



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

Report No.: 50-416/85-29

Licensee: Mississippi Power And Light Company
Jackson, MS 39205

Docket No.: 50-416

License No.: NPF - 29

Facility Name: Grand Gulf 1

Inspection Conducted: July 30 - August 2, 1985

Inspector: *P. T. Burnett*
P. T. Burnett, Reactor Inspector

7 August 85
Date Signed

Approved by: *Frank Jape*
F. Jape, Section Chief
Engineering Branch
Division of Reactor Safety

8/8/85
Date Signed

SUMMARY

Scope: This routine, unannounced, inspection entailed 32 inspector-hours at the site in the review of completed startup tests and in witnessing the loss of feedwater heating test.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Licensee Employees Contacted

- *J. E. Cross, General Manager
- *J. C. Roberts, Technical Support Superintendent
- *R. F. Rogers, Technical Assistant
- *L. F. Daughtery, Compliance Superintendent
- *J. D. Bailey, Compliance Coordinator
- M. J. Wright, Manager, Plant Operations
- *D. Cupstid, Start-up Supervisor
- *S. F. Tanner, Manager, Nuclear Site Quality Assurance
- G. H. Davant, Startup Engineer
- W. C. Cade, Shift Superintendent
- G. L. Lee, Shift Supervisor
- W. Russell, Assistant Operations Superintendent

Other licensee employees contacted included reactor operators, engineers, and office personnel.

Other Organizations

- T. R. Enright, General Electric Company
- J. A. Marshall, Bechtel

NRC Resident Inspectors

- *R. C. Butcher, Senior Resident Inspector
- J. L. Caldwell, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on August 2, 1985 with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed the inspection findings. 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 inspector during this inspection. The licensee made the following commitments, which will be tracked as inspector followup items:

- 416/85-29-01, Complete by August 30, 1985, a draft revision of FSAR Figure 14.2-4 to more accurately portray observed performance in natural circulation and with low flow forced recirculation, paragraph 5a.
- 416/85-29-02, Include a revised curve of power-flow performance along with a discussion of the reasons for and significance of differences from FSAR Figure 14.2-4 in the Startup Report, paragraph 5a.

- 416/85-29-03 - Concurrent with the submission of the Startup Report, submit proposed changes to FSAR Figure 14.2-4 and Technical Specification Figure B 3/4.2.3-1 for review by NRC/NRR, paragraph 5a.
- 416/85-29-04 - Evaluate by August 30, 1985, the effect of the changed axial power distribution, as evidenced by 43 of 44 LPRM strings having base criticality codes, on the values of the thermal limits calculated in TC4, paragraph 5a..

A draft of the above commitments was discussed with and reviewed by members of the licensee staff prior to the Exit Interview.

3. Licensee Action on Previous Enforcement Matters

Not Inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Review of Completed Startup Tests (72532)

The following completed startup tests were reviewed to assure that the results had been reviewed and accepted by plant management, that the acceptance criteria had been satisfied, and that all test exceptions had been resolved or were being actively pursued:

a. Tests in Test Condition 4 (TC4)

- (1) 1-B21-SU-16-4 (Revision 2), Selected Process Temperatures Water Level Measurements, was performed on May 7-8, 1985. The results were accepted by the nuclear plant manager on May 14, 1985 with no open test exceptions.
- (2) 1-000-SU-19-4 (Revision 1), Core Performance, was performed without exceptions on May 7, 1985, and the results were accepted on May 13, 1985.
- (3) 1-000-SU-21-4 (Revision 2), Core Power-Void Mode, was performed on May 7, 1985. The results were accepted on July 9, 1985 with no open exceptions.
- (4) 1-N32-SU-22-4 (Revision 3), Initial Pressure Controller, was performed on May 7-8, 1985. The results were accepted by the nuclear plant manager on July 29, 1985 with test exception FP-16, a level 2 acceptance criterion unresolved.
- (5) 1-000-SU-23-4 (Revision 1), Feedwater System, was performed on May 7, 1985. The results were accepted on July 8, 1985 with no open test exceptions.

- (6) 1-B33-SU-30-4 (Revision 3) Reactor Recirculation System Performance Measurement, was performed on May 7, 1985, and accepted on May 13, 1985 with no open test exceptions.

The review of the TC4 tests revealed that all had been performed at a nominal power level of 39% of rated thermal power (RTP) and a nominal, natural-convection, core flow of 26% of rated. When plotted on the thermal power versus core flow map of FSAR Figure 14.2-4, the test condition did not match the graphical description of TC4, which centered on a point corresponding to 51% RTP and 32% flow. However, Figure 14.2-4 also contains a written description of TC4 as, "The natural circulation condition, within 5% power, from the intersection of the natural circulation line and 100 percent rod line." The licensee stated the graphical portion of Figure 14.2-4 is in error, and the natural circulation capability of the reactor is not as great as indicated in the figure.

Earlier, the licensee had corresponded with the NSSS vendor (General Electric Company) on lower than expected recirculation flow capability using the low-frequency motor generator. In a letter dated January 25, 1985, General Electric (GE) responded that the lower flow (24% vice 32%) did not affect the FSAR Chapter 15 safety analyses, the 10 CFR 50 Appendix K ECCS analysis, and had only minimal effect on the MCPR limits in the Technical Specifications. Additionally, the licensee had acknowledged in a letter to the NRC (AECM-85/0015) that experience through December 1984 indicated a need to revise Figure 14.2-4, and committed to issue the necessary revision by the end of startup testing.

At the exit interview the licensee made a commitment to have a draft revision of the figure available for review by the inspector by August 30, 1985. (Inspector followup item 416/85-29-01)

The licensee also committed to include the revised curve in the Startup Report along with a discussion of the reasons for and significance of the changes. (Inspector followup item 416/85-29-02)

A further commitment included submitting the corresponding changes to the FSAR and bases of the Technical Specifications for NRC/NRR review concurrently with the Startup Report. (Inspector followup item 416/85-29-03)

Throughout TC4 testing, the plant computer output from P1-3 program, Periodic Core Evaluation-Thermal Limits, indicated base criticality codes for 43 of the 44 LPRM strings. A base criticality code is indicative of a significant difference in current axial power distribution from the distribution that existed when the LPRM string was last calibrated. The large number of codes called into question the validity of the conclusions that the acceptance criteria on thermal limits had been satisfied.

At the exit interview, the licensee made a commitment to evaluate the effect of the changed mode of operation on the axial power distribution. From that they will re-evaluate the measurements of thermal limits. This work is to be completed by August 30, 1985. (Inspector followup item 416/85-29-04)

b. Test Condition 5

- (1) 1-C51-SU-12-5 (Revision 2), APRM Calibration, was performed without test exceptions on May 3-4, 1985 using 06-RE-1J11-V-0001 (Revision 23), Power Distribution Limits Verification, for data collection. The results were accepted by the plant manager on May 7, 1985.
- (2) 1-000-SU-19-5 (Revision 1), Core Performance, was performed without test exceptions on May 3-4, 1985. The results were accepted on May 7, 1985.
- (3) 1-000-SU-21-5 (Revision 2), Core Power-Void Mode, was performed on May 4-5, 1985, and the results were accepted by the plant manager on May 7, 1985 with no test exceptions open.
- (4) 1-N32-SU-22-5 (Revision 2), Initial Pressure Controller, was performed on May 1-7, 1985, and the results were accepted on July 9, 1985 with no open test exceptions.
- (5) 1-000-SU-23-5 (Revision 2), Feedwater System, was performed without test exceptions on May 2-5, 1985. The plant manager accepted the results on May 7, 1985.
- (6) 1-000-SU-24-5 (Revision 1), Turbine Valve Surveillance, was performed without test exceptions on May 5, 1985. The results were accepted by the plant manager on July 17, 1985.
- (7) 1-B21-SU-25-5 (Revision 2), Main Steam Isolation Valves, was performed without test exceptions on May 5-6, 1985, with the results accepted by the plant manager on July 29, 1985.
- (8) 1-B33-SU-30-5 (Revision 3), Reactor Recirculation System, was performed without test exceptions on May 4-5, 1985. The results were accepted on May 8, 1985.

6. Loss of Feedwater Heating Test (70302)

The loss of feedwater heating test, section 7 of startup test procedure 1-000-SU-23-6, Feedwater System, was witnessed during the evening of August 2-3, 1985. The temperature decrease was less than predicted and correspondingly, the power increase was less than anticipated. Prior to initiating the test, the operating crew received an adequate briefing from the test engineer. The test was conducted in a safe, deliberate manner and

in apparent full compliance with the approved test procedure. The completed test package will be inspected during a future inspection.

Attachment:
Grand Gulf Unit 1:
Power Level Data Review

ATTACHMENT TO INSPECTION REPORT 50-416/85-29

GRAND GULF UNIT 1: POWER LEVEL DATA REVIEW (file GG72532)

Startup Test Performance and Review Schedule
(NR = not required by FSAR Table 14.2-3)

Test No.	Title	Test Condition						
		Heatup	One	Two	Three	Four	Five	Six
SU-01	Chemical and radiochemical			NR		NR		
SU-02	Radiation measurements			NR		NR	NR	
SU-05	Control rod drive system	84-04	NR	85-21	85-25	NR	NR	
SU-06	SRM performance & rod sequence	84-04	85-21	NR	NR	NR	NR	NR
SU-08	Rod sequence exchange	NR	NR	NR	NR	NR		NR
SU-10	IRM performance	84-04	85-21	NR	NR	NR	NR	NR
SU-11	LPRM calibration	85-25	84-46	NR	85-25	NR	NR	
SU-12	APRM calibration	84-04	84-46	84-50	85-25	NR		
SU-13	Process computer	85-25	85-21	NR	85-25	NR	NR	
SU-14	RCIC system	84-04	NR	85-21	NR	NR	NR	NR
SU-16	Selected process temperature	85-25	85-21	84-50	85-25	85-29	NR	
SU-17	System expansion	85-26	85-26	NR	85-26	NR	NR	
SU-18	Core power distribution	NR	NR	NR	85-25	NR	NR	
SU-19	Core performance	NR	84-46	84-50	85-25	85-29	85-29	
SU-21	Core power-void mode response	NR	NR	NR	NR	85-29	85-29	NR
SU-22	Pressure controller setpoint changes	NR	85-21	85-21	85-25	85-29	85-29	
SU-23	Feedwater system	85-25	85-21	85-21	85-25	85-29	85-29	
SU-24	Turbine valve surveillance	NR	NR	NR	85-25	NR	85-29	
SU-25	Main steam isolation valves	85-25	NR	NR	85-25	NR	85-29	
SU-26	Relief valves	85-25	NR	85-21	NR	NR	NR	NR1
SU-27	Turbine SV trip & gen load rejection	NR	NR	85-21	85-25	NR	NR	
SU-28	Shutdown from outside control room	NR	NR	85-21	NR	NR	NR	NR
SU-29	Recirculation flow control system	NR	84-46	NR	85-25	NR	NR	
SU-30	Recirculation system	NR	NR	84-50	85-25	85-29	85-29	
SU-31	Loss of turbine/generator & offsite power	NR	NR	85-21	NR	NR	NR	NR
SU-33	Drywell piping vibration		NR			NR		
SU-34	RPV internals vibration		NR			NR		
SU-35	Recirculation system flow calibration	NR	NR	NR	85-25	NR	NR	
SU-36	Isolated reactor stability	84-04	NR	NR	NR	NR	NR	NR
SU-70	Reactor water cleanup system	85-25	NR	NR	NR	NR	NR	NR
SU-71	Residual heat removal system	84-04	84-46	NR	NR	NR	NR	
SU-72	Drywell atmosphere cooling	85-25	NR	85-21	NR	NR	NR	
SU-74	Offgas system	84-52	84-52	NR	84-52	NR	NR	
SU-75	Cooling water system	85-25	85-21	NR	85-25	NR	NR	

84-04(typ) = Inspection in which review of the completed procedure was finished.

NR1 = Not required per letter of July 23, 1985 from T.M. Novak(NRC/NRR) to J.B. Richard (MP&L)