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REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report No.: 50-416/89-26

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

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

Facility Name: Grand Gulf

Inspection Conducted: September 25-19, 1989

Inspector: C. Smith 11-8-89
C. Smith, Team Leader Date Signed

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OPS Section
Operations Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of design control, design changes and modifications.

Results:

In the areas inspected, violations or deviations were not identified.

Design controls for the preparation, review and approval of MCPs are technically adequate and comply with the requirements of ANSI 45.R.11-1974. Changes to plant structures, systems and components implemented by means of temporary system alteration are controlled by operations procedure 01-3-06-03. Temporary alterations are adequately reviewed for technical adequacy by the System Engineer; and their installation is frequently reviewed for closure by permanent design changes or removal. Implementation of a company wide 10 CFR 50.59 evaluation training program has resulted in improvements in the technical adequacy of safety evaluations. Engineering calculations are prepared in a planned, controlled and correct manner. The reorganization of the plant engineering staff and the establishment of the Systems Engineering group in particular, appeared to have been well planned and implemented.

Purchase orders related to MCPs were determined to be adequate for procuring materials that met specified technical and quality requirements. Review of audits of design controls showed the audits to be thorough, in-depth and effective in identifying problems. One weakness was identified with regard to the Corrective Action Program.

The screening criteria for determining safety significance of problems were not clearly defined and root-cause analysis was not always at a level of detail to identify root-causes of known problems.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*G. Cesare, Director, Nuclear Licensing
*W. Cottle, Vice President, Nuclear Operations
*W. Eiff, Principal Quality Engineer-Nuclear Plant Engineering
*S. Feith, Director, Quality Programs
*C. Hicks, Operations Assistant
*C. Hutchinson, General Manger
*L. Moulder, Operations Superintendent
*R. Patterson, Technical Assistant to General Manager
*J. Reaves, Manager, Quality Systems
*J. Roberts, Manager, Performance and Systems Engineering
*J. Summer, Compliance Coordinator
*S. Tanner, Manager, Quality Services
*F. Titus, Director, Nuclear Plant Engineering
*M Wright, Manager, Plant Support
*J. Yelverton, Manager, Plant Operations
*G. Zinke, Plant Licensing Superintendent.

Other licensee employees contacted during this inspection included engineers, operators, and administrative personnel.

NRC Resident Inspectors

*C. Christensen - Senior Resident Inspector
*J. Mathis - Resident Inspector

*Attended exit interview

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Design Control Process

Changes to plant structures, systems, or components during the operational phase may be accomplished via DCPs, MCPs, or Temporary System Alterations. An inspection of the design change process related to the preparation, review, approval, and installation of DCPs was performed during January 9-13, 1989 and is documented in inspection report number 50-416/89-06. This review of the design control process is intended to verify the technical adequacy of plant modifications implemented via MCPs and Temporary System Alteration and to verify compliance with the TS, the Operational Quality Assurance Program, and applicable industry codes and standards. The inspectors conducted interviews with selected members of the licensee staff and reviewed both NPE administrative procedures and plant operations manual procedures to ascertain the adequacy of the program controls. Additionally, independent design reviews of completed MCPs and temporary system alterations were performed. The results of the reviews for MCPs are documented in paragraph 5.0 of the report.

NPE is the design authority for Grand Gulf during the operational phase. NPE administrative procedures have been developed, approved and implemented to ensure that the design engineering controls are in accordance with ANSI N45.2.11-1974. Design inputs, which provide the requirements upon which final detailed design is based, are controlled in accordance with NPE procedure #323, Design Inputs, Revision 1. Attachment 1 to this procedure provides information listed in ANSI N45.2.11-1974, paragraph 3.2, Design Input Requirements, and is used by the responsible engineer during this phase of the design process. Requirements have also been established for identifying, documenting and controlling design-inputs. Design verification activities are controlled in accordance with the requirements of NPE procedure #01-324, Design Verification, Revision 0. The requirements specified are applicable to all NPE generated design documents that require design verification. Acceptable verification methods have been delineated and requirements for interdisciplinary reviews have been established. The inspector concluded that the above design controls collectively with those specified in NPE procedure #303, Design Change Notice, Revision 14, are in compliance with ANSI N45.2.11-1974. These controls are applicable to the preparation review and approval of MCPs.

Temporary alterations are administratively controlled by plant operations manual procedure 01-3-06-03, Control of Temporary Alterations Safety Related. Responsibility for administration of this program has been assigned to the Nuclear Operations department. The inspectors conducted interviews with members of the operations staff to verify (1) the scope of activities that are controlled by this program, (2) the process for preparation, review, approval and installation of temporary alterations, (3) provisions of ensuring the technical adequacy of 10 CFR 50.59 safety evaluations performed for temporary alterations and (4) the degree of involvement of the design authority i.e., NPE, with the temporary alteration program. The inspectors determined that temporary alterations are prepared, reviewed, approved and installed in accordance with the guidelines of ANSI 18.7-1976, paragraph 5.2.6, Equipment Control.

Primary responsibility for ensuring the technical adequacy of temporary alterations made to plant structures, systems and components has been assigned to the System Engineers. The System Engineers, or another qualified individual at the supervising level, performs an initial safety evaluation screening to determine the safety significance of proposed temporary alterations. A technical review is also performed by the System Engineer to ensure that he is aware of all changes made to systems for which he has responsibility. Additional responsibilities of the System Engineers are discussed in paragraph 5.0.

Requirements have been established for revising design output documents and applicable plant procedures that have been affected by temporary alterations. The documents are classified as QA records and are controlled in accordance with the requirements of procedure 01-S-05-01, Nuclear Records Procedure Safety Related.

Distribution of design output documents revised pursuant to temporary alteration is accomplished in accordance with the requirements specified in procedure 01-S-05-6, Receipt, Distribution, and Maintenance of Plant Drawings.

Temporary alterations are closed out by a process that involves a monthly audit by Nuclear Operations. Those installed for six months or greater are re-reviewed by the operations Superintendent to determine their continued need. Temporary alterations installed for greater than one year are presented to the general manager for forced closure. Conversion of temporary alterations to permanent plant modifications is facilitated by a prioritization process that ensure an appropriation of funds to have the work completed. This process is accomplished in accordance with the requirements of procedure 01-S-17-2, Plant Design Change Requests, Revision 0. The inspectors reviewed the following temporary alterations to verify technical adequacy and compliance with the program requirements.

Temporary Alteration No. 89-005
89-0013
89-0012
89-0010
89-0001
89-0004
87-0006
87-0016

Additional Operations' department reviews specified in procedure number 02-S-0-21, DCP/Temp. Alt/Tech. Spec./TSPS Review and Training, Revision 3, were also evaluated by the inspectors.

Based on the requirements specified in this procedure and the improved technical adequacy of 10 CFR 50.59 evaluations discussed in paragraph 3.0, the inspectors concluded that the most recently completed temporary alterations were adequately controlled.

Within this area, no violations or deviations were identified.

3. 10 CFR50.59 Safety Evaluation Training

The SERI Operating Manual, Policy No. 7.205, Revision 3, Safety and Environmental Review and Evaluation, specifies requirements for performing safety and environmental reviews of changes, tests and experiments conducted in accordance with regulatory requirements and the conditions of the operating license. 10 CFR 50.59 safety evaluations are addressed in paragraph 5.1. This paragraph establishes requirements for personnel who perform safety evaluations and screenings for safety evaluation applicability to have attended a company wide 50.59 training. Similar requirements have been established for contractor personnel who perform the above functions; this training to be achieved either by attending SERI 50.59 training course or an equivalent course. Additionally, independent reviews of 50.59 screenings or safety evaluations are required to be performed by qualified personnel.

Procedure number 316, 10 CFR 50.59 Safety Evaluations, Revision 6, implements the requirements of SERI Operating Manual Policy No. 7.205.

This procedure requires annual retraining of personnel. The inspectors verified by review of objective evidence that a list of qualified personnel who had completed the above training had been prepared by licensee management. Responsibility for ensuring that 10 CFR 50.59 evaluations are performed by trained personnel is assigned to each supervisor. A formal process for administrative control of the qualified reviewers list had not been established. Discussions with licensee management revealed, however, that procedure number 316 was being revised to delete the requirement of annual retraining. This revision in conjunction with licensee's objective of providing training to all engineering personnel is intended to provide positive control of the qualified reviewer list. Procedure number 316 was scheduled for issuance the week of October 2, 1989.

The inspectors performed independent reviews of 10 CFR 50.59 evaluations completed for the temporary alterations addressed in paragraph 2.0. The results of this review showed an improvement in the technical adequacy of the 50.59 evaluations completed since implementation of the 50.59 training program.

Within this area no violations or deviations were identified

4. Engineering Calculations

NPE procedure number 305, Engineering Calculations, Revision 11, specifies requirements for preparing, reviewing, approving and controlling engineering calculations. Based on review of this procedure the inspectors determined that requirements related to set-point calculations were not specifically addressed. Discussions with licensee management revealed that an Instrument Information and Set-Point Control System (IISCS) users manual was scheduled to be issued for use by the technical staff. This manual along with (1) General Electric set-point Methodology, NEDC-31336 Class III, October 1986, and (2) NPE procedure number 331, Instrumentation Information Set-Point Control, Revision 0, is intended to provide a personnel based computer program designed for calculating safety system set-points and maintaining configuration control information related to the instrumentation. The inspectors were informed that delay in implementation of the IISCS program was caused by the contractor's late delivery of specified QA requirements for the program and an ongoing review of the program by NRR. Because of the ongoing review of the licensee's IISCS programs by NRR a detailed evaluation for determining the adequacy of the set-point program was not performed by the inspectors.

The inspectors performed a review of selected electrical calculations to verify the technical adequacy and procedural compliance. The inspectors determined that the calculations were performed in a planned, controlled and correct manner. The level of detail was sufficient as to the purpose of the calculations; assumptions, design criteria, references, and conclusion were clearly stated. Additionally, signatures required by program requirements were included.

No deficiencies were identified during this review.

Within this area no violations or deviations were identified.

5. Plant Support By Engineering Organizations

Engineering support for the plant is provided by the corporate engineering organization, NPE, and the onsite engineering organization, P&SE. Recent initiatives to improve the quality of engineering support were the consolidation of onsite engineering resources and the implementation of two programs to enhance the interface between engineering and the plant. A primary aspect of the consolidation was the formation of a system engineering group. The EER program provided a method to improve the plant engineering interface utilizing a mechanism to document plant requests for engineering assistance. The MCP program improved the timeliness of engineering response to plant problems by permitting more timely development of minor design change packages. These initiatives have improved the capability of the licensee engineering organizations to provide plant support.

The onsite (plant) engineering organization was reorganized in July 1988 to consolidate the onsite engineering resources. This organization, P&SE, divided the onsite engineering resources into three groups. The Support Engineering group assumed responsibility for large scope programs such as inservice inspection and MOVATS testing. Reactor Engineering was assigned responsibility for fuel management and reactor physics. The System Engineering group provides a focus of expertise and accountability for plant systems. The responsibilities of these groups were outlined generally in the Grand Gulf Nuclear Station Organization procedure, AP-01-S-01, and more specifically in the System Engineer's Handbook. The System Engineering group provides the focal point for engineering and technical support for the plant. The Support and Reactor Engineering groups responsibilities are for broad scope issues which permits the system engineers to focus on system performance.

The system engineering staff consisted of 33 system engineers and 3 supervisors. An average of 5 systems per system engineer did not represent an unmanageable workload. Approximately 80 percent of the system engineers had completed a 3 weeks systems training course which was a portion of the Management and Technical Staff training program. Formal training in root cause analysis and deficiency reporting system processing have not been provided. This is a weakness. A large percentage of the system engineers have received training on 10 CFR 50.59 safety evaluations which is important because this group develops temporary alterations. There was not a formal document which stated the system engineer's responsibilities; however, the system engineers handbook did provide a good perspective of these responsibilities. A formal document, Division of Responsibilities, was in draft.

Discussions with system engineers indicated an adequate comprehension of assigned responsibilities, familiarity with assigned systems, and sufficient in-plant time to be aware of system performance. The duties identified by system engineers were; design change implementation, emergent problems, i.e. deficiency reporting processing, support to plant staff, interface with Nuclear Plant Engineering, interface for procurement, and ultimate responsibility for system performance which included component trending. Two of the 3 system engineers interviewed were familiar with the System Engineer's Handbook. Previous experience with the system assigned and system specific training provided the system engineer's knowledge of system performance. The discussions indicated that considerable amount of time was spent in the plant. Location of the system engineers in the protected area in close proximity to the plant facilitates frequent field work.

In general, the reorganization of the plant engineering staff and the establishment of the system engineering group in particular, appears to be well planned and implemented. The System Engineering group provides direct plant support and interface with NPE. The quality of NPE support was reviewed by examining the mechanisms utilized to document this activity. The Engineering Evaluation Request, EER, Minor Change Package, MCP, and Material Nonconformance Report, MNCR, programs provide documentation of NPE plant support.

The EER program was initiated in late 1988 to document the interface between engineering and the plant. This program was not utilized for identifying plant deficiencies. The plant and NPE have procedures to provide guidance in processing and interfacing for EERs. The following procedures were reviewed to determine programatic guidelines: AP-01-S-17-S, Engineering Evaluation Request, Revision 0, and NPE 327, NPE Response to Engineering Evaluation Request, Revision 0. The program defined by these procedures clearly delineated the responsibilities for program activities. The implementation of this program was reviewed by a licensee QA audit in September 1989. This audit identified minor administrative deficiencies in the closeout of EERs. A review of EERs processed by NPE indicated that responses were adequate and generally timely. The following EERs were reviewed: 89/6241, 89/6134, 88/6067, 88/6039, 89/6293, 89/6204. Individual coordinators at both NPE and P&SE provide administrative control and traceability for EERs. This program has been effective in providing a mechanism for plant support by the engineering organization. There have been 457 EERs generated since program initiation, nearly 50 percent have been evaluated and closed. This volume of activity, the timeliness of response, and the licensee monitoring of the program indicate this interface mechanism has been implemented effectively. Although the program has been effectively controlled and managed, a weakness was noted related to the lack of established prioritization criteria. Prioritization was being accomplished by the P&SE manager with no documented criteria. The lack of specific prioritization criteria indicates that program effectiveness is personnel dependent.

The MCP program was another program initiated in late 1988 to facilitate plant engineering support. The MCPs generally address design change of low complexity. The program has been effective in providing plant support in a more timely manner than was possible via the full design change process. The actual engineering effort was not substantially reduced, however, the budgeting and scheduling process was minimized and unnecessary cross discipline reviews were eliminated which improved the turn around time for providing plant support. Development of MCPs is accomplished by NPE. NPE procedure 334, Minor Change Packages, Revision 0, provided guidance for this activity. This procedure references applicable NPE procedures for performance of design input documentation, safety evaluation, design verification, etc. The following MCPs were reviewed:

MCP 89/1049	Station Service Water Pipe Support Modification
MCP 88/1029	Addition of Filters on Automatic Depressurization System
MCP 88/1004	Recirculation Pump Seal Modification
MCP 89/1075	Remove Recirculation Pump A Replacement Interference
MCP 89/1076	Use of New Gasket Material in Reactor Recirculation Pump

These change packages met the requirements of licensee commitments for design change activity, i.e. QA Topical report and ANSI N45.2.11-1974.

Since program implementation, 139 MCPs have been issued. Approximately 50 percent of the issued MCPs have been implemented and administratively closed. The MCPs have been issued to resolve EERs, MNCRs or address items on the Budget Year Planning List. The program was well managed and controlled. The minor change determination was made by the Manager, Nuclear Design, based on the complexity and scope of a proposed design change. A noted weakness in MCP program was the lack of documented criteria for minor change determination.

The engineering organizations, NPE and P&SE, also provided support to the plant via the deficiency reporting process. The MNCR program was reviewed for timeliness and adequacy of response by engineering. NPE response to MNCRs was generally timely. However, in several cases it had been three months or more before an MNCR was routed to NPE. The cause for the delay was not identified during this inspection, however, it was identified that no safety significant issues were among the delayed MNCRs. Although engineering support via the MNCR process was adequate, some examples of less than adequate performance were noted. Two MNCRs were reviewed which did not provide a thorough root cause evaluation. Both the examples involved installation of non-EQ qualified terminals being installed in limitorque valves.

The probable cause discussions stated that the applicable procedures required installation of EQ qualified parts but insufficient documentation or dedication was performed. An adequate root cause would have addressed the program or personnel deficiency which resulted in unverified parts being installed. Another example was a resolution which provided an adequate final resolution but did not address interim actions necessary before implementation of the final resolution. The MCNR addressed the thinning of Diesel Generator Air Starting System piping due to internal corrosion. The resolution to replace the piping was adequate; however, a design change to implement this action was scheduled for 1990. No interim action such as a monitoring program to identify further degradation was implemented even though the source of the corrosion was not eliminated. This condition was identified in 1986 and current problems with particles in the diesel air system may be related to rust particles from this piping. These examples did not appear to reflect the overall adequate performance of the engineering organization with respect to plant support provided via the MNCR program.

The plant does not currently utilize a comprehensive component trending program. There are individual program such as lubricating oil analysis, vibration analysis, and the NPRDS which have limited applications. A comprehensive program has been in development for two years which will resolve this weakness. The Station Information Management System, SIMS, will be implemented within the next six months. The data base has been identified and entered into the system. The resources dedicated to this system demonstrate management's commitment to improve system and component reliability.

6. Procurement

A cursory review of Grand Gulf's procurement process was performed to determine the adequacy of materials purchased for safety related modifications. The procurement of materials used at Grand Gulf Nuclear Station is governed by Administrative Procedure 01-S-09-1, Procurement of Materials and Services, Revision 25. The procedure identifies the responsibilities of various departments in the procurement process. The MTG is responsible for determining the safety class, the quality level and assuring that all design bases and technical requirements are imposed on the item being procured. NPE may also provide input for determining technical requirements when requested by the MTG.

The MTG will assign quality levels once all technical requirements are established for the items being procured. Materials procured at Grand Gulf are assigned quality levels of 1, 2, 3, or 4. Materials procured QL1 and QL2 are purchased for Safety Class 1, 2 or 3 application and typically have unique design requirements and specification requirements. QL3 are non-pressure retaining items which may affect the safety related function of a Safety Class 1, 2 or 3 system or component. Items procured QL3 do not have unique design or specification requirements. Commercial grade items may be procured QL3. QL4 level procurements are for items which serve no safety related function in either safety related or non-safety related systems.

The inspectors reviewed the following plant change packages to determine if procurement of components/material were required; and if the items procured were suitable for its intended application based on the design information provided.

MCP 88/1034
MCP 88/1058
MCP 88/1008
MCP 88/1007

The inspectors also selected materials purchased for safety related applications, that was stored in the warehouse, to establish acceptability.

MCP 88/1007 replaced the hydrogen analyzer sample flow differential pressure switch Q1E61-PDSL-N050B, model number 15R3-K2Y1C1AX, with a new model supplied by the original manufacturer. The model number of the new differential pressure switch is 15B-K2Y1C1AX. During an earlier EQ audit it was determined that the pressure switches must meet certain EQ requirements. The licensee reclassified the differential pressure for EQ requirements per EQ-004. The safety requirements and the EQ requirements for the old pressure switch were verified in a test report supplied by Comsip-Delphi. The test performed provided information on the hydrogen analyzer and associated components. Qualification of the new differential pressure switch was based on information supplied by Comsip Inc. in a certificate of conformance written on July 7, 1988. Comsip indicated that the new differential pressure switch is qualified to IEEE standards 323-1974 and 344-1975 as documented in Test Report Number 1035-1 Rev.2. The inspector reviewed the test report and other associated EQ documentation and concluded that the differential pressure switches are suitable for the intended application.

For other MCPs reviewed (88/1034, 88/1008, 88/1058), the inspectors located sufficient documentation to show suitability for the intended application. MCP 88/1058, Motor Operator Valve Limit Switch Modification, changed the torque bypass circuitry. This MCP changed rotor locations, therefore no procurement was required.

The inspectors randomly selected identification numbers from piping materials located in the warehouse. Information provided on each item indicated that the material was purchased for safety related applications. The inspector reviewed purchase orders for each of the items selected. Adequate technical and regulatory information was provided by the licensee on each purchase order. In each case the vendor supplied sufficient information to assure suitability and traceability of the items procured (Material Certification, Metallurgical Test Report and Manufacture Test Certificate).

The inspector interviewed licensee personnel concerning receipt inspection on incoming items. It appears that most receipt inspections consist of visual, dimension checks and review of documentation. Testing performed on incoming items appears to be limited.

The inspector specifically questioned QC personnel about testings done on large quantities of items such as bolts and nuts received that were purchased for safety related application. QC personnel stated that no sample testing, such as a hardness test, is performed before the items are released to stock for use.

The licensee appeared to limit the use of commercial grade items in safety related applications. The licensee presently utilizes many of the items originally procured for Unit 2 as replacement items in Unit 1.

Licensee personnel also stated that a major revision to its procurement program is in progress. The changes are required to enhance the licensee's procurement program. The changes should also bring the licensee's procurement program in line with EPRI standards, which are conditionally endorsed by the NRC, and other industry standards.

Within this area no violation or deviations were identified.

7. QA Audits of Design Controls

The inspectors reviewed selected audits of NPE and other design change activities that were performed over the last 18 months. Audit findings and the responses to the findings were also reviewed. Types of findings reviewed included CARs, DMRs, MNCRs, and QDRs. Through review of the audit reports and discussions with licensee personnel, the inspectors made the following observations.

Licensee personnel stated that they have been placing emphasis on conducting performance based QA audits. The audits reviewed by the inspectors were considered to be thorough, in-depth, and effective in identifying problem areas. One measure of the effectiveness of the QP audits has been the increase in requests from various plant groups for QP to perform audits of new plant programs and initiatives. QP personnel stated that approximately 40 percent of the audits they perform are due to requests from plant groups. One example of this is the QP audit that is currently being performed of the recently implemented MCP program. This audit was requested by the Director of NPE in order to provide an early assessment of the implementation and effectiveness of the MCP program. The NPE Director is a member of the audit team as an observer. The inspectors considered this involvement by management in assuring the quality and effectiveness of the MCP program to be a positive indication of management's continuing efforts to improve engineering support to the plant.

The inspectors reviewed audit findings and the responses to the findings. The corrective actions described in the responses to the applicable audit findings appeared to be adequate.

While reviewing selected MNCRs, the inspectors noted a weakness where the root causes of problems identified in the applicable MNCRs were not always determined.

for the MNCRs in question, the corrective actions addressed the specific nonconformant condition. However, the actions did not appear to address steps which would prevent recurrence of the problems because the root causes were not identified. During discussion of this item licensee personnel stated that determination of the root causes of a problem is generally based on the safety significance of the problem. During further review of this item the inspectors found that the licensee has not established criteria for screening MNCRs to determine their safety significance. Licensee personnel stated that, although they do not have screening criteria for determining safety significance, for those MNCRs which were determined to be safety significant conditions, the root causes of the problems were determined where applicable. Licensee personnel further stated that they have been reviewing this item prior to this inspection and they are developing guidance to assist their personnel in determining the safety significance of problems.

With the exception of the weakness identified, the inspectors considered the interface among QP, NPE, and the plant to be good. QP has been effective in identifying both hardware problems and various program weaknesses. Corrective actions for the QP findings have generally been adequate.

No violations or deviations were identified in the area inspected.

8. Exit Interview

The inspection scope and results were summarized on September 29, 1989, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results. Although reviewed during this inspection, proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

. Acronyms and Initialism

CAR - Corrective Action Request
DMR - Discrepant Material Report
EER - Engineering Evaluation Request
EQ - Environmental Qualification
IEEE - Institue of Electrical and Electronics Engineers
MNCR - Material Nonconformance Report
MTG - Materials Technical Group
MCP - Minor Change Package
NPE - Nuclear Plant Engineer
PS&E - Performance and Systems Engineering
QA - Quality Assurance
QDR - Quality Deficiency Report
QL - Quality Level
QP - Quality Programs