



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA ST., N.W., SUITE 3100
 ATLANTA, GEORGIA 30303

Report No. 50-369/81-15

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

Facility Name: McGuire 1

Docket No. 50-369

License No. NPF-9

Inspection at Lake Norman, North Carolina

Inspectors: J. C. Bryant for 7/9/81
 M. J. Graham Date Signed

J. C. Bryant for 7/9/81
 W. Orders Date Signed

Approved by: J. C. Bryant 7/9/81
 J. C. Bryant, Section Chief, Resident and Reactor Date Signed
 Project Inspection Division

SUMMARY

Inspection on April 27 - May 15, 1981

Areas Inspected

This routine, announced inspection involved 125 resident inspector-hours on site in the areas of operational safety, outage maintenance activities, surveillance testing, personnel airlocks, inadvertent safety injections, radwaste releases, and followup of TMI Action Items.

Results

Of the seven areas inspected, no items of noncompliance or deviations were identified in four areas; three items of noncompliance were found in three areas (Violation - change of modes in an Action Statement - Paragraph 5; Violation - failure to follow procedure resulting in safety injection, - paragraph 9; Violation - failure to follow tagging procedures - paragraph 10).

DETAILS

1. Persons Contacted

Licensee Employees

- *M. McIntosh, Manager
- *T. McConnel, Superintendent of Technical Services
- *D. Rains, Superintendent of Maintenance
- *G. Cage, Superintendent of Operations
- *R. Wilkinson, Superintendent of Administrative Services
- *W. Sample, Projects and Licensing
- *R. Rider, Mechanical Maintenance
- *C. Rogers, Maintenance
- W. McCollough, Maintenance
- *L. Weaver, Performance
- *S. Frye, Operations
- *L. Massey, Operations
- *J. Silver, Operations
- *R. Ruth, Quality Assurance
- *M. Pacett, Site Safety Review Group
- *R. Michaels, Radwaste Chemistry
- R. Probst, Radwaste Chemistry
- T. Keane, Health Physics
- *C. Figueroa, Planning
- *C. Fish, Contract Services
- E. Estep, Projects and Licensing
- *D. Lampke, Projects and Licensing
- *G. Copp, Projects and Licensing, Corporate Office

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

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on May 15, 1981 with those persons indicated in Paragraph 1 above. License management acknowledged the inspectors' findings without dissent.

3. Licensee Action on Previous Inspection Findings

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Operational Safety

At various times throughout the inspection interval, the inspectors observed operations activities in progress in both the control room and the plant. Modifications in progress at the personnel air lock (Paragraph 8), and fuel transfer canal were discussed with licensee personnel. Operations activities observed were reviewed to verify that written procedures were in use where appropriate and that individuals performing work were qualified to do so. Portions of safety-related valve line-ups and equipment tagged from service were independently verified to be in the condition required by procedures. Compliance with Technical Specification Limiting Conditions for Operation was confirmed, where possible, in the control room. The inspector also reviewed all control room and tagging logs, and licensee event report records. As a result of this review of operating practices the inspector had the following findings.

- a. On May 8, 1981, the reactor operator's and shift supervisor's logs had late entries, made at approximately 1420, indicating that the vessel head had been retorqued at approximately 1100. Retorquing the vessel head took the operating status of the plant from Mode 6 to Mode 5. For greater than three hours, the control room operations staff was unaware of the actual plant mode of operation.

Station Directive 3.1.4 Conduct of Operations, which requires in part that: "... The shift supervisor... must be cognizant of all operational conditions affecting the safety of the plant ...(and)... of all maintenance activities affecting plant operation being performed while he is on duty." The shift supervisor's being unaware of the correct mode of plant operation is a violation (Violation 50-369/81-15-01).

As a result of this violation, the transition from Mode 6 to Mode 5 was made while the plant was in an Action Statement with respect to Technical Specification 3.4.1.4 which requires both trains of Decay Heat Removal to be operable. Changing modes in an action statement is a violation of Technical Specification 3.0.4. This is a part of violation 81-15-01.

- b. The inspector also noted a continuing housekeeping problem in the area behind the Unit 1 control boards. The presence of cigarette butts, paper and extraneous fuses and screws was discussed with the licensee staff. The inspector noted that immediately afterward, access to the area was controlled by requiring use of the shift supervisor's key and warning signs were posted. The effectiveness of the licensee's corrective action will be evaluated with time.

6. Outage Maintenance Activities

The licensee was forced to cool down prior to completion of precritical hot testing due to mechanical difficulties. The inspector followed up on the principal maintenance activities of the outage, which were chiefly related to reactor coolant system leakage. The first isolation valve of the hot leg

suction line of the decay heat removal system exhibited body to bonnet leakage, the first reactor vessel head o-ring began leaking severely, and check valve back leakage to cold leg accumulator developed.

During the outage, extensive leak testing and repair was performed on the accumulator and safety injection system valves. The head was removed and a scratch found on the vessel flange surface. Vendor evaluation of the scratch resulted in grinding out the scratch. The reactor coolant system and decay heat removal systems were drained and the leaking valves repaired.

The inspector observed selected portions of the maintenance activities in progress in order to verify that procedures were being used where appropriate, tagging practices were adequate, and activities complied with Technical Specification Limiting Conditions for Operation.

No violations were identified in this area.

The inspector observed that the maintenance procedure for removal and replacement of the vessel head, MP/1/A/7150/42, failed to address the implications of the maintenance activity on operational status.

There are four transition points in the procedure which change the operational mode or the operational condition specified for applicability of a technical specification. These areas; untorquing the head, removing the head, setting the head on the vessel, torquing the head. The procedure does not recognize these transition points or require that technical specification compliance be verified. Needing to be addressed are; verification that surveillance requirements have been met for mode changes; that the mode change will not be made in an action statement, that the reactor is shut down for 100 hours prior to lifting the head, and that a power operated relief valve or 4.5 in² vent is operable before setting the head on the vessel.

The inspector also noted that the radiation protection information provided in the procedure is minimal. It was suggested that in the review planned for MP/1/A/7150/42, consideration be given to incorporating prerequisites based on ALARA considerations but not performed by Health Physics in preparing the radiation work permit. Specifically discussed were cleaning the reactor refueling cavity prior to retorquing the head, and installation and use of special shielding.

The inspector noted that Violation 81-15-01 reflects a general unfamiliarity of the operations staff with the status of systems removed from service for maintenance or operated by the radwaste chemistry group. For example, no entries are shown in control room logs for removal or replacement of the vessel head; the operator's log has no reference to transition into mode 6. The inspector stated that the licensee's response to Violation 81-15-01 therefore should address efforts to enhance communications with control room personnel, in addition to any changes made in MP/1/A/7150/42.

7. Surveillance Test

Selected portions of periodic test PT/O/A/4601/03 (RPS Channel 3 Functional Test) were witnessed in order to ascertain that the test instrumentation employed by the technician was in calibration, the procedure was being followed and the technician was qualified for the addressed activity. Testing appeared to have been performed within the surveillance schedule and applicable LCO's appeared to have been met.

System/component removal and restoration appeared to be adequately addressed.

No violations were identified within the areas addressed.

8. Personnel Airlocks

Numerous problems with the personnel air locks were described in Inspection Report 81-13. Three areas were noted as requiring corrective action; seal reliability, interlock prevention of door closure, and door bounce. The following actions have been taken or are planned to effect corrective action.

a. Seal Reliability

The seal rupture problem appears to be related to overinflation. An earlier vendor recommendation to inflate the seals to 90 psi to decrease leakage past the seal was apparently inappropriate for a later model of seal. This model seal has a 60 psi nominal inflation pressure, and tended to overextend at the higher pressure, particularly around the corners of the doors. Here, the curvature placed greater strain on the outside surface of the seal and the door to frame gap was the greatest. The following corrective actions have been taken:

1. Shims have been installed on all airlocks to decrease the door to frame gap, particularly at the corners. The inspector reviewed QA records of the materials for the modification and observed portions of the work in progress. Surface testing of the shim welds revealed numerous apparent flaws in earlier work on the airlock, done by the vendor in assembly. The licensee's QA followup to these apparent flaws will be reviewed by the inspector and addressed in a future inspection report.
2. The licensee has also ordered a complete replacement stock of seals designed to a 90 psi inflation pressure. To date, one set of two seals has been delivered and installed. These seals will be maintained at 85 psi and their reliability observed with use.
3. The seals on the other three doors are of the 60 psi inflation pressure type. The pressure in these seals has been reduced to 55 psi for normal use. Leak testing is currently underway per technical specification requirements. The inspector noted that

the acceptance criteria for seal leakage of 14.95 sccm in T.S. 4.C.1.3.d is based on maintenance of an adequate seal for seven days with no instrument air available to replenish seal supplies. The technical specification number was determined using a 90 psi initial inflation pressure, and is therefore not conservative for the new lower inflation pressures. The licensee has committed to determine conservative acceptance criteria and adhere to them in leak testing the seals.

b. Interlock Prevention of Door Closure

The interlock system on door operation had prevented closure of a door on one occasion when a seal on the companion door ruptured. The inspector discussed various licensee proposals to avoid repetition of this event, reviewed the modification selected, and observed portions of the work in progress. The close button has been removed from the interlock circuit entirely so that a door will always be closed. The inspector will review testing of the circuitry for the open and close buttons and interlocks after the modification has been completed.

c. Door Bounce

On one occasion, one door closed, making up the door's limit switch and triggering the locking mechanism, but bounced back a few inches. The locking mechanism then closed, effectively holding the door open instead of shut. With all interlocks satisfied, the seals inflated and the other door could be opened. The licensee has reduced the speed on the hydraulic door closure mechanism, reducing the momentum available to cause a bounce. The inspector also discussed with the licensee and observed portions of the work on a modification in progress on the locking mechanism. The mechanism consists of alignment pins which slide into brackets on doors. The pins are being tapered at the insertion end and the bracket holes are being enlarged to an oval shape. This modification will provide increased ease in locking if the door and pins are slightly misaligned at the time the pins begin to slide into place. The inspector has no further questions on this modification at this time.

9. Inadvertent Safety Injections

On March 30, 1981 during maintenance on the solid state protection system (SSPS) cabinets, an inadvertent safety injection was initiated. I&E technicians were trying to clear a feedwater isolation signal that was preventing the operators from opening the feedwater isolation valves. To work inside the logic section of the 1A SSPS cabinet without disturbing the plant, the technicians placed the "Input Error Inhibit" switch in the "Inhibit" position and the "Mode Selector" switch in the "Test" position. The "Input Error Inhibit" switch inhibits the field inputs to the cabinet and the "Mode Selector" switch isolates the output of the cabinet. After working in the cabinet for a while but before completing the job, the technicians left the area. The switches were left in the aforementioned

positions. While the technicians were gone, their supervisor walked by the cabinets. He assumed that the job was finished and the technicians had forgotten to return the test switches to their normal positions. He turned the "Mode Selector" switch to "Operate" and the "Input Error Inhibit" switch to "Normal". A now unblocked ESF signal immediately initiated safety injection on train 1A. After the reset timers elapsed, the operators reset train 1A safety injection, phase A isolation diesel generator load sequence, and proceeded to recover the plant.

An I&E Technician was again called to help get the feedwater isolation valves open. The feedwater isolation valves are interlocked with the reactor trip breakers so that the breakers must be reset, or simulated reset, to open the valves. The technician attempted to simulate the reset of the reactor trip breakers by lifting and reconnecting a lead in the SSPS logic cabinet. The operators had not reinserted the permissive blocks in the SSPS logic during the recovery process and the simulation of the closed reactor trip breakers cleared the resets on train 1A safety injection, phase "A" isolation and diesel generator load sequencer. Since the ESF signal was still present, unblocked, and the systems not reset, another safety injection was initiated. The operators again reset train 1A safety injection, phase "A" isolation, and diesel generator load sequencer. This time the permissive blocks were inserted by the operators using the switches on the control board.

A procedure was not in use by the I&E Supervisor when the first safety injection was initiated nor by the technician when the second safety injection was initiated. SSPS maintenance procedure IP/0/A/3010/07 (Procedure for Troubleshooting Solid State Protection System (SSPS) During Critical Operation) was available for use but did not clearly describe the steps necessary to return a train of the SSPS to normal operation. Operators were using AP/1/A/5500/35 (ECCS Actuation During Plant Shutdown) to recover the plant after the first safety resetting, but it did not adequately detail inserting the permissive blocks after resetting the systems. A similar occurrence transpired on April 29, 1981 when an inadvertent safety injection was initiated on train A when the train A Solid State Protection System (SSPS) cabinets were returned to service without blocking the safety injection signals.

I&E technicians were working on modification to train A of SSPS. When prepared to return the system to normal, one of the technicians asked an operator to insert the logic block in SSPS. Licensee investigation revealed there was confusion at the time as to what action need be taken, if any, to preclude a safety injection initiation. The technician returned to the cabinets with the understanding that the operators need not and would not take any preclusive actions on the front panel. The technician placed the Input Error Inhibit Switch in the normal position which initiated a safety injection on train A. The control operator later stated that he had attempted to insert the logic blocks but they would not energize. Control operators recovered from the S.I. using procedure AP/1/A/5500/35 (ECCS Actuation During Plant Shutdown).

Procedure IP/O/A/3010/07 (Procedure for Troubleshooting Solid State Protection System) was available to provide guidance in the efforts of restoring SSPS to normal but was not being used. Had operations and I&E verified that the blocks were inserted/energized as in the intent of the aforementioned procedures, the safety injection would not have initiated. Failure of the I&E supervisor to employ a written approved procedure in his attempt to restore the SSPS cabinets to normal on March 30, 1981, an attempt which resulted in a safety injection initiation; the failure of the I&E technician to employ a written approved procedure in his attempts to defeat the feedwater valve interlocks on March 30, 1981, attempts which again led to an inadvertent Safety Injection; and the failure to employ a written approved procedure in attempts to restore SSPS to normal on April 29, 1981, attempts which once again led to an inadvertent Safety Injection and violates McGuire Nuclear Station Technical Specification 6.8.1 which requires written procedures be established, implemented and maintained covering activities concerning safety-related equipment.

10 CFR 50 Appendix B part V (Instructions, Procedures, and Drawings) as implemented by Duke Power Company Topical Report, Quality Assurance Program part 17 2.5 (Instructions, Procedures and Drawings) and as further implemented by McGuire Nuclear Station Technical Specification 6.8.1 (Procedures and Programs) requires in part that activities associated with nuclear safety-related structures, systems and/or components be accomplished in accordance with instructions, procedures, and/or drawing which include quantitative and/or qualitative criteria/information in order to assure the activity addressed is satisfactorily accomplished.

Failure of SSPS maintenance procedure IP/O/A/3010/07 to entail adequate guidance/information to clearly describe the actions necessary to return SSPS to normal operation, and the failure of procedure AP/1/A/5500/35 to entail adequate guidance/information to clearly describe the actions necessary for the operators to recover from the inadvertent Safety Injections as aforementioned violate the requirements and intent of McGuire Technical Specification 6.8.1 which requires that adequate written procedures be established, implemented and maintained for activities associated with safety-related structures, systems and/or components.

The above is a violation (Violation 50-369/81-15-02). Response must address both the failure to follow procedues and the procedural inadequacy.

10. Radwaste Releases

The inspector responded to the following events related to radwaste releases.

- a. On April 24, 1981, a waste monitor tank was pumped to the environment while the flow monitor required by Technical Specifications to be in operation was out of service for calibration. The individuals executing the procedures for pumping out the waste monitor tank were not aware that the instrumentation was out of service until after the

release was begun, and it was apparent that the flow indicator was not responding.

The work request form for calibration of the flow monitor incorrectly identified the system as being under the control of the operations staff rather than Radwaste Chemistry. The shift supervisor who signed the work request failed to recognize the error, and therefore failed to execute OP/O/B/6200/44 Radwaste Chemistry Procedure for Component Removal from the Restoration to Service. This procedure is required to be executed for all Radwaste Chemistry equipment removed from service, regardless of the group initiating removal from service.

The shift supervisor also failed to identify the flow monitor as safety-related, and therefore incorrectly completed OP/O/A/6100/09 Removal and Restoration of Station Equipment. The instrument was not noted in the log as a technical specification requirement, and the waste monitor tank subsystem was not noted as inoperable except in an Action Statement. These examples of failure to follow procedure constitute noncompliance with Technical Specification 6.8.1 which requires that "Written procedures be established, implemented and maintained..." for safety-related activities, including the administrative control of safety-related equipment. (Violation 50-369/81-15-03).

The inspector verified that when the instrument was found out of service, the release volume was estimated per the technical specification action statement. The radiation monitor on the line was in operation, and required sampling was done. The water in the waste monitor tank was demonstrated to be uncontaminated.

The possibility of releasing radwaste without required instrumentation in service was discussed by the inspector in an exit interview on April 21, 1981. At that time, the licensee committed to review all radwaste release procedures and add prerequisite verification that required instrumentation was operable and operating prior to beginning a release. This commitment had not yet been carried out at the time the waste monitor tank was pumped out. The procedure in use had not yet been changed to include this precaution. The licensee has now adjusted his previous commitment to require that it be carried out for all release procedures prior to initial criticality. This commitment is already tracked with IE Report No. 50-369/81-13. The inspector will verify completion of the changes prior to initial criticality.

- b. At various times throughout the inspection interval, maintenance personnel cut into piping to perform repairs and found that it had been inadequately isolated or drained. In addition, the Chemical and Volume Control system was aligned to drain through a rubber hose to the floor drain, resulting in several inches of water throughout the auxiliary building. In several of the above cases, severe contamination would have resulted if the events had occurred after the plant had been critical.

The inspector discussed the need to avoid recurrence with licensee management at the exit interview. The possibility was discussed that some carelessness was arising from the knowledge that the systems were not contaminated. The inspector noted that the licensee Health Physics organization had already expressed concern at these practices, and was increasing its involvement with maintenance activities. The effectiveness of the licensee's efforts to avoid spills of potentially radioactive liquids will continue to be evaluated by the inspector. No violations were identified in this area.

11. TMI Response

The following TMI action items were analyzed in order to determine adequacy of licensee response.

a. Item I.A.I.3 Shift Manning

Inspection efforts reveal that McGuire Station Directive 3.1.4, Conduct of Operations, which was originally issued November 30, 1979, and subsequently revised through revision 3 effective March 25, 1981, details, in part, the normal working hours for licensed operators and imposes administrative restrictions on overtime for those personnel. Station Directive 3.1.4 does not entail overtime restrictions for other station staff who perform safety-related functions such as auxiliary operators, I&E technicians, key maintenance personnel and health physicists.

Conversations with the licensee reveal that they do not regard the clarification offered in NUREG 0737 as a requirement and as such has not addressed the subject of limiting overtime for those personnel referenced above. It is concluded that current administrative policy at McGuire adequately addresses overtime for licensed operators but fails to fully regard the guidance and clarification offered in NUREG 0737 item 1.A.1.3 Shift Manning.

b. Item I.C.6 Verification

In the "Duke Power Company, McGuire Nuclear Station, Response to TMI Concerns", as updated by its letter of March 9, 1981, the licensee committed to implement a system of verification of correct performance of operating activities prior to Mode 4 operation. In NUREG 0422, Supplement No. 5, ONRR acknowledged that "The system described by the licensee is consistent with the clarification in NUREG 0737".

Selected portions of the requirements entailed in item I.C.6. and the licensee's obligations were inspected during this reporting period. Those items inspected appear to meet the intent of the action item.

Further details/inspection efforts are detailed in inspection report 50-369/81-03.

c. Item I.C.5 OEEP

By letter dated August 6, 1980, Duke Power Company provided a description of its Operating Experience Evaluation Program (OEEP) in response to this TMI Action Plan item to ONRR. In NUREG 0422 Supplement No. 4, ONRR acknowledges that based on their review of the OEEP, they conclude that Duke Power has made adequate provision for the dissemination of operating experience and that it therefore meets the staff requirements as expressed in TMI Action Plan item I.C.5.

Selected portions of the requirements and the licensee obligations to the above item were reviewed during this report period and appear to be adequate.