RWST.

*5.16 Establish RHR system letdown to the CVCS by slowly opening CV8, Letdown From RHR, while adjusting CV18, Letdown Pressure Control valve, to maintain the desired letdown flow.

NOTE

The three CVCS Letdown Orifice Isolation Valves 1CV3, 1CV4 and 1CV5 should remain open even though letdown is from RHR. This provides additional relieving capacity in case of inadvertent RCS pressurization.

*5.17 Open 11SJ49 and 12SJ49 RHR Discharge to Cold Legs.

*5.18 Over period of 5-10 minutes, crack open 1RH20 RHR HX Bypass valve and slowly increase RHR system temperature to RCS temperature.

*5.19 Over a period of 5-10 minutes, slowly open 1RH20 to desired flow, 3000 gpm for 1 pump operation or 6000 gpm for 2 pump operation.

NOTE

Adjustment of 1CV18, Letdown Pressure Control valve will be required to maintain desired letdown during above steps.

*5.20 Establish desired RCS cooldown rate by slowly opening 11RH18 and 12RH18 RHR Heat Exchanger Outlet Valves, while closing 1RH20 to maintain total flow established in step 5.16.

*5.21 When desired RCS temperature is reached, stop one RHR pump and maintain 3000 gpm flow with other pump.

Prepared by F. E. Flynn (NSS)

Manager - Salem Generating Station

SORC Meeting No. 21-76

Rev. 5
3/12/76

OPERATING INSTRUCTION

II-6.3.3

TERMINATING RESIDUAL HEAT REMOVAL

1.0 PURPOSE

1.1 To provide instructions for terminating residual heat removal in preparation for plant startup with either of the following plant conditions:

I. RCS Solid (no bubble in pressurizer).

II. With a bubble in the pressurizer.

1.2 In the event plant conditions require a delay during some part of this procedure, the Watch Engineer will retain the data sheets until the procedure is continued or terminated.

1.3 If this procedure is terminated prior to completion, the Watch Engineer will note the termination and time and date on each data sheet which has been started. He will then file these data sheets in the normal manner.

1.4 All steps of this instruction with an asterisk are to be signed off on the appropriate check off sheets.

1.5 Procedural steps must be completed in sequence, initial conditions may be satisfied in any order.

2.0 INITIAL CONDITIONS

2.1 The Residual Heat Removal System is in operation IAW OI II-6.3.2, "Initiation of Residual Heat Removal".

3.0 PRECAUTIONS

3.1 The Residual Heat Removal System is designed for operation as part of the engineered safeguard system. Prior to power operation, all valves must be returned to the proper valve lineup IAW attached Check Off Sheets 4.3 & 4.4, RHR System Electrical and Valve Lineups for Power Operation.

3.2 The RHR system shall not be aligned to the reactor coolant system when the pressure is greater than 425 psig or 350°F (Relief valve RH3 is set at 450 psig).

3.3 Do not allow RHR system pressure to exceed 600 psig at any time.

3.4 If the RCS is solid and letdown is from RHR, an increase in reactor coolant pressure should be expected when an RHR pump is stopped (100 psi).

3.5 Maintain the RCS pressure ≤ 375 psig when 1RH1 and 1RH2 RHR Common Suction valves are open.

4.0 CHECK OFF SHEETS

4.1 Terminating RHR with Solid RCS
4.2 Terminating RHR with Bubble in Pressurizer
4.3 RHR System Electrical Alignment for Power Operation
4.4 RHR System Valve Alignment for Power Operation

5.0 PROCEDURE

5.1 Terminating RHR with solid RCS (no bubble in pressurizer)

*5.1.1 Slowly close 11RH18 and 12RH18 RHR Heat Exchanger Outlet valves.

*5.1.2 Close 1RH20 RHR Heat Exchanger Bypass valve.

*5.1.3 Close 11SJ49 and 12SJ49 RHR Discharge to Cold Legs.

*5.1.4 Verify that the RHR pump Minimum Flow valves 11 & 12RH29 open when pump flows reach 500 gpm.

*5.1.5 Maintain miniflow for one-half hour or until RHR pumps are cooled down.

*5.1.6 Place 1CV18 Low Pressure Letdown Control valve in manual to control reactor coolant system pressure increase when RHR pumps are stopped.

*5.1.7 Stop the RHR pump(s).

*5.1.8 When the pressurizer bubble has been formed, switch to CVCS letdown by slowly closing Letdown Flow from RHR valve 1CV8 and adjusting the Letdown Pressure Control valve 1CV18 to maintain desired letdown flow.

*5.1.9 Close 1RH1 and 1RH2 RHR Common Suction valves.

*5.1.10 Lock out 1RH2 by use of console operated key switch.

*5.1.11 Open 11RH18 and 12RH18 RHR Heat Exchanger Outlet valves.

*5.1.12 After RHR heat exchangers have cooled down, close RHR Heat Exchanger CCW Outlet valves 11CC16 and 12CC16.

*5.1.13 Reduce component cooling flow by stopping pumps and/or securing component cooling water heat exchangers, as required.

*5.1.14 Complete Check Off Sheet 4.3 RHR System Electrical Alignment for Power Operation.

*5.1.15 Complete Check Off Sheet 4.4 RHR System Valve Alignment for Power Operation.

5.2 Terminating RHR with Bubble in Pressurizer

*5.2.1 Slowly close 11RH18 and 12RH18 RHR Heat Exchanger Outlet valves.

*5.2.2 Close 1RH20 RHR Heat Exchanger Bypass valve.

*5.2.3 Close 11SJ49 and 12SJ49 RHR Discharge to Cold Legs.

*5.2.4 Verify that the RHR Pump Minimum Flow valves 11 and 12RH29 open when pump flows reach 500 gpm.

*5.2.5 Switch to CVCS letdown by slowly closing Letdown Flow from RHR valve 1CV8 and adjusting the Letdown Pressure Control valve 1CV18 to maintain desired letdown flow.

*5.2.6 Open 1SJ69 RHR Suction from RWST.

*5.2.7 Close 1RH1 and 1RH2 RHR Common Suction valves.

*5.2.8 Lock out 1RH2 by use of console operated key switch.

*5.2.9 Maintain miniflow for one-half hour or until RHR pumps are cooled down.

*5.2.10 Stop the RHR pump(s).

*5.2.11 After RHR heat exchangers have cooled down, close RHR Heat Exchanger CCW Outlet valves 11CC16 and 12CC16.

*5.2.12 Reduce component cooling flow by stopping pumps and/or securing Component Cooling Heat Exchangers, as required.

*5.2.13 Complete Check Off Sheet 4.3 RHR System Electrical Alignment for Power Operation.

*5.2.14 Complete Check Off Sheet 4.4 RHR System Valve Alignment for Power Operation.

6.0 FINIAL CONDITIONS

6.1 The RHR system is aligned for plant power operation.

Prepared by F. E. Flynn (NSS)

Manager - Salem Generating Station

SORC Meeting No. 21-76

Rev. 5
3/12/76

ATTACHMENT 1

No. 11 SI Pump

CONTRACTOR ______

CUSTOMER WESTINGHOUSE APD

SPIN NO PSE SIAPSI-1 P.O. 51-E-705-03B SUPP.

IMPELLER PATTERN M-6146 M-6147/48

MAXIMUM DIAMETER 8 5/8 8 5/8 / 8 5/8

RATED DIAMETER 8 5/8 8 5/8 / 8 5/8

MINIMUM DIAMETER 8 1/4 8 1/4 / 8 1/4

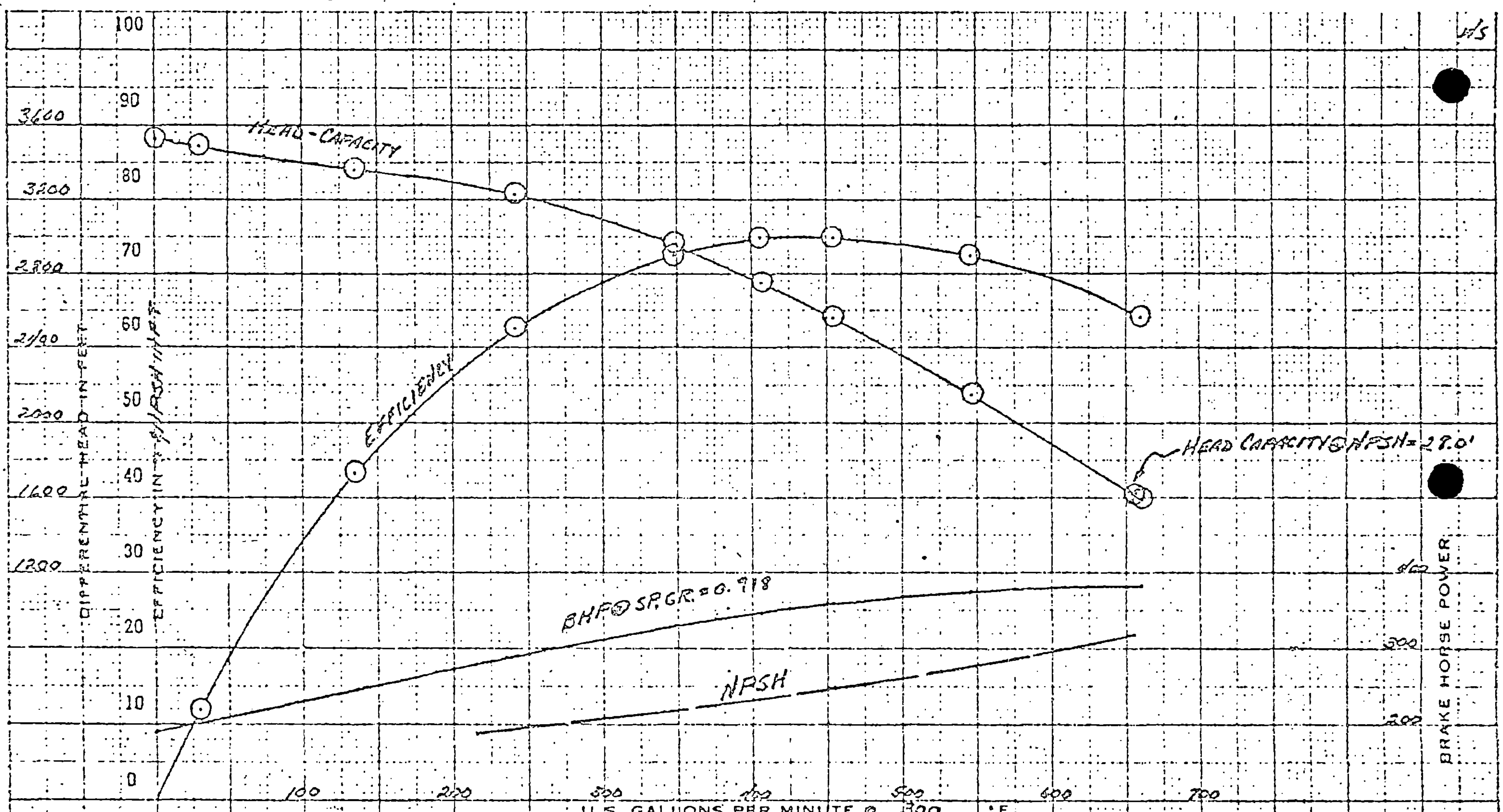
TEST PERFORMANCE CURVE NO. 34554E

SIZE 2 1/2 TYPE JTCH STAGES 10

R.P.M. 3570 DATE 2-16-70

PUMP NUMBER 45493

PERFORMANCE ALSO APPLIES TO PUMP NUMBER ______



PACIFIC PUMPS. HUNTINGTON PARK, CALIFORNIA

CONTRACTOR

CUSTOMER Westinghouse A PD

SPIN NO. PSS STAPS-2F.O 54-E-705-03B SUPP

IMPELLER PATTERN M-6146 M-6147/78

MAXIMUM DIAMETER 8 5/8 8 5/8 / 8 5/8

RATED DIAMETER 8 5/8 8 5/8 / 8 5/8

MINIMUM DIAMETER 8 1/4 8 1/4 / 8 1/4

No. 12 SI Pump

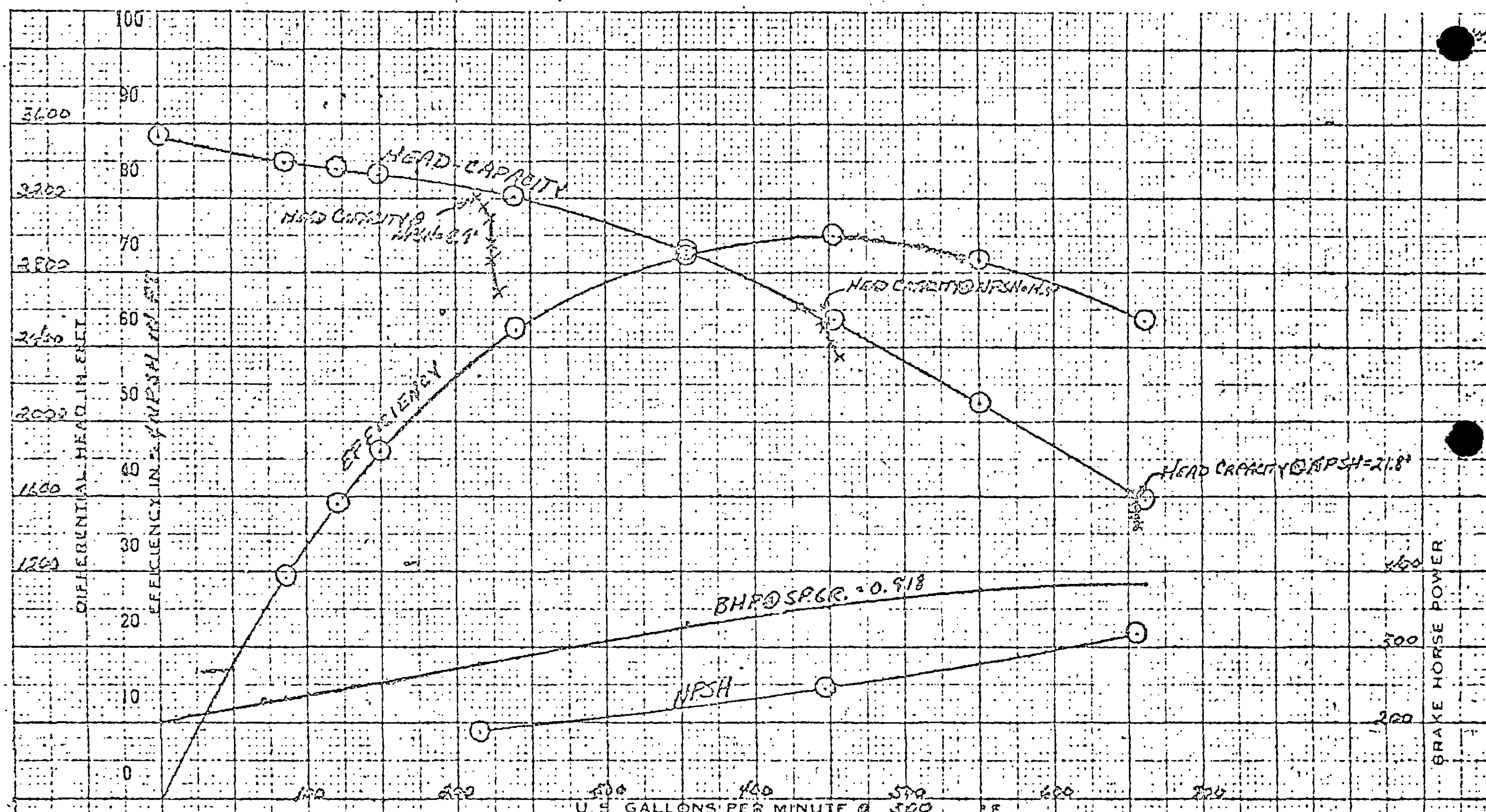
TEST PERFORMANCE CURVE NO. 34554K.

SIZE 2½" TYPE JTCH STAGES 10

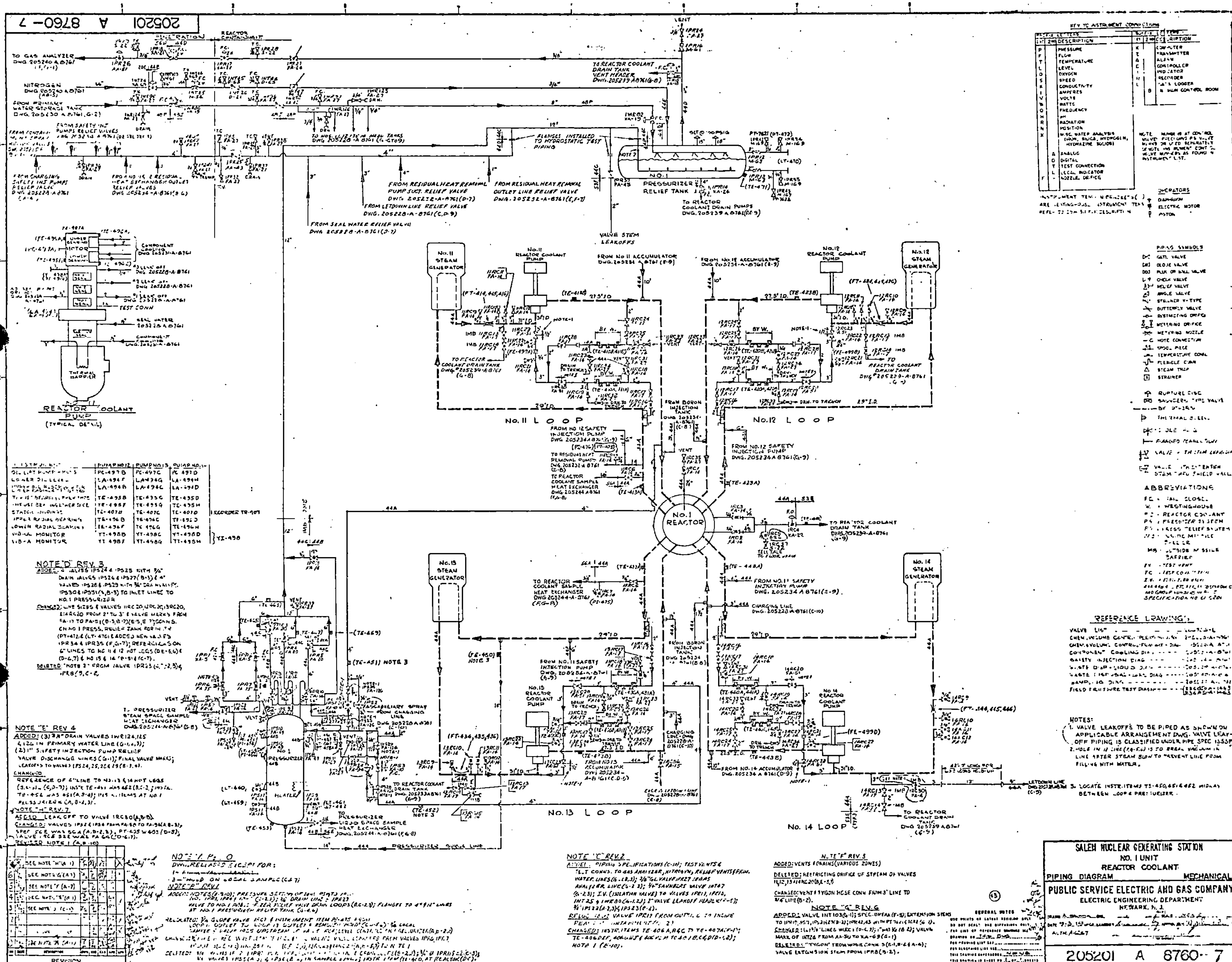
R.P.M. 3570 DATE 1-15-70

PUMP NUMBER 45499

PERFORMANCE ALSO APPLIES TO PUMP NUMBER



PACIFIC PUMPS HUNTINGTON PARK, CALIFORNIA


205201 A 8760-7
REACTOR CONTAINMENT
TO GAS ANALYZER
NITROGEN
FROM PRIMARY WATER STORAGE TANK
FLANGES INSTALLED TO HYDROSTATIC TEST PIPING
NO. 1 PRESSURIZER RELIEF TANK
TO REACTOR COOLANT DRAIN TANK VENT HEADER
FROM RESIDUAL HEAT REMOVAL PUMP SUCT. RELIEF VALVE
FROM RESIDUAL HEAT REMOVAL OUTLET LINE RELIEF VALVE
FROM LETDOWN LINE RELIEF VALVE
FROM SEAL WATER RELIEF VALVE
TO REACTOR COOLANT DRAIN PUMPS
VALVE STEM LEAKOFFS
REACTOR COOLANT PUMP (TYPICAL DETAIL)
THERMAL BARRIER
No.11 STEAM GENERATOR
No.11 REACTOR COOLANT PUMP
No.12 REACTOR COOLANT PUMP
No.12 STEAM GENERATOR
No.11 LOOP
No.12 LOOP
No.13 STEAM GENERATOR
No.14 STEAM GENERATOR
No.13 REACTOR COOLANT PUMP
No.14 REACTOR COOLANT PUMP
No.13 LOOP
No. 14 LOOP
No. 1 REACTOR
TO REACTOR COOLANT DRAIN TANK
No. 1 PRESSURIZER
HEATER
PRESSURIZER SURGE LINE
NOTE "D" REV. 3
NOTE "E" REV 4
NOTE "C" REV.2
NOTE "F" REV 5
NOTE "G" REV.6
KEY TO INSTRUMENT CONNECTIONS
PIPING SYMBOLS
ABBREVIATIONS
REFERENCE DRAWINGS
NOTES:
1. VALVE LEAKOFFS TO BE PIPED AS SHOWN ON APPLICABLE ARRANGEMENT DWG. VALVE LEAKOFF PIPING IS CLASSIFIED UNDER PIPE SPEC 1555P.
REVISION
SALEM NUCLEAR GENERATING STATION
NO. 1 UNIT
REACTOR COOLANT
PIPING DIAGRAM
MECHANICAL
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC ENGINEERING DEPARTMENT
NEWARK, N. J.
205201 A 8760-7

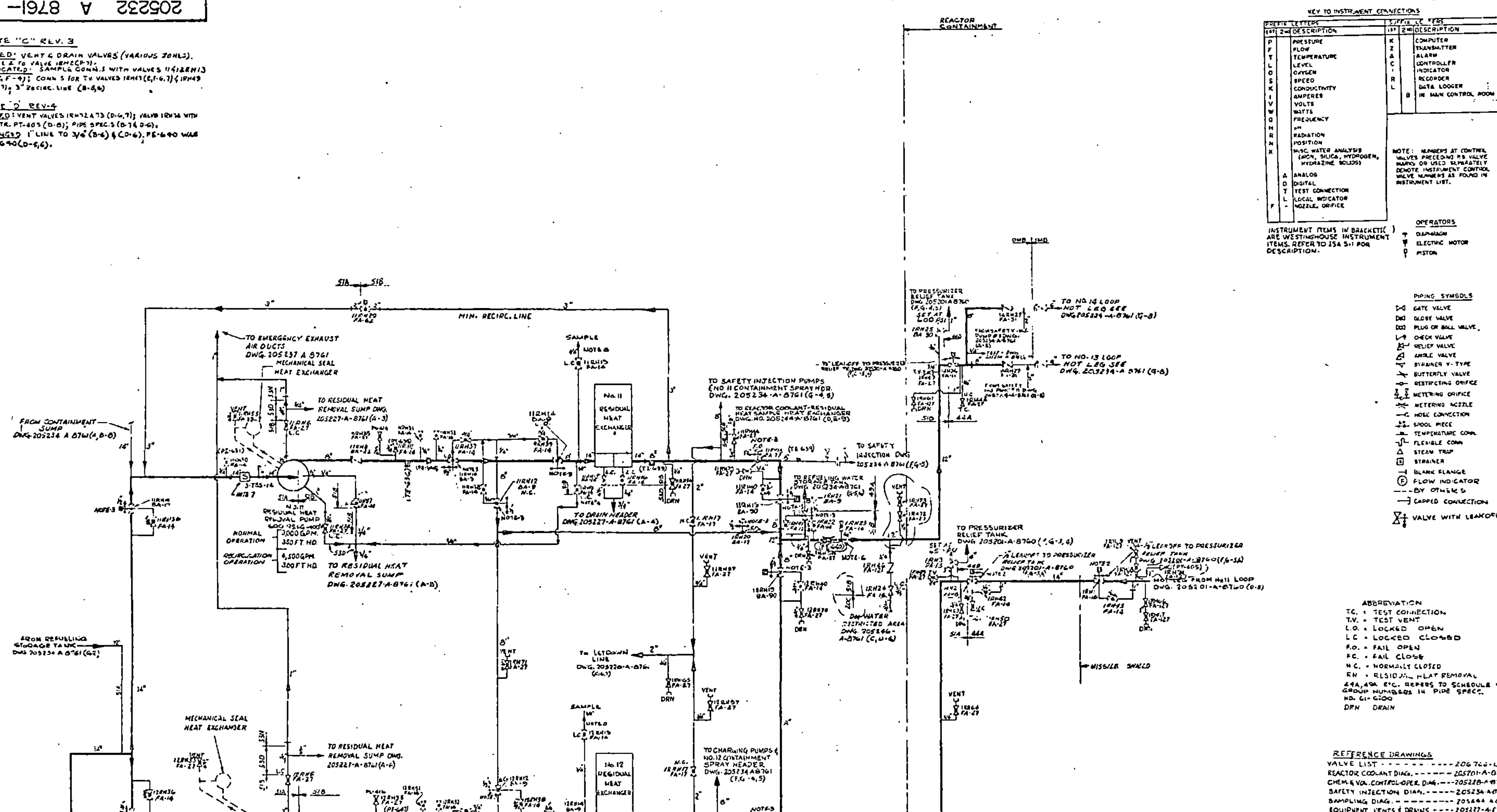
205232 A 8761-4

NOTE "C" REV. 3

ADDED: VENT & DRAIN VALVES (VARIOUS ZONES). NOTE 2 TO VALVE 1RH2(F-7).
RELOCATED: SAMPLE CONN.S WITH VALVES 11&12RH13 (C&F-4); CONN S FOR T.V. VALVES 1RH47(E,F-6,7) & 1RH49 (D-6,7); 3" RECIRC. LINE (B-5,6)

NOTE "D" REV-4

ADDED: VENT VALVES 1RH72 & 73 (D-6,7); VALVE 1RH36 WITH INSTR. PT-403 (D-8); PIPE SPEC.S (D-7 & D-6).
CHANGED: 1" LINE TO 3/4" (B-6) & (D-6). FE-640 WAS FT-640 (D-5,6).



ABBREVIATION
T.C. = TEST CONNECTION
T.V. = TEST VENT
L.O. = LOCKED OPEN
L.C. = LOCKED CLOSED
F.O. = FAIL OPEN
F.C. = FAIL CLOSE
N.C. = NORMALLY CLOSED
RH = RESIDUAL HEAT REMOVAL
44A, 49A ETC. REFERS TO SCHEDULE & GROUP NUMBERS IN PIPE SPECS. NO. 61-6200
DRN DRAIN

REFERENCE DRAWINGS
VALVE LIST ---------- 206766-L
REACTOR COOLANT DIAG. ------- 205201-A-8760
CHEM & VOL. CONTROL-OPER. DIAG. --- 205228-A-8761
SAFETY INJECTION DIAG. ----- 205234-A-8761
SAMPLING DIAG. ---------- 205444 A 8761
EQUIPMENT VENTS & DRAINS ---- 205227-A-8761
FIELD PRESSURE TEST DIAG. _ _ _ 228232-A-1302

NOTES:

2-VALVES 1RH1&2 ARE INTERLOCKED WITH REACTOR COOLANT SYSTEM PRESSURE SIGNALS.
3-VALVE HAS LEAKOFF CONNECTION WHICH IS PERMANENTLY PIPED TO EQUIPMENT DRAIN HEADER.
4-VALVE HAS REACH ROD TO FLOOR ABOVE.
6-ELBOW TAP FLOWMETER.
7-TEMPORARY STRAINER IS PLACED IN LINE DURING INITIAL FLUSHING. CAPPED LINE IS CONNECTED TO TEMPORARY PRESSURE GAGE AT THIS TIME.
8-LOCATE VALVE BEHIND SHIELDING AND AT A LOWER ELEVATION THAN PIPE BEING SAMPLED.

NOTE "A" REV.1

ADDED: PIPING SPECS. (C,D-10); VALVE DISC EQUALIZING VALVE TO 11RH4 (E-1), 12RH4 (B,C-1), 11RH10 (E-3), 12RH10 (B,C-3), 11RH12 (E-4), 12RH12 (B,C-4), 11RH14 (E-4), 12RH14 (B,C-4), 11RH19, 12RH19 (D-5,6), 1RH1, 1RH2 (D-7,8); VALVE STEM LEAKOFFS TO 11RH12 (E-4), 12RH12 (B,C-4), 11RH19, 12RH19 (D-5,6), 1RH21 (D,E-6), 1RH26 (E,F-7); CHECK VALVES 1RH45 (A,B-6,7) & 1RH46 (D-6,7) IN DM WATER LINES & DELETED HOSE CONNS; 3/4" TEST VENTS & TEST CONNS. (D,G-7); 3/4" VALVES 11RH44 & 12RH44 IN LINES TO SAMPLE HEAT EXCHANGERS & RELOCATED FROM 3" LINE TO 8" LINE (B&F-5), 11&12RH40 (D,E-6).

RELOCATED: VALVE 12RH30 WITH INSTR. (PI-632) UPSTREAM OF STRAINER & CAPPED CONN. DOWNSTREAM OF STRAINER (B-1,2); VALVE 11RH30 WITH INSTR. (PI-631) UPSTREAM OF STRAINER & CAPPED CONN. DOWNSTREAM OF STRAINER (E-1,2), INSTRS (FE-641A) (E-3,4) & (FE-641B) (B-3,4) FROM SUCTION SIDE OF PUMPS TO DISCHARGE SIDE; INSTRS (FT-946) & (FT-947) (C,D-6) FROM SAFETY INJECTION DWG. 205234-A-8761 (F,G-5,6).

NOTE "A" REV. 1 (CONT'D.)

REVISED: PIPING, VALVES, DRAINS & SAMPLES BETWEEN NO. 11 & 12 RHR PUMP DISCHARGE & RHR HEAT EXCHANGERS (B C-2 TO 5) & (E-2 TO 5); PIPING, VALVES, & INSTRS. TO NO. 13 & 14 LOOP LEGS & CHANGED FROM COLD TO HOT LEGS (C,D-9).

DELETED: NOTES 1 & 5 (B-9); STEM LEAKOFFS FROM VALVES 11RH6 (E-2) & 12RH6 (C-2).

REROUTED: VENTS FROM NO. 11 & 12 RESIDUAL HEAT REMOVAL PUMPS (C,E-2).

CHANGED: VALVES 11RH19 & 12RH19 TO MOTOR OPERATED (D,E-6).

NOTE "B" REV. 2

ADDED: FINAL VALVE MARKS; 3/4" VALVES 11&12RH40 (B,E-6); TE-639 (E-4); NOTE 4 TO 11RH2 (E-4); HEAT EXCHANGERS AT NO. 11 & 12 RHR PUMPS WITH VENT VALVES 11&12RH55 (C&E-2).
DELETED: 13 & 14 RH52 & 1,2 TEMP FLOW INSTRUMENTS (E,F-7); NOTE 6 FROM FE 641 A (E-3) & FE 641 B (C-3)

RELOCATED: TE 639 FROM (D-6,7) TO (E-6). 13&14RH53, 13&14RH54 & 1RH51 FROM ZONE (F-7,8) TO DWG 205234-A-8761 ZONE (G-8,9) AND CHANGED GENERATION NO. TO 13&14SJ164, 13&14SJ165 & 1SJ163, 11&12SJ46, 11&12SJ47 & FT 946 & 947 FROM ZONE (D,E-6) TO DWG. 205234-A-8761 ZONE (G-5).
CHANGED: VALVE MARKS OF VALVES 11RH18 & 12RH18 FROM BA-9 TO BA-90 (B&E).

4	SEE NOTE "D" (6-1)						
3	SEE NOTE "C" (6-1)						
2	SEE NOTE "B" (4-7)						
1	SEE NOTE "A" (6-1)						
NO.	DATE	DESCRIPTION					

REVISION

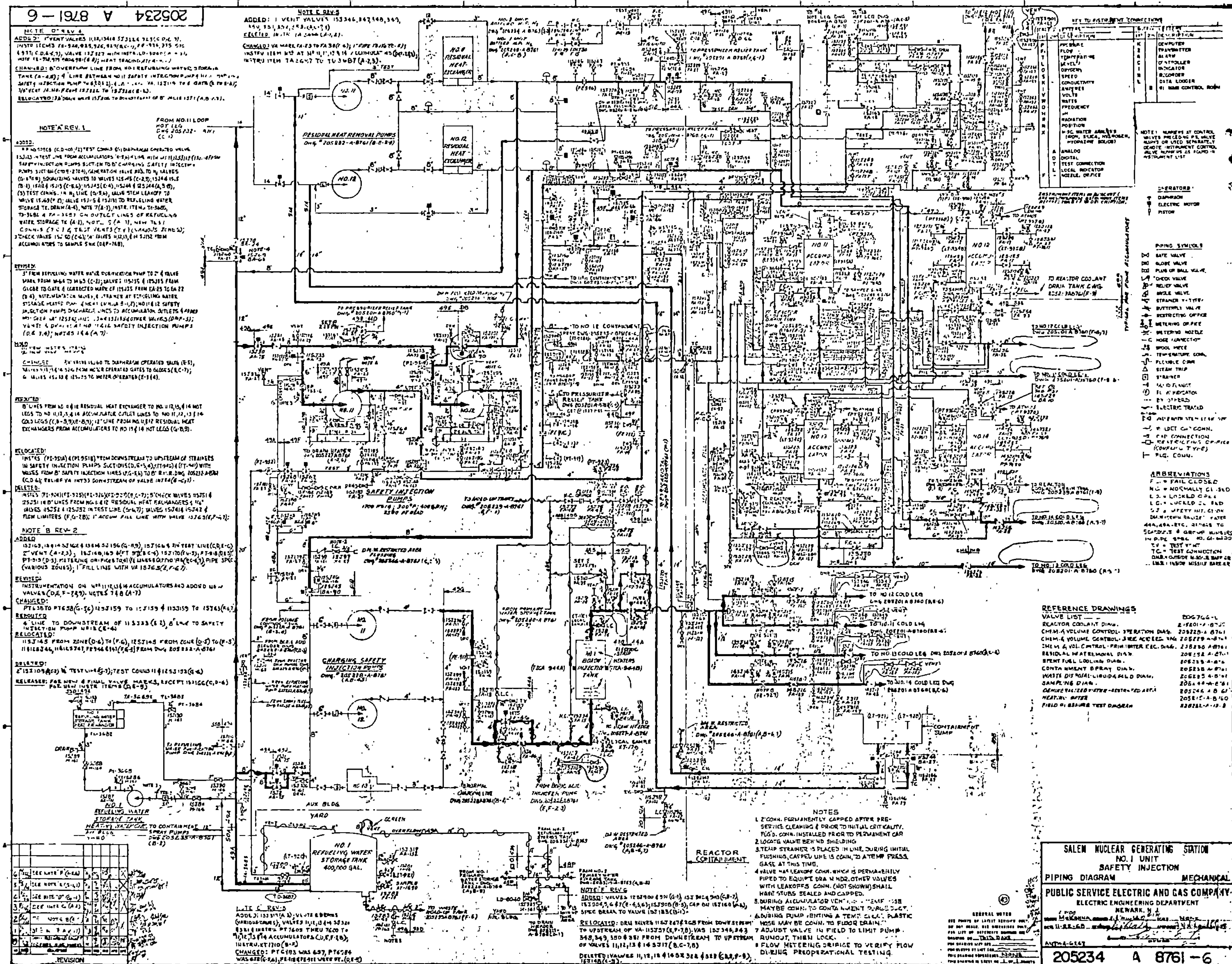
GENERAL NOTES

DRAWN S. BLAHA CHECKED SCALE NONE
DATE 9-30-1969
AUTH.- A-267
APPROVED
THIS SHEET IS SHEET NO. 1 OF 1 SHEETS.

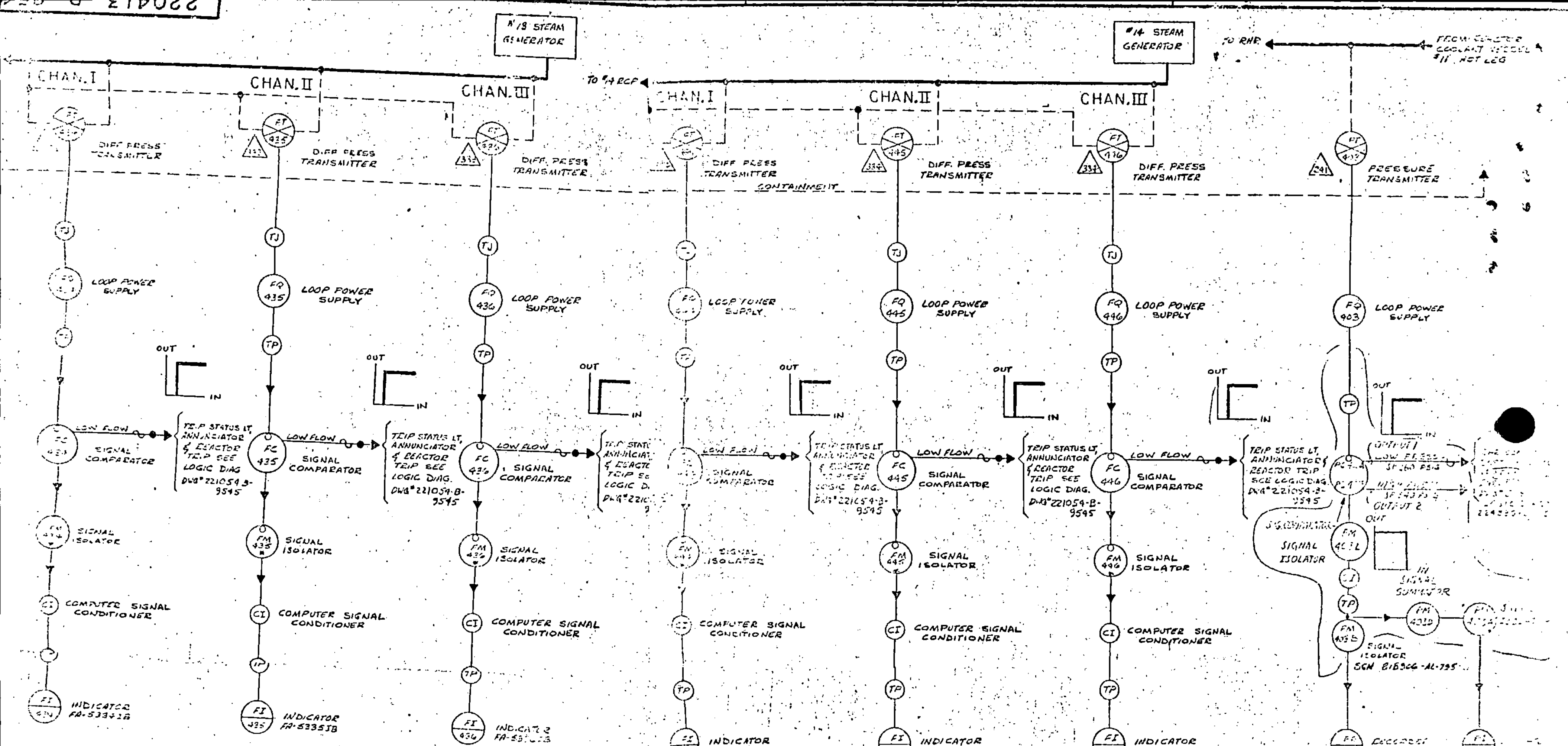
SALEM NUCLEAR GENERATING STATION
NO. 1 UNIT
RESIDUAL HEAT REMOVAL
PIPING DIAGRAM MECHANICAL

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC ENGINEERING DEPARTMENT
NEWARK, N. J.

205232 A 8761-4



205234 A 8761 — 6
RESIDUAL HEAT REMOVAL PUMPS
SAFETY INJECTION PUMPS
CHARGING SAFETY INJECTION PUMPS
NO. 1 REFUELING WATER STORAGE TANK 400,000 GAL.
REACTOR CONTAINMENT
AUX BLDG
YARD
REFERENCE DRAWINGS
PIPING SYMBOLS
ABBREVIATIONS
NOTES
1. 2" CONN. PERMANENTLY CAPPED AFTER PRE-SERVICE CLEANING & PRIOR TO INITIAL CRITICALITY. FLG'D. CONN. INSTALLED PRIOR TO PERMANENT CAP
2. LOCATE VALVE BEHIND SHIELDING
3. TEMP STRAINER IS PLACED IN LINE DURING INITIAL FLUSHING, CAPPED LINE IS CONN. TO A TEMP PRESS. GAGE AT THIS TIME.
4. VALVE HAS LEAKOFF CONN. WHICH IS PERMANENTLY PIPED TO EQUIP'T DRAIN HDR. OTHER VALVES WITH LEAKOFFS CONN. (NOT SHOWN) SHALL HAVE STUBS SEALED AND CAPPED.
5. DURING ACCUMULATOR VENTING A TEMP. HOSE MAYBE CONN. TO CONTAINMENT PURGE DUCT.
6. DURING PUMP VENTING A TEMP. CLEAR PLASTIC HOSE MAY BE CONN. TO FLOOR DRAIN.
7. ADJUST VALVE IN FIELD TO LIMIT PUMP RUNOUT, THEN LOCK.
8. FLOW METERING ORIFICE TO VERIFY FLOW DURING PREOPERATIONAL TESTING.
SALEM NUCLEAR GENERATING STATION
NO. 1 UNIT
SAFETY INJECTION
PIPING DIAGRAM
MECHANICAL
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC ENGINEERING DEPARTMENT
NEWARK, N. J.
205234 A 8761 — 6
REVISION



NO.13 REACTOR COOLANT FLOW IND. AND ALARM

NO.14 REACTOR COOLANT FLOW IND. AND ALARM

REACTOR COOLANT PRESSURE IND. AND CONTROL

REFERENCE DRAWINGS:

- CONTROL STATION-FRONT VIEWS (NO 2 UNIT) — DWG # 228507-B-9556
- CONTROL STATION-FRONT VIEWS (NO. 1 UNIT) — DWG # 207500-B-9461
- CONTROL STATION-FRONT VIEWS (NO. 1 UNIT) — DWG # 203063-B-9461
- #13 RC FLOW IND & ALARM INTERCONN. WD — DWG # 220069-B-9
- #14 RC FLOW IND & ALARM INTERCONN. WD — DWG # 220065-B
- RC PRESSURE IND INTERCONN. WD — DWG # 220062-B-9
- CONTROL STATION-FRONT VIEWS (NO 2 UNIT) — DWG # 228486-B-9556
- METER PANEL 341 WD — DWG # 218317-A-8
- METER PANEL 333 ARRGT & WD — DWG # 211493-A-8
- METER PANEL 334 ARRGT & WD — DWG # 211494-A-8

NOTES:
FOR SYMBOL DESCRIPTION SEE DWG #220400-B-9542

GENERAL NOTES:
USE PRINTS OF LATEST REVISION ONLY.
DO NOT SCALE. USE DIMENSIONS ONLY.
FOR LIST OF REFERENCE DRAWINGS SEE DRAWING NO. THIS DRAWING
FOR DRAWING LIST SEE
FOR BLUEPRINT LIST SEE
THIS DRAWING SUPERSEDES
THIS DRAWING IS SHEET NO. 1 OF 1 SHEETS.

SALEM NUCLEAR GENERATING STATION
NO 1 & 2 UNITS-REACTOR COOLANT SYS.
NO 13, 23, 14 & 24 REACTOR COOLANT LOOPS
LOW FLOW & REACTOR COOLANT PRESS.
FUNCTIONAL DIAGRAM

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC ENGINEERING DEPARTMENT
NEWARK, N.J.

220413 B 9542