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

Report No.: 50-416/86-34

Licensee: Mississippi Power and Light Company
Jackson, MS 39205

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

Facility Name: Grand Gulf

Inspection Conducted: October 6-10, 1986

Inspector: E. H. Girard 11/2/86
E. H. Girard Date Signed

Approved by: J. J. Blake 11/3/86
J. J. Blake, Section Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection was in the areas of inservice inspection, inservice testing, and inspector followup items.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*C. R. Hutchinson, General Manager
*L. F. Daughtery, Compliance Superintendent
*J. D. Bailey, Compliance Coordinator
*J. W. Yelverton, Operation Technical Assistant
R. A. Courtney, QA Supervisor, Inservice Inspection
R. S. Lewis, Senior Quality Representative
C. Abbott, QA Supervisor, Inspections
C. Ferguson, Outage Specialist
S. Saunders, Retest and Systems Engineering Superintendent
J. Feil, Engineering Supervisor, Nuclear
J. Parrish, Chemistry/Radiation Control Superintendent

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

Other Organizations

D. Dheria, Engineer, Bechtel

NRC Resident Inspectors

*W. F. Smith, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on October 10, 1986, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee. The following new item was identified during this inspection.

Inspector Followup Item 416/86-34-01, Adequacy of Flow to Some Areas Served by the Standby Service Water System, paragraph 7.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items were not identified during the inspection.

5. Inservice Inspection (73052, 73753, and 73755)

The inspector selectively reviewed the licensee's inservice inspection (ISI) procedures, observed ISI work, and reviewed ISI records to assess the licensee's compliance with regulatory requirements and the applicable code. The applicable code is ASME Section XI (77S79).

a. Review of Procedures

The inspector reviewed weld ultrasonic examination procedures and the procedures for a leakage test. The review was performed as follows:

(1) Ultrasonic Examination Procedures

The following procedures were reviewed:

UT-1.30 R11
UT-1.43 R4
UT-30 R14

The above procedures were reviewed to determine if the following procedure elements were properly implemented:

- The type of apparatus to be used including frequency range, linearity, and signal attenuation accuracy requirements were specified.

- The extent of coverage (beam angles, scanning surface, scanning rate and directions) and methods of scanning were specified and consistent with the ASME Code.

- Calibration requirements, methods, and frequency; calibration block type, size, geometry, and material and location and size of calibration block reflectors were clearly specified and consistent with the applicable ASME Code.

- The sizes and frequencies of search units were specified and consistent with the ASME Code.

- Beam angle or angles were specified and consistent with the ASME Code.

- Methods of compensation for the distance traversed by the ultrasonic beam as it passes through the material were specified and consistent with ASME Code.

- The reference level for monitoring discontinuities was defined and the scanning gain setting specified.

- Methods of demonstrating penetration were established.

- Levels or limits for evaluation and recording of indications were specified.

- Methods of recording significant indications were established and the reporting requirements were in accordance with requirements established by the licensee.

- Acceptance limits were specified or referenced and were in accordance with the ASME Code, Section XI.

(2) Leak Test Procedures

The following documents prescribed the procedural requirements for leak testing the ASME Class 1 portion of the High Pressure Core Spray (HPCS) System:

Plant Modification and Construction Section Instruction 15-S-02-504R1, System Pressure Test for Pressure Retaining Components

Inservice Inspection System Leakage Test Special Instructions, MWO No. F66121 (9/20/86)

Quality Assurance Procedure (QAP) 10.80R2, VT-2, Visual Examination

The above documents were reviewed to determine if the following procedural elements were properly specified and controlled:

- Test pressure and temperature

- Pressure gages

- Extent of examination

- Valve alignment (initial and restoration after test)

- How visual examination is to be performed

- Illumination and special equipment for examination

- Monitoring of test pressure

- Protection from overpressure

- Data to be recorded

- Acceptance criteria

b. Observation of Work

The inspector observed the visual examination performed as part of the leakage test of the ASME Class 1 portion of the HPCS system. The inspector observed the performance of the examination to verify compliance with procedural requirements referred to in 5.a.(2) above. In addition, the inspector verified that:

- The examiner was knowledgeable of the examination requirements
- The applicable procedure and instructions were available and were being followed
- The examiner was properly qualified and certified for the examination
- The examination results were being properly recorded

c. Review of Records

(1) Ultrasonic Examinations

The inspector reviewed the ultrasonic examination records for the Recirculation System welds identified below:

Weld No.	Outage Year Examined	Exam Procedures
G9-B1-B	1985	UT-1.43R4
G10-B1-A	1985	UT-1.30R11
G10-B1-B	1985	UT-1.30R11
G10-B1-E	1985	UT-1.30R11
G10-B1-C	1985	UT-1.43R4
	1986	UT-30R14
W-29	1986	UT-30R14
	1985	UT-1.30R11
W-11	1985	UT-1.30R11
W-7	1985	UT-1.30R11
W-6	1985	UT-1.30R11
	1986	UT-30R14

The records for the examinations of the above welds were reviewed to verify that they contained or provided reference to the following, as applicable:

- Examination results and data sheets
- Examination equipment data

- Calibration data sheets
- Examination evaluation data
- Records on extent of examination
- Records on deviation from program and procedures including justification for deviation, if applicable
- Records on disposition of findings
- Identification of couplant

(2) Visual Examination

The inspector reviewed the in-process records of the visual examination referred to in 5.a.(2) and 5.b above to verify that they contained or made proper reference to the following:

- Examination results and data sheets
- Examination equipment data
- Calibration of gages
- Extent of examination

Within the areas examined, no violations or deviations were identified.

6. Inservice Testing (61725)

As described in paragraph 7 below, the licensee has modified Standby Service Water (SSW) Pump A. The inspector reviewed the results of the licensee's testing of this pump following the modification to verify compliance with ASME Section XI pump test requirements imposed through Technical Specification (TS) 4.0.5 and 10 CFR 50.55.a(g). The ASME Section XI pump test was performed by the licensee in accordance with their procedure 06-OP-1P41-Q-0005. The inspector's review examined compliance with the following Section XI requirements:

a. Measurement of flow, differential pressure, and vibration at points of operation that may be readily duplicated in subsequent inservice testing.

b. Comparison of the above parameters with previous reference values.

Within the areas examined, no violations or deviations were identified.

7. Inspector Followup Item (IFI)

(Closed) IFI (416/86-29-02): Standpoint Service Water System Loop A Modifications.

This item was opened to identify planned followup on the licensee's completion of work and tests in accordance with License Condition 2.C(20). The license condition was intended to assure that the licensee performed modifications on their Standby Service Water System such that it would provide satisfactory design flows to essential equipment during all operational conditions.

Preoperational testing found that SSW system produced less than design flow to certain essential equipment. In order to avoid a delay in the start of plant operation, the licensee proposed to isolate the spent fuel pool cooler from the SSW system to provide increased SSW flow to the other components. This presented no immediate problem as the pool cooler would not be needed to store spent fuel until the first refueling outage and the licensee indicated that modifications to correct the flow deficiencies would be completed prior to that need. The NRC staff agreed to the licensee's proposal and placed a requirement for the modifications in the Grand Gulf operating license as Condition 2.C.(20). The condition included requirements that adequate flow be verified to all essential equipment served by SSW prior to placement of irradiated fuel in the spent fuel pool.

The licensee modified and tested the B loop of their SSW system during a 1985 outage.

When the NRC inspector first examined the licensee's modification work during NRC inspection 416/86-29 (September 1986), the licensee was modifying SSW System A loop to complete intended modifications. During that inspection, the inspector observed examples of the modification work to verify that the modifications were being completed in accordance with the license condition and other regulatory requirements. The licensee has since completed the intended modifications and has performed tests to verify adequacy SSW flow.

During the current NRC inspection, the inspector examined additional selected examples of the licensee's completed modification work and associated records and discussed the work with cognizant licensee personnel to determine if the modifications had satisfied requirements of License Condition 2.C.(20). In addition, the inspector checked the work and records examples for conformance with regulatory requirements and with the requirements of the licensee's loop A Design Change Package DCP 82/5020-1, Modification Work Plan MWP 86/1159, and Modification Special Test Instructions MSTI P41-86-0011-0-S. The examples of work and records examined by the inspector were as follows:

a. Records

(1) Loop A Testing

- pump test (including pump flow, differential pressure, vibration and absence of vortexing)
- motor bearing cooler flow
- setting for pump relief valve
- flows to essential equipment

(2) Welding and QC inspection records and associated personnel qualification records for the following SSW system modification welds:

- Weld 501 (pipe support installation) on drawing ISO AQS-P41-G010C11RC
- Welds 540 and 541 (piping welds for installation of valve F002 on sketch NPE-M-B-1358K RO)

(3) Traceability for pump A column bolting (Trace No. RO 740-86)

b. Work (Visually Observed)

(1) Completed welds 540 and 541 referred to in a.(2) above

(2) Installed pump A relief valve

(3) Operation of pump A

During his examinations and his discussions with licensee personnel relative to License Condition 2.C.(20), the inspector became aware of three significant problems that had been identified by the licensee related to this item. These are described below:

Incorrect Flow Determinations

In August 1986, while developing instructions to test and flow balance SSW loop A, the licensee discovered that the flow determinations they had made for loop B following its modification in Fall 1985, had been incorrect. The discrepancies had been caused by their use of incorrect flow coefficients in measuring flow with Annubar Type 73 flow measuring devices. Additional investigation by the licensee found that the SSW A loop flow to Engineered Safety Feature (ESF) electrical switchgear (SWG) room coolers had been verified in December 1985, using the same

incorrect coefficient. After discovering the error, the licensee made flow check to the components served by the SSW system using a post-LOCA system alignment. They found that the SSW flow rates to the Division 1 and Division 2 ESF SWG were below design values. The licensee determined that the flow inadequacies were the result of fouling of small diameter branch piping that supplied flow to the coolers.

Cooling water to the ESF coolers is normally supplied by the Plant Service Water (PSW) system - except in the case of accident conditions, when the SSW system provides the flow. The PSW was blamed for the fouling. Also, it was considered that the condition was possibly compounded by the reduced flows that resulted from the incorrect flow balances that had been made because of incorrect flow calculations (due to use of incorrect Annubar coefficients).

The above conditions were reported to the NRC in Licensee Event Report (LER) 86-029-00 dated September 25, 1986. This LER stated that the piping had been flushed and that adequate short term cooling had been obtained, but that in some instances design flows were still not being achieved.

The LER indicated that to preclude further errors in use of Annubar coefficients, the Annubars will be controlled and issued as measuring and test equipment, with an attached metal tag indicating the proper flow coefficient and other pertinent data. The LER stated that corrective action for the deficient flows would be to modify the PSW/SSW system piping to applicable components to allow for periodic hydrolasing or flushing. In addition, the LER stated that flow rates would be monitored monthly until a determination is made as to the need for other corrective actions and that during the current refueling outage, or until design flow rates are established, the cooling water supply and discharge pressure for ESF SWG room coolers that are required to be operable will be monitored daily.

The licensee assessed the as-found low flow conditions and determined that, had a design basis loss-of-coolant accident (LOCA) combined with a loss-of-power occurred, the cooling provided would have still been adequate at this point in the life of the plant.

Piping Corrosion

In their SSW system modification work, the licensee discovered microbiologically induced (or influenced) corrosion (MIC) of the system's carbon steel. MIC of carbon steel piping is typically characterized by the growth of tubercles (principally iron oxide) on the attacked surface, with pits forming beneath the tubercles. Although the pitting may grow to through-wall depth, the tubercles are generally a more serious problem. When they exist on the inside

diameter (ID) of the piping, as is the usual case, they may severely reduce flow. The licensee's Material Science Engineering Supervisor indicated the following actions had been taken or were planned to address the MIC problem.

- The SSW basin and samples of SSW piping have been examined to establish the extent of the problem and the concerns developed have been documented on Material Nonconformance Reports (MNCRs) 676-85, 701-86, 702-86, and 707-86.

- Coupons have been placed in the SSW system to aid in monitoring the MIC.

- Revisions are planned to water chemistry, with special biocides and corrosion inhibitors being added.

- Water circulation is to be increased to assure good distribution of biocides and corrosion inhibitors and to reduce the stagnant water conditions considered conducive to MIC.

- Some small bore piping was replaced because of holes in the material.

- On line monitoring of water chemistry is planned.

- Further visual examination of small and large bore piping is planned at the next refueling outage.

- The conditions of various heat exchangers served by the SSW system has been visually checked.

- A report addressing the MIC problem will be prepared following the current refueling outage.

Region II plans to monitor the licensee's future activities with regard to the MIC during routine NRC inspections.

Inadequate Flow to Essential Equipment Served by the SSW System

In flow balancing loop A of the SSW system following modifications to comply with License Condition 2.C.(20), the licensee was unable to obtain design flows to the following essential equipment:

- Control Room Air Conditioning

- ESF SWG Cooler 139'W

- ESF SWG Cooler 119'E

- RCIC Room Cooler

- RHR Pump Seal Cooler A

The above were documented in MNCR 899-86. The licensee's engineering evaluation indicates that, due to conservatism in the original design, the flows obtained to all loop A equipment except the Control Room Air Conditioning and the RCIC Room Cooler are acceptable. The flows to the latter pieces of equipment are considered adequate for the current outage but their subsequent acceptability requires further evaluation. However, the RCIC Room Cooler is not required during Modes 4 or 5 (Refueling) and its flow is, therefore, acceptable during the current outage. The licensee had previously identified inadequate flows to the loop B ESF SWG coolers. The inadequate flows to the loop A Control Room Air Conditioning and to the loop B ESF SWG coolers represent deficiencies in the SSW System which, in accordance with License Condition 2.C.(20), would preclude the licensee from placing spent fuel in the spent fuel storage pool. However, as documented in letters from the licensee to NRC Region II, dated September 10 and October 8, 1986, the licensee has obtained permission from Region II to use the pool for storage of fuel during the current outage. The permission was granted based on their determination that the flow is adequate for current conditions, that monitoring and administrative controls will assure the continued adequacy (as described in the letters), and that a follow-up report on their actions to address the issue will be provided for NRC review prior to restart from the outage.

The licensee's resolution of the SSW system flow deficiencies and of their conformance to License Condition 2.C.(20) will be examined further in subsequent NRC inspections and is identified as inspector followup item 416/86-34-01, Adequacy of Flow to Some Areas Served by the Standby Service Water System. This item replaces inspector followup item 416/86-29-02.

Within the areas examined, no violations or deviations were identified.