Report Nos.: 50-280/89-13 and 50-281/89-13

Licensee: Virginia Electric and Power Company
Glen Allen, VA 23060

Docket Nos.: 50-280 and 50-281 License Nos.: DPR-32 and DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: April 2 - 29, 1989.

Inspectors: Scott M Shaffer FOR 5-26-89
W. E. Holland, Senior Resident Inspector Date Signed

Scott M Shaffer FOR 5-26-89
J. W. York, Resident Inspector Date Signed

Scott M. Shaffer FOR 5-26-89
L. E. Nicholson, Resident Inspector Date Signed

Approved by: M. S Lewis for 5-30-89
P. E. Fredrickson, Acting Branch Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope:

This routine resident inspection was conducted on site in the areas of plant operations, plant maintenance, plant surveillance, licensee event report review, and followup on inspector identified items. A special evaluation of the licensee's program which was used to walk down selected systems prior to unit(s) restart was documented in the last three resident reports and this inspection effort continues in this inspection report.

Certain tours were conducted on backshifts or weekends. Backshift or weekend tours were conducted on April 3, 9, 15, 23, and 26, 1989.

Results:

During this inspection period, no violations were identified. The licensee's ongoing operational readiness program appears to be addressing all necessary items for Unit 1 restart.

## REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. Benthall, Supervisor, Licensing
*R. Bilyeu, Licensing Engineer
*R. Blount, Superintendent of Technical Services
D. Christian, Assistant Station Manager
D. Erickson, Superintendent of Health Physics
*E. Grecheck, Assistant Station Manager
M. Kansler, Station Manager
J. McCarthy, Superintendent of Operations
*G. Miller, Licensing Coordinator, Surry
J. Ogren, Superintendent of Maintenance
A. Price, Site Quality Assurance Manager
*T. Sowers, Superintendent of Engineering

Other licensee employees contacted included control room operators, shift technical advisors, shift supervisors and other plant personnel.

*Attended exit interview.

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Plant Status

Units 1 and 2 began the reporting period in cold shutdown. The units remained in cold shutdown for the duration of the inspection period while substantial operational reviews and maintenance activities were being conducted.

3. Operational Safety Verification (71707)

a. Daily Inspections

The inspectors conducted daily inspections in the following areas: control room staffing, access, and operator behavior; operator adherence to approved procedures, technical specifications, and limiting conditions for operations; examination of panels containing instrumentation and other reactor protection system elements to determine that required channels are operable; and review of control room operator logs, operating orders, plant deviation reports, tagout logs, jumper logs, and tags on components to verify compliance with approved procedures.

b. Weekly Inspections

The inspectors conducted weekly inspections in the following areas: verification of operability of selected ESF systems by valve alignment, breaker positions, condition of equipment or components, and operability of instrumentation and support items essential to system actuation or performance. Plant tours were conducted which included observation of general plant/equipment conditions, fire protection and preventative measures, control of activities in progress, radiation protection controls, physical security controls, plant housekeeping conditions/cleanliness, and missile hazards. The inspectors routinely monitored the temperature of the auxiliary feedwater pump discharge piping to ensure steam binding was prevented.

c. Biweekly Inspections

The inspectors conducted biweekly inspections in the following areas: verification review and walkdown of safety-related tagouts in effect; review of sampling program (e.g., primary and secondary coolant samples, boric acid tank samples, plant liquid and gaseous samples); observation of control room shift turnover; review of implementation of the plant problem identification system; verification of selected portions of containment isolation lineups; and verification that notices to workers are posted as required by 10 CFR 19.

d. Areas Inspected

Inspections included areas in the Units 1 and 2 cable vaults, vital battery rooms, steam safeguards areas, emergency switchgear rooms, diesel generator rooms, control room, auxiliary building, Unit 1 containment, cable penetration areas, independent spent fuel storage facility, low level intake structure, and the safeguards valve pit and pump pit areas. Reactor coolant system leak rates were reviewed to ensure that detected or suspected leakage from the system was recorded, investigated, and evaluated; and that appropriate actions were taken, if required. The inspectors routinely independently calculated RCS leak rates using the NRC Independent Measurements Leak Rate Program (RCSLK9). On a regular basis, RWPs were reviewed and specific work activities were monitored to assure they were being conducted per the RWPs. Selected radiation protection instruments were periodically checked, and equipment operability and calibration frequency were verified.

e. Physical Security Program Inspections

In the course of monthly activities, the inspectors included a review of the licensee's physical security program. The performance of various shifts of the security force was observed in the conduct of

daily activities to include: protected and vital areas access controls; searching of personnel, packages, and vehicles; badge issuance and retrieval; escorting of visitors; and patrols and compensatory posts.

f. Licensee 10 CFR 50.72 Reports

(1) On April 6, 1989, the licensee made a report in accordance with 10 CFR 50.72 with regards to loss of the normal power supply to the "F" bus. The power loss was caused by a failure in the switchyard of the 500 KV stepdown transformer which normally feeds the "F" bus. The "F" bus was supplying normal power to the Unit 1 "H" bus and the Unit 2 "J" bus (4160 volt vital buses). Loss of power to the Unit 1 "H" bus resulted in loss of power to the running (A) RHR pump for Unit 1. Operators started the Unit 1 "B" RHR pump within one minute of the loss of the "A" pump. RCS temperature did not increase during the time that RHR cooling was lost. The No. 1 EDG intentionally was not aligned to automatically start due to potential vibration problems that had been identified earlier. However, after discussion with station management, the diesel was started and the Unit 1 "H" bus was loaded onto the EDG. Loss of power to the Unit 2 "J" bus resulted in an automatic start and load of the No. 3 EDG onto the "J" bus. RHR was not lost on Unit 2 due to the operating pump being powered from the Unit 2 "H" bus.

During the event, the Unit 1 reactor vessel level, as indicated by standpipe, was 18.6 feet (approximately 2 to 4 inches above the reactor vessel flange). The Unit was not in a reduced inventory condition (3 feet below the vessel flange) as defined by GL 88-17. Loss of power to the "F" bus resulted in loss of control room indicated standpipe level for the unit. Immediate operator action was to dispatch an operator into the Unit 1 containment and locally monitor the standpipe level. No loss of RCS inventory was experienced during the event. The licensee took actions during the next four hours to restore offsite power to the "F" bus and to transfer emergency busses back to the "F" bus. In view of the licensee's response to the event, the inspectors believe that the operators are properly sensitized to a loss of RHR condition.

(2) On April 7, 1989, the licensee made a report in accordance with 10 CFR 50.72 as a result of an evaluation of main control room habitability following a DBA. The evaluation stated that the accident analysis assumed that the main control room air bottle system would dump at the same time the DBA occurred. However, the air bottle system is presently designed to be manually initiated by the operators. Using an allowance of ten minutes for operator action, the licensee determined that a potential

exists for excessive cumulative radiation exposure to operators during the 30 days following the accident. Corrective actions will include redesign of the actuation system to allow for automatic initiation.

(3) On April 13, 1989, the licensee made a report in accordance with 10 CFR 50.72 with regards to loss of the power supply to the "F" bus. The power loss was caused by a failure to properly conduct a test by licensee personnel in the switchyard. The "F" bus was supplying normal power to the Unit 1 "H" bus and the Unit 2 "J" bus (4160 volt vital buses). The No. 1 EDG generator was tagged out for repairs and was not available to provide emergency power to the Unit 1 "H" bus. Loss of power to the Unit 2 "J" bus resulted in an automatic start and load of the No. 3 EDG on the "J" bus. RHR flow to both units was maintained throughout the event with no increase in RCS temperature.

During the event, the Unit 1 vessel level was 18.3 feet (approximately equal to the reactor vessel flange), and therefore the unit was not in a reduced RCS inventory. Loss of power to the "F" bus resulted in loss of control room indicated standpipe level for the unit. Immediate operator action was to dispatch an operator into the Unit 1 containment and locally monitor the standpipe level. No loss of RCS inventory was experienced during the event. The licensee took actions during the next two hours to restore offsite power to the "F" bus and to transfer emergency busses back to the "F" bus.

(4) On April 17, 1989, the licensee made a report to the NRC in accordance with 10 CFR 50.72 with regards to an ESF actuation of the main control room ventilation dampers. The dampers went closed due to a spurious high spike on the chlorine monitor. The chlorine monitors are no longer required to be installed at the station and a design change to remove them is in progress. The high alarm condition on the monitors was reset, the monitors were removed from service, and the ventilation dampers were realigned to their normal position.

Within the areas inspected, no violations were identified.

4. Operational Readiness Program Review (71710)

The inspectors continued to review the licensee's operational readiness program as discussed in NRC Inspection Reports 280,281/88-51, 89-06, and 89-08. This effort is being performed in accordance with EWR 88-584, System Review For Startup, and includes both field walkdowns and a review of outstanding issues by the system engineers. The inspectors are routinely monitoring all aspects of this readiness program. The following details some specific inspection areas and findings from this review.

a. Plant Configuration Confirmation

This portion of the program, performed in accordance with Attachment II to the above EWR, consisted of the station system engineers conducting field walkdowns of the systems and noting discrepancies for resolution. These discrepancies were evaluated to determine if they should be corrected before unit startup and a justification was written if deferral was recommended.

The inspector reviewed field change "T" to EWR 88-584, dated March 2, 1989, that identified and dispositioned discrepancies as a result of system walkdowns against 46 station drawings. This walkdown resulted in the identification of 35 startup issues that were subsequently added to the official startup list. The inspector independently verified that all startup items are being tracked on the master startup list.

In addition to an overall review of this extensive field change, the inspector selected the following drawings for a more in-depth audit:

- Drawing 11448-FB-46C, Sheet 1 of 2, Emergency Diesel Generator Air Start System.
- Drawing 11448-CBM-72B, Sheet 2 of 3, Component Cooling Water System.
- Drawing 11448-FM-87A, Sheet 1 of 2, Residual Heat Removal System.

The inspector continued a review of the walkdowns documented via field change "U" to EWR 88-584, dated April 13, 1989, to verify adequate identification and disposition of discrepancies. This general review included the following:

- Drawing 11448-FM-084A, Sheet 2 of 3, Containment Spray System
- Drawing 11448-FB-041B, Sheet 1 of 1, Main Control Room Bottled Air System
- Drawing 11448-CBM-084B, Sheet 2 of 2, Outside Recirculation Spray System
- Drawing 11448-CBM-084, Sheet 1 of 2, Inside Recirculation Spray System
- Drawing 11448-CBM-086B, Sheet 2 of 3, Reactor Coolant System

The inspector verified that each discrepancy identified was properly dispositioned and an appropriate mechanism was in place to require adequate corrective actions. For example, if a problem with the

drawing was identified, the inspector verified that the drawing discrepancies were formally submitted and tracked by the station drawing update group. No outstanding concerns were identified during this inspection effort.

b. Assessment of Outstanding Issues

This item is covered in Attachment IV to EWR 88-584 and includes a review of outstanding temporary modifications and/or jumpers, station deviations, commitment items, outstanding safety-related work orders, outstanding EWRs and open Type 1, 2, and 3 engineering evaluations. The system engineers have been tasked with reviewing the above items pertaining to their system and evaluating if closure of the item should be performed prior to unit startup. For those items that will not be closed prior to startup, a justification for not completing the item must be written and approved by the Superintendent of Technical Services.

(1) The inspector reviewed field change "S" to EWR 88-584, dated March 1, 1989, that addressed closed Type 1, 2, and 3 engineering reports. No startup items were identified by the licensee during their evaluation of the above field change. The inspector reviewed each item of this field change with the accompanying supporting documentation and justification and concurred with the licensee's evaluations. No inspector discrepancies were identified.

(2) The inspector reviewed parts of field changes J, K, P, W, and AA made to EWR 88-584, that addressed commitments on which action did not have to be taken before startup of the units. Field changes O and Z to EWR 88-584 were reviewed for commitments on which action was necessary before startup. The following is a list of 14 commitments that were reviewed on these seven field changes. Nine commitments were evaluated as not requiring resolution before startup, and include:

| Commitment No. | Description |
|---|---|
| 89-2089-001 | Inspect wiring on hydrogen analyzer quarterly. |
| 85-5026-020 | IE Bulletin 85-03, MOV Common Mode Failure--Operators have been trained but training documents have not been changed. |
| 88-2168-001 | Batteries for security diesel to be placed on preventive maintenance program. |

| Commitment No. (cont'd) | Description |
|---|---|
| 88-2355-001 | Procedure deviation for permanent change to operation procedure 1-OP-33A. Deviation is available to be used when this procedure is required. |
| 88-1615-002 | Independent verification (with regards to station tagging program) revision to administrative procedure. |
| 88-1377-001 | Technical Specification change request No. 204, procedure changes for future core upgrade. |
| 87-0913-001 | Future Predictive Analysis Group vibration program for monitoring safety-related equipment. |
| 88-0811-001 | Westinghouse letter that deals with outage related maintenance. |
| 88-0020-002 | Pressurizer safety relief setpoint drift (LER 88-016). |

The following five commitments were evaluated by the licensee as not requiring resolution prior to unit startup:

| Commitment No. | Description |
|---|---|
| 88-1374-001 | Technical Specification Change No. 194(8), heat up and cooldown curves necessary for startup. |
| 88-0040-003 | Commitment to NRC to perform full flow test on inside recirculation spray pumps during this outage. |
| 84-0201-005 | Supplementary response to IEB 84-02 which identifies additional AC energized relays that must be replaced. |
| 84-1152-004 | Design changes to feed data into the plant status computer program for containment spray flow, pressurizer heater status, and pressure transmitters for the accumulators. |
| 88-0103-004 | Containment spray system walkdown by NRC resulting in two work requests and two drawing changes. |

A discussion with the licensee on commitment 88-0020-002 concerning pressurizer safety relief setpoint drift revealed that a TS change would have to be made. The acceptance band was ±1 percent of the pressure range, but the setpoint drifted beyond this range. Calculations appear to show that ±3 percent is acceptable and the setpoint could be maintained within this range. The inspector's discussion with the licensee questioned whether this should be a startup item. The licensee's decision and action in this area will be evaluated prior to restart and tracked as IFI 280,281/89-13-01, resolution of pressurizer safety relief setpoint drift.

c. Inspection and Review Status

The overall status of the engineering work that pertains to Unit 1 (as of April 24, 1989) was as follows:

| | | |
|---|---|---|
| Walkdowns | Total Items: | 3341 |
| | Items Reviewed: | 3341 |
| | Startup Items: | 287 |
| Commitments | Total Items: | 1018 |
| | Items Reviewed: | 770 |
| | Startup Items: | 143 |
| Closed Type 1 | Total Items: | 655 |
| | Items Reviewed: | 556 |
| | Startup Items: | 16 |
| EWRs | Total Items: | 786 |
| | Items Reviewed: | 370 |
| | Startup Items: | 85 |
| Open Type 1,2 & 3 | Total Items: | 261 |
| | Items Reviewed: | 251 |
| | Startup Items: | 56 |
| Temp. Mods. | Total Items: | 16 |
| | Items Reviewed: | 16 |
| | Startup Items: | 5 |

Within the areas inspected, no violations or deviations were identified.

5. Maintenance Inspections (62703)

During the reporting period, the inspectors reviewed maintenance activities to assure compliance with the appropriate procedures. Inspection areas included the following:

a. Evaluation of Maintenance/Modification On The Low Head Safety Injection Pump (1-SI-P-1A)

The inspector continued the review of the maintenance activities associated with replacement of replica parts in the LHSI pump manufactured by Byron Jackson. Initial maintenance activities were discussed in NRC Inspection Report 280,281/89-08.

The licensee is currently working on the Unit 1 low head SI pump (1-SP-P-1A) in order to replace the replica parts (non-original equipment manufacturer parts) previously placed in the pumps. The inspector reviewed procedure MMP-P-C-SI-090, Removal, Disassembly, Inspection, Repair, Reassembly, and Reinstallation of Low Head Safety Injection Pump "Safety Related" dated August 20, 1987. Completed and signed off portions of this procedure were reviewed.

All of the parts have been removed from the pump well and wiped to minimize any contamination. The Byron Jackson parts have a number stenciled on them and if a number is not present it cannot be verified as a vendor supplied item. The licensee is replacing all of the carbon steel bearings, because carbon steel rusts and the identifying number cannot be maintained. One coupling out of five did not have an identifying number and will be replaced. A new throttle bushing issued by the licensee's warehouse as a category 1 part for this pump was found to be a replicated part. (Station deviation No. S1-89-869).

The maintenance group, engineering, and the vendor are having discussions concerning the difficulty of pressing the bearings back onto the shafts. The bearings require a nine thousandths interference fit and this causes an installation problem. The inspectors will continue to monitor this maintenance activity.

b. Regulator Replacement in Response to NRC IN 88-24

On April 7, the inspector witnessed replacement of the air supply regulator on containment isolation valve 1-CC-TV-110C in accordance with EWR 89-003, Regulator Replacements In Response To NRC IN 88-24. The subject NRC IN identifies a potential for overpressurization failures of solenoid valves caused by an air system pressure greater than the solenoid design maximum operating pressure differential. A typical AC powered ASCO solenoid valve used at Surry has an air maximum operating pressure differential of 45 psi. However, the regulators that are used to reduce the instrument air supply down from approximately 100 psi are not safety-related and their settings are not controlled in the station setpoint document.

The licensee could not produce documentation that the maximum supplied air pressure through the regulators is less than the maximum operating differential operating pressure of the SOV, and therefore

stated that the qualification status of the SOVs is indeterminate. The corrective actions specified in the above EWR require replacement of the upstream regulators with new regulators that are designated safety-related with their setpoint officially controlled in the station setpoint document. This changeout is required on 51 containment isolation valves. The inspector verified that the work performed in the field was being conducted and documented in accordance with the licensee's approved procedures. No discrepancies were identified.

c. Emergency Diesel Generator No. 1

The inspectors followed the work being performed on the EDG No. 1 to correct an excessive vibration problem and inspect for damage as a result of lube oil contamination. Station deviation S1-89-818, dated April 6, 1989, identified excessive vibrations during performance of the EDG monthly surveillance test. The observed vibrations were severe enough to cause the operators to perform an emergency shutdown of the engine. Work Order No. 3800078912 authorized the removal and retorquing of the EDG foundation anchor bolts. The inspector witnessed portions of the removal and reinstallation of the anchor nuts and discussed with the maintenance personnel their observation that the as-found nuts were not tight. Maintenance Engineering inspected the as-found condition and recommended installation of jam nuts. In addition, plans were being made to inspect and retorque the foundation bolts on the remaining two EDGs.

The problem of lube oil contamination was addressed in Work Order No. 3800079985 and involved high zinc concentrations found in the lube oil during normal sampling and analysis. The EDG manufacturer states that a zinc concentration in excess of 10 ppm in the lube oil could damage the silver coating on the piston wrist pin bearings. The samples of lube oil from the No.1 EDG were determined to contain 15 to 17 ppm zinc. The samples from the remaining two EDGs were well within specifications. The inspector witnessed the removal and inspection of four power assemblies from the EDG No.1 and concur with both the licensee engineer and vendor representative that no damage to the bearing surface had occurred. The licensee was continuing to search for the source of the zinc with speculation that the thread lubricant may have been a contributor. No discrepancies were identified.

Within the areas inspected, no violations or deviations were identified.

6. Surveillance Inspections (61726 & 42700)

During the reporting period, the inspectors reviewed various surveillance activities to assure compliance with the appropriate procedures as follows:

- Test prerequisites were met.

- Tests were performed in accordance with approved procedures.
- Test procedures appeared to perform their intended function.
- Adequate coordination existed among personnel involved in the test.
- Test data were properly collected and recorded.

Inspection areas included the following:

a. Emergency Diesel Generator Fuel Oil Supply

On March 4, the inspector witnessed testing of the emergency fuel oil pump 1-EE-P-1A in accordance with test procedure PT-22.2, Emergency Fuel Supplies. This pump supplies makeup fuel from the inground fuel oil tank to the wall tanks in each EDG room. The test verified that the pump automatically starts and stops on specific levels in the wall tank. The inspector discussed the test with station personnel involved and noted that several problems were identified with the level indication in the wall tanks. The licensee agreed that further testing of the diesel pumps that transfer fuel from the wall tank to the skid tank is warranted and stated that a test procedure is being prepared. No discrepancies were noted.

b. Functional Test of the Low Head Safety Injection System

The inspector reviewed the recently developed surveillance test, 1-PT-18.3E, Refueling Test Of LHSI Lines To Charging Pumps, which ensures that an operable flowpath exists from the LHSI pumps to the charging pumps via the recirculation mode transfer piping. The licensee discovered during an investigation of a previously identified valve labeling and power supply problem (ref. IR 280,281/88-45) that they had never functionally tested the flowpath from the LHSI pumps to the charging pumps. The inspector verified the flowpath specified in the test procedure and discussed the test method with the appropriate system engineer. No discrepancies were identified.

c. Emergency Diesel Generator No. 3

The inspector reviewed periodic test 2-PT-22.3C, Diesel Generator No. 3 Test, dated February 22, 1988. This surveillance procedure implements the requirements of TS 4.6.A.1.a that each emergency diesel generator has a manually initiated start followed by synchronization with other power sources and assumption of load by the diesel generator up to 2750 kw. This is a monthly test and requires a minimum duration of 30 minutes.

On April 7, the inspectors attended the pre-briefing with the SROs and ROs to discuss the running of the No. 3 EDG. On this date, observations were made of the RO taking oil samples, running the air

compressor diesel, making valve alignments, recording proper level of cooling water, etc. In the main control room, the inspectors observed the starting and manual synchronization of the diesel with other power sources. The periodic test instructions suggest running the diesel for approximately two hours; however, the test was terminated after approximately 35 minutes because rainwater was entering the air louvers in the close vicinity of the electronic control cabinets, with some water hitting the cabinets. The licensee terminated the test to evaluate any adverse effects the rain might have on the electronic controls. This condition was identified as a deviation report in the licensee's corrective action program. No discrepancies were observed during the performance of the periodic test.

d. Functional Testing of Unit 1 IRS Pumps.

The inspector reviewed the test procedure which was used to conduct operability testing of the Unit 1 IRS pumps 1-RS-P-1A and 1-RS-P-1B. Test procedure 1-ST-214, Operability of IRS Pumps for Unit 1 was conducted on 1-RS-P-1A on April 3, 1989, and on 1-RS-P-1B on April 4, 1989. The inspector verified that the procedure adequately documented the conduct and results of the testing. The procedure copy that was reviewed had three procedure deviations which were incorporated prior to or during testing. The deviations received required reviews for 10 CFR 50.59 compliance and were approved by the station safety committee as required by TS. No discrepancies were identified.

Within the areas inspected, no violations or deviations were identified.

7. Licensee Event Report Review (92700)

The inspectors reviewed the LERs listed below to ascertain whether NRC reporting requirements were being met and to determine appropriateness of the corrective actions. The inspector's review also included followup on implementation of corrective action and review of licensee documentation that all required corrective actions were complete.

LERs that identify violations of regulations and that meet the criteria of 10 CFR, Part 2, Appendix C, Section V are identified as LIVs in the following closeout paragraphs. LIVs are considered first-time occurrence violations which meet the NRC Enforcement Policy for exemption from issuance of a Notice of Violation. These items are identified to allow for proper evaluations of corrective actions in the event that similar events occur in the future.

(Closed) LER 280/87-14, Inadequate Review of AFW Supply Following HELB in Safeguards. The issue involved a scenario in which AFW could be lost to an operating unit due to a HELB in the main steam valve house. With a single active failure of the opposite unit's available AFW pump a total

loss of AFW to the affected unit would result. Corrective action included immediate administrative control to ensure that when a unit is above 350 degrees/450 psig, two AFW pumps are available from the other unit. The licensee also submitted a TS change to require this action. The inspector reviewed the corrective action and verified that the TS change was submitted. This LER is closed.

(Closed) LER 280/87-38, Increased Off-Site Thyroid Dose Calculations from Steam Generator Tube Rupture due to Post Trip Steam Generator Tube Uncovery. The issue involved determination of a condition in which a potential exists for uncovering of a tube break after a steam generator tube rupture event. This issue was identified after the North Anna steam generator tube rupture event which occurred on July 15, 1987. The licensee's initial evaluation concluded that the additional thyroid dose would be below regulatory limits. However, the issue has been assigned for additional generic review by a Westinghouse program. The program was proposed to the WOG and is expected to be completed in 1989. The inspector reviewed the LER and also determined that the issue resolutions will be reviewed by other technical NRC groups. This LER is closed.

8. Action on Previous Inspection Findings (92701, TI 2515/100 & 101)

a. (Closed) IFI 280,281/87-13-02, Followup on Licensee Performance for Decay Heat Removal Evolutions during Low Reactor Coolant Level Operation. The issue involved the licensee's evaluation and implementation of lessons learned from NRC IN 87-23, Loss of Decay Heat Removal During Low Reactor Coolant Level Operation. After issuance of the IN, the licensee took actions to implement design changes to both units for the installation of permanent level instrumentation to monitor RCS level during reduced inventory operation. This level instrumentation was installed for both units during their respective refueling outages in 1988.

On October 17, 1988, the NRC issued GL 88-17, Loss of Decay Heat Removal. The GL requested that each licensee respond to actions taken with regard to implementation of eight recommended expeditious actions which are discussed below, and to respond to actions taken with regard to six programmed enhancement recommendations discussed in the attachment to the GL. The licensee submitted their response to the GL expeditious actions request by letter dated January 6, 1989, and responded to the GL programmed enhancement recommendations request by letter dated February 3, 1989.

The inspectors reviewed the licensee's responses to GL 88-17 and conducted specific reviews of the eight recommended expeditious actions as outlined in the licensee's January 6, 1989 reply. The following is a brief description of the recommended actions of the licensee's response and the inspectors' findings.

- TRAINING - Discuss the Diablo Canyon event, related events, lessons learned, and implications with appropriate plant personnel. Provide training shortly before entering reduced inventory condition.

  The licensee's response stated that the event had been discussed with operations personnel including specific evolutions involved in cooldown/draindown operation. The inspectors verified through discussions with operators that they had received training on specific evolutions involved in cooldown/draindown operations and that they were sensitized to potential loss of DHR. The inspector also determined that the training included reviews of all procedural and administrative changes implemented as a result of the licensee's response to GL 88-17.

- CONTAINMENT CLOSURE - Implement procedures and administrative controls that reasonably assure that containment closure will be achieved prior to the time at which core uncovery could result from a loss of DHR coupled with the inability to initiate alternate cooling or addition of water to the RCS inventory.

  The licensee's response stated that procedures require that the status of the containment configuration be established and verified prior to entering a reduced inventory condition (water level lower than 3 feet below the vessel flange). In addition, the AP for loss of RHR capability directs containment closure action to be initiated and continued until the RHR system is returned to service and core conditions are verified normal. The inspectors verified that the licensee has prepared procedures and administrative controls to reasonably assure that containment closure will be achieved prior to the time at which core uncovery could occur. This was done by reviewing OP-1G, Refueling Containment Integrity and RCS Mid-Loop Containment Closure Checklist; Standing Order No. 7, Operation When the RCS Is Partially Drained; and AP 27.00, Loss of Decay Heat Removal Capability.

- RCS TEMPERATURE - Provide at least two independent, continuous temperature indications that are representative of the core exit conditions whenever the RCS is in a mid-loop condition.

  The licensee's response stated that procedures for draining the RCS will be revised to ensure at least two incore temperature indicators are operable prior to draining the RCS to a reduced inventory condition. The incore temperature will continuously indicate in the control room and will be periodically monitored by the operators. The temperature readings are periodically recorded on the control room shutdown logs by the control room operators. The inspectors verified that controlling procedures

for draining the RCS were revised to ensure at least two incore temperature indicators are operable prior to draining the RCS to a reduced inventory condition. The inspector also verified that the control room operators periodically recorded these temperature readings in their logs. Also, it was verified that RCS temperature curves were incorporated into AP 27.00, Loss of Decay Heat Removal Capability.

- RCS WATER LEVEL - Provide at least two independent, continuous RCS water level indications whenever the RCS is in a reduced inventory condition.

  The licensee's response stated that one continuous means of level indication has been installed which provides for continuous readout in the control room. This system also provides for an alarm for loss of shutdown cooling at a level of 12 feet, 4 inches. The second means of level indication is still under review. The inspectors verified that the licensee has a permanently installed water level instrument with continuous readout in the control room whenever the RCS is in a reduced inventory condition. This instrument alarms when water level decreases to 12 feet, 4 inches (approximately 7 inches above mid-nozzle). This system is currently operable on both units. The licensee has committed to installing a second independent channel during the next respective unit refueling outages.

- RCS PERTURBATION - Implement procedures and administrative controls that generally avoid operations that deliberately or knowingly lead to perturbations to the RCS and/or to systems that are necessary to maintain the RCS in a stable and controlled condition while the RCS is in a reduced inventory condition.

  The licensee's response stated that an operations procedure for assessing maintenance activities that could potentially cause a loss of RCS inventory, is being developed. The inspectors verified that the licensee had prepared a procedure, OC-28, Assessment of Maintenance Activities for Potential Loss of Reactor Coolant Inventory, which allowed for assessment of work on systems for potential loss of reactor coolant inventory during reduced RCS inventory conditions. This procedure allows for operator evaluation of work to be performed based on guidelines for the assessment. The procedure also established additional controls to assure that maintenance activity will not adversely affect RCS inventory.

- RCS INVENTORY ADDITION - Provide at least two available or operable means of adding inventory to the RCS that are in addition to pumps that are part of the DHR systems. These should include at least one high pressure injection pump.

The licensee's response stated that procedures will be revised to require that one high head and one low head safety injection pump with appropriate flowpaths be provided prior to RCS draindown into a reduced inventory condition. The inspectors verified that the licensee has a procedure which requires at least two available or operable means of adding inventory to the RCS in addition to the RHR system. This requirement is accomplished by OC-6, Boric Acid Flow Paths and Tech Spec Heat Trace Circuit Verification. The procedure requires that in a reduced inventory condition, one CHG/SI pump and one LHSI pump must be available with appropriate flowpaths to the core.

- NOZZLE DAMS - Implement procedures and administrative controls that reasonably assure that all hot legs are not blocked simultaneously by nozzle dams unless a vent path is provided that is large enough to prevent pressurization of the upper plenum of the reactor vessel.

  The licensee's response stated that RCS loop isolation is obtained by the use of loop isolation valves. Therefore, nozzle dams are not used. The inspectors verified that the licensee does not presently use steam generator nozzle dams.

- LOOP STOP VALVES - Implement procedures and administrative controls that reasonably assure that all hot legs are not blocked simultaneously by closed loop stop valves unless a vent path is provided that is large enough to prevent pressurization of the reactor vessel upper plenum or unless the RCS configuration prevents vessel water loss if reactor vessel pressurization should occur.

  The licensee's response stated that this condition will be controlled by procedures to assure that one loop remains unisolated with the respective loop bypass valve open. The inspectors verified that the licensee has implemented procedure and administrative controls that reasonably assure that at least one loop remains unisolated with the respective loop bypass valve open. This is accomplished by Standing Order No. 7, Operation When the RCS Is Partially Drained.

The inspectors consider that the licensee has satisfactorily implemented the eight recommended expeditious actions responses to GL 88-17 as outlined in their January 6, 1989 reply. This item is closed.

b. (Closed) IFI 280,281/88-33-01, Followup on Sequence of Data Collection for Testing AFW Pumps. This issue involved the adjustment of the turbine-driven AFW pump speed prior to collection of data for the monthly surveillance. The licensee agreed that clarification of the test procedure was warranted and issued a revision to periodic

test 1 and 2-PT-15.1C dated March 23, 1989. The inspector reviewed the revised test procedure and noted that an engineering evaluation is now required before proceeding if the as found pump speed is outside an allowable range. This item is closed.

c. EDG Fuel Oil Handling and Storage (TI 2515/100)

On January 16, 1987, the NRC issued IE Information Notice 87-04 alerting licensees of potentially significant problems pertaining to long-term storage of EDG fuel oil. The inspector reviewed the licensee's program for storage and handling of EDG fuel oil as a result of information provided in the Notice. Discussions with the licensee revealed the following:

- New procedures are being put into place for sampling the fuel oil in the tanks for oxidation and biological contamination.
- Additional fuel sampling ports are being added to some of the tanks.
- Fuel oil filters and strainers are in the preventive maintenance program.

No violations or deviations were identified.

9. Exit Interview

The inspection scope and findings were summarized on May 2, 1989, with those individuals identified by an asterisk in paragraph 1. The following new items were identified by the inspectors during this exit:

One IFI (paragraph 4.b) was identified for followup on resolution of pressurizer safety relief setpoint drift (280, 281/89-13-01).

The licensee acknowledged the inspection findings with no dissenting comments. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

10. Index of Acronyms and Initialisms

| | | |
|---|---|---|
| AFW | - | AUXILIARY FEEDWATER |
| AP | - | ABNORMAL OPERATING PROCEDURE |
| CC | - | COMPONENT COOLING |
| CCW | - | COMPONENT COOLING WATER |
| CFR | - | CODE OF FEDERAL REGULATIONS |
| CHG | - | CHARGING |
| DBA | - | DESIGN BASIS ACCIDENT |
| DHR | - | DECAY HEAT REMOVAL |

| | | |
|---|---|---|
| DPI | - | DELTA PRESSURE INDICATORS |
| DR | - | DEVIATION REPORT |
| EDG | - | EMERGENCY DIESEL GENERATOR |
| EMP | - | ELECTRICAL MAINTENANCE PROCEDURE |
| ESF | - | ENGINEERED SAFETY FEATURE |
| ESW | - | EMERGENCY SERVICE WATER |
| EWR | - | ENGINEERING WORK REQUEST |
| GL | - | GENERIC LETTER |
| GPM | - | GALLONS PER MINUTE |
| HELB | - | HIGH ENERGY LINE BREAK |
| HPSI | - | HIGH PRESSURE SAFETY INJECTION |
| IE | - | INSPECTION AND ENFORCEMENT |
| IFI | - | INSPECTOR FOLLOWUP ITEM |
| IN | - | INFORMATION NOTICE |
| IR | - | INSPECTION REPORT |
| IRS | - | INSIDE RECIRCULATION SPRAY |
| ISI | - | INSERVICE INSPECTION |
| LER | - | LICENSEE EVENT REPORT |
| LHSI | - | LOW HEAD SAFETY INJECTION |
| LIV | - | LICENSEE IDENTIFIED VIOLATIONS |
| LOCA | - | LOSS OF COOLANT ACCIDENT |
| MOV | - | MOTOR OPERATED VALVE |
| NRC | - | NUCLEAR REGULATORY COMMISSION |
| NRR | - | NUCLEAR REACTOR REGULATION |
| OP | - | OPERATING PROCEDURE |
| PM | - | PREVENTATIVE MAINTENANCE |
| PPM | - | PARTS PER MILLION |
| PSI | - | POUNDS PER SQUARE INCH |
| PSIG | - | POUNDS PER SQUARE INCH GAUGE |
| PT | - | PERIODIC TEST |
| QA | - | QUALITY ASSURANCE |
| QC | - | QUALITY CONTROL |
| RCS | - | REACTOR COOLANT SYSTEM |
| RHR | - | RESIDUAL HEAT REMOVAL |
| RG | - | REGULATORY GUIDES |
| RO | - | REACTOR OPERATOR |
| RSS | - | RECIRCULATION SPRAY SYSTEM |
| RWP | - | RADIATION WORK PERMIT |
| RWST | - | REFUELING WATER STORAGE TANK |
| SI | - | SAFETY INJECTION |
| SOV | - | SOLENOID OPERATED VALVE |
| SRO | - | SENIOR REACTOR OPERATOR |
| SW | - | SERVICE WATER |
| TS | - | TECHNICAL SPECIFICATIONS |
| UFSAR | - | UPDATED FINAL SAFETY ANALYSIS REPORT |
| URI | - | UNRESOLVED ITEM |
| WOG | - | WESTINGHOUSE OWNER'S GROUP |