

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-440/92009(DRP)

Docket No. 50-440

License No. NPF-58

Licensee: Cleveland Electric Illuminating Company
Post Office Box 5000
Cleveland, OH 44101

Facility Name: Perry Nuclear Power Plant

Inspection At: Perry Site, Perry, Ohio

Inspection Conducted: April 13 through June 1, 1992

Inspectors: A. Vogel
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Approved By:

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Reactor Projects
Section 3B

6-18-92
Date

Inspection Summary

Inspection on April 13 through June 1, 1992 (Report No. 50-440/92009(DRP))

Areas Inspected: Routine unannounced safety inspection by resident inspectors of previously identified items; licensee event report followup; surveillance observations; maintenance observations; operational safety verification; and event followup.

Results: Non-cited violations (NCVs) were identified in the area of licensee event report followup (Paragraphs 3.b., 3.c, 3.e, 3.i, and 3.j). Those NCVs met the requirements of Section VII.B of the Enforcement Policy.

The following is a summary of the licensee's performance during this inspection period:

Plant Operations

Operator control of the plant during the refueling shutdown was generally good. Quick response to a loss of shutdown cooling minimized plant impact. However, late in the report period, several events

occurred that could have been avoided by better performance by plant operators. Those events are the subject of a special safety inspection documented in inspection report 50-440/92011.

Maintenance/Surveillance

The quality of observed maintenance and surveillance activities was good. However, a significant weakness in the control of motor-operated valve auxiliary limit switches was identified (paragraph 8.b.(3)).

Engineering and Technical Support

Good involvement of system engineers in the identification and disposition of deficiencies identified during the outage was noted.

Safety Assessment and Quality Verification

The quality of reviewed event reports was acceptable.

DETAILS

1. Persons Contacted

a. Cleveland Electric Illuminating Company

- M. Lyster, Vice President - Nuclear
- R. Stratman, General Manager, Perry Nuclear Power Plant (PNPP)
- *K. Donovan, Manager, Licensing and Compliance
- *M. Gmyrek, Operations Manager, PNPP
- S. Kensicki, Director, Perry Nuclear Engineering Department (PNED)
- *F. Stead, Director, Perry Nuclear Support Department (PNSD)
- *H. Hegrat, Compliance Engineer, PNSD
- E. Riley, Director, Perry Nuclear Assurance Department (PNAD)
- *V. Concel, Manager, Technical Section, PNED
- *D. Conran, Compliance Engineer, PNSD
- *W. Coleman, Manager, Quality Assurance Section
- P. Volza, Manager, Radiation Protection Section
- D. Cobb, Superintendent, Plant Operations, PNPP
- K. Peck, Outage Planning
- *W. Wright, Manager, Instrumentation and Control

b. U. S. Nuclear Regulatory Commission

- J. Hopkins, Project Engineer
- *P. Hiland, Senior Resident Inspector, RIII
- A. Vogel, Resident Inspector, RIII
- *M. Khanna, Intern, RIII
- *W. Stearns, Resident Inspector, RIII

* Denotes those attending the exit meeting held on June 1, 1992.

2. Licensee Action on Previous Inspection Findings (92701)

- a. (Closed) Unresolved Item (440/90002-04): Surveillance Test Requirements Not Satisfied. As documented below in paragraph 3.c, the licensee submitted Licensee Event Report (LER) 90-003 in March 1990 which documented the subject inadequate surveillance testing. The inspectors review of that LER addressed the subject Unresolved Item. This item is closed.
- b. (Open) Inspection Followup Item (50-440/92003-01(DRP)): Compression Tube Fittings. As documented in inspection report 50-440/92003, paragraph 7.g, dated April 27, 1992, the inspectors noted several examples where components of compression tube fittings were interchanged with those of another manufacturer. These fittings were identified on several instrument racks, including safety-related instrumentation. At the end of that inspection period, the licensee was evaluating the inspectors' findings. Pending the inspectors' followup review of the licensee's corrective actions, this item remained open.

Upon the inspectors' identification of multiple examples of mixed tube fitting components in the plant, the licensee issued nonconformance report (NR) 92-S-090, which documented mixed fitting combinations on impulse tubing to leak detection instrumentation. Also, NR 92-S-091 was initiated to document mixed fitting combinations on calibration tubing on numerous instruments. The licensee conducted additional walkdown inspections of safety-related instrument panels. These walkdowns resulted in the issuance of an additional nonconformance report (NR 91-S-122) to address the mixing of tube fitting components from different manufacturers on the impulse tubing to 41 instruments totaling 65 improper connections. In addition to walkdowns of the instrument panels, the licensee inspected post loss of coolant accident (LOCA) hydrogen analyzers A and B and found mixed fitting components inside these panels. Inspection of the emergency diesel generators were also conducted without any mixed fittings being identified. To document and track corrective actions relevant to interchanged compression fitting parts, the licensee initiated Condition Report (CR) 92-107.

As a result of preliminary inspection findings and the resultant nonconformance reports, the licensee implemented a surveillance plan to walk down other areas in the plant including safety-related instrument racks and a sample inspection of safety-related pneumatic control valves. The surveillance, conducted on April 22-24 under the direction of the plant quality assurance organization, consisted of a walkdown of 125 safety-related instrument racks and panels and 18 safety-related pneumatic control valves. The results were that no mixed fitting components were found in the population defined by the surveillance plan. However, one example of mixed compression fitting components manufactured from different materials, i.e. brass vice stainless steel, was noted and NR 92-A-157 was initiated. Another problem was the identification of a large number of insufficient "pullup" problems. Licensee corrective action to address that problem as well as other concerns related to tube fittings discussed in NRC Information Notice (IN) 92-15 were currently in progress.

The nonconformance reports generated to address the mixed compression fitting component issues were dispositioned to rework with interim use-as-is during the refueling outage. The exceptions were the nonconformance reports concerning calibration (92-S-091) and intermixed tube fittings (92-S-122). Nonconformance report 92-S-091 was previously addressed in NR 91-N-049 which resulted in the generation of a design change request to remove the calibration units. Nonconformance Report 92-S-122 was dispositioned to rework with interim use-as-is for operability until completion of the current refueling outage, with the exception of the following instruments which were to remain isolated from their process until the fittings were reworked.

1E12N0050A
1E12N0051A
1E12N0050B

1E12N0051B
1G33R0005
1G33R0008
1E31N0075 (abandoned location)

The 1E12 instruments were associated with instrument interlocks for operating the residual heat removal (RHR) system in steam condensing mode. The 1G33 instruments were associated with reactor water cleanup system pressure indication with no interlock functions. These instruments were isolated under tagout program controls and could be unisolated as necessary to obtain readings. To correct the deficient fittings, 27 work orders were generated and completed on a safety-significance priority basis. In addition to repairing the affected fittings, the licensee's preliminary corrective action plan included enhanced training on compression fittings for all plant personnel who had responsibility for planning work, working with, or inspecting compression fittings. In addition, signs were to be posted next to instrumentation panels to caution personnel against mixing tube fitting components.

The root cause for the mixing of tube fittings was personnel error (inattention to detail). Several levels of the work organization including procurement engineering, instrument and controls, the nuclear test section, and installation contractors during plant construction failed to adhere to the requirements in Installation Standard Specification, SP-2200. Section 5:03.15(5) of SP-2200 stated: "UNDER NO CIRCUMSTANCES shall any component of a tube fitting be interchanged with those of another manufacturer."

The inspectors reviewed applicable licensee documentation concerning this issue including the preliminary CR-92-107 closure package. The inspectors observed licensee inspection and repair efforts of the mixed fittings and conducted walkdowns of various instrument panels and plant components to assess the effectiveness of the licensee's efforts. Based on the above observations, the inspectors concluded that the licensee's efforts appeared aggressive and effective in identifying and repairing compression fittings with mixed manufacturer's parts. The inspectors will continue to evaluate the adequacy of the licensee's planned corrective actions during routine inspection of plant activities.

As noted above, the licensee identified compression fittings with insufficient "pullup." Licensee actions to correct the pullup deficiency, as well as action to address other concerns related to tube fittings identified in LN 92-15, were in progress.

Though licensee corrective action appeared adequate concerning compression fittings with mixed manufacturer's components with respect to instrument lines, the inspectors also identified pipe fittings with mixed manufacturer's components installed on plant equipment. Specifically, the inspectors identified mixed pipe fitting components on the A control rod drive (CRD) pump lube oil pump. With the frequent maintenance being performed on the CRD pumps, the inspectors were concerned that maintenance controls may

not be in place to ensure that pipe fittings were properly installed without mixed manufacturer's components. The licensee was to address this concern in their ongoing evaluation of IN 92-15 and its application to the Perry plant.

Pending the inspector's review of the licensee's corrective actions concerning compression fitting problems, including the licensee's evaluation of IN 92-15, inspection followup item 50-440/92003-C1(DRP) remains open.

No violations or deviations were identified. One inspection followup item remained open.

3. Licensee Event Report Followup (90712, 92700)

Through review of records, the following event reports were reviewed to determine if reportability requirements were fulfilled, immediate corrective actions were accomplished in accordance with technical specifications (TS) and corrective actions to prevent recurrence had been established:

- a. (Closed) LER 50-440/88035-00: On September 14, 1988, primary containment integrity was compromised for approximately 30 seconds in that the upper containment airlock inner door seals were deflated with the outer door open.

Licensee's Investigation of Root Cause and Corrective Actions

Root Cause

The root cause of the event was failure of the door interlock. The cause of the interlock failure was found to be a failed mechanical interlock push/pull cable. Contributing factors to this event included personnel error when an operator attempted to open the inner door when indication existed that the outer door was being operated, and a lack of instruction for abnormal door conditions.

Corrective Action

Corrective actions taken for this event included replacing the failed cable, the addition of operator aids at the airlock doors, and additional training of plant personnel on airlock doors during annual radiological controls training. An engineering evaluation was conducted to increase the reliability of the airlock door mechanical interlock cables. As a result, a design change was implemented to provide additional support to the cable to prevent bending.

Inspectors Review

The inspectors reviewed applicable licensee documentation and noted that all corrective action commitments were completed. The

inspectors concluded that the licensee's corrective actions appeared reasonable and adequate to prevent recurrence. This item is closed.

- b. (Closed) LER 50-440/89018-00: Failure to place an instrument trip unit in the tripped condition as required by TS. On May 29, 1989, a reactor vessel low water level trip unit to the balance of plant isolation trip system was made inoperable during a surveillance test. The affected trip channels remained inoperable about 6 hours longer than the TS allowed 1 hour time limit.

Licensee's Investigation of Root Cause and Corrective Actions

Root Cause

The root cause for this event was personnel error. The operations crew misunderstood the TS action statement and took action to comply with the inoperable trip system and not the trip unit.

Corrective Action

Personnel involved were retrained on the correct interpretation of the associated TS requirements. A TS position statement was issued to provide guidance on the correct implementation of the associated TS. The qualification card used to upgrade a supervising operator to a unit supervisor position was revised to include specific training on implementation of the associated TS.

Inspectors Review

The licensee's corrective actions appeared reasonable and adequate to prevent recurrence of the event. Failure of the plant operators to place the reactor vessel low water level trip unit in a tripped condition within one hour was a violation of TS action statement 3.3.2.b. This violation was not cited because the licensee's efforts in identifying and correcting the violation met the criteria specified in Section VII.B of the "General Statement of Policy and Procedures for NRC Enforcement Actions," (Enforcement Policy, 10 CFR Part 2, Appendix C (1992)). This item is closed.

- c. (Closed) LER 50-440/90003-00: Failure to perform stroke-time testing of motor-operated valves. As documented in inspection report 50-440/90002(DRP), paragraph 8.b.(7), dated March 20, 1990, the licensee identified 18 motor-operated valves that were stroke-time tested in one direction only. Since those valves performed an active function in both directions, stroke-timing was required in both directions (i.e. open and closed).

Licensee's Investigation of Root Cause and Corrective Actions

Root Cause

The root cause for this event was a program deficiency during the development of the inservice test (IST) surveillance procedures. Personnel preparing the surveillance procedures and the associated revisions were not aware of the specific requirements in American Society of Mechanical Engineers (ASME) Section XI and the governing Perry administrative procedure for stroke-time measurement for all active valve functions.

Corrective Action

Deficient procedures were revised to include the appropriate stroke-timing requirements. The licensee's program for review and approval of surveillance instructions was modified to ensure reviews by personnel knowledgeable in ASME Section XI requirements were completed prior to instruction approvals.

Inspectors Review

The corrective actions taken by the licensee appeared reasonable and adequate to prevent recurrence. As documented in inspection report 50-440/90002, paragraph 8.b.(7), all 18 valves were successfully stroke-time tested promptly after licensee identification. As noted in the subject LER, all 18 valves had been stroke-time tested in at least one direction at the required frequency prior to the event discovery. Therefore, the subject valves' ability to function in both directions was demonstrated although the timing was not recorded. Failure of the licensee to stroke-time test the 18 subject valves in both directions prior to February 1990 was a violation of TS 4.0.5. This violation was not cited because the licensee's efforts in identifying and correcting the violation met the criteria specified in Section VII.B of the "General Statement of Policy and Procedures for NRC Enforcement Actions," (Enforcement Policy, 10 CFR Part 2, Appendix C (1992)). This item is closed. In addition, unresolved item 50-440/90002-04 concerning the same event is also considered closed.

- d. (Closed) LER 50-440/90007-00: On April 18, 1990, a seal on the outer door of the upper containment airlock ruptured, while the inner door was opened, resulting in a loss of containment integrity being declared for approximately 2 minutes. At the time of the event, a chemistry technician was entering containment to obtain samples. Inadequate communication between the control room and the technician resulted in the technician using the inner door again causing two more losses of containment integrity.

Licensee's Investigation of Cause and Corrective Actions

Root Cause:

The root causes of this event were equipment failure and personnel error. The small seal on the outer door ruptured causing the

outer door to become inoperable, resulting in a loss of containment integrity when the inner door was opened. This equipment failure combined with inadequate knowledge, training, and communications was responsible for the second and third loss of containment integrity.

Corrective Action

To prevent recurrence, the small seal on the outer door of the upper containment airlock was replaced. Radiological controls training for personnel operating the airlock doors was enhanced to explain the consequences of improper operation of airlock doors and signs were posted inside the containment airlocks to provide additional operating instructions. Additionally, as part of the established requalification training program, all plant licensed operators were instructed on the lessons learned from this event.

Inspectors Review

The inspectors reviewed the applicable licensee documentation and noted that all corrective action commitments were completed. The inspectors noted that inadequate communication continues to be a problem at the Perry plant. A recent example was the reactor siphoning event on May 26, 1992, discussed in paragraph 8.b.(5) of this report. The licensee's efforts in preventing further errors as a result of poor communication will be evaluated during continuing assessment of licensee performance. This item is closed.

- e. (Closed) LER 50-440/90012-00: From June 5 until June 8, 1990, both trains of the control room heating, ventilation and air conditioning (CRHVAC) system were inoperable for the emergency recirculation mode due to the inoperability of both supporting chillers. This condition violated TS 3.0.3 and potentially prevented a system responsible for control room habitability from fulfilling its safety function.

Licensee's Evaluation of Cause and Corrective Action

Root Cause:

The cause of this event was personnel error (inattention to detail). Two recorded parameters were not noted as being outside of administrative limits by operators taking required readings or by supervisors reviewing that information. A work request to correct the equipment problem was inappropriately canceled due to insufficient research into the problem. Contributing factors to this event were poor guide vane linkage design and ineffective corrective actions taken as a result of a similar event documented in LER 88-19.

Corrective Action

To prevent recurrence, the Operations Manager issued a memorandum for operations personnel concerning the importance of identifying

and correctly communicating out of specification log entries. Also, system engineering personnel were instructed on the need to thoroughly research work orders. The "A" CRHVAC chiller and all similar safety and non-safety related chiller guide vane linkages were repaired. Additionally, all plant licensed operators were instructed on the lessons learned from this event.

Inspectors Review

The inspectors reviewed the applicable licensee documentation, including work orders to repair the affected chiller guide vane linkages. The inspectors concluded that licensee corrective actions were complete and appeared adequate to prevent recurrence. Failure of the licensee to maintain both trains of the control room emergency recirculation mode operable was a violation of TS 3.7.2. This violation was not cited because the licensee's efforts in identifying and correcting the violation met the criteria specified in Section VII.B of the "General Statement of Policy and Procedures for NRC Enforcement Actions," (Enforcement Policy, 10 CFR Part 2, Appendix C (1992)). This item is closed.

- f. (Closed) LER 50-440/91005-00: On January 29, 1991, maintenance activities on rod control and information system (RC&IS) power supplies resulted in conditions prohibited by TS 3.1.3.3 and entry into TS 3.0.3. Due to a misapplication of TS 3.1.3.3.a.2, control room operators believed the plant was in a 12-hour shutdown LCO action statement. However, the oncoming shift determined that the TS 3.1.3.3.a.2 action statement could not be met and that the plant was in TS 3.0.3. Actions were initiated to shut down the plant until the RC&IS was returned to service.

Specifically, when the RC&IS power supplies were taken out of service for maintenance, the RC&IS could no longer monitor the accumulator leak detection instrumentation. All accumulators were declared inoperable which resulted in the requirement to enter TS action statement 3.1.3.1.a.2. Since the removal of the power supplies also resulted in loss of the operator interface to the RC&IS, the operators were precluded from moving any control rods. Therefore, one withdrawn control rod could not be inserted at least one notch to verify that at least one control rod drive pump was operating, as required by TS action statement 3.1.3.3.a.2.a. Operators verified that a control rod drive pump was running by observing system parameters. However, because they could not comply with the action statements as written, entry into TS 3.0.3 was required.

Licensee Evaluation of Cause and Corrective Actions

Root Cause:

The root causes for this event were personnel error and inattention to detail, in that the operators misinterpreted the TS and incorrectly applied the 12 hour shutdown action requirement.

Corrective Actions:

Corrective actions included detailed discussions concerning the error made in applying TS with the control room operators involved in the event. All plant licensed operators were instructed on the lessons learned from this event. Additionally, the licensee submitted a TS change request, "Alternate Method of Determination of an Operating Control Rod Drive Pump", dated September 23, 1991, to add another method for immediate verification of whether a control rod drive (CRD) pump was operating. The proposed method involved the verification of charging water header pressure in excess of 1520 psig. Basically, the licensee was proposing that instead of depending on the insertion of a control rod one notch to verify the operation of a CRD pump, the indication of sufficient header pressure would adequately demonstrate the same condition of operability.

Inspectors Evaluation:

The inspectors reviewed the applicable licensee documentation and noted that all corrective action commitments were completed. The inspectors concluded that the licensee's corrective actions appeared reasonable and adequate to prevent recurrence. Concerning the licensee's TS change request, "Alternate Method of Determination of an Operating Control Rod Drive Pump "; that request was still being evaluated by the NRC staff. The licensee's failure to comply with TS 3.0.3 was a violation. The inspectors' initial evaluation of the event, including appropriate enforcement action, was documented previously in Inspection Report 50-440/91003(DRP) dated March 20, 1991. This item is closed.

- g. (Closed) LER 50-440/91008-00: On March 5, 1991, both trains of the control room heating and air conditioning (CRHVAC) system became inoperable for the emergency recirculation mode due to the inoperability of both supporting chillers. The "B" control complex chiller was secured from service for scheduled maintenance when the "A" control complex chiller tripped on low refrigerant temperature and the "A" chiller and its associated CRHVAC train were declared inoperable. Because this condition was not addressed in TS 3.7.2., the plant entered TS 3.0.3.

Licensee Evaluation of Cause and Corrective Actions

Root Cause:

The root cause of this event was component failure. The event occurred when the solenoid valve on the thermal purge unit did not close when required, resulting in a loss of refrigerant and the low temperature trip. When the thermal purge unit was isolated, the chiller was successfully recharged and returned to service.

Corrective Actions:

To prevent recurrence, the affected solenoid valve was replaced. Licensee investigation into the failure of the valve determined

that debris lodged between the valve seat and the piston seal prevented the valve from closing. As a result, an engineering evaluation was initiated to evaluate design changes that will prevent recurrence of this type failure. In the interim, the licensee isolated and red-tagged the thermal purge lines for the CRHVAC chillers to preclude leakage of refrigerant through the solenoid valve. In addition, due to the numerous cases of CRHVAC inoperability, the licensee conducted an engineering analysis to evaluate the design of the CRHVAC and support systems. As a result of that analysis, several CRHVAC support system modifications have been implemented. For example, the control complex chilled water system was modified to permit the use of the Unit 2 "C" train chiller to supply either the "A" or "B" loops. Using the "C" chiller as the primary control complex chiller allows for the "A" and "B" chillers to be safety related backups. The result of this design change was to minimize the time the "A" and "B" chillers were operating and to minimize the risks that were encountered when maintenance was being performed on either the "A" or "B" chillers.

Inspectors Evaluation

The inspectors reviewed the applicable licensee documentation and noted that corrective action commitments were completed. The inspectors concluded that the licensee's corrective actions appeared aggressive in improving the reliability of the CRHVAC system and preventing the recurrence of similar events.

- h. (Closed) LER 50-440/91016-00: On August 16, 1991, while investigating a potential problem concerning the drywell atmospheric particulate radiation monitor, a technician inadvertently mispositioned a front panel switch on the drywell atmospheric gaseous radiation monitor. As a result of the incorrect switch manipulation, a trip signal was initiated causing the closure of the backup hydrogen purge isolation valves.

Licensee Evaluation of Cause and Corrective Actions

Root Cause:

The root cause of this event was personnel error (inattention to detail). The technician performing the investigation manipulated the front panel switch for a high voltage check on the wrong radiation monitor. The monitors were located in the same vicinity, but they were properly labeled and could easily be distinguished from each other.

Corrective Actions:

Licensee corrective actions included counseling and disciplining of the technicians involved and the review of this event with all Instrumentation and Control (I&C) technicians. In addition, all licensed operators were instructed on the lessons learned from this event. The licensee also placed a label plate on the drywell

atmospheric gaseous radiation monitor to identify to operators that manipulation of the switches may cause an isolation signal.

Inspectors Evaluation

The inspectors' initial review of this event was documented in inspection report 50-440/91014(DRP) dated September 5, 1991. During the current inspection period, the inspectors reviewed the applicable licensee documentation and noted that all corrective action commitments were completed. Concerning the cause of this event, personnel error, licensee corrective action to decrease the number of events caused by personnel error were still in progress. The inspectors will evaluate the effectiveness of the corrective action in their continuing assessment of licensee performance. This item is closed.

1. (Closed) LER 50-440/91021-00: On October 11, 1991, preferred source breaker EH114 would not close on demand from its switch in the control room. Investigation determined that this breaker had been inoperable since September 4, 1991. As a result, the allowable outage time limit provided by TS 3.8.1.1 was exceeded.

Licensee Evaluation of Cause and Corrective Actions

Root Cause:

The root cause of this event was equipment malfunction. Over the years, modifications were performed on the "racking tool" utilized to engage and turn the breaker's racking lead screw. These modifications allowed interference with the end of the racking release lever as it attempted to settle in the final detent (racked-in) position; thereby allowing the racking lead screw to be overturned, which placed the breaker into a trip-free condition.

Corrective Actions:

To prevent recurrence, the licensee visually inspected safety- and nonsafety-related bus breakers to ensure that their mechanical interlocks were disengaged. All auxiliary operators were retrained to perform visual checks of the mechanical interlock during future racking evolutions. Additionally, spring pins on the applicable racking tools were modified and an 18 month repetitive task to inspect racking tools was initiated. Licensed personnel and auxiliary operators were trained on this event.

Inspectors Evaluation:

The inspectors reviewed the applicable licensee documentation and conducted a visual inspection of the affected breaker and the operation of the racking tool. The inspectors concluded that licensee corrective actions appeared reasonable and adequate to prevent recurrence. In addition to the corrective actions documented in the LER, the licensee initiated additional action to control tool modifications. Specifically, metal tags were placed

on racking tools with a warning to install proper length spring pins. Maintenance supervisors, planners, and field engineers were trained on this event to increase their awareness to the potential effects of improperly controlled tool modifications. The licensee's failure to take compensatory action due to one of the two independent circuits between the offsite transmission network and the onsite Class 1E distribution system not being operable due to the inoperability of the preferred source breaker EH1114, is a violation of TS 3.8.1.1. This violation was not cited because the licensee's efforts in identifying and correcting the violation met the criteria specified in Section VII.B of the "General Statement of Policy and Procedures for NRC Enforcement Actions," (Enforcement Policy, 10 CFR Part 2, Appendix C (1992)). This item is closed.

- j. (Closed) LER 50-440/91023-00: On November 5, 1991, the misadjustment of two main steam line "temperature - high" channels resulted in the inoperability of both channels in violation of TS. These channels had been considered operable from November 5 at 6:11 p.m. until 7:17 p.m., at which time they were declared inoperable again for testing. However, during that period, both of these channels were inoperable. The action to place at least one trip system in the tripped condition within one hour, as required by TS, was not taken.

Licensee's Evaluation of Cause and Corrective Actions

Root Cause:

The root cause of this event was an equipment problem. A Transmation Model 1010 reference cell, used as part of the test equipment for surveillance testing, had an intermittent malfunction which caused the reference cell to provide an inaccurate output during the test. This caused the instrumentation channels to appear to require adjustment and resulted in the subsequent inoperability of both channels.

Corrective Actions:

A review of the previous uses of the reference cell in question was conducted to verify that the operability of other plant equipment had not been affected. Additionally, all applicable reference cells have been checked to ensure that battery connections are clean and tight. To prevent recurrence, qualification training on the reference cell was enhanced to include direction on how to check the reference cell during usage. The lessons learned from this event were covered in I&C shift briefings and licensed operators training.

Inspectors Evaluation

The inspectors reviewed the applicable licensee documentation and noted that all corrective action commitments were completed. The inspectors concluded that the corrective actions appeared adequate and reasonable to prevent recurrence. The inspectors also noted

that the I&C technicians performing the test correctly questioned the validity of the first functional test results. Because both of the instruments were found outside of the LAIZ (leave as is zone) by the same amount, the technicians consulted with their supervisors and reperformed the test with different test equipment. As a result of the technicians' actions, the time the instrumentation was inoperable was minimized. However, the licensee's failure to take compensatory actions as required by TS 3.3.2 with both channels inoperable was a violation. The licensee identified violation is not being cited because the criteria specified in Section VII.B of the "General Statement of Policy and Procedures for NRC Enforcement Actions, (Enforcement Policy, 10 CFR Part 2, Appendix C (1992)) were satisfied. This item is closed.

- k. (Closed) LER 50-440/91026-00: On December 16, 1991, a Division I nuclear steam supply shutoff system signal resulted in an unexpected reactor core isolation cooling (RCIC) system isolation during the performance of a surveillance. The technician performing the surveillance incorrectly read the procedure and thereby failed to lift the leads disabling the RCIC isolation prior to inserting the trip signal.

Licensee's Evaluation of Cause and Corrective Actions

Root Cause:

The root cause of the event was personnel error (inattention to detail). The I&C technician incorrectly read the specific step in the procedure to disable the RCIC system isolation and, therefore, did not properly perform the procedure as written. The procedure was reviewed by the licensee and determined to be adequate and understandable.

Corrective Actions:

The technician performing the surveillance activity was counseled on the consequences of this event and was involved in the investigation of the event. The event was discussed with all I&C technicians as part of their continuing training program.

Inspectors Evaluation:

The inspectors reviewed the applicable licensee documentation and noted that all corrective action commitments were complete. In addition, the inspectors reviewed the applicable surveillance procedure and determined that the procedure was clear in providing guidance on the sequence of the steps required to properly perform the surveillance. Concerning the adequacy of the corrective actions to prevent future personnel errors, licensee efforts to decrease the number of events caused by personnel error were still in progress. The inspectors' evaluation of the long term effectiveness of the licensee's efforts to reduce personnel errors will be evaluated during continuing assessment of licensee performance. This item is closed.

No deviations were identified. Five non-cited violations (NCVs) were identified.

4. Monthly Surveillance Observation (61726)

For the surveillance activities listed below, the inspectors verified one or more of the following: testing was performed in accordance with procedures; test instrumentation was calibrated, limiting conditions for operation were met; removal and restoration of the affected components were properly accomplished; test results conformed with technical specifications, procedure requirements, and were reviewed by personnel other than the individual directing the test; and any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

Surveillance Activity

Turbine Lube Oil CO₂ Systems Detection/Operability Test

Division 2 Diesel Generator Surveillance Run

Local Leak Rate Tests (LLRT)

P87 Testing (LLRT)

No violations or deviations were identified.

5. Monthly Maintenance Observation (62703)

Station maintenance activities of safety-related systems and components listed below were observed and/or reviewed to ascertain that activities were conducted in accordance with approved procedures, regulatory guides and industry codes or standards, and in conformance with Technical Specifications.

The following items were considered during this review: the limiting conditions for operation were met while components or systems were removed from service; approvals were obtained prior to initiating the work; activities were accomplished using approved procedures and were inspected as applicable; functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; radiological controls were implemented; and fire prevention controls were implemented.

Work requests were reviewed to determine status of outstanding jobs and to assure that priority was assigned to safety-related equipment maintenance which may affect system performance.

Specific Maintenance Activities Observed:

Feedwater Sparger Repair
Main Steam Isolation Valve Repair
Reactor Water Cleanup Pipe Replacement
Division 2 Diesel Generator Maintenance
Drywell Demobilization
Safety Relief Valve Replacement
Compression Fitting Repair
Residual Heat Removal Suction Valve Repair

No violations or deviations were identified.

6. Operational Safety Verification (71707)

The inspectors observed control room operations, reviewed applicable logs, and conducted discussions with control room operators during this inspection period. The inspectors verified the operability of selected emergency systems, reviewed tagout records, and verified tracking of Limiting Conditions for Operation associated with affected components. Tours of the pump houses, control complex, the intermediate, auxiliary, reactor, radwaste, and turbine buildings were conducted to observe plant equipment conditions including potential fire hazards, fluid leaks, and excessive vibrations, and to verify that maintenance requests had been initiated for certain pieces of equipment in need of maintenance. The inspectors, by observation and direct interview, verified that the physical security plan was being implemented in accordance with the station security plan.

The inspectors observed plant housekeeping, general plant cleanliness conditions, and verified implementation of radiation protection controls.

a. Drywell Evacuation Alarm

On April 23, 1992, at approximately 3:45 p.m., a drywell evacuation alarm was received in the main control room (MCR). There were no abnormal indications on the MCR radiation monitors. The control room operators used the appropriate procedures to respond to the alarm and made the drywell evacuation announcement. The source of the alarm was a malfunctioning local area radiation monitor which had been connected to the evacuation alarm circuit for the refueling outage. Local area radiation surveys were normal. The radiation monitor was taken out of service for repair. The control room operators' response to the drywell evacuation alarm was deliberate and well organized.

b. Drywell and Containment Inspections

Prior to the May 26 initial plant startup, the inspectors conducted walkdown inspections of the drywell and the containment. The inspectors observed that the areas were satisfactorily cleaned up following the extensive maintenance activities that occurred during the refueling outage. During the walkdowns, the inspectors noted the following discrepancies:

- Broken conduit between HCU 22-47 and 26-43
- Broken conduit on junction box 1M17-F030
- Improperly secured material in the north end refuel floor storage area
- Inboard main steam isolation valve B position indication conduit support missing, held up by duct tape.
- Inboard main steam isolation valve B position indication support bolts not tightened.
- Various instrumentation label plates missing, labeled with felt tip marker.

The discrepancies were identified to the licensee and corrective action was taken to address each concern.

c. Administrative Control of Working Hours

The inspectors reviewed the licensee's administrative control of working hours during the current refueling outage (RFO-3). Time sheets for personnel in the operations department (including managers), instrument and control (I&C) department, and the outage planning section were reviewed. Proper authorization was granted when personnel exceeded the limits in Perry Administrative Procedure (PAP) 0110, revision 4, "Shift Staffing and Overtime." Additionally, a licensee Quality Assurance audit for control of overtime for RFO-3 involving the maintenance section, I&C, and a maintenance contractor was reviewed. Only minor discrepancies with the contractor's record keeping were identified.

The overtime guidelines in PAP-0110 did not apply to several positions such as the outage planning section and operations department management. Plant management expectations were that personnel in these positions would control their own overtime in order to avoid excessive fatigue.

d. Control Room Observations

During this inspection period, the inspectors observed control room activities during the refueling outage and during the plant startup and shutdown evolution on May 26 and May 27, respectively. The inspectors observed activities to assess operator control of evolutions, compliance with plant procedures, operator awareness

of plant status, and control room decorum. During the outage, the inspectors noted that the operators maintained good control of evolutions and responded well to the loss of shutdown cooling events on April 30 and May 5, described below in section 8.b. Operator control of the plant startup and shutdown was also good. Control room decorum was maintained during the outage with the exception of the use of telephones in the control room. Specifically, the inspectors observed a supervising operator, while on shift, discussing personal business on the phone in the vicinity of the reactor control panel, in the area commonly referred to as the "horseshoe." The inspectors discussed their observations with the superintendent of plant operations, questioning the effectiveness of the policies in place to control the use of telephones in the horseshoe for personal calls while the operators were on shift. As a result, the superintendent of plant operations issued a memorandum to all shift supervisors, unit supervisors, and supervising operators. That memorandum stated that personal phone calls shall not be conducted inside the horseshoe.

No violations or deviations were identified.

8. Onsite followup of Events at Operating Power Reactors (93702)

a. General

The inspectors performed onsite followup activities for events which occurred during the inspection period. Followup inspection included one or more of the following: reviews of operating logs, procedures, and condition reports; direct observation of licensee actions; and interviews of licensee personnel. For each event, the inspectors reviewed one or more of the following: the sequence of actions; functioning of safety systems required by plant conditions; licensee actions to verify consistency with plant procedures and license conditions; and verification of the nature of the event. Additionally, in some cases, the inspectors verified that licensee investigation had identified root causes of equipment malfunctions and/or personnel errors and were taking or had taken appropriate corrective actions. Details of the events and licensee corrective actions noted during the inspector's followup are provided in paragraph 8.b. below.

b. Details

(1) Potential Main Steam Line Erosion

On April 15, 1992, at about 10:00 p.m., while conducting cleanliness inspection of main steam line isolation valve (MSIV) 1B12-F0022B, an enlarged drain hole was identified in the main steam line flow limiter, upstream of the valve. Ultrasonic testing was conducted to measure the pipe thickness. Preliminary indications identified areas of the main steam line which were suspected of being less than minimal wall thickness. Preliminary observations noted that

the designed drain hole (i.e. "scallop hole") was larger than specified in initial design drawings.

The licensee informed the NRC operations center of this event via the emergency notification system (ENS) at 5:53 a.m. on April 16. The licensee initiated CR 92-106 to document their investigation and corrective action for this event.

On April 28, 1992, the licensee retracted the ENS notification based on engineering evaluations of the size of the "scallop hole" and the pipe wall thicknesses measured. The licensee determined that although the "scallop hole" was larger than designed, 2 inches across vice 1 inch \pm .25 as shown on vendor drawings, the impact of the size of the hole on the performance of the flow element or the structural pressure integrity of the system was negligible. Concerning minimal wall thickness, the licensee determined that the pipe area in question was previously evaluated by the supplier during construction; therefore, the calculated allowed minimal wall thickness was not compromised. Specifically, the calculated required minimal wall thickness was 0.975 inches. The data obtained during ultrasonic testing on April 15 resulted in measured thicknesses varying from 1.1 inch to 1.3 inch and thickness data obtained in the same approximate area of the pipe in 1983 ranged from 1.19 inch to 1.26 inch. Based on this data, the licensee concluded that no appreciable wall thinning had occurred and that no nonconforming condition existed with respect to the main steam line pipe in question.

The inspectors reviewed licensee documentation and discussed the conclusions with the licensee engineering staff. The inspectors concluded that the licensee's assessment of the event as not reportable appeared reasonable.

(2) Loss of Shutdown Cooling

On April 30, 1992, at 11:30 a.m., while in operational condition 5, REFUELING, a loss of shutdown cooling occurred due to a "balance of plant" containment isolation. At the time of event occurrence, the fuel pool cooling and cleanup system (G41) was providing decay heat removal. In response to this event, control room operators entered the appropriate off-normal instructions and restored decay heat removal by opening the associated containment isolation valves 13 minutes after event initiation. During the event, reactor coolant temperature remained stable at 81° F.

The licensee's initial investigation into the cause for this event identified a procedural deficiency in a preventive maintenance work order being performed at the time of event occurrence. In accordance with the work order instructions, system isolation signals were inserted while replacing various "Agastat" relays followed by the performance of the

applicable test instructions. However, the as-written work order failed to instruct maintenance technicians on the need to reset isolation signals prior to performing a second channel. Therefore, with one channel having an existing isolation signal, work commenced on a second channel, satisfying the group isolation logic. Initial corrective action included revising the in-process work order to include appropriate logic restoration and a review of all similar work order packages to verify that no additional deficiencies existed. The licensee initiated CR 92-128 to document this event and to document the root cause evaluation. In addition, LER 92-10 was submitted May 29, 1992, which discussed the licensee's corrective actions. The inspectors will review that report in a future inspection period.

The licensee informed the NRC operations center of this event via the ENS at about 1:00 p.m. on April 30.

(3) Loss of Shutdown Cooling

On May 5, 1992, at 9:30 p.m., while in operational condition 5, REFUELING, a loss of shutdown cooling occurred when the running residual heat removal (RHR) "A" pump unexpectedly tripped. In response to this event, control room operators entered the appropriate off-normal instruction and started the RHR "B" pump about 16 minutes after event initiation. During the event, reactor coolant temperature increased from 87° F to 90° F.

The cause for the loss of the RHR "A" pump was determined to be a momentary opening of an auxiliary contact on the associated pump suction valve (1E12-F006A). The as-found condition of the auxiliary contact, recorded in licensee work order 92-1881, was identified to have insufficient contact surface area to assure repeatability. The as-left condition of the auxiliary contact provided a 1 second interval between the auxiliary contact rotor and the valve's limit switch rotor.

The inspectors concluded that the licensee's response to this event was appropriate. The standby shutdown cooling system was placed in service within a reasonable amount of time. The licensee's investigation into the cause for the RHR pump trip was prompt with appropriate corrective actions taken. The inspectors noted that the auxiliary contact rotor was initially set to function in accordance with the design drawings. Since that setting did not provide a sufficient interval to assure proper operation, the inspectors requested the licensee to review additional rotor setpoints. A review of rotor switch usage was conducted by the licensee as documented in memorandum R. Parker to W. Kanda, dated May 23, 1992. That review identified the population of safety related motor-operated valves utilizing a four-rotor auxiliary contact design. For each application

the licensee evaluated the potential for valve misoperation due to the auxiliary contact setpoints. Six motor-operated valves in the RHR system were identified as requiring adjustment of their associated auxiliary contacts.

Licensee CR 92-139 was initiated to document the root cause for this event and the corrective action taken. In addition, LER 92-012, dated June 4, 1992, discussed the subject event and the corrective action taken. The inspectors' review of that LER will be documented in a future inspection report.

(4) Main Steam Line Drain Valve Isolation

On May 14, 1992, at about 11:15 a.m., while in operational condition, a COLD SHUTDOWN, an unexpected automatic isolation of four main steam line drain valves occurred. At the time of event occurrence, local leak rate testing of a main steam line penetration was in preparation, requiring opening of associated drain valves. Concurrent with that test evolution, maintenance activities on a main turbine stop valve were in progress. When the main turbine stop valve was stroked open greater than 90 percent, a low vacuum isolation of the four drain valves occurred.

Immediate actions by control room operators was to suspend maintenance activities on the main turbine stop valve and select the closed position for the four main steam line drain valves.

Licensee investigation into the cause of this event identified a deficient maintenance instruction. The maintenance instruction in use for the main turbine stop valve failed to identify the potential for a low vacuum trip signal generation when that valve was opened greater than 90 percent, regardless of the bypass switch position. For the plant conditions at the time of this event, the low vacuum isolation signal was "bypassed." However, with a main turbine stop valve greater than 90 percent, the low vacuum isolation signal became unbypassed.

The licensee initiated CR 92-152 to document the results of their investigation into the cause of this event and the corrective actions taken. In addition, an LER was to be submitted in accordance with 10 CFR 50.73. The inspectors will review that report in a future inspection period.

The licensee informed the NRC operations center of this event via the ENS at about 1:30 p.m. on May 14.

(5) Loss of Water Inventory and Mispositioned Fuel Bundle

Four events occurred in the latter part of the report period that were to be the subject of a special safety inspection to be documented in inspection report 50-440/92011.

On May 23, 1992, while performing maintenance on RHR "A" system valves, suppression pool water level unexpectedly decreased from 18.3 feet to 18.0 feet. The drainage pathway was through a manual isolation valve that had not been fully closed, apparently due to a failure in its operating mechanism.

On May 26, 1992, while refilling a circulating water box following corrective maintenance, an open drain valve resulted in a loss of circulating water inventory of about 18,000 gallons.

On May 26, 1992, during a fill-and-vent evolution on the RHR system, reactor vessel water level was unexpectedly drained from 217 inches to 202 inches. The drainage path was through the operating shutdown cooling pump's (RHR-B) minimum flow valve to the suppression pool. The minimum flow valve had opened in response to the fill-and-vent evolution.

On May 27, 1992, during review of the core verification video, a licensee quality assurance inspector identified a misaligned peripheral fuel bundle. Fuel bundle LYP198 in core location 49-54 was observed to be approximately one inch higher than surrounding fuel bundles. Based on the uncertainty for the cause of the misalignment, the licensee commenced a reactor shutdown to cold shutdown to investigate and repair the misaligned bundle. The licensee informed the NRC operations center via the ENS at 3:07 p.m. on May 27.

For each of these events the inspectors noted that immediate actions had been taken to stop the loss of water inventory. The inspectors' evaluation of the cause(s) for these events will be documented in special inspection report 50-440/92011.

No deviations or violations were identified.

9. Items For Which A "Notice of Violation" Will Not Be Issued

During this inspection, certain activities, as described above in paragraph 3 appeared to be in violation of NRC requirements. However, the violations are not being cited because the criteria specified in Section VII.B of the "General Statement of Policy and Procedure for NRC Enforcement Actions," (Enforcement Policy, 10 CFR Part 2, Appendix C, (1992)), were satisfied.

10. Exit Interviews

The inspectors met with the licensee representatives denoted in paragraph 1 throughout the inspection period and on June 1, 1992. The inspectors summarized the scope and results of the inspection and discussed the likely content of the inspection report. The licensee did

not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.

During the inspection report period the inspectors attended the following exit interview:

Inspector

S. Orth

Exit Date

4/24/92