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

Report Nos.: 50-413/89-31 and 50-414/89-31

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 Units 1 and 2

Inspection Conducted: October 7, 1989 - October 28, 1989

Inspectors: MB Shymlock for 24 Nov. 1989
W. T. Orders, Senior Resident Inspector Date Signed

MB Shymlock for 24 Nov. 1989
M. S. Lesser, Resident Inspector Date Signed

MB Shymlock for 24 Nov. 1989
P. C. Hopkins, Resident Inspector Date Signed

Approved by: MB Shymlock 24 Nov. 1989
M. B. Shymlock, Chief Date Signed
Reactor Projects Section 3A
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 event reports; compliance with the ATWS rule; non-routine reporting program; and follow-up of previously identified items.

Results: One strength was identified with the licensee's non-routine reporting program. The review and evaluation process for off normal events and vendor bulletins, as required by Problem Investigation Reports and the Operating Experience Program, is clearly and completely prescribed and generally appears to function appropriately. (paragraph 7)

One non-cited violation was identified involving the failure by a maintenance technician to wear dosimetry. (paragraph 8b)

One weakness was identified in that the Emergency Notification System (ENS) has not been fitted with a backup power supply in the event of a loss of offsite power. (paragraph 2d)

One weakness was identified in that a low voltage load list to use as a reference does not exist and contributed to the inadvertent loss of (ENS) communications. (paragraph 2d)

One weakness was identified with a Design Engineering operability evaluation associated with a Hydrogen Skimmer Fan Circuit breaker which tripped on over-current. (paragraph 8a)

REPORT DETAILS

1. Persons Contacted

Licensee Employees

W. Beaver, Performance Engineer
T. Crawford, Integrated Scheduling Superintendent
*J. Forbes, Technical Services Superintendent
*R. Glover, Compliance Engineer
T. Harrall, Design Engineering
R. Jones, Maintenance Engineering Services Engineer
F. Mack, Project Services Engineer
W. McCollough, Mechanical Maintenance Engineer
W. McCollum, Maintenance Superintendent
*T. Owen, Station Manager
J. Stackley, Instrumentation and Electrical Engineer
B. Caldwell, Station Services Superintendent

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

NRC Resident Inspectors

*W. Orders
*M. Lesser
*P. Hopkins

*Attended exit interview.

2. 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, 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. Daily plant status meetings were routinely attended.

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, protection activities and radiological control practices. The inspectors reviewed Problem Investigation Reports to determine if the licensee was appropriately documenting problems and implementing corrective actions.

b. Unit 1 Summary

The unit started the inspection period operating at 100% power. On October 21, the licensee detected the presence of sodium in the steam generators and determined the source to be Main Condenser Circulating Water (RC) intrusion due to a possible condenser tube leak. The licensee trended the sodium concentration and calculated the leak rate. On October 24 a unit shutdown was conducted when sodium concentration exceeded 75 ppb and the leak rate was estimated to be 2.1 gpm. The licensee performed eddy current testing of the condenser tubes in two of three water boxes and detected significant tube degradation in the upper rows. The degradation appears to be due to steam erosion caused by leaking steam dump valves. As a precautionary measure the licensee plugged approximately 140 tubes in the affected area. Efforts continue to confirm the root cause for the erosion.

Additional outage work included the cleaning of the main feed flow venturis which provide input to the secondary heat balance calculation used to determine reactor power. The unit returned to power operation on October 27.

c. Unit 2 Summary

The unit started the reporting period at 97% power. Power reductions to approximately 50% were conducted several times to facilitate various maintenance activities on Low Pressure Service Water, Cooling Tower Fan Switchgear and Main Feedwater Pumps. The unit ended the period at 98% power.

d. Emergency Notification System

On October 15, 1989, electrical panel SMXQ was de-energized to conduct work associated with remodeling the Administration Building. Lighting panel AL-3, which is fed from SMXQ and was subsequently found to power the Emergency Notification System (ENS) phones, was de-energized at this time rendering the ENS system inoperable. The licensee was unaware of the degraded communication capability until the NRC Operations Center unsuccessfully attempted a routine phone call. Backup communications via the commercial network remained intact for the duration of the ENS inoperability. The inspectors

were concerned with two aspects of this event: 1) The failure to determine the ENS would be inoperable prior to de-energizing SMXQ due to an apparent lack of low voltage electrical load list reference material. 2) The power supply for the ENS is not protected during a loss of offsite power event in that there is no backup power supply.

The lack of a low voltage load list was identified as a weakness by INPO during the licensee's last evaluation. This is an example where the availability of this type of reference material could have prevented the event. The licensee currently is in the process of generating a data base of low voltage loads for use in labeling panels and as reference material for use in tagout applications. This weakness is identified as Inspector Followup Item 413/89-31-01: Lack of Low Voltage Load List For Tagout Applications, pending completion of the load list data base by Design Engineering and implementation by the station.

NRC Information Bulletin 80-15, Possible Loss of ENS with Loss of Offsite Power, described occurrences where a loss of offsite power resulted in a loss of communications between a facility and the NRC Operations Center. The bulletin required facilities holding operating licenses to conduct inspections and tests to verify ENS operability in the event of loss of offsite power and to make necessary modifications to provide a reliable backup supply if one currently did not exist. Catawba was issued an operating license after the bulletin and apparently was not required to implement it prior to licensing.

Following this event, licensee management concurred with the need for a backup power supply and committed to have the ENS powered from the Site Communications Building, which is currently powered from Unit 2 non-emergency power, and is backed up by a 150kw diesel generator which automatically starts on loss of power. The engine is periodically tested. This is identified as Inspector Followup Item 413/89-31-02: Inadequate Power Supply for Emergency Notification System, pending modification completion to provide a reliable backup source of power.

No violations or deviations were identified.

3. Surveillance Observation (61726)

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 acceptance criteria 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.

No violations or deviations were identified.

4. 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 was assigned to safety-related equipment maintenance which may effect system performance.

b. Freeze Plugs

The inspectors reviewed the licensee's program for the use of freeze plugs during maintenance on fluid system components which cannot be isolated through the use of existing valves. Administrative requirements are provided in Station Directive 3.1.1, Safety Tags and Delineation Tags, and actual freeze seal installation procedural requirements are specified in MP/O/A/7650/71, Freeze Seal of Pipe. The inspector also reviewed a draft document describing the freeze sealing technical support program. The licensee has designated two engineers responsible for the program and is currently in the process of developing improved freeze seal training for craft personnel. The program appeared to be acceptable in that procedures are established and personnel qualified to perform freeze seal operations by Training and Qualification Guide MM 8669 are listed.

The following observations were noted and forwarded to the licensee for consideration to enhance the program:

- Procedures do not require and provisions are not made for installation of temperature monitoring instruments in the freeze seal chamber and use of dependable nitrogen flow monitoring, other than gaseous plume observation. Industry experience indicates that plume observation is not considered to be a dependable method of flow monitoring.

- Procedures require freeze seal fixture surface temperature to be checked periodically; however, neither the frequency nor the required value is specified. There is also no requirement to record temperature readings.

- Procedures do not require "tailgate" meetings between operations, technical support, and maintenance to discuss the evolution although this is recommended in the description of the program nor do procedures require additional meetings at shift changes.

- Procedures require application of nitrogen as necessary to maintain the frost band width, however, the required band width, as specified by engineering support, is not recorded.

- Procedures do not prohibit supplying multiple seals from a single nitrogen bottle.

- Procedures do not specify that the maximum allowed fluid pressure is 400 psig unless design engineering approval for a change in pressure is obtained.

- Procedures do not have steps outlining a contingency plan for seal failure.

- Procedures do not have precautions to ensure adequate ventilation exists and/or air monitor instrumentation is used if necessary.

- The freeze seal maintenance procedure, MP/O/A/7650/72 is not referenced in The Training and Qualifications Guide.

It was pointed out to the licensee that the noted observations are not regulatory requirements. The licensee agreed to consider the suitability of each item for possible implementation into their freeze seal program. This is identified as Inspector Followup Item 413/89-31-03: Freeze Seal Program Enhancements, pending completion of evaluation and possible improvements by licensee.

No violations or deviations were identified.

5. Review of Licensee Non Routine Event Reports (92700)

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. The following LERs are closed:

413/89-06	Tech Spec Violation Due to Inoperable Turbine Building Sump Radiation Monitor Because of Inappropriate Actions and Instrument Setpoint Drift.
413/89-16	Technical Specification 3.0.3 Entered Due to Four Channels of Power Range Instrumentation Declared Inoperable Following Unit Runback.
413/89-18	Technical Specification Violation As a Result of Missing Unit Vent Continuous Sample Due to Inappropriate Action.

No violations or deviations were identified.

6. T/2500/20 Determination of Compliance With ATWS Rule 10 CFR 50.62

Background:

On July 26, 1984 the Code of Federal Regulations (CFR) was amended to include Section 10CFR 50.62, Requirements for Reduction of Risk From Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants (Known as the ATWS Rule). An ATWS is an expected operations transient (such as loss of feedwater, loss of condenser vacuum, or loss of offsite power) which is accompanied by a failure of the reactor trip system (RTS) to shut down the reactor. The ATWS Rule requires specific improvements in the design and operation of commercial nuclear power facilities to reduce the likelihood of failure to shut down the reactor following anticipated transients, and to mitigate the consequences of an ATWS event.

Requirements:

The basic requirements for Westinghouse plants are specified in Paragraph (c)(1) of 10 CFR 50.62. Specifically, "Each pressurized water reactor must have equipment from sensor output to final actuation device, that is diverse from the reactor trip system, to automatically initiate the auxiliary (or emergency) feedwater system and initiate a turbine trip under conditions indicative of an ATWS. This equipment must be designed to perform its function in a reliable manner and be independent (from sensor output to the final actuation device) from the existing reactor trip system".

The Westinghouse Owners Group (WOG) submitted topical Report WCAP-10858, AMSAC Generic Design Package, in response to 10 CFR 50.62. Guidance for meeting the requirements of 10 CFR 50.62 was provided in the preamble to that rule and was further provided to all licensees in Generic Letter 85-06, Quality Assurance Guidance For ATWS Equipment That Is Not Safety Related.

The results of the staff's review of the generic design for the ATWS Mitigation Systems Actuation Circuitry (AMSAC) were documented in a Safety Evaluation (SE) in which the staff concluded that the generic design was acceptable. Giwever, many plant specific details which were needed in order to ensure conformance with the rule were not addressed by the WOG generic design. The licensee using WCAP-10858 as the basic design, forwarded a Catawba site specific design for NRC review. The NRC staff with the technical assistance of EG&G reviewed the Catawba proposal and concluded that, pending further staff review of the appropriateness of Technical Specifications for ATWS requirements, the design is in compliance with the ATWS Rule 10 CFR 50.62, paragraph (c) (1). The licensee has since completed installation of the ATWS Mitigation System Actuation Circuitry.

Implementation:

The inspectors review focused on the implementation of the ATWS rule at Catawba and the effectiveness of the QA controls applied to ATWS activities. Emphasis was placed upon the licensees system of documentation, control of the ATWS system design, implementation and operation. Responses to the ATWS rule (10 CFR 50.62) as submitted to NRR were reviewed, including applicable quality assurance controls.

A review of the QA controls pertaining to the implementation of AMSAC revealed that the engineering quality assurance program provided confidence in the technical adequacy of the design activities and practices that insure that licensing commitments, established criteria and system functional requirements were met. Additionally, multiple interdiscipline interfaces helped insure that sufficiently detailed procedures were written and approved for the different engineering activities. Seismic considerations were established early and complied with consistently to minimize rework or reanalysis. A human factors review was performed on the AMSAC control room bypass switches to insure that they can be used efficiently and easily understood. The bypass allows the operator to bring the plant up in power using alternate flow paths to the steam generator and meet steam generator preheating requirements.

Training on the AMSAC system was conducted by the Nuclear Training Department.

Interviews revealed that the personnel associated with the AMSAC modification were knowledgeable and capable. Personnel qualifications were verified through Administrative Policy Manual (APM), personnel records and personnel interviews.

Modification work activities were conducted in accordance with the appropriate specifications drawings and controls. The licensee's philosophical approach to 10 CFR 50.59 safety evaluations and the initiation of good QA/QC and procedural controls has focused significant attention on the identification of possible or potential failure modes that may result from the implementation of the AMSAC modifications.

The licensee has performed comprehensive integrated safety evaluations and reviews to insure that the AMSAC modifications do not adversely affect the design or operability of other systems.

In conclusion, the inspectors reviewed the NRC requirements, endorsement packages, the licensee's responses, engineering design packages, procurement orders, modifications and testing packages and surveillance procedures and determined that the licensee has a completed operational AMSAC system.

No violations or deviations were identified.

7. Nonroutine Reporting Program (90714)

The purpose of this inspection was to ascertain whether responsibilities have been assigned for review and evaluation of normal events and to ascertain whether vendor bulletins and circulars are reviewed for applicability to the facility.

Station Directive 2.8.1, Problem Investigation Process and Regulatory Reporting, defines the licensee's program for evaluating events and determining followup corrective action including reporting. The directive assigns responsibility to groups who are to report certain events.

The foundation of the program is the Problem Investigation Report (PIR) which documents an identified problem and initiates an internal investigation or an external report. A PIR may be generated for events such as personnel errors, defective or malfunctioning equipment, procedural or administrative deficiencies or other causes resulting in unexpected performance. Any employee having knowledge of a problem which meets specified criteria shall inform supervision to ensure a PIR is generated. Upon receipt of a PIR the Compliance Manager determines if the event is reportable pursuant to various reporting requirements including 10 CFR 21 and 10 CFR 50.73. The Compliance Manager then assigns an investigation or further evaluation to applicable personnel.

Corrective actions are tracked on the Catawba Action List and Commitment Index as described in Station Directive 3.0.9. The number of overdue commitments is trended and controls are placed on extending action due dates. The Quality Assurance organization reviews proposed corrective action and determines if additional action or evaluation is required.

Vendor bulletins and circulars are reviewed for applicability by the Operating Experience Group at the general office. The program is outlined in Nuclear Production Department Directive 4.8.1, Operating Experience Program Description. The Operational Nuclear Safety section is responsible for the receipt, screening and distribution of Operating Experience Program (OEP) information. The Vendor Equipment Technical Information Program (VETIP) is a specific program established in response to Generic Letter 83-28, Required Actions Based on Generic Implications of Salem ATWS Events, and pertains to information associated with the Westinghouse reactor trip system and other NSSS vendor equipment. Documents received from the vendor covering this information are formally acknowledged in writing. Other technical letters and bulletins received from vendors are evaluated, classified and forwarded to technical and engineering support participants for resolution. Items are tracked in a data base and assigned response due dates which reflect the degree of urgency. Immediate attention items have a 30 day response due date and normal attention items have a 90 day due date. Controls are established to periodically review outstanding OEP items and initiate action to alert management and escalate completion efforts. Based on the results of the inspectors' review, the licensee's nonroutine reporting program as established is considered a strength.

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

   a. (Open) Violation 414/89-29-05: Inadequate Procedure to Ensure Proper Testing of Loads Following Circuit Breaker Replacement. The licensee determined that although the circuit breaker for the 2A Hydrogen Skimmer (VX) fan tripped on overcurrent following a start, the fan would not have tripped under accident scenarios due to the lower line voltage experienced following a unit trip. The inspectors reviewed calculations performed by the licensee to justify their determination. The inspectors concluded that the calculations were inadequate to support the contention for the following reason. The circuit breaker overcurrent trip setting was determined to be set at 674 amps during tests conducted by Westinghouse. The licensee's calculations show that at a reduced voltage of 607.7 volts, a maximum inrush current of 583 amps would be experienced during motor start and the circuit breaker would not trip. The inspectors attempted to validate the calculational methods by showing that the breaker would trip under a normal voltage of 638 volts, which it did on June 19, 1989. A maximum inrush current of 612 amps was calculated, a value below the trip setpoint of 673 amps. Therefore this method cannot be

used to show the fan would not have tripped under accident conditions and is considered a weakness. The licensee was unable to explain the apparent flaw in the operability evaluation, however, indicated efforts would continue to solve the discrepancy. The licensee was asked to address the issue of operability in the violation response.

b. (Closed) Unresolved Item 413/89-29-01: Failure to Properly Wear Dosimetry While in the Radiation Control Area. The licensee's investigation determined the individual involved clearly understood the requirements to wear dosimetry, however, became preoccupied with another task and failed to comply with radiological work practice requirements. The licensee also determined station policies and training to be adequate, however, did agree to consider amplifying guidance for wearing dosimetry following removal of protective clothing. This NRC identified violation is not being cited because the criteria specified in section V.A of the Enforcement Policy were satisfied. This is identified as Non-Cited Violation 413/89-31-04: Failure to Wear Dosimetry While in Radiation Control Area.

One non cited violation was identified in paragraph 8b.

9. Exit Interview

The inspection scope and findings were summarized on November 3, 1989, 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.

Item Number	Description and Reference
IFI 413/89-31-01	Lack of Low Voltage Load List For Tagout Applications (paragraph 3d.)
IFI 413/89-31-02	Inadequate Power Supply For Emergency Notification System (paragraph 3d.)
IFI 413/89-31-03	Freeze Seal Program Enhancements (paragraph 5b.)
NCV 413/89-31-04	Failure to Wear Dosimetry While in Radiation Control Area. (paragraph 9b.)