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

Report Nos. 50-369/82-26 and 50-370/82-20

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

Facility Name: McGuire Units 1 and 2

Docket Nos. 50-369 and 50-370

License Nos. NPF-9 and CPPR-84

Inspection at the McGuire site near Charlotte, North Carolina

Inspectors: A. J. Ignatonis for — 8/12/82
P. R. Bemis — Date Signed

A. J. Ignatonis for — 8/12/82
P. Hopkins — Date Signed

Approved by: A. J. Ignatonis for — 8/12/82
J. C. Bryant, Section Chief, Division of Project and Resident Programs — Date Signed

SUMMARY

Inspection on June 21 - July 25, 1982

Areas Inspected

This routine announced inspection involved 340 resident inspector-hours on site in the areas of operational safety verification, maintenance, surveillance, significant event followup, plant trips and transients, steam generator ECT, and thermal sleeve identification and removal.

Results

Of the seven areas inspected, no items of noncompliance or deviations were identified in any area.

DETAILS

1. Persons Contacted

   Licensee Employees

   *M. McIntosh, Station Manager
   *G. Cage, Superintendent of Operations
   *E. Estep, Project Engineer

   Other licensee employees contacted included superintendents, operating engineers, shift supervisors, reactor operators, unit coordinators, station group supervisors, planners, technicians, mechanics, specialists, security, office personnel, corporate design engineers, training and QA personnel.

   Other Organizations

   J. Roth, Westinghouse
   J. Larson, Westinghouse

   *Attended exit interview

2. Exit Interview

   The inspection scope and findings were summarized on July 26 1982, with those persons indicated in Paragraph 1 above. The station manager acknowledged the findings.

3. Licensee Action on Previous Inspection Findings

   Not inspected.

4. Unresolved Items

   Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve noncompliance or deviations. New unresolved items identified during this inspection are discussed in paragraph 6d.

5. Operational History

   The reporting period began with the unit at 75% power and making preparations for a three week outage for steam generator (S/G) eddy current tests (ECT). On June 22, 1982 the unit finished its allowed 720 hour power run at 75% and reduced power to 50%.

   On June 24, 1982, the licensee performed the loss-of-offsite power test, as part of their power ascension program, just prior to their outage. The test was successful and is discussed in more detail in paragraph 6a.

The majority of the inspection interval was taken up by the eddy current testing (ECT) of the four steam generators (S/G's).

A new problem surfaced during this outage. This was the discovery of a missing thermal sleeve in one of the cold leg safety injection line in which the licensee was prompted to perform the inspection based on similar findings that occurred at another utility. The details of inspection results are discussed in paragraph 9.

Other major work completed during this outage was ice condenser surveillance which included weighing ice baskets and water and ice addition; "A" diesel generator inspection; replacement and checkout of seventy ROTORK limit switches; fourteen penetration leak tests; and over one hundred PM/PT's; these items were followed by the inspectors and are addressed in detail in paragraph 5.

During the inspection interval five transients occurred which were of interest and are discussed in paragraph 10.

On July 15, 1982, the unit began heatup and return to power operation following an approval by NRC. On July 17, 1982, the unit was tied into the grid and on July 18,1982 it reached 50% power where it will continue to remain pending completion of the ECT data analysis and submittal of an operating program to the NRC for review and approval.

6. Operational Safety Verification

Throughout the inspection interval the inspectors observed operational activities in the plant and the control room. The following activities were reviewed and/or observed as possible on a daily basis: shift turnover; control room and shift manning; control and other vital area access; control room and plant operators adherence to approved procedures for ongoing activities; instrumentation and recorder traces important to safety for anomolies; operator understanding of alarmed control room annunciators including initiation of corrective action in a timely manner; operator response to computer alarms; valve and electrical alignment for emergency safeguards features (ESF), and reactor protection system (RPS) inputs in the control room in compliance with technical specification (TS) requirements; shift supervisor, control operator, tag out, and operator's work request logs; access and egress from the protected area in compliance with requirements of the security procedures; and egress from controlled areas in compliance with the health physics plan.

During the inspection period the inspectors also observed, reviewed and/or verified the following: status of instrument calibration, equipment tags and radiation work permits; results of selected liquid and gaseous samples; and gas and liquid waste discharges and logs. The inspectors toured the accessible areas of the plant to make an assessment of the following: plant and equipment conditions; areas which could be fire hazards; interior of selected electrical and control panels; proper personnel monitoring practices; housekeeping and cleanliness practices; and radiation protection

controls. The inspectors performed a complete walkdown of the containment spray system (NS).

Based on this review and observation one unresolved and three inspector followup items were identified.

a. Loss of offsite Power Test

The loss-of-offsite power test was observed by the inspector through all phases. The test was accomplished and demonstrated that the turbine-generator had the ability to sustain a loss or isolation of the offsite power distribution system and subsequently acted as the onsite power source. In response to the transient, the evaluations of the control systems and the interaction of the system responses were adequate.

Observations were made at the switchyard of the testing of the switchyard circuit breakers prior to the loss-of-offsite power test.

Station auxiliaries were maintained with the main generator as the power source.

After reviewing the control copy of the procedure there were numerous pen and ink changes that made the procedure very hard to follow. The major element of concern lies in the distribution of information copies to control room operations personnel, while the control copy had never been retyped and proofed so as to alleviate to the best extent possible misinterpretation or loss of sequential steps. This applies to TP/1/A/2650/12, Loss of Off-site Power Test, and AP/1/A/5500/03, Load Rejection. The Duke administrative procedure does not provide for retyping the TP's when numerous changes have been made, nor does it require the operators to have a controlled copy of the test procedure (TP) as the test coordinator is telling the operators what to do during the test. The licensee has committed to a complete retype of all test procedures incorporating the required changes prior to use on Unit 2. Until the inspector can verify this incorporation this will be carried as an Inspector Followup Item. (370/82-20-01).

b. Excessive Cooldown of the Reactor Coolant System (NC)

After the loss-of-offsite power test was performed satisfactorily the unit was tied back into the grid to allow offsite power to supply station demands, then the unit was taken into a controlled shutdown.

At the time the shutdown began an operator in training was at the controls under the guidance of a licensed operator. The operator began driving control rods in to shut down the reactor. But due to many minor problems which caused steam demands, once the reactor was below the point of adding nuclear heat the NC temperature began to drop since decay heat and RCP heat could not keep up with the steam demands. The NC temperature dropped below 551°F for seven minutes while the reactor

was critical before the operator could return the reactor above the point of adding nuclear heat and return Tave above 551°F. Technical Specification (T/S) 3.1.1.4 requires NC temperature to be greater than or equal to 551°F when the reactor is critical, but the action statement allows operation below 551°F for fifteen minutes and the licensee did meet this requirement.

The licensee is presently evaluating the above transient and the item will be carried as an Inspector Followup Item until the final evaluation is made (369/82-26-01).

c. Unintentional Mode Change from 5 to 4

On June 26, 1982 at 0638 hours, while the unit was being shutdown, the unit experienced a momentary loss of voltage on two vital inverters. This caused loss of power to a cooling water isolation valve to the residual heat removal (ND) heat exchanger which was being used to cool the plant. When the loss occurred the NC temperature was 198°F and by the time cooling was restored NC temperature climbed to 209°F. 200°F is the point at which mode 4 changes to mode 5 going down and vice versa. Therefore, a mode change occurred, mode 5 to 4, while the unit had not met the mode 4 requirements. The licensee is evaluating and will submit a written report. Even though this event occurred due to equipment failure the inspector's concern stems from the fact that this is the second time this same power failure has caused a plant transient (1st time was a reactor trip on June 13, 1982). Until the licensee determines the cause of these momentary power failures this will be carried as an Inspector Followup Item. (369/82-26-02).

d. Stopping ND pumps while in mode 5

T/S 3.4.1.4 requires two ND loops to be operable and at least one in operation while in mode 5. The T/S also allows the one running pump to be de-energized for up to one hour (when certain conditions are met).

On July 1, 1982 and again on July 10, 1982 the, licensee stopped the running ND pump because of leakage through containment spray valves. During this time there was a considerable increase in NC temperature (40°F in one case). The inspector will contact NRC management to determine the intent of the allowance for de-energizing the running pump, especially when the other ND train ("A" train) was available for use prior to stopping the "B" train ND pump which would have prevented the increase in core temperature.

Until NRC makes a determination of intent, this item will be carried as Unresolved Item (369/82-26-03).

7. Maintenance

Maintenance activities were observed in progress throughout the inspection period. The inspector verified that the following activities were

accomplished by qualified personnel using approved procedures: Radiation controls, fire prevention and safety measures, and QA/QC hold points were observed as appropriate; test equipment used was verified to be calibrated, and data recorded were compared to that observed; required administrative approvals and tagouts were obtained prior to initiating work; limiting conditions for operation (LCO) were met while maintenance was being performed; replacement parts and materials used were proper certified; testing and calibration as necessary were completed prior to returning equipment to service; and houskeeping requirements were met.

The inspector reviewed portions of outstanding work orders for safety-related systems to insure the licensee is performing maintenance in a timely manner and that an excessive backlog is not developing. The inspector examined the used procedures for technical adequacy and the completion of work orders. The following maintenance activities were observed and reviewed in depth:

Work Request HPS 40-860,	Trouble Shoot and Repair Loss of Sample Flow to EMF 43A
Work Request 009666 PMP	Perform PM/PT of Hydraulic Snubber operability
MP/0/A/7650/50	Snubber Removal, Test, Inspect and Replace
MP/0/A/7650/54	Test Bench, Snubber
Work Request 108548 OPS	Repair Leak on Hydraulic Snubber Reservior
NSM 91864	Check Main Steam System Snubbers for Design
MCM 1201-26-0057	Removal of 14" Thermal Sleeve from Hot Leg 2B Steam Generator, Unit 2
Work Request 011692 PMP	PM/PT on UHI Accumulator Level Switches
IP/0/A/3000/03D	UHI Level Switch Calibration
Work requests nos.	63732, 63727, 63728, 63723, 63721, 63716, 63730, 63712, and 63717 OPS
IP/0/A/3066/05	Field Changeout of ROTORK NA2 Actuator Switches
IP/0/A/3066/02	ROTORK Actuator Corrective Maintenance
PT/1/A/4401/03	KC Valve Stroke Timing (shutdown)
PT/1/A/4204/02	NA Valve Stroke Timing
PT/1/A/4201/02	FW Valve Stroke Timing

PT/1/A/44453/02	V1 Valve Stroke Timing
PT/1/A/4203/02	N3 Valve Stroke Timing
PT/1/A/4206/02	N1 Valve Stroke Timing
PT/1/A/4206/03	N1 Valve Stroke
MCEE-155-01.01	
Work Request no. 63733	IAE Setup add on Pak, not set correctly as valve only had close computer indication
IP/0/A/3066/02	ROTORK Actuator Corrective Maintenance
Work request nos. 108485 OPS	NM-3 Leak Repair (pressurizer liquid samle line inside containment isolation valve)
IP/0/A/3066/02	ROTORK actuator Corrective Maintenance
MP/0/A/7650/44	Hanger Installation, Removal and Replacement
MP/0/A/7650/48	Re-installation of Red Head Concrete Anchor
MP/0/A/7650/71	Annulus Pressure-door Seals Corrective Maintenance
MP/0/A/7650/74	Coating Procedure
PT/1/A/4207/02	NM Valve Stroke Timing
PT/1/A/4200/01C	Isolation Valve Leak Test
1MCR-NM-759	
Work request no. 52822	Replace Diesel Crankshaft Oil Seal
MP/0/A/7400/44	Diesel Engine Alignment
Work request nos. 91891	Perform NSM MG-933 Revision 0. Plug Tube in S/G A.
MP/0/A/7650/14	Calibration of Snap on Torque Wrench Tester

Westinghouse procedure MRS 2.3.2 GEN-13, Revision 2 "Mechanical Plugging of S/G Tubing and Tube Holes".

Certification of qualifications from Westinghouse plugging personnel.

Work request nos. 009660	PM/PT on Diesel Generator 1A
MP/O/A/7400/42	Diesel Lead Control Mechanism Corrective Maintenance
MP/O/A/7400/15	Diesel Engine Piston and Liner Removal and Replacement
MP/O/A/7400/41	Diesel Engine Mounted Lube Oil Strainer Corrective Maintenance
MP/O/A/7400/43	Diesel Engine Lube Oil Separator Corrective Maintenance
MP/O/A/7400/28	Diesel Main Engine Lube Oil Pump and Drive Removal and Replacement
MP/O/A/7400/50	Diesel Mounting Bolt Torquing
PT/O/A/4350/21	D/G Periodic Maintenance
PT/O/A/4350/19	D/G Governor and Voltage Regulatory Bench Mark Comparison Test
PT/1/A/4350/15A	D/G 1A Periodic Test
Work request Nos. 109253 and 109258 OPS	Damage to 1A2 KC (Component Cooling) Motor rotor and Inspect Pump
MP/O/A/2002/01	Motor Inspection and Maintenance
IP/O/A/3250/51	Cable Tray Installation, Removal, and Replacement
IP/O/A/3090/02	Controlling Procedure for Troublshootng and Corrective Maintenance
PT/1/A/4401/01A	Component Cooling Train 1A Performance Test

Based on the above review and observations two Inspector Followup Items were identified and are discussed below.

a. UHI Level Switches Out-of-Calibration

It appears that everytime the calibration is checked on the UHI level switches it is out of calibration and must be recalibrated. The licensee has reported this repeatedly to the NRC and has asked Westinghouse to perform analysis to determine, if the 0.25 inch tolerance on the level switch setpoint can be widened without creating

a safety issue. Until such time as Westinghouse makes this determination this item will be carried as an Inspector Followup Item (369/82-26-04)

b. Rotork Model NA-2 Electric Motor Operators with Clear Plastic Switch Deficiency

During pre-turnover survey of Unit 2, four Rotork Model NA-2 actuators were found to have cracked or broken control switch mechanisms. The problem was isolated to NA-2 actuators with clear plastic switches. Failure of these switches could impair proper valve operation. All NA-2 actuators in Class IE service could possible be affected. NA-2 actuators are used outside containment only.

Rotork has determined the problem to be caused by subvendor supplied switches with casings made of the wrong molecular weight material. These clear plastic switch casings may crack or break causing improper operation of actuator. Rotork reported this problem under 10 CFR Part 21 on June 23, 1982.

Valves possibly affected are located outside containment in the following systems: Component cooling, Diesel Generator Fuel Oil, Residual Heat Removal, Safety Injection, Breathing Air, Instrument Air, Station Air, Chemical and Volume Control, Auxiliary Feedwater, Nuclear Service Water, Control Air Ventilation, Containment Spray, Refueling Water, Liquid Waste Recycle, Boron Recycle, and Nuclear Sampling.

Failure of these switches could prevent valves from performing their safety function.

All Rotork NA-2 actuators will be inspected of clear plastic switches which will be replaced by qualified upgraded design switches. All Rotork NA-2 actuators on Unit 1 have been inspected and switch changeout is complete. All Rotork NA-2 actuators on Unit 2 will have switch changeout completed prior to fuel loading. Until such time as the Unit 2 chanegout is complete this item will be carried as an Inspector Followup Item (370/82-20-02)

8. Surveillance

Surveillance activities were observed throughout the inspection interval. The inspector reviewed and/or verified that procedures used conform to the technical specification (TS) requirements and had received proper licensee review and approval; that test instrumentation was properly calibrated; that the systems were removed from service and restored to service per procedure; test prerequisites and acceptance criteria were met; test data was accurate and complete; completed tests were properly reviewed and discrepancies were rectified; and tests were performed by qualified individuals. The following surveillance activities were observed in greater depth.

IP/0/B/3006/03A	Process RMS Detector Flow Switch Set Point Calibration (Personnel Qualification)
PT/1/A/4600/03A	Semi - Daily Surveillance Items
PT/1/A/4150/01B	Reactor Coolant (NC) Leakage Calculation
PT/1/B/4250/04D	FWPT and Oil Pump Test
OP/0/B/6150/10	Loose Parts Monitoring System
PT/1/B/4350/12	Exciter Blown Fuse Test
PT/0/A/4200/08	Airlock Operational Test
OP/1/A/6100/03	Controlling Procedure for Unit 1 Operation (Unit 1)
OP/1/A/6450/02	Annulus Ventilation Test
PT/1/A/4400/01J	Fire Protection System weekly Inspection
PT/1/A/4450/03C	Annulus Ventilation System Performance Test
PT/0/A/4400/01D	Fire Pump Operability
PT/1/A/4201/01	FWST Level Instrumentation
PT/1/A/4250/01A	Weekly Turbine Test
HP/0/B/1003/13	CVVCDT Release, Manual Release Rate Determination
TP/1/A/2650/12	Loss-of-Offsite Power Test
AP/1/A/5500/03	Load Rejection
OP/1/A/6150/06	Draining the Reactor Coolant System
MP/0/A/7650/51	Hydraulic Snubber Repair and Replacement
HP/0/B/1006/05	Westinghouse Initial Entry Survey

Based on this review and observation no violations or deviations were identified.

9. Significant Event Followup

During the inspection interval two significant events occured: (1) S/G ECT were performed on all 4 S/G's and (2) a thermal sleeve was discovered to be missing from the "B" loop cold leg safety injection line penetration to the NC system. These events are discussed in detail in the following paragraphs.

a. S/G ECT

On June 24, 1982 the unit began a controlled shut down to perform ECT on all 4 S/G's after a 720 hour power run at 75% power and a short power run at 50%. The licensee performed ECT of all tubes in rows 47, 48, and 49 which are the suspect areas for tube problems. As of the end of this inspection period the data on the S/G tubes is only preliminary and the official results will be reported in a subsequent report. The preliminary data did indicate one tube above the plugging limit and the licensee decided that rather than wait for the official results it would take the safe approach and plug the tube. The tube was plugged by certified Westinghouse personnel and tested satisfactorily. The licensee was given permission by NRC to run at 50% power until the unit refuels. The licensee will submit a proposed operations program at power levels above 50% power after they receive the final ECT results presently being evaluated by their contractor.

b. Missing Thermal Sleeve

During the outage the inspector noted a problem that had occurred at another utility operating a plant similar to McGuire. The licensee of the other plant found all of their thermal sleeves on safety injection cold leg lines to be missing (and subsequently found them in the bottom of the reactor vessel). Since this information had not yet been supplied to the industry the inspector informed plant management of the problem and the licensee immediately began a program to determine if all of their thermal sleeves were present.

The licensee, using radiographic techniques (RT) began looking for the seven existing thermal sleeves of the design which had previously failed. After looking at all locations it was determined that the thermal sleeve from the "B" loop safety injection cold leg was missing. This was further verified by use a TV camera inside the pipe.

The licensee contacted Westinghouse to perform a safety analysis to determine if they could operate the unit with the thermal sleeve not in its proper place and if it was in the bottom of the reactor vessel. The Westinghouse analysis was presented to NRC on July 14, 1982 and showed there would be no safety concerns even if all the sleeves were to leave their original position and end up in the bottom of the reactor vessel or in the case of the pressurizer surge line sleeve, the sleeve would end up in the "B" S/G.

The NRC after evaluating the Westinghouse analysis and the licensee program determined that there were no safety concerns, therefore, the unit could operate.

The licensee has instituted a vigorous monitoring program using the loose parts monitoring system to insure that the thermal sleeves do not begin to move around. If the sleeves do move and cause an alarm on the

loose parts monitor system then the licensee has committed to shut down the unit. The licensee has also committed to increase their surveillance in four areas that would detect early identification of any problems the sleeves might cause.

The licensee has committed to remove the thermal sleeves at the next outage of sufficient duration and by no later than the first refueling outage of the Unit.

The licensee has already removed the sleeve on the pressurizer surge line on Unit 2 and plans to remove the other sleeves after they complete hot functional tests on Unit 2 (prior to fuel loading). The resident inspector observed the removal of the Unit 2 pressurizer thermal sleeve and no problems were identified.

10. Plant Transients, Trips and Safety System Challenges

During the reporting interval the unit experienced one unplanned reactor trip and one transient. Details are discussed below.

a. Reactor Trip

On July 21, 1982 at 0555 hours the unit experienced an unplanned trip without safety injection actuation from 50% power. During the performance of a turbine trip test the turbine actually tripped when it should have not which in turn tripped the reactor. Turbine/reactor trip setpoint is above 48% power. For the test a lever on the turbine must be held to the test position to prevent tripping the turbine. After extensive testing it was determined that the operator must have released the lever prior to the trip signal resetting. The licensee evaluation will be discussed in an up coming LER.

b. Turbine Trip

On June 23, 1982 at 1731 hours the turbine experienced a runback after tripping feedwater pump 1B. The load runback was from 600 Mwe to less than 200 Mwe. Operations determined the runback should not have occurred and took manual control of the turbine.

The unit has a control circuit which causes the turbine, if greater than 56% power, to runback to less than 50% power if either feedwater pump is tripped. The switch which senses turbine impulse pressure, which is used for determining 0% power, had been set by instructions sent by the vendor, but the instructions were wrong and the switch setpoint was much to low. The switch also had a large reset error which made the unit runback farther than it should have. The licensee has changed out the switch and made additional modifications during the last outage which should prevent reoccurrence of this problem.

11. Independent Inspections - Snubbers

The inspector verified by direct observation and discussions with the licensee all aspects of inspecting snubbers which included the selection process, removal, testing, replacement and maintenance, and QA work. This was the first inservice functional test of Unit 1 hydraulic snubbers to be performed during the scheduled outage of June 25, 1982.

A representative sample of hydraulic snubbers was randomly selected from the total population of Unit 1 safety-related hydraulic snubbers by the licensee and was tested per Technical Specification, Section 3/4.7.8c, Plan number one.

The representative sample was selected as follows by the licensee:

1. Four separate computerized printouts were generated which contains 837 random numbers each. The 837 random numbers reflect the total population of Unit 1 safety-related hydraulic snubbers from which a functional test sample must be selected.

2. A computer printout that listed all Unit 1 snubbers in order by their serial numbers was used to number each safety-related hydraulic snubber in order from 1 to 837.

3. The random number printouts were correlated with the serial number printout to produce four separate lists of snubbers which represent four different random samples.

4. A comparison was made between the four random samples to determine which one would offer the most selective representation of the total population of snubbers.

5. Each of the four random samples was representative of the total population; but, random sample number one appeared to be the most representative and it was used for the selection of hydraulic snubbers for functional testing.

Included in the selection process of hydraulic snubbers to be inspected were the following parameters: (1) configuration; (2) operating environment (temperature and humidity); (3) size; and, (4) capacity.

The inspector verified that each work crew received adequate instructions pertaining to Health Physics and Security, safety precautions, work orders, and tool selections. One individual was assigned to each crew who was responsible to insure that all aspects of the job were completed and that all documents were properly accounted for.

Based on this inspection, observations and records review no violations or deviations were identified.