



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W.
 ATLANTA, GEORGIA 30323

Report Nos.: 50-413/90-30 and 50-414/90-30

Licensee: Duke Power Company
 P.O. Box 1007
 Charlotte, N.C. 28201-1007

Docket Nos.: 50-413 and 50-414

License Nos.: NPF-35 and NPF-52

Facility Name: Catawba Nuclear Station Units 1 and 2

Inspection Conducted: November 4, 1990 - December 8, 1990

Inspector:	<u>W. H. Myers for</u> W. T. Orders, Senior Resident Inspector	<u>12-21-90</u> Date Signed
	<u>W. H. Myers for</u> P. C. Hopkins, Resident Inspector	<u>12-21-90</u> Date Signed
	<u>W. H. Myers for</u> J. Zeiler, Resident Inspector	<u>12-21-90</u> Date Signed
Approved by:	<u>M. B. Shymlock for</u> M. B. Shymlock, Chief Projects Section 3A Division of Reactor Projects	<u>12/21/90</u> Date Signed

SUMMARY

Scope: This routine, resident inspection was conducted in the areas of review of plant operations; surveillance observation; maintenance observation; review of licensee event reports; and followup of previously identified items.

Results: Two violations were identified; one involving four examples of failure to follow procedures, resulting in a missed fire watch, Control Room and Shift Supervisor Logbook discrepancy, inadequate Problem Investigation Report initiation, and an inadvertent steam release (Paragraphs 2.c and 2.d). The other violation involved a failure to perform required post maintenance testing, resulting in Unit 2 operating with VP-17A inoperable for 43 days. (Paragraph 4.c).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- B. Caldwell, Station Services Superintendent
- R. Casler, Operations Superintendent
- T. Crawford, Integrated Scheduling Superintendent
- R. Ferguson, Shift Operations Manager
- *J. Forbes, Technical Services Superintendent
- *R. Glover, Performance Manager
- *J. Hampton, Station Manager
- T. Harrall, Design Engineering
- *L. Hartzell, Compliance Manager
- R. Jones, Maintenance Engineering Services Manager
- *V. King, Compliance
- *F. Mack, Project Services Manager
- *W. McCollum, Maintenance Superintendent

Other licensee employees contacted included technicians, operators, mechanics, security force members, and office personnel.

NRC Resident Inspectors

- *W. Orders
- P. Hopkins
- J. Zeiler

*Attended exit interview.

2. Plant Operations Review (71707)

- a. The inspectors reviewed plant operations throughout the reporting period to verify conformance with regulatory requirements, Technical Specifications (TS), and administrative controls. Control Room logs, the Technical Specification Action Item Log, and the Removal and Restoration (R&R) log were routinely reviewed. Shift turnovers were observed to verify that they were conducted in accordance with approved procedures. Daily plant status meetings were routinely attended.

The inspectors verified by observation and interviews that measures taken to assure physical protection of the facility met current requirements. Areas inspected included the security organization, the establishment and maintenance of gates, doors, and isolation zones in the proper conditions, and that access control and badging were proper and procedures followed.

In addition to the areas discussed above, the areas toured were observed for fire prevention and protection activities and radiological control practices. One example of a degraded barrier is documented below. The inspectors reviewed Problem Investigation Reports (PIRs) to determine if the licensee was appropriately documenting problems and implementing corrective actions.

b. Units 1 and 2 Summary

Both Units 1 and 2 operated at virtually full power the entire report period with no major perturbations. One minor operations event concerning an inadequate Steam Generator Power Operated Relief Valve (PORV) lineup on Unit 2 occurred and is discussed in Paragraph 2.d.

c. Degraded Fire Barrier

On November 30, 1990 at approximately 12:30 p.m., a resident inspector on a routine plant tour, found fire door TS27#1 to the Unit 1 CAPT control panel room, blocked open with no fire watch posted. The inspector called the control room, reported the finding to the Unit 1 operations supervisor and secured the door. It was later determined that a maintenance crew performing work in the room had blocked the door open but failed to secure it when they departed.

Subsequent licensee investigation revealed that the maintenance crew had departed the room less than 10 minutes prior to the inspector's arrival. In as much as Technical Specification 3.7.11, Fire Barrier Penetrations, allows 1 hour to establish a continuous fire watch if a fire barrier becomes inoperable, the action statement of the specification was not violated. Station Directive 2.12.7, Fire Detection and Protection, Section 4.3 Plant Personnel, requires however, that any group/section (person) responsible for degrading a fire barrier, including fire doors, is responsible for ensuring that a fire watch is provided until the barrier is returned to service.

Contrary to this requirement, on November 30, 1990, the maintenance crew in question degraded fire barrier TS27#1, the fire door to Unit 1 CAPT control panel room, but did not provide a fire watch as required. This is a violation of the requirements of Technical Specification 6.8.1 for failing to follow the procedural requirements of Station Directive 4.3. This violation constitutes one of four examples which collectively comprise Violation 413, 414/90-30-01: Failure to Follow Procedures.

On the morning of December 3, 1990, the resident inspector, in following up on licensee actions taken as a result of the identification of the above fire barrier penetration, detected that

there was no written record of the occurrence in the operations logs. It was also determined that a PIR had not been initiated.

With respect to the operators logs, Operations Management Procedure 2-17, Control Room and Unit Supervisor Logbooks, requires in Section 7.0, General Instructions, that sufficient logbook entries be made to permit the reconstruction of the sequence of events during a shift. Furthermore, Section 10.0, Unit Supervisor Logbook Entries, requires that entries in the unit supervisor's logbook shall provide a detailed chronological word description of problems identified during the shift and the corrective action initiated.

Contrary to those requirements there were no log entries in either the operator's logbook or the unit supervisor's logbook pertaining to the above fire barrier problem.

This is identified as a violation of the requirements of Technical Specification 6.8.1 for failing to follow the procedural requirements of Operators Management Procedure 2-17 as specified above. This violation is one of four examples which collectively comprise Violation 413, 414/90-30-01: Failure to Follow Procedures.

With respect to the PIR, Station Directive 2.8.1, Problem Investigation Process and Regulatory Reporting, Section 4.0 requires that any employee who has knowledge of a problem that meets the criteria of Enclosure 3 of the same directive, is responsible to inform his supervisor or responsible technical contact to initiate an investigation. The fire protection/detection systems are identified in Enclosure 3 and meets the criteria. Section 5.1 of the directive requires that a problem identified that meets the criteria in Enclosure 3 shall be documented as soon as practical and delivered promptly to the Compliance Section, thus initiating the investigation process.

Contrary to these requirements, a PIR was not generated to investigate the event until December 5, 1990 after conversations between the licensee and the resident concluded that a PIR was appropriate.

This is identified as a violation of the requirements of Technical Specification 6.8.1 for failing to follow the procedural requirements of Station Directive 2.8.1 as detailed above.

This violation constitutes one of four examples which collectively comprise Violation 413, 414/90-30-01: Failure to Follow Procedures.

d. PORV Valve Misalignment

On November 14, 1990 Unit 2 was in mode 1, operating at 94 percent power. At approximately 7:00 p.m. that evening, the licensee

initiated performance test procedure PT/2/A/4200/31A, to perform a post maintenance stroke test on valve 2SV-13, the PORV for the "2B" Steam Generator. When PORV block valve 2SV-28R was opened, steam immediately filled the mechanical penetration room (doghouse). The block valve was immediately re-closed and the test personnel exited the doghouse.

The licensee suspected that the PORV block valve may have experienced a packing leak, but no attempts were made to continue work on the affected equipment. The day shift was just ending, and management decided that it would be best to continue work on the valves the next morning when the engineering staff would be available.

The following morning a resident inspector and an operations engineer went into the doghouse to inspect valves 2SV-13 and 2SV-28R. It was found that valve 2SV-66, the 2B PORV line drain valve was open, and its associated pipe cap was not reinstalled. This allowed a direct flow path to the atmosphere when the PORV block valve was opened. Review of main steam operating procedure OP/2/A/6250/06 revealed that 2SV-66 should have been closed, with the pipe cap installed.

A review of the tagout (R&R) record sheet, which listed the positions of the equipment when it had been removed from service for the above mentioned maintenance indicated that PORV drain line valve 2SV-66 had been opened as a function of the maintenance but should have been closed and the pipe cap installed in order to perform PT/2/A/4200/31A.

Further review revealed that the licensee did not utilize the valve line up check list of the operating procedure nor the tag out (R&R) record sheet to ensure that valve 2SV-66 was returned to its proper position prior to performance of PT/2/A/4200/31.

The above event is identified as a Violation of the requirements of Technical Specification 6.8.1 for failing to follow the requirements of operating procedure OP/2/A/6250/06. This violation constitutes one of four examples which collectively comprise Violation 413, 414/90-30-01: Failure to Follow Procedures.

One violation with four examples was identified as discussed in Paragraphs 2.c and 2.d.

3. Surveillance Observation (61726)

- a. During the inspection period, the inspectors verified plant operations were in compliance with various TS requirements. Typical of these requirements were confirmation of compliance with the TS for reactivity control systems, reactor coolant systems, safety

injection systems, emergency safeguards systems, emergency power systems, containment, and other important plant support systems. The inspectors verified that: surveillance testing was performed in accordance with approved written procedures, test instrumentation was calibrated, limiting conditions for operation were met, appropriate removal and restoration of the affected equipment was accomplished, test results met acceptance criteria 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.

- b. The inspectors witnessed or reviewed the following surveillances:

PT/1/A/4200/01E	Upper Containment Personnel Air Lock Leak Rate Test
PT/1/A/4200/09A	Auxiliary Safeguards Test Cabinet Periodic Test
PT/1/A/4200/10B	Residual Heat Removal Pump 1B Performance Test
PT/1/A/4200/06C	Containment Spray Valve Lineup Verification
PT/1/A/4200/02C	Turbine Control Valve Movement Test
PT/1/A/4200/07A	Centrifugal Charging Pump 1A Test
PT/1/A/4350/02A	Diesel Generator 1A Operability Test
PT/1/A/4400/02C	RN Valve Verification
PT/1/A/4600/02A	Mode 1 Periodic Surveillance Items
PT/2/A/4200/26	NS Valve Inservice Quarterly Test
PT/2/A/4200/31A	Steam Generator PORV Stroke Test
PT/2/A/4250/02C	Turbine Control Valve Movement Test
PT/2/A/4350/02A	Diesel Generator 2A Operability Test

No violations or deviations were identified.

4. Maintenance Observations (62703)

- a. Station maintenance activities of selected systems and components were observed/reviewed to ensure that they were conducted in accordance with the applicable requirements. The inspectors verified licensee conformance to the requirements in the following areas of inspection: activities were accomplished using approved procedures, and functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; activities performed were accomplished by qualified personnel; and materials used were properly certified. Work requests were reviewed to determine the status of outstanding jobs and to assure that priority was assigned to safety-related equipment maintenance which may affect system performance.
- b. The inspectors witnessed or reviewed the following maintenance activities:

011953 SWR	Remove/Restore Hanger and Remove/Install Travel Stops
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on Hanger for PORV Valve 2SV-1

001195 SWR Disassemble Steam Generator PORV 2D and Repair

c. Lack of Post-Maintenance Testing on Containment Purge Valve VP-17A

Event Summary:

During the review of PIR 2-C90-327, the resident inspector noted that valve VP-17A, the Incore Instrumentation Room Purge Supply inside containment isolation valve had been found partially open during the performance of a routine local leak rate test on November 7, 1990. It was subsequently determined that the valve had been left open as a result of the licensee's failure to perform required Post-Maintenance Testing (PMT) after maintenance associated with the valve's position indication. As a result, the Unit was operated for 43 days in Modes 1-4 with the valve open.

Background:

VP-17A is the Incore Instrumentation Room Purge Supply containment isolation valve. Technical Specification 3.6.1.9 requires each containment purge supply and exhaust isolation valve to be operable and sealed closed in Modes 1 through 4. This is required because the licensee was unable to demonstrate that these valves are capable of closing during a LOCA. Maintaining these valves sealed closed during plant operations ensures that excessive quantities of radioactive material will not be released through the Containment Purge System in the case of an accident.

Event Details:

On September 4, 1990, with Unit 2 in Mode 4, starting up from a refueling outage, an operator observed a problem with the Operator Aid Computer (OAC) computer point associated with the indicated position of valve VP-17A. Work Request 47257 OPS was written to investigate the cause of the OAC position indication continuously changing state between "Open" and "Not Closed." The operator correctly surmised this to be only an OAC computer point problem since in Modes 1 through 4, power to VP-17A is removed to prevent its inadvertent operation.

On September 6, 1990, the OAC computer point for VP-17A indication was removed from service, however, it was later determined by the inspectors that the operator had failed to document this in the OAC Out-of-Service Log. This log helps control and prevent the inadvertent manipulation of computer points. In this case, Operations personnel removed the OAC computer point from service, and since the valve is sealed closed in Modes 1 through 4, it was determined that positive control of the computer point was maintained. After being made aware of the missed log entry, the

licensee indicated that training and discussions with operations personnel would be conducted to ensure proper documentation of OAC points removed from service. The inspectors will periodically review this log to ensure that it is being maintained properly. This issue will be tracked as Inspector Followup Item (IFI) 414/90-30-02: Ensure OAC Out-of-Service Log is Being Maintained.

On September 8, Instrumentation and Electrical (IAE) technicians investigated the OAC indication problem and discovered a defective optical isolator in the valve's indication circuitry. The component was replaced but, since the valve is required to be sealed closed in Modes 1 through 4, the technicians could not cycle the valve as prescribed by the Work Request's PMT Plan. The PMT Plan specified VP-17A to be cycled by IAE as part of the Functional Verification as well as stroke-timed and leak rate tested by the Performance Department as part of the valve's retests. After replacing the optical isolator, the Work Request was returned to the Maintenance Planning Department to await plant conditions which could support PMT.

On September 14, the Unit was placed back in Mode 5 to repair two leaking Core Exit Thermocouple Nozzle Assemblies. During this period, the Work Request was sent to the Performance Department for the necessary PMT to be performed. The responsible test engineer determined that the specified retests, i.e., the stroke test and leak rate test, were unnecessary based on the limited scope of the work that had been performed on the valve. The optical isolator is located in the valve indication circuitry and did not affect the valve's control circuitry. If the valve was to be cycled, the PMT required that the valve be stroke timed and leak rate tested to verify operability. The engineer explained later that he did not notice that the PMT Plan specified IAE to physically cycle the valve as part of the functional verification.

The Work Request was then sent to IAE, and on September 21, with the Unit still in Mode 5, IAE technicians functionally verified the operation of VP-17A by cycling it using electrical jumpers placed in the valve's control circuitry. It should be noted that as a result of the location of the installed jumpers, VP-19A, the Incore Instrumentation Room Purge Exhaust containment isolation valve, located in another penetration, was also cycled. After cycling the valves, the work Request was not returned to Performance for the required stroke and leak rate tests. Resultantly, on September 25, Unit 2 entered Mode 4 without having had the tests performed to demonstrate that VP-17A and VP-19A were operable.

On October 21, the containment penetration associated with VP-19A, was successfully leak rate tested in accordance with Technical Specification Surveillance Requirement 4.6.1.9.3. This confirmed that the valve had re-closed properly after being cycled by IAE on

September 21. On November 7, however, with the Unit in Mode 4, VP-17A failed its normally scheduled leak rate test. Investigation revealed that the valve disc was approximately one-eighth of an inch off its seat. The valve disc was manually pushed closed sealing the valve and a retest was performed to verify leak tightness. The licensee concluded that, when the valve was cycled by IAE on September 21, it had failed to close. Had the leak rate test been performed as required after the valve was cycled, this discrepancy probably would have been identified and corrected.

Safety Significance:

A review of the circumstances surrounding VP-17A being left open during the period in question indicated that there was minimal safety significance. This conclusion was based primarily on evidence that the outside containment isolation valve in this penetration, VP-18B, was leaktight and de-energized during this period. Therefore, had an accident occurred during this period, a reliable isolation barrier existed to prevent leakage through the containment.

Conclusion:

The root cause of this event appears to be the licensee's failure to control and ensure that the required PMT was performed after maintenance was conducted on VP-17A. As discussed previously, the containment purge valves have not been demonstrated capable of closing during an accident. Therefore, following valve maintenance, or cycling of the valve, it is essential that the operability of the valves and penetrations be determined through the performance of stroke-time and leak rate tests.

10 CFR 50, Appendix B, Criterion XI requires that a test program be established and implemented to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily inservice is identified and performed.

Contrary to these requirements, on September 21, 1990, testing adequate to ensure that VP-17A would perform its intended safety function was not performed after maintenance had been performed on the valve. This resulted in the valve remaining open/unsealed for a period of 43 days when the unit was operated in Modes 1 through 4 in violation of Technical Specification 3.6.1.9.

The above issue is considered a violation of these requirements and is identified as Violation 414/90-30-03: Failure to Perform Testing to Demonstrate Operability of Containment Isolation Valve VP-17A.

One violation was identified in Paragraph 4.c.

5. Followup on Previous Inspection Findings (92701 and 92702)

- a. (Closed) EA-89-46: Notice of Violation and Proposed Imposition of Civil Penalty, re. Inspection Report Nos. 50-413/88-38 and 50-414/88-38.

This enforcement action involved the inoperability of train A of the Unit 2 Containment Air Return and Hydrogen Skimmer (VX) system due to an electrical wiring error associated with the January 1988 installation of a station modification. Two wires were incorrectly labeled during fabrication, and this condition was not identified at that time because station modification procedures did not require an independent verification of this process. The licensee had the opportunity to discover the installation error during post-modification testing, but failed to do so because of the inadequate scope of the test performed. The routine quarterly performance test did not provide a complete functional check of the modification because the safeguards relays which automatically control the dampers during an accident were not tested. Consequently, train A of the system would not have performed its intended safety function while the reactor was operated from February 19, to April 1, 1988.

The enforcement action also involved the excessive amount of time that it took for the licensee to report the event. After discovery on March 31, 1988, a Licensee Event Report (LER) was not issued until January 27, 1989. Contributing to the reporting delay was an incorrect operability determination performed by Design Engineering on April 15, 1988. This issue continued to receive attention from the various groups involved with the modification through December 19, 1988, at which time it was determined to be a reportable condition.

The licensee responded to EA-89-46 by letter dated June 16, 1989 acknowledging that violations of requirements had occurred and specifying corrective actions which had or would be taken to prevent recurrence. Those corrective actions included the following:

1. Correcting the wiring, checking the control circuits affected by the implementation of the modification and verifying the correct contact status of associated test switches.
2. Changing the wiring installation practices for both Nuclear Production and Construction and Maintenance Departments to require independent verification of the installation of wire markers for new conductors.
3. Changing the station modification program to enhance the post-modification testing program.

4. Increasing emphasis on complete, quality and timely operability evaluations in the Construction and Maintenance (CMD), Design Engineering and Nuclear Production Departments.
5. Increasing emphasis on communicating frequently, early, both informally and formally with the Nuclear Regulatory Commission on issues and problems as they develop.

Based on a review of implemented corrective actions and operations activities which have occurred since the events in question, the corrective actions are considered adequate. This item is closed.

- b. (Closed) Violation 414/88-38-13: Containment Air Return Damper Inoperable Due to Incorrectly Terminated Electrical Connections.

This issue involved the inoperability of one train of the VX System due to an electrical wiring error associated with the installation of a station modification on the System. This issue is closed based on corrective actions taken pursuant to Enforcement Action EA-89-46. Refer to paragraph 5.a. of this report.

- c. (Closed) URI 413/88-38-14: Post-Modification Testing of VX Damper.

This issue is resolved based on enforcement action taken pursuant to Enforcement Action EA-89-46. Refer to paragraph 5.a of this report for details.

- d. (Closed) URI 413/88-38-04: Valve Stroke Program Inadequacies.

This Unresolved Item concerned licensee's valve stroke test program and the practice of testing motor operated valve stroke times from limit switch to limit switch.

The inspector's review revealed that the licensee was granted relief from measuring full stroke time of certain valves based on their contention that more consistent and repeatable results can be obtained by timing the valve from limit switch to limit switch."

When a valve is timed from limit switch to limit switch "full" stroke time is not measured as is required by 10CFR50.55 a (g). Realistically, only 90 to 95 percent of valve stroke is measured. Further, this method does not account for the time between initiation of the actuating signal and the start of valve motion.

After careful consideration and in a move toward a more conservative test program, the licensee has committed to reissuing all procedures to incorporate initiation to limit requirements. These procedural changes will be completed by June 1, 1991. Based on these planned actions, this item is closed.

- e. (Closed) URI 414/89-13-02: Connection Drawing Errors Associated With Incorrectly Labeled Optical Isolators.

On March 21, 1989 the licensee was performing testing to verify that Containment Purge System (VP) would isolate on a high humidity or high radiation signal, when the Train "A" VP valves failed to isolate as required. Work Requests 6953 PRF and 6954 PRF were written to identify and repair the problem. IAE technicians replaced three optical isolators which were suspected of being inoperable using connection diagram CN-2784-03.02-01 as a reference. After replacement, the test again failed. It was then determined that the output terminals of the optical isolators were reversed. Further review indicated the wires had been incorrectly terminated in accordance with the connection diagram which was itself incorrect. The optical isolator terminals as labelled on the connection diagram did not reflect the labelling standard specified by Duke Power Company design criteria DC 14.05. This resulted in the incorrect installation of the replacement optical isolators by IAE. The licensee immediately corrected the wiring error, satisfactorily passed the re-test and initiated action to correct the drawing.

The inspectors questioned the licensee as to whether the optical isolators had been incorrectly wired for an extended period or only after they were replaced by IAE under the above mentioned work request. A maintenance history revealed previous maintenance activities on the optical isolators. In as much as the VP valves functioned properly during previous tests, they were wired correctly, but not in accordance with the drawing. The inspectors were also concerned about drawing errors on other similar connection diagrams.

The licensee corrected the drawing errors immediately and evaluated drawings of other similar systems to ascertain whether these were similar problems. No other problems were identified. The inspectors reviewed the event documentation including the drawings that were corrected, actions taken to resolve, correct and to prevent recurrence of this type of event. The inspectors find these actions adequate. This item is closed.

No violations or deviations were identified.

6. Exit Interview

The inspection scope and findings were summarized on December 12, 1990, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection findings listed below. No dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

<u>Item Number</u>	<u>Description and Reference</u>
VIO 413, 414/90-30-01	Failure to Follow Procedures (four examples). Paragraphs 2.c and 2.d.
IFI 414/90-30-02	Ensure OAC Out-of-Service Log is Being Maintained. Paragraph 4.c.
VIO 414/90-30-03	Failure to Perform Testing to Demonstrate Operability of Containment Isolation Valve VP-17A. Paragraph 4.c.