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

Report No.: 50-416/87-28

Licensee: System Energy Resources, Inc.
Jackson, MS 39205

Docket No.: 50-416 License No.: NPF-29

Facility Name: Grand Gulf Nuclear Station

Inspection Conducted: October 5 - 9, 1987

Inspector: P. T. Burnett 11-10-87
Date Signed

Approved by: for F. Jape, Section Chief, Engineering Branch Division of Reactor Safety 11-10-87
Date Signed

SUMMARY

Scope: This routine inspection was conducted in the areas of closeout of unresolved item, review of core performance and nuclear instrument calibrations.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Licensee Employees Contacted

J.E. Cross, GGNS Site Director
R.F. Rogers, Manager, Unit 1 Projects
*M.J. Wright, Manager, Plant Support
*J.D. Bailey, Compliance Coordinator
*D.G. Cupstid, Technical Support Superintendent
*L.F. Daughtery, Compliance Superintendent
*W. R. Patterson, Reactor Engineering Supervisor

Other licensee employees contacted included engineers and office personnel.

NRC Resident Inspectors

*R. C. Butcher, Senior Resident Inspector
J. L. Mathis, Resident Inspector

* Attended exit interview

2. Exit Interview (30703)

The inspection scope and findings were summarized on October 9, 1987 with those persons indicated in paragraph 1 above. Proprietary materials were reviewed during this inspection, but are not included in this report. The licensee had no comment on the inspection findings.

3. Licensee Action on Previous Enforcement Matters (92702)

(Closed) Unresolved item 416/86-06-02: Define the allowed applications of rod position bypass switches. By letters dated October 7, 1986 and December 5, 1986, the licensee applied for amendment 28 to license NPF-29 to change Technical Specifications for the rod pattern controller function to properly position out-of-sequence control rods. That extensive change to Technical Specification 3.1.4.2 was authorized by Commission letter dated March 5, 1987. This item is closed.

4. Unresolved Items

No unresolved items were identified.

5. Documents Reviewed

a. XN-NF 87-11(P) (Revision 1), Grand Gulf Unit 1, Cycle 2, Startup and Operations Report,

b. XN-NF 833(P), POWERPLEX(R) Core Monitoring Software System , User's Manual for The Grand Gulf Nuclear Station,

c. 06-RE1C51-0-0001 (Revision 26), Local Power Range Monitor Calibration, (addresses Technical Specifications Table 4.3.1.1-1 item 2, 4.3.7.7, 4.3.6, and 4.3.1.1),

d. 06-RE-1J11-V0001 (Revision 31), Power Distribution Limits Verification (addresses Technical Specifications 4.2.1, 4.2.3, 4.2.4, Table 4.3.1.1-1 items 2b and 2c, and Table 4.3.6-1 item 2a), 4.2.4, Table 4.3.1.1-1 items 2b and 2c, table 4.3.6-1 item 2.a),

e. 06-RE-SB13-V-0017 (Revision 25), Reactivity Anomalies (addresses Technical Specifications 4.1.2.1 and 4.1.2.b),

6. Power Distribution Monitoring (61702)

With fuel cycle 2, which began in December 1986, the licensee changed fuel vendors. One-third of the present core is composed of bundles manufactured by Advanced Nuclear Fuels Corporation (ANF), formerly Exxon Nuclear Fuels (XN). Consequently it was necessary to change the computer-based fuel performance monitoring procedures, although the remainder of the core is fuel provided by General Electric (GE), the original supplier.

The ANF PowerPlex software system for core monitoring is described in document 5.b and is installed on a PRIME computer, which is backed up by another PRIME. Plant instrumentation, including the local power range monitors (LPRMs) and traveling incore probes (TIPs) remain interfaced to the original plant computer (PC), which now serves as a data link rather than a data analyzer. With the PC down, it is possible to manually enter plant data into PowerPlex.

This software is more fully described in the topical report XN-NF-80-19, Volume 1 and Supplements 1 and 2, Exxon Nuclear Methodology for Boiling Water Reactors-Neutronic Methods for design and Analysis (March 1983). This topical report was approved in an NRC letter dated April 7, 1982.

The more powerful computer and software provide the opportunity to perform three-dimensional core power distribution analysis and prediction in a manner of minutes and whenever desired. According to the reactor engineering supervisor, this capability has been much needed during this cycle. Although the core has ample margin to all thermal limits during steady-state, full-power operation, maintaining thermal limits during transients such as startups and rod pattern changes has been difficult. However, the analytical capability has been available to the operations staff

around-the-clock. The reactor engineering supervisor and two qualified reactor engineers each have dumb terminals in their homes, from which it is possible for them to monitor, analyze, and predict core performance. Therefore it is never necessary for operations to move a rod at any time without the benefit of reactor engineering judgement based upon review of the predicted effect calculated by a core-design-quality code.

Surveillance of thermal thermal limits is performed using an approved procedure, document 5.d. A review of the completed procedures confirmed that the surveillances had been performed with the proper frequency and satisfactory result during the period January 12, 1987 to July 10, 1987.

No violations or deviations were identified.

7. Calibration of Nuclear Instruments (61705)

Calibration of LPRMs by use of the TIPs is accomplished by approved procedure, document 5.c. Review of completed procedures and surveillance records confirmed that the calibrations had been performed at intervals less than 1000 Mwd/T throughout the current cycle.

Procedures for calibration of the average power range monitors (APRMs) are contained in document 5.c, in which case the APRMs are recalibrated immediately after the LPRM calibrations, and in document 5.d, which assures recalibration every twenty-four hours. Review of over twenty procedures completed during the current cycle showed no instances of unacceptable gain adjustment factors.

No violations or deviations were identified.

8. Shutdown Margin and Reactivity Anomaly (61707)

The beginning-of-cycle measurement of shutdown margin is described in document 5.a. The predicted R factor for increase in core reactivity during the cycle from consumption of burnable poisons in the fuel was 1.31% rho, which led to a minimum acceptable shutdown margin of 1.69% rho for the measurement. The measured shutdown margin using in-sequence rod withdrawal was 4.06% rho. the inspector reviewed the data analysis and agreed with the results.

Surveillance of reactivity anomalies is adequately addressed in document 5.e. Review of procedures completed during the current cycle confirmed that the surveillance was being performed at an acceptable frequency with satisfactory results.

No violations or deviations were identified.