



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

Report Nos. 50-413/88-25 and 50-414/88-25

Licensee: Duke Power Company  
 422 South Church Street  
 Charlotte, N.C. 28242

Docket Nos.: 50-413 and 50-414

License Nos.: NPF-35 and NPF-52

Facility Name: Catawba 1 and 2

Inspection Conducted: June 26, 1988 - July 25, 1988

Inspectors: *P. K. Van Doorn* 8/19/88  
 P. K. Van Doorn Date Signed

*M. S. Lesser* 8/19/88  
 M. S. Lesser Date Signed

Approved by: *T. A. Peebles* 8/19/88  
 T. A. Peebles, Section Chief Date Signed  
 Projects Branch 3  
 Division of Reactor Projects

SUMMARY

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

Results: The inspection findings indicate a weakness in the management of Technical Specification compliance. A strength was noted in the establishment and use of an on-site design engineering staff. A second strength was noted in the establishment of station specific performance indicators with specified goals.

In the areas inspected, the following violations were identified:

- Failure to maintain two operable channels of valve position indication for PORV Flock Valves (para. 7.c)
- Inoperability of containment purge valves due to use of fused jumpers (para. 6.b). This violation is classified as a Licensee Identified Violation (LIV).

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

H. B. Barror, Operations Superintendent  
W. F. Beaver, Performance Engineer  
W. H. Bradley, QA Surveillance  
\*R. N. Casler, Unit 1 Coordinator  
R. H. Charest, Station Chemistry Supervisor  
T. E. Crawford, Integrated Scheduling Superintendent  
W. P. Deal, Health Physics Supervisor  
R. M. Glover, Compliance Engineer  
\*T. P. Harrall, Design Engineering  
F. N. Mack, Project Services Engineer  
W. W. McCollough, Mechanical Maintenance Supervisor  
\*W. R. McCollum, Station Services Superintendent  
C. E. Muse, Unit 2 Coordinator  
\*T. B. Owen, Station Manager  
\*G. T. Smith, Maintenance Superintendent  
J. M. Stackley, I. & E. Engineer  
D. Tower, Shift Operating Engineer  
R. F. Wardell, Technical Services Superintendent  
\*R. White, CSRG Chairman  
J. W. Willis, Senior QA Engineer, Operations

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

#### NRC Resident Inspectors

\*P. K. Van Doorn  
\*M. S. Lesser

\*Attended exit interview.

### 2. Unresolved Items

An Unresolved Item is a matter about which more information is required to determine whether it is acceptable or may involve a violation. There were no unresolved items identified in this report.

### 3. Plant Operations Review (71707 and 71710)

- 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, danger tag logs, Technical Specification Action Item Log, and the removal and restoration log were routinely reviewed. Shift turnovers were observed to verify that they were conducted in accordance with approved procedures.

The inspectors verified by observation and interviews, that the 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. These included such things as combustible material control, fire protection systems and materials, and fire protection associated with maintenance activities. The inspectors reviewed Problem Investigation Reports to determine if the licensee was appropriately documenting problems and implementing appropriate corrective actions.

- b. Unit 1 Summary

The Unit continued its current run of 133 days of continuous operation and achieved one year without an automatic trip above 15% power. On July 19, sulfate contamination of the steam generators occurred when a valve isolating the demineralized makeup water system from a regenerating demineralizer leaked by, causing sulfuric acid to be injected into the condensate system. The unit was reduced to 30% power, although not expeditiously due to misunderstanding of written procedures. The sulfates were cleaned up within a day and the unit returned to full power.

- c. Unit 2 Summary

The Unit started the reporting period at 100% power and tripped on June 26 when an operator misinterpreted a test procedure step and shut one Main Steam Isolation Valve. The unit later restarted, however, it was forced to shutdown on July 16 when an action statement expired on the 2A centrifugal charging pump (see paragraph 5.c.). The unit started up on July 21. Power escalation was hampered by problems with the steam dumps and turbine control valves hydraulics.

- d. Based upon an event at another facility where unexpectedly high radiation levels in the reactor building forced evacuation of site personnel, the inspector asked the licensee whether reportability

procedures adequately covered events which significantly hamper site personnel in the performance of duties necessary for the safe operation of the plant. Although this type of event was covered by procedure RP/O/B/5000/13 the licensee agreed that the procedure could be improved and has initiated a change to affect this improvement.

No violations or deviations were identified.

#### 4. Surveillance Observation (61726)

a. During the inspection period, the inspector verified plant operations were in compliance with various TS requirements. Typical of these requirements were confirmation of compliance with the TS for reactor coolant chemistry, refueling water tank, emergency power systems, safety injection, emergency safeguards systems, control room ventilation, and direct current electrical power sources. The inspector verified that surveillance testing was performed in accordance with the 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 requirements and were reviewed by personnel other than the individual directing the test, and that any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

b. The inspectors witnessed or reviewed the following surveillances:

IP/1/A/3222/00D	Channel IV Analog Channel Operations Test
PT/1/A/4200/09A	Auxiliary Safeguards Test Cabinet Periodic Test
PT/2/A/4200/14/A	Ice Condenser Intermediate Deck Door and Inlet Door Position Monitor
PT/2/B/4150/29	Containment Floor and Equipment Drain Sumps Increase Test

No violations or deviations were identified.

#### 5. Maintenance Observations (62703)

a. Station maintenance activities of selected systems and components were observed/reviewed to ascertain that they were conducted in accordance with the requirements. The inspector verified licensee conformance to the requirements in the following areas of inspection: the 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 status of outstanding jobs and to assure that priority is assigned to safety-related equipment maintenance which may effect system performance.

- b. The inspectors witnessed or reviewed the following maintenance activities:

MP/O/A/150/81	Nuclear Service Water Lube Injection Strainer Corrective Maintenance
8972SWR	Replace KF Filter 2B
MP/O/A/7150/16	Repair 2A NV Pump

- c. On July 13 operators observed decreasing pressurizer level, charging flow decreasing from 87 to 50 gpm and increasing VCT level on Catawba Unit 2. The problem was quickly diagnosed to the operating 2A Centrifugal Charging Pump (NV) and operators recovered from the transient by starting the other pump. The licensee initially assumed gas binding and initiated actions to vent the pump after declaring it inoperable. A later attempt to operate the pump resulted in significantly reduced flow (25 gpm) and smoke was observed in the vicinity of the inboard bearing. The licensee determined that disassembly of the pump and replacement of the rotating element was necessary. The rotating element was replaced under work request 41005 OPS with a spare rotating element with a similar shop head curve. The new element was retested after installation. At the reference operating point of 88 gpm the pump exhibited a head of approximately 85 psig lower than the head of the old pump. The licensee obtained an evaluation by Westinghouse with results documented in letters dated July 15, 1988 to T. F. Wyke from S. S. Kilburn and July 19, 1988 to R. Puryear from Dan Dudek and Steve Swanther. The evaluation concluded that the flow characteristics of the system were not materially altered and the pump will operate adequately under runout conditions. The inspectors performed independent calculations to verify the results. The root cause for failure of the pump has not been determined. Disassembly of the old rotating element has revealed indications of excessive internal pump recirculation.

No violations or deviations were identified.

#### 6. Review of Licensee Non Routine Event Reports (92700)

- a. The below listed Licensee Event Reports (LER) were reviewed to determine if the information provided met NRC requirements. The determination included: adequacy of description, verification of compliance with Technical Specifications and regulatory requirements, corrective action taken, existence of potential generic problems, reporting requirements satisfied, and the relative safety significance of each event. Additional inplant reviews and discussion with plant personnel, as appropriate, were conducted for those reports indicated by an (\*). The following LERs are closed:

413/87-45	Technical Specification Violation due to inadequate procedural guidance and a personnel error.
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413/88-03 Rev. 1            Technical Specification Violations on Wide  
 Range Temperature Monitoring Instrumentation  
 due to Installation and Design Deficiencies.  
 413/88-20                Technical Specification Violation involving  
 Pressurizer PORV's and Associated Block  
 Valves Position Indication.

- b. On December 8, 1987, the licensee determined that the Containment Purge (VP) system had been inoperable in September 1986 during core alterations in that Train B would not have isolated on a high relative humidity condition as required by TS 4.9.4.1.b. The reason for the inoperability was that a set of fused jumpers used for troubleshooting were never removed. The jumpers were used without declaring the system inoperable or without performing a 10CFR50.59 evaluation. The licensee reported the inoperability in LER 413/87-45. Corrective action included requirements in IP/O/A/3890/01 Controlling Procedure for Troubleshooting and Corrective Maintenance, for technicians to consult with engineers prior to using fused jumpers and precautions of instrument loop inoperability when using fused jumpers to troubleshoot intermittent electrical faults. Appropriately a Notice of Violation is not proposed as permitted by Appendix C of 10CFR2 and this event is classified as a Licensee Identified Violation 413/88-25-02. Inoperability of Containment Purge Valves due to use of fused jumpers.

One licensee identified violation as described above was identified.

7. Follow-up on Previous Inspection Findings (92701 and 92702)

- a. (Closed) Violation 413/87-30-01: Unauthorized Isolation of an Auxiliary Feedwater Pressure Switch rendering the Auxiliary Feedwater System unable to function as designed under certain conditions. The licensee responded to the violation in correspondence dated December 31, 1987. Corrective action included review, revision and implementation of safety related instrumentation valve lineups done after extended outages, increased guidance upon identifying instrument valves out of position and training. Based upon these corrective actions this item is closed.
- b. (Closed) Violation 413,414/87-30-02: Failure to establish adequate measures to periodically calibrate all safety related instruments. The licensee responded to the violation in correspondence dated November 13, 1987 and December 28, 1988. Corrective action included identification and completion of instrument calibrations that had not yet been done, evaluation of those instruments discovered to be out of tolerance, and development of administrative guidance to ensure instrumentation added by modifications is identified in the periodic calibration program. Based upon these corrective actions this item is closed.

- c. (Closed) Unresolved Item 413, 414/87-33-01: Two channels of valve position indication for PORV's and PORV block valves not installed as required by TS 3.3.3.6. TS 3.3.3.6 requires 2 channels of valve position indication for each pressurizer PORV and PORV block valve. The licensee's use of a non-safety related strap on resistance temperature defector (RTD) as the second channel for the PORV position indication was deemed acceptable by the NRC. The licensee however failed to maintain 2 channels per PORV block valve operable from initial licensing until May 20, 1988 at which time the channels were declared inoperable and a seven day action statement was entered. At this time the licensee determined that an independent position indication for each block valve was available at the test patch panel and initiated action to verify operability. The licensee was unable to obtain operable channels on Unit 2 without entering containment. To avoid an unnecessary shutdown, the licensee requested an emergency TS change for Unit 2 to require only one operable channel. The request was granted and issued as amendment 39 for Unit 2, effective May 27, 1988. This is identified as a violation of TS 3.3.3.6, violation 413,414/88-25-01: Failure to maintain two operable channels of valve position indication for PORV block valves. This violation has minor safety significance as the basis for the Technical Specification (Regulatory 1.97 and TMI-2 Action Plan Item II. D.3) indicates that one channel per valve may be acceptable.
- d. (Open) Unresolved Item 413,414/88-22-03: Potential Inadequate Venting of ECCS Systems. The inspectors reviewed change 7 to PT/2/A/4200/06 and change 11 to PT/1/A/4200/06, (implemented June 30, 1988) ECCS Valve Lineup Verification which includes actions to meet monthly T.S. requirements to vent discharge piping of ECCS systems. As a result of the inspector's questions concerning adequacy of venting, one vent valve in each train was identified to be at a higher elevation and therefore a better valve to ensure the system is water solid. The licensee was previously using the highest vent valve in the flowpath but not the system high point.

The inspectors reviewed PT/2/A/4200/10A, ND Pump 2A Performance Test conducted on February 1, 1988. Horizontal vibration readings of the pump were noted to fall into the alert range as defined by Table IWP-3100-2 of section XI of the ASME Boiler and Pressure Vessel Code. The problem was corrected when the pump was adequately vented. The inspectors determined the licensee does not have written procedures for fill and vent of safety related systems. The licensee stated that typically a system or component would be isolated with a Removal and Restoration (R&R). The R&R defines the boundaries and is also used to fill and vent the system. This item remains open pending continued review of ECCS venting and apparent requirements by T.S. 6.8.1 and Regulatory Guide 1.33 to have and maintain written procedures for system fill and vent.

- e. (Closed) Unresolved Item 414/86-38-01: No Criteria Established for Documentation of Reverification of Reperformance of Station Status and Prerequisites of Interrupted Tests. The licensee has addressed this issue via Revision 9 to Station Directive 3.2.2, Development and Conduct of the Periodic Testing Program. This change adequately addresses this concern and no significant problems were identified as a result of the weakness. Therefore, this item is closed.
- f. (Closed) Inspector Followup Item 413/86-05-01: Revise Station Directive 3.2.2. Revision 9 to the Station Directive (SD) has been issued which addresses notification of the Shift Supervisor when a test is not completed within the allowed TS interval. This adequately addresses the NRC concern.
- g. (Closed) Inspector Followup Item 413/86-36-01, 414/86-39-01: Revision of SD 3.2.2 to clarify administrative controls for test interruption. SD 3.2.2 has been appropriately revised.
- h. (Closed) Inspector Followup Item 413/87-30-04: Evaluation of Subcooling Nuisance Alarm. The licensee has evaluated the setpoint for the alarm and has raised the setpoint by 3°F thereby eliminating the nuisance alarm.
- i. (Closed) Inspector Followup Item 413,414/88-08-03: Upgrade Program For Use of Jumpers to Operate MOV's. The licensee added controls to troubleshoot motor operated valves to IP/O/A/3890/01, Controlling Procedure for Troubleshooting and Corrective Maintenance. The procedure requires troubleshooting to be conducted under IP/O/A/3820/04, Operating Checkout of Limitorque and Rotork Valve Actuators or IP/O/A/3820/07, Troubleshooting and Maintenance of Rotork Actuators. Procedures now require consultation with operations and/or Technical Support personnel when bypassing interlocks, permissives, automatic functions, and torque/limit switches during troubleshooting. Additional precautions must be taken to ensure a motor does not reach stall torque situations.  
  
A specialized training package, Basic Troubleshooting and Corrective Maintenance Guidelines for Motor Operated Valve Actuators has been generated and is to be incorporated into the station personnel training program. Based on this the item is closed.
- j. (Closed) Inspector Followup Item 413,414/88-15-01: Inoperable RN Pit Level Transmitters Interpretation Implementation. The licensee committed to writing a procedure to implement an interpretation of TS 3.3.2 item 14g concerning operability of RN pit level transmitters. The procedure has been implemented as enclosure 4.15 of OP/O/A/6400/06C, Nuclear Service Water System. The enclosure specifies actions to be taken in the event of an inoperable transmitter to ensure that the actions are at least as conservative as the instrument's automatic actions. Based upon the inspectors review of the enclosure this item is closed.

- k. (Open) Inspector Followp Item 413,414/88-15-03: Changes in RHR Operation with Low Flow Annunciators. The inspector reviewed enclosure 4.1 of Revision 9 of OP/1(2)/A/6200/04, Residual Heat Removal System (ND). The change requires that the ND cross connect valves be isolated when the system is used for routine decay heat removal. This ensures that with the reactor coolant system filled, normal ND flow rates will not result in a low flow alarm. The licensee has also initiated a Station Problem Report (SPR CNPRO3449) to reduce the setpoint of the low flow annunciator, such that it will not be in alarm when a lower flow is required during reactor coolant draining operations.

While reviewing the change, the inspector noted that NI-173 and NI-178 (ND pump discharge isolation valves to the cold legs) are simultaneously shut in order to recirculate flow and obtain boron concentration samples. This makes both trains of ND inoperable, as TS 3.5.3 requires at least one train's valve to be open. In the past the unit has unknowingly been placed in an action statement, however, there is no evidence that the licensee had ever violated the action statement. The licensee has stated it would be prudent to isolate one train at a time for sampling and has agreed to revise the procedure.

8. Followup of NRC Bulletin 88-05 (92701)

As a result of inspections directed by NRC Bulletin 88-05, Non Conforming Materials Supplied by Piping Supplies, Inc. of Folsom, New Jersey and West Jersey Manufacturing Company at Williamstown, New Jersey. The licensee has to date identified 10 non conforming socket weld flanges. The systems involved include Steam Supply to the Auxiliary Feedwater Pump Turbine, Diesel Generator Air Start, Auxiliary Feedwater and Main Feedwater. Proper notification to the NRC have been made in each case. The licensee is performing an analysis in each case to justify continued operation.

No violations or deviations were identified.

9. Licensee Weakness Regarding Management of Technical Specification Compliance

The licensee has had a history of difficulties in complying with Technical Specifications (TSs) at Catawba Nuclear Station. The cause of this problem is, in part, weaknesses in the original TS review which resulted in some TSs which were unclear, some which did not meet plant design, and some where compliance with the letter of TSs goes beyond the intent of or the basis for the TS. Licensee personnel, on occasion, have chosen not to follow the letter of TSs while meeting intent or safety aspects. Confusing TSs have led to personnel errors. The number of TS changes that are able to be processed in a given time period by NRC due to Federal law and the licensee due to manpower makes it difficult to affect all changes necessary in a timely manner. For example 41 amendments were processed in

1987 and to date, 28 amendments have been processed in 1988. Changes which support clarifications and improvements in complying with intent appear to have a low priority since these are in competition with the necessary changes such as those which support upcoming modifications. This typically leads to delays between when the need for the changes is identified and submittal to NRC of 7 months and greater, up to 2 years. The licensee uses a TS Interpretation Manual to provide guidance and also has procedure guidance relative to support systems required for operability of TS systems. Use of the manual has typically been reactive rather than proactive and some interpretations have been made without use of the manual. Issuance of guidance has not always been timely. Issues which illustrate this weakness are as follows:

Control Room Ventilation - instrumentation in TS did not meet plant design. TS has been changed.

Auxiliary Building Ventilation - original TS was excessively restrictive, i.e. 24-hour action in lieu of 7 days. Caused by poor review and resulted in several discretionary enforcement actions before TS was finally changed.

D.C. Power Sources (TS 3.8.2.1) - action e. is poorly worded. This has led to confusion surrounding entering TS 3.0.3 (see LER 413/87-32 and NRC Report 413,414/87-33). An interpretation has been issued but the poor wording remains.

Violation 414/87-05-05 (LER 414/87-05) - corporate personnel issued a TS interpretation allowing site personnel 24 hours to isolate a containment isolation valve in lieu of 4 hours required by TS 3.6.3.

Violation 414/87-25-01 - licensee inappropriately took credit for pegged high gauges for channel checks of Auxiliary Feedwater System flow instruments. Unit 2 design results in normally pegged high gauges requiring special methodology to meet standard TS.

Violation 414/87-30-01 - power range neutron flux trip setpoint was not evaluated by corporate personnel in accordance with the equation required by TS 2.2.1.

Violation 413/414/87-44-01 - Auxiliary Feedwater valves were throttled when TS requires the valves to be fully open. No TS interpretation was issued although operations personnel had interpreted the intent of the TS to allow this operations mode. The need for this TS to be changed was recognized by the licensee in November 1986, and was not submitted to NRC until February 1988.

Violation 414/87-44-03 - a confusing TS for the shared Control Room Ventilation contributed to both trains being inoperable from emergency power for a period of time. The licensee recognized the need for changing this TS in December 1987 and the request has not yet been submitted to NRC.

Violation 414/87-88-07 - licensee used unqualified instrumentation to compensate for inoperable acoustic monitors for pressurizer safety valves. TS uses the term valve position indication with no amplifying information.

Violation 413,414/88-25-01 - two channels of pressurizer PORV block valve position indications were not available per TS which were also a standard TS. Corporate personnel indicated to site personnel that two indications rather than two separate channels were acceptable and met basis for TS rather than requiring compliance with the letter of the TS. This issue was raised in late 1987. An emergency change was granted for Unit 2 in May 1988 and additional changes for Unit 1 block valves and PORV position indicators are yet to be submitted to NRC.

LER 413/88-13 - both trains of Containment Spray were made legally inoperable. A poorly written TS contributed to this problem. The need for a TS change was recognized in December 1987 and is yet to be submitted to NRC.

Unresolved Item 413/86-17-01 - licensee chose not to follow letter of TS and does not vent pump casings of running pumps while taking credit for the surveillance which requires venting. Although the exemption appears to be technically reasonable, the licensee has yet to submit a TS change request to NRC.

While these situations are not individually significant, TS non-compliance can lead to significant problems. Licensee management has recognized the need for improvement in this area and reformatting of operator guidance information is in progress. The licensee indicated that this issue will be further reviewed to determine the need for additional corrective actions. Further followup will be conducted in this area by the RI. This is Inspector Followup Item 413/88-25-03: Weakness Regarding Management of Technical Specification Compliance.

#### 10. Licensee Strengths

- a. The licensee has completed staffing of an on-site Design Engineering (D/E) group. This group is providing more timely response to issues involving D/E and providing a more thorough understanding of the issue. Several interfaces with this group by the inspectors has been beneficial. The presence of this group is considered to be a strength.
- b. The licensee had recently established a site Performance Indicator Program. Indicators have been established for material conditions, modification backlog, commitment index, personnel exposure, people performance (errors), cost per kilowatt-hour, safety system unavailability, gross equivalent availability factor, preventive to corrective maintenance ratio and work request backlog. Challenging