



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

Report Nos.: 50-369/83-46 and 50-370/83-53

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

Docket Nos.: 50-369 and 50-370

License Nos.: NPF-9 and NPF-17

Facility Name: McGuire 1 and 2

Inspection at McGuire site near Charlotte, North Carolina

Inspector: P. A. Taylor 1-06-84
for P. T. Burnett Date Signed

Approved by: P. A. Taylor 1-06-84
for F. Jape, Section Chief Date Signed
Engineering Program Branch
Division of Engineering and Operational Programs

SUMMARY

Inspection on December 12-14, 1983

Areas Inspected

This routine, unannounced inspection involved twenty-four inspector-hours on site in the areas of reactor coolant leak rate calculations and followup of licensee event report.

Results

No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *M. D. McIntosh, Station Manager
- *T. L. McConnell, Superintendent of Technical Services
- *R. Wilkinson, Superintendent of Administration
 - J. W. Boyle, Performance Engineer
 - W. M. Sample, Projects and Licensing Engineer
- *H. B. Barron, Operations Engineer
- *D. S. Marquis, Reactor Engineer
- *L. E. Weaver, IAE Engineer
- *R. B. White, IAE Support Engineer
 - D. E. Simmons, IAE Associate Engineer
 - S. Carter, IAE Supervisor
- *D. Mendezoff, Licensing Engineer
- *W. H. McDowell, Technical Associate-Licensing

Other licensee employees contacted included two operators, and three office personnel.

NRC Resident Inspectors

- W. T. Orders, Senior Resident Inspector
- *R. C. Pierson, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on December 14, 1983, with those persons indicated in paragraph 1 above. The licensee made the following commitments (Items 02 and 03).

IFI 369/83-46-02: Revise tests 4150/01B to minimize temperature effects - paragraph 5.

IFI 369/83-46-03: Review temperature effects on tank levels - paragraph 5, also

IFI 369/83-46-01: Resolve differences in PZR mass accounting - paragraph 5.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Reactor Coolant System (RCS) Leakage Calculation (61700, 92706)

The licensee uses periodic test procedures PT/1/A/4150/01B and PT/2/A/4150/01B, both titled Reactor Coolant Leakage Calculation, for Units 1 and 2 respectively. With the exception of different valve identifications, the only significant difference between the two procedures is that a test duration of one hour is specified for Unit 1 and 30 minutes is specified for Unit 2. A test frequency of once per three days is required by technical specification 4.4.6.2.1. Tests on both units were scheduled for the midnight to 0800 shift on December 13, 1983. At the request of the inspector, the licensee readily agreed to try to extend the test duration on Unit 2 to four hours. (Unit 1 was scheduled for load following during that shift, and an extended test was not practical on that unit). The licensee further cooperated by setting up automatic digital recording of the data required for input to RCLK8. (RCLK8 is a microcomputer program used on the NRC Independent Measurements Program). The following data were recorded every fifteen minutes during the test period: average RCS temperature, pressurizer level, pressurizer pressure, pressurizer relief tank (PRT) level, volume control tank (VCT) level, reactor coolant drain tank (RCDT) level, reactor thermal power, pressurizer relief tank temperature and reactor coolant drain tank temperatures. (The latter three records were not required for the calculation, but were used as qualitative indicators of systems stability).

The licensee was able to run the test for five hours and forty-five minutes starting at 1:03 a.m. and terminating at 6:47 a.m. The RCLK8 program was run for the period 1:16 a.m. to 6:46 a.m. Using the operator assist computer (OAC) program, as provided for in the procedure, the licensee calculated a total leakage rate of 0.632 gpm, and an unidentified leakage rate of 0.547 gpm. The RCLK8 results were 0.67 gpm total and 0.58 gpm unidentified, which was considered to be good agreement. The output of RCLK8 and the plant-specific parameters developed for use for both McGuire units are appended to this report.

In comparing the details of the OAC and NRC calculations, there were good agreements on mass change in the RCS, PRT, VCT and RCDT. However, the NRC calculation gave nearly twice the change in the pressurizer of the OAC calculation. That observation was discussed with a member of the licensee staff, by telephone, on December 20, 1983, and will be resolved during a latter inspection (Inspector Followup Items 370/83-53-01 and 369/83-46-01: Resolve Differences in PZR Mass Accounting Between OAC and RCLK8).

The licensee procedure also provided a method of hand calculating leak rates when the OAC is not operable. The inspector used the hand calculation and found the results to be different from the computer calculations (0.84 gpm total leakage and 0.71 gpm unidentified leakage). The hand calculation did

not provide for accounting for changes in RCS mass as a consequence of changes in T-average. From the beginning to the end of the measurement T-average dropped 0.8°F leading to a 600 lb. increase in RCS inventory. At the exit interview licensee management agreed to add procedural controls to minimize the effect of changing T-average on test results. (Inspector Followup Item 369/83-46-02 and 370/83-53-02: Revise periodic tests 415/01B to minimize temperature affects).

All level instruments that provide input to the calculation are calibrated at a single temperature, 653°F for the pressurizer and 68°F for the remaining tanks. The level measurements are obtained from differential pressure (d/p) cells. Hence it appears to be incorrect to apply an ambient temperature correction to tank levels as is done in the hand calculation and may be done in the computer calculation. At the exit interview the licensee made a commitment to review the correctness of the practice (Inspector Followup Items 369/83-46-03 and 370/83-53-03: Review temperature corrections to tank levels). With the exception of the pressurizer, the effect of the other temperature corrections appears to be small to negligible.

The licensee further agreed that the commitments would be completed within 60 days.

6. Followup of Licensee Event Reports (92700)

(Closed) LER 370/83-39: Control rod withdrawal limits exceeded during startup on August 9, 1983. The inspector reviewed the licensee's analysis based upon the use and methodology of WCAP-10182, and accepted the conclusion that the moderator temperature coefficient (MTC) remained negative (-0.79 pcm/°F) in spite of the withdrawal limits being exceeded. Review of TP/2/A/2150/13, Determination of Rod Withdrawal Limits to Prevent A Positive Moderator Coefficient, revealed that the limits were established to enforce an MTC of -1pcm/°F. Technical Specification 3.1.1.3 requires only that the MTC be less than zero.

NRC

INDEPENDENT MEASUREMENTS PROGRAM

REACTOR COOLING SYSTEM LEAK RATES

STATION: MC GUIRE
 UNIT : 2
 DOCKET : 50-370

TEST DATE : 13DEC83
 START TIME: 0116
 DURATION : 5.5 hours

TEST DATA

	Initial	Final
System Parameters:		
Pressure, psia	2255.3	2256.2
T Ave, degrees F	585.4	584.7
Water Levels:		
Pressurizer, %	59.1	58.5
Relief Tank, %	78.3	78.4
Volume Control Tank, %	65.4	52.4
Drain Tank, %	47	51
Water Charged = 0 gal		Water Drained = 0 gal

TEST RESULTS

Change in Water Inventory in pounds:

Vessel & Piping	566	Relief Tank (1)	122
Pressurizer	-323	Drain Tank (1)	118
Volume Control Tank (1)	-2082		
Less: Water Charged	0	Collected Leakage	240
Plus: Water Drained	0		

Cooling System	-1839		

Leak Rates in gpm (3):

Gross	0.67
Identified	0.09
Unidentified	0.58

- (1) Determined from tank calibration curve.
 (2) Determined from tank dimensions.
 (3) The density used for converting inventory change to leak rate was 62.31 pounds/cubic foot based on standard conditions.

PARAMETER LIST

Unit Identification:	
Plant Name	MC GUIRE
Unit Number	2
Docket Number	50-370
Nuclear Steam System Supplier	Westinghouse
Vessel and Piping:	
Volume	10240 cubic feet
Pressurizer:	
Level Units	%
Temperature Compensated	No
Calibration Curve	
Slope	538.705 pounds per %
Upper Level Limit	100 %
Lower level Limit	0 %
Relief	Relief Tank
Volume Control Tank:	
Level Units	%
Calibration Curve	
Slope	160.18 pounds per %
Upper Level Limit	100 %
Lower level limit	0 %
Geometric Method Available	No
Drain Tank:	
Level Units	%
Calibration Curve	
Slope	29.42 pounds per %
Upper Level Limit	7 %
Lower level limit	23 %
Geometric Method Available	No
Relief Tank:	
Level Units	%
Calibration Curve	
Slope	1224 pounds per %
Upper Level Limit	75 %
Lower level limit	23 %
Geometric Method Available	No