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

Report Nos.: 50-413, 91-01 and 50-414/91-01

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-413 and 50-414 License Nos.: NPF-35 and NPF-52

Facility Name: Catawba 1 and 2

Inspection Conducted: January 7-11, 1991

Inspectors: for M. Thomas 1/29/91
Date Signed

S. Ninh 1/29/91
Date Signed

Approved by: Frank Jape 1/28/91
F. Jape, Chief
Test Programs Section
Engineering Branch
Division of Reactor Safety
Date Signed

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of design changes and modifications and engineering technical support activities.

Results:

In the areas inspected, violations or deviations were not identified.

Modification packages reviewed were technically adequate. There was evidence of good communication and interface between site personnel and design engineering personnel. The Project Services Section has been timely in providing responses to plant requests for engineering support. There was a high turnover of personnel in the Performance Section during 1990 which resulted in a reduction in the experience level of system engineers. This reduction in system engineering experience is considered a weakness. The organization, staffing level, and experience in the Maintenance Engineering Services Section is considered a strength.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*J. Aycock, Projects Engineer, Mechanical/Civil
A. Bhatnagar, Test Engineer, Performance
*R. Casler, Operations Superintendent
*J. Forbes, Technical Services Superintendent
M. Glover, Performance Manager
*J. Hampton, Station Manager
*C. Hartzell, Compliance Manager
G. Horne, Reactor Engineer, Performance
R. Jones, Maintenance Engineering Manager
*V. King, Compliance Staff
*F. Mack, Jr., Projects Manager
*W. McCollum, Maintenance Superintendent
G. Rogers, Projects Engineer, Station Support
Z. Taylor, Test Engineer, Performance

Other licensee employees contacted during this inspection included engineers, operators, technicians, and administrative personnel.

NRC Resident Inspectors

*W. Orders, Senior Resident Inspector
*J. Zeiler, Resident Inspector

*Attended exit interview

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

2. Design, Design Changes, and Modifications (37700)

The inspectors reviewed the NSMs and CEVNs listed below to determine the adequacy of the 10 CFR 50.59 safety evaluations; to verify that the modifications were prepared and installed in accordance with DE requirements and applicable industry codes and standards; to verify that the modifications were reviewed and approved in accordance with TS and administrative controls; to ensure the modifications were installed (for those physically inspectable) in accordance with the applicable NSM or CEVN package; and to verify that post modification test requirements were specified and adequate testing was performed.

a. NSM CN-20451, Install a Manual Bypass for P-14 Safety Signal (S/G Hi Hi Level)

This modification was prepared to correct a station problem report documented on CNPR-00246. This problem report stated that S/G level swings caused unwanted P-14 signals leading to feedwater isolations during unit shutdown operations. The recommended corrective action was to install a manual bypass switch for P-14 to prevent feedwater isolations resulting from S/G level swings during Modes 4, 5, and 6. The solid state protection system was modified to block turbine trip, feedwater pump trip, and feedwater valve closure on the coincidence of a manual block signal from main control board switch and pressurizer low pressure (P-11) at the permissive P-11 setpoint. The modification was to assure that: P-14 will not actuate with the manual block instated below P-11 setpoint; P-14 will actuate when the manual block is removed below P-11; the manual block will not work when above the P-11 setpoint; and the manual block will automatically be unlocked when P-11 setpoint is reached.

Installation of the manual bypass switch was implemented under WR 13352, 13353, and 13361. The WRs were reviewed by the inspector to verify that specific QA controls requirements were included in the NSM. The technical information contained and referenced in the NSM package reviewed was adequate. The implementation of this modification did not create any unreviewed safety questions.

b. NSM CN-20485, Provide Temperature Indications For Reactor Coolant Cold Leg To The SSF From Loops C and B Instead Of Loops A and B

This modification was prepared to correct a station problem report documented on CNPR-02319. This problem report stated that reactor coolant cold leg temperature indications located in the SSF were wired from loops A and B, whereas during an SSF event, steam generators B and C were required to achieve hot standby from the SSF. The recommended corrective action was to provide reactor coolant cold leg temperature indication from loop C instead of loop A. The modification involved the reconfiguration of existing components and replacement of the existing RTD on loop C with an identical model, a Conax Dual Element RTD. The operators ability in the SSF to monitor temperatures in the cold leg corresponding to the steam generators supplying steam to the auxiliary feedwater turbine driven pump was enhanced by this modification.

This modification was implemented under WR 012712 and 012712-1. The WRs and the technical information contained and referenced in the NSM package reviewed were adequate. The implementation of this modification did not create any unreviewed safety questions.

c. NSM CN-20579, Replace RN Supply Valves for KD Heat Exchanger

This NSM involved replacing valves 2RN232A and 2RN292B with more reliable isolation valves. Seat leakage past the EDG engine JW cooler inlet valves mentioned above affected the ability to keep the lube oil warm during EDG engine standby. The new valves were

determined to be more reliable and easier to maintain. The valve body is made of stainless steel for better corrosion protection in raw water applications.

During review of this NSM, the inspectors noted that valve replacement design input information was documented on a Valve Replacement Evaluation Form which was included in the NSM package. The inspectors considered that use of such a form to provide valve design input information was a positive addition to the NSM package. However, the inspectors noted that it was not clear from reviewing the form that all changes in design input information had been evaluated. For example, it was not specifically documented on the form what effect rotating the valves' operators had on the applicable pipe analysis. The inspectors discussed this question with DE personnel who stated that any effect from rotation of the valve operators would have had an effect on the center of gravity. The operators were rotated 180 degrees. Changes in the valve center of gravity were evaluated and determined to be negligible as documented on the form. The inspectors determined from discussions with DE personnel that, although it was not specifically addressed on the form, rotation of the valve operator appeared to have been considered in the DE evaluation. The inspectors had no further questions in this area.

d. CEVN-2434, Replace The Existing Valve Positioner Filter Regulator For the Feed Regulating Valves With A New Filter Regulator

This modification was implemented to correct a station problem report documented on CNPR-04369. This problem report stated that filter regulators for valve positioners on main feedwater regulating valve actuators were undersized for correct output pressure. Design engineering determined that the existing filter regulator only put out 60 psig maximum and did not meet a minimum required pressure of 61 psig for proper operation of the feedwater regulating valves. The air supply pressure was required to be set at 61 to 70 psig because at lower pressures the actuator did not work properly. The recommended corrective action was to replace the existing filter regulator with the V62 filter regulator that provided an output pressure range of 35 to 100 psig. This modification did not create any unreviewed safety questions.

e. CEVN-2436, Replace 1CF60 Actuator With A Spare

This modification replaced 1CF60 actuator with a spare and added a seal welded nitrogen manifold, seal welded pressure switch and pressure gauge ports, and a new pressure switch junction box seal to actuator for 1CF60. Compression and threaded connections were prone to leaks. These leaks allowed the nitrogen supply to diminish. The nitrogen is required to place the valve in its safe position (closed) during an emergency condition. This modification was

implemented to eliminate the leaks and provide the switch protection from the actuator's environment. This modification did not create any unreviewed safety questions.

f. CEVN-2786, Replace NV Valve Motor

This modification involved replacing the motor for valve 1NV252A. The actuator for the valve was a Rotork actuator with a special motor. The motor was damaged and there was no replacement available which was identical to the original motor. The special motor (14NA1) was replaced with a standard motor (16NA1). The inspector reviewed the 10 CFR 50.59 safety evaluation and verified that the evaluation considered torque requirements, motor amperage requirements, physical dimensions, as well as other design input information. Included with the 50.59 evaluation was an evaluation by the vendor stating that the replacement motor was acceptable. This modification did not create any unreviewed safety questions.

The inspectors' concluded from reviewing the above NSMs and CEVNs that the quality and technical content of the information contained in the modifications reviewed were adequate. System and/or component functions and performance requirements were clearly stated. The safety evaluations were detail and thorough. The post modification test requirements specified for the applicable modifications were adequate.

In the areas inspected, violations or deviations were not identified.

3. Engineering Technical Support

The inspectors reviewed the activities of several station groups involved in providing real time plant engineering support. The groups reviewed included Projects Services, Performance, and Maintenance Engineering Services. The review focused on the timeliness and thoroughness of engineering involvement in the on-site problem identification and resolution process.

Project Services

The responsibilities of Projects Services personnel include but are not limited to coordinating station activities concerning the processing of station modifications, performing design work on station design modifications and exempt change variation notices, reviewing SPRs to determine proper resolution, and review and approval of TSMs.

Projects Services accountable engineers serve as the interface between DE and the station during modification preparation and implementation. The inspectors discussed some of the modifications listed above with the assigned AEs. The inspectors observed that AEs interviewed were technically competent and knowledgeable of the modifications assigned to them. The inspectors determined that the AEs were providing timely

support in ensuring that modification implementation schedules were being met.

Projects Services also has primary responsibility to review all approved SPRs for completeness, maintain all SPRs up-to-date, and determine the proper method of resolution (e.g., NSM, CEVN, WR or no action). The inspectors reviewed the SPR backlog in an effort to assess the timeliness of responses. In general, Projects was timely in providing resolutions to those SPRs which had a high priority or could potentially impact plant operations. The inspectors noted examples where the resolutions were provided the same day that the request was written. However, for those SPRs that were screened and determined to have a low priority, resolutions were not always timely. A total of 739 SPRs were received in Projects from March 1, 1990, to December 31, 1990. A total of 546 SPRs were resolved during that time period. A total of 299 were still in review. Of the 299 SPRs still open, 111 were older than six months and 41 were older than one year. Some of the SPRs dated back as far as 1987. The inspectors discussed this matter with licensee personnel who stated that there is no specific time requirement with regard to when a SPR should be answered. Licensee personnel further stated that although some of the SPRs had not been answered, the SPRs were periodically reviewed by station management in order to determine whether the SPRs should be considered for implementation. The inspectors reviewed selected SPRs that were greater than one year old and determined that, although some of the SPRs were written for safety related systems, the safety significance appeared to be very minor or none.

Projects personnel also review and approve TSMs. The inspectors reviewed the status of the active TSMs. There are 55 active TSMs for both Units 1 and 2 combined. The inspectors noted that approximately 45 percent of the TSMs were at least one year old. Some TSMs have been installed for almost four years. The inspectors discussed the length of time some TSMs have been installed with licensee personnel who stated that there is an ongoing effort to reduce the number of TSMs. Permanent modifications have been prepared and scheduled to replace all of the older TSMs. The inspectors further questioned whether any of the older TSMs had been re-evaluated to determine what, if any, effect have subsequent modifications had on the TSMs.

Licensee personnel stated that the TSMs are reviewed periodically to verify that the appropriate tags and other identification are in place, but the TSMs are not re-evaluated to determine the effect of subsequent modifications. Licensee personnel stated that this matter will be reviewed and appropriate actions will be taken. The inspectors reviewed selected TSMs and found that only one of the older TSMs was installed on a safety related system. That one TSM was for a concrete missile barrier. The inspectors further noted that administrative controls contained in Station Directive 4.4.5, Temporary Station Modification, Revision 10, states that TSMs should not be approved if the installation

is expected to be longer than 12 months for TSMs not requiring an outage for removal. These controls should preclude examples such as those noted above where TSMs are installed for periods greater than one year.

System Engineer Program

The licensee's SEP that provides engineering support to the station was evaluated during this inspection. The inspectors interviewed the System Engineer Coordinator, 3 engineering supervisors, and 5 system engineers. The inspectors also reviewed the Station Directive and system engineer's files associated with the SEP.

The SEP was initially established in late 1987 under Station Directive 3.2.18, System Expert Program, and later revised to System Engineer Program in November 1990. The purpose of this program is to maximize the performance, availability and reliability of station systems. The Station Directive 3.2.18 defines program administration and organization, training and qualification requirements, and the system engineers functions. These functions include: detailed system understanding; overall plan and files; system monitoring; problem solver; modification review; procedure review; scheduling; system walkdowns; and reliability review.

The Performance Section Manager is designated as the System Engineer Coordinator and has overall responsibility for coordinating the program at the station. Most system engineers are assigned in the Performance Section and they have engineering degrees. Approximately 33 systems and 8 programs have been identified in the SEP; however, only 8 systems and 3 programs are fully established and being implemented at the station. Systems are nuclear service water, incore, excore, engineered safety features, loose part monitoring, radiation monitor, operator aid computer, and transient monitor.

The inspectors verified that the system engineers reviewed all the station problem reports, problem investigation reports, standard work requests, and modifications for their assigned systems. The inspectors also noted that the system engineers reviewed and approved the post modification testing for all modifications.

The inspectors determined that the system engineers' duties and responsibilities have not been fulfilled as described in Station Directive 3.2.18. For example, system walkdowns were not being performed on a regular basis as required and the experience level for the system engineer was low. This was considered a weakness in the SEP.

The inspectors were informed by the licensee that a high number of experienced system engineers had transferred to non-nuclear departments or left the company in early 1990. Approximate 60 percent of system engineer staff was replaced by graduate engineers with little nuclear power experience.

The licensee has recognized the problem and stated that with the present staff level, inexperienced staff, and other routine responsibilities in the performance section, the system engineers will not be able to meet their system engineers duties and responsibilities as required.

The inspectors noted that the station experienced a high number of safety equipment unavailability in 1990. In response to availability problems, the licensee took an initiative to establish five safety engineering teams in late October 1990. Teams were formed for auxiliary feedwater, nuclear service water, diesel generators, emergency core cooling, and control room ventilation systems. The purpose of each team is to monitor safety system performance indicators and improve the station safety systems availability. Each team consists of members from Performance, Maintenance, Operations, Design, Projects, and Integrated Scheduling. Each team meets regularly at least once a month to discuss, evaluate, and provide inputs to maximize the safety equipment and system availability.

The inspectors were informed by the licensee management that a proposal to change from individual system engineer concept to system engineer team concept is being reviewed. The licensee stated that the system engineer team concept will meet the stations needs to have a true working system engineer within the existing station organization structure. A subsequent inspection will follow up in this area.

Maintenance Engineering Services

The inspectors held discussions with MES management and performed a limited review of the functions performed by MES. This group was reviewed in detail during the recently completed NRC Maintenance Team Inspection. MES has a staff of almost 50 technical support engineers and specialist who function as component experts for the station. There are approximately 170 assigned component expert areas.

MES is responsible for providing daily technical support to the work execution crews as required, development and implementation of the preventive and predictive maintenance programs, parts procurement and setting up of inventory parts, failure analysis and trending programs, researching and initiating equipment modifications to enhance reliability and operability.

The inspectors noted that MES actively communicated and interfaced with Projects, Performance, and Operations personnel in resolving both the individual equipment problems and those which impacted the overall system. The inspectors considered the organization, staffing level, and experience in MES to be a strength of the licensee's overall station engineering support organization.

In the above areas inspected, violations or deviations were not identified.

4. Exit Interview

The inspection scope and results were summarized on January 11, 1991, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

5. Acronyms and Initialisms

AE	Accountable Engineer
CEVN	Catawba Exempt Variation Notice
CF	Main Feedwater System
CFR	Code of Federal Regulations
CN	Catawba Nuclear
CNPR	Catawba Nuclear Problem Report
DE	Design Engineering
EDG	Emergency Diesel Generator
JW	Jacket Water
KD	Emergency Diesel Generator Jacket Water System
MES	Maintenance Engineering Services
NSM	Nuclear Station Modification
NV	Chemical and Volume Control System
psig	Pounds Per Square Inch Gauge
QA	Quality Assurance
RN	Nuclear Service Water System
RTD	Resistance Temperature Detector
SE	System Engineer Program
S/G	Steam Generator
SPR	Station Problem Report
SSF	Safe Shutdown Facility
TS	Technical Specifications
TSM	Temporary Station Modification
WR	Work Request