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

Report No.: 50-416/92-19

Licensee: Entergy Operations, Inc.
Jackson, MS 39205

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

Facility Name: Grand Gulf

Inspection Conducted: July 27 - 31, 1992

Inspectors: Paul J. Fillion for M. D. Hunt — 9/2/92 Date Signed

Paul J. Fillion P. J. Fillion — 9/2/92 Date Signed

Accompanying Personnel: C. Rapp, Reactor Engineer

Approved By: McKenzie Thomas for Frank Jape, Chief — 9/2/92 Date Signed
Test Programs Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine announced inspection was conducted in the areas of design, design changes, and plant modification including engineering support. Interfaces between the plant system engineering staff and the design engineering staff were reviewed.

Results:

The licensee takes the initiative in identifying and implementing modifications that will contribute to reactor reliability and safe operation. The management permits the engineers to take ownership of projects and to identify and resolve technical issues. The engineering staff appears knowledgeable and aggressive in resolving technical issues. Management uses good reasoning in determining the priorities for plant design changes and modifications in the budgeting of expenditures. In the areas inspected, violations or deviations were not identified.

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REPORT DETAILS

1. Persons Contacted

License Employees

*W. Cottle, Vice President, Operations
*L. Daughtery, Plant Compliance Superintendent
*M. Dietrich, Manager, Nuclear Training
*J. Dimmette, Jr., Manager, Performance and System Engineering (P&SE)
*R. Dubey, Nuclear Plant Engineering (NPE)
*C. Dugger, Manager, Operations
*W. Eiff, Principal Quality Engineer, NPE
*C. Hicks, Operations Superintendent
*R. Hutchinson, General Manager
*A. Khanifar, NPE
*M. Meisner, Director, Nuclear Safety and Regulatory Affairs
*L. Moulder, Assistant to the General Manager
*D. Pace, Director, NPE
*W. Patterson, Assistant to the General Manager
*M. Renfroe, P&SE
*R. Ruffin, Licensing Specialist
*S. Saunders, P&SE
*W. Shelly, Assistant Manager, Nuclear Training
*R. West, Assistant Manager, P&SE
*R. Wright, NPE

Licensee employees contacted during this inspection included craftsmen, engineers, technicians, and administrative personnel.

NRC Personnel

*C. Hughey, Resident Inspector
*F. Talbot, Intern

*Attended exit interview

Acronyms and initialisms are defined in Paragraph 5.

2. Design Change and Modifications (37700)

The inspectors selected several DCPs and MCPs for review and evaluation. Both the DCPs and MCPs involve an engineering function. All were reviewed for environmental equipment qualification, ALARA, fire protection requirements, safe shutdown requirements, human factors, ASME Section XI (when required), and Technical Specification compliance. The DCPs receive a safety analysis evaluation (10 CFR 50.59) while all MCPs are screened to determine the need for a 10 CFR 50.59 evaluation. MCPs were used by the licensee to accelerate certain changes that require prompt action. The change packages reviewed were implemented by the licensee during the recently completed outage and at earlier dates. Several of the change packages were developed earlier but were delayed for various reasons. The change packages selected were those that improved unit reliability or efficiency, reduced challenges to safety systems, or were required to meet NRC requirement.

All the reviewed packages contained summary statements describing the purpose of the change, evaluations as required, and had been reviewed by appropriate responsible personnel designated by procedures. Listed below are the DCPs and MCPs reviewed during this inspection.

DCP 82/0056-1 replaced and relocated relief valves on the Division I & II EDG starting air tanks.

DCP 87/0048-0 and 1 replaced EDG starting air headers with stainless steel piping.

DCP 87/0087-0 installed a control switch in the control room to allow the re-energizing of certain 480 VAC load centers after load shedding.

DCP 87/4023 relocated the drain line on the Division III EDG exhaust.

DCP 88/0213 revised annunciator windows to meet a detailed control room design review.

DCP 88/0284 replaced the A and B recirculating pump shafts with a new design. Section 3 of this DCP modified the hydrostatic bearings for these pumps.

DCP 90/0005-1 replaced the safety relief valve accumulators in the ADS with stainless steel.

DCP 90/0109-1 installed thermal performance testing instrumentation of the standby service water heat exchangers.

DCP 91/0072 installed new fuses at the main 125 VDC distribution panel.

DCP 91/0107 increased the size of the HPCS pump minimum flow orifice as required by NRC Bulletin 88-04.

MCP 91/1066 changed the P75 system (EDG starting air) Division I & II low pressure lockout setpoint.

MCP 91/1097 relocated the feedwater valve 1N19-F501 positioner position transformer and booster to local panel 1H22-P591.

MCP 92/1028 reinstalled the ground straps from the panel chassis ground bus to the instrument ground bus for the neutron monitoring panels.

MCP 89/1114 separated the open torque switch bypass circuit and the position indication circuit for approximately 78 motor operated valves in accordance with the requirements of GL 89-10.

DCP 88/0284 was reviewed in depth for compliance with the following:

NEAP 304, Design Change Packages
NEAP 334, Minor Change Packages
NEAP 316, 10 CFR 50.59 Safety Evaluations

The inspectors conducted walkdown inspections for some of the above listed changes and modifications to verify the as-built conditions.

The inspectors had one general comment concerning the development of design change packages. The statements of purpose and reason for the modification typically did not include a clear and concise statement of the initiating cause for the modification. The inspectors felt that more attention to this detail would greatly add to the adaptability of the change packages as well as provide a more complete history of plant changes.

The inspectors reviewed the site and corporate organization to evaluate how modifications and changes are controlled, both technically and financially. The design engineers and the system/plant engineers appeared to work in a closed loop. This closed loop provided for adequate interface to insure that all changes made were coordinated in a manner that provided sufficient and correct information for safe operation of the plant. One strength noted was the position of quality engineer in NPE that provided an additional quality review when design packages were being prepared and issued.

It was also noted that the CRB, comprised of supervisors from all departments, developed the guidelines for development, implementation, and maintenance of the DCR program to optimize allocation of resources. The CRB met bimonthly. This effort provided for timely implementation of plant modifications consistent with plant objectives. The CRB categorized the modifications to ensure adequate funding was placed on the most urgent and important items. Operations had a special fund to expedite the implementation of smaller scope emergent work. The inspectors considered the concept of a special fund was a good idea.

The number and scope of the design modifications that were implemented in the last refueling outage indicated the licensee scheduled work to prevent potential safety problems. The inspectors did not identify any modifications that should have been implemented but were not. The recirculation pump shaft modification was innovative and at least one other modification was purely an enhancement. All the modifications reviewed resolved the originally defined problem in a satisfactory manner.

3. Engineering and Technical Support (37700)

The inspectors reviewed the organization, activities, and staffing of P&SE to qualitatively assess the responsiveness of P&SE to operational and maintenance related problems. P&SE was organized into five functional units, Engineering Support, Systems Engineering, Reactor Engineering, Computer Services Support, and Work Control. The latter two units provided mainly non-engineering support functions and were not reviewed within the scope of this inspection. The remaining three units are discussed in the following paragraphs.

Reactor Engineering

Reactor Engineering provided reactivity management support to operations during both refueling and power operations. To support refueling operations, Reactor Engineering assisted with the core reload analysis, verified fuel weights and burnup, provided core reloading pattern, and provided an engineer on the refuel bridge for independent verification during core reload. During post-refueling startups, reactor engineers performed startup tests such as SDM determination, reactor anomaly, power/flow verification, LPRM calibration, and control rod scram timing and friction testing. Reactor Engineering provided continuous startup support in the control room from first control rod withdrawal to 100 percent power. During normal power operations, Reactor Engineering independently verified power adjustments either by flow or control rod adjustment, and developed the target control rod pattern and movement sequence. Reactor engineers also assisted in reactor trip reviews. Trending of k_{eff}, thermal limits, LPRM EOL, and LPRM drift was also performed by Reactor Engineering.

Reactor Engineering was staffed with four engineers and one supervisor. All personnel possessed a Nuclear Engineering degree. The average experience level was about five years with the supervisor having seven years experience.

System Engineering

System Engineering provided support to both operations and maintenance by ensuring the plant was operated and maintained within design and complied with codes and standards. System Engineering also provided contact points for problems with plant systems, wrote and reviewed procedures, determined post-modification test requirements, reviewed DCPs and MCPs, performed 50.59 safety reviews, monitored and trended system performance, and provided support for PRA. There was no administrative procedure that described the system engineer's responsibilities.

Generally, the system engineers were assigned more than four systems with several engineers assigned as many as ten systems. This resulted in a reactive rather than preventative approach to system support. Additionally, system engineers were responsible for writing approximately 2300 maintenance and preventative maintenance procedures and reviewing operations procedures. These activities were about 25 percent of the system engineer's workload. Also, the system engineers reviewed system performance trends for possible increased testing or for preventative maintenance.

There were 25 engineers assigned to System Engineering. To increase the system engineer's involvement, licensee management reevaluated the system engineer's job scope. This included reducing the number of systems monitored to three or four systems per engineer, removing unnecessary tasks, and involving the backup system engineers. These changes were expected reduce the workload and allow the system engineers to be proactive in problem identification and improve ownership.

Engineering Support

Engineering Support provided support for maintenance activities. This included reviewing MWOs, implementing programs such as ISI, IWP/IWV, ILRT, MOV, reviewing RCM data, reviewing surveillance data for trending, and performing daily plant monitoring. ISI/IWP-IWV surveillance data was reviewed for acceptability. The data was not trended, but was compared to previous data for adverse change. If an adverse change was observed, an EER was written to determine the cause. If the data was not adverse, but was greater than the previous data, a CI was written for maintenance to troubleshoot and correct the problem.

Training

Training of P&SE engineers was controlled by procedure 17-S-01-6, Engineering Personnel Qualification and Certification, Revision 1. Each engineer was required to have both formal education and nuclear power plant experience for certification. Additionally, required classroom training and reading of selected plant procedures was included.

As part of formal plant training, the P&SE and PM&C engineers attended a four week Technical Staff and Managers course that covered plant systems. A written examination was administered each week. A one week simulator course was also available that provided basic plant operations training. This simulator course included four hours of classroom material and four hours of simulator operations. The inspectors found the formal plant training acceptable. Also, several plant engineers had completed the SRO certification program. The SRO certification program provided the plant engineers with additional plant systems and plant operations training.

Root cause analysis and 50.59 safety review training as well as vendor training was provided on an as-needed basis. Reactor engineers must also demonstrate proficiency and pass an oral examination for certification. No formal training on PRA was provided; however licensee management recognized the need for PRA awareness for safety evaluations.

Continuing training was offered twice per year. During this training, industry events, incident reports, NRC bulletins, and SOERs wei covered. Also, plant modifications installed during outages were reviewed.

Material Non-Conformance Reports

Procedure 01-S-03-3, Material Non-Conformance Reports, Revision 26 described the process for initiating, processing, and dispositioning MNCRs. The inspectors reviewed this procedure and found no significant deficiencies. However, no guidance on assignment of MNCRs was present. The inspectors discussed assignment of MNCRs with the licensee and were told MNCRs were distributed based on functional responsibility. When the inspectors asked how this was controlled, the licensee stated it was dependent on the reviewing individual knowing which group had responsibility. Root cause was required on significant MNCRs. The root cause could be completed by P&SE or by NPE if requested.

The inspectors reviewed a log of MNCRs and noted several MNCRs over two years old. The inspectors asked how many MNCRs were over two years old and were told there were about thirty eight. To reduce the backlog, licensee management was reviewing the MNCR log to determine which MNCRs needed to be implemented and which could be dropped. This review was not complete at the time of the inspection. The inspectors selected MNCRs 0133-88, 0145-91, 0032-92, 0270-90, 0014-92, 0215-90, 0027-90, and 0092-91 for further review. These MNCRs were detailed and complete. The problem was aggressively pursued and the resolutions were well founded. The inspectors reviewed MNCRs 0270-90, 0032-92, and 0027-90 with P&SE engineers. These engineers were not initially involved with the MNCRs, but were able to reconstruct the problem from the MNCR. The engineers demonstrated adequate system knowledge to explain the MNCRs. The inspectors noted one instance of a MNCR being used to implement a plant design change. Procedure 01-S-03-3 did not address the use of MNCRs for plant design changes.

4. Exit Interview

The inspection scope and results were summarized on July 31, 1992, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

5. Acronyms and initialisms

ADS	Automatic Depressurization System
ALARA	As Low As Reasonable Achievable
ASME	American Society of Mechanical Engineers
CRB	Change Review Board
DCP	Design Change Package
DCR	Design Change Review
EDG	Emergency Diesel Generator
EER	Engineering Evaluation Request

EOL	End of Life
HPCS	High Pressure Core Spray
ILRT	Integrated Leak Rate Testing
ISI	Inservice Inspection
LPRM	Local Power Range Monitor
MCP	Minor Change Package
MNCR	Material Non-Conformance Report
MOV	Motor Operated Valves
MWO	Maintenance Work Order
NEAP	Nuclear Engineering Administrative Procedure
NPE	Nuclear Plant Engineering
P&SE	Performance and System Engineering
PM&C	Plant Modification and Construction
PRA	Probabilistic Risk Assessment
RCM	Reliability Centered Maintenance
SDM	Shut Down Margin
SOER	Significant Operating Event Report
SRO	Senior Reactor Operator