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

Report No.: 50-416/89-30

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

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

Facility Name: Grand Gulf Nuclear Station

Inspection Conducted: December 16, 1989 - January 19, 1990

Inspectors: _____ 1/31/90
H. O. Christensen, Senior Resident Inspector Date Signed

_____ 1/31/90
J. L. Mathis, Resident Inspector Date Signed

Approved by: _____ 1/31/90
F. S. Cantrell, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope:

The resident inspectors conducted a routine inspection in the following areas: operational safety verification; maintenance observation; surveillance observation; action on previous inspection findings; and reportable occurrences. The inspectors conducted backshift inspections on December 31, 1989, and January 15 and 17, 1990.

Results:

Two violations were identified during this inspection period. The first violation was for failure to identify an excessive plant cooldown rate prior to a unit restart and when the cooldown rate was identified, failure to perform the required engineering evaluation in a timely manner (paragraph 3). The second violation, a non-cited violation, was for failure to remove an equipment deficiency tag after completing corrective maintenance on the RCIC (paragraph 4). Both violations are an indication of a lack of attention to detail by the plant staff.

On December 30, 1989, the plant was manually scrammed due to a loss of plant service water (paragraph 3). During the scram recovery, plant cooling was maintained by RCIC and pressure was controlled by using safety relief valves.

Twelve of the plants twenty SRVs began weeping after this evolution. The licensee is monitoring the valves and is planning corrective action. In the inspection areas of safety verification, maintenance observation and surveillance observation (paragraphs 3, 4 and 5), the licensee met the safety objectives of these areas. The maintenance work order process has shown improvements in the area of work instructions.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

J. G. Cesare, Director, Nuclear Licensing
W. T. Cottle, Vice President, Nuclear Operations
D. G. Cupstid, Manager, Plant Modifications and Construction
*L. F. Daughtery, Compliance Supervisor
J. P. Dimmette, Manager, Plant Maintenance
S. M. Feith, Director, Quality Programs
*C. R. Hutchinson, GGNS General Manager
F. K. Mangan, Director, Plant Projects and Support
*L. B. Moulder, Operations Superintendent
*J. C. Roberts, Manager, Plant & System Engineering
*S. F. Tanner, Manager, Quality Services
F. W. Titus, Director, Nuclear Plant Engineering
M. J. Wright, Manager, Plant Support
J. W. Yelverton, Manager, Plant Operations
*G. Zinke, Superintendent, Plant Licensing

Other licensee employees contacted included superintendents, supervisors, technicians, operators, security force members, and office personnel.

*Attended exit interview

2. Plant Status

The plant began the inspection period in Mode 1, Power Operations. On December 30, 1989, the unit was manually scrammed due to a loss of plant service water. The unit returned to power operations on December 31, 1989.

3. Operational Safety (71707 and 93702)

The inspectors were cognizant of the overall plant status, and of any significant safety matters related to plant operations. Daily discussions were held with plant management and various members of the plant operating staff. The inspectors made frequent visits to the control room. Observations included the verification of instrument readings, setpoints and recordings, status of operating systems, tags and clearances on equipment controls and switches, annunciator alarms, adherence to limiting conditions for operation, temporary alterations in effect, daily journal and data sheet entries, control room manning, and access controls. This inspection activity included numerous informal discussions with operators and their supervisors.

On a weekly basis selected engineered safety feature (ESF) systems were confirmed operable. The confirmation was made by verifying that accessible valve flow path alignment was correct, power supply breaker and fuse status was correct and instrumentation was operational. The following systems were verified operable: HPCS, LPCI A and B, and SSW A and B.

General plant tours were conducted on a weekly basis. Portions of the control building, turbine building, auxiliary building and outside areas were visited. The observations included safety related tagout verifications, shift turnovers, sampling programs, housekeeping and general plant conditions, the status of fire protection equipment, control of activities in progress, problem identification systems, containment isolation system, and the readiness of the onsite emergency response facilities.

The inspectors observed health physics management's involvement and awareness of significant plant activities, and observed plant radiation controls. Periodically the inspectors verified the adequacy of physical security control.

The inspectors reviewed safety related tagouts, 900033 (IRM A&C); 894108 (PSW Piping); and 894103 (Firewater Pumphouse Heaters) to ensure that the tagouts were properly prepared, and performed. Additionally, the inspectors verified that the tagged components were in the required position.

The inspectors reviewed the activities associated with the events listed below:

On December 18, 1989, during the performance of the monthly division one diesel generator surveillance, the output breaker tripped approximately one hour into the load run. Generator output voltage, field voltage and field current were fluctuating. The diesel was secured and declared inoperable. Initial troubleshooting did not indicate any obvious defects. Subsequently, the diesel successfully completed a 1.5 hour run. The licensee performed additional troubleshooting and identified loose potential transformer fuse holders. These holders were tightened and the diesel generator successfully passed retesting. The diesel was returned to service on December 19, 1989. The failure was considered a valid test failure and resulted in the surveillance frequency being increased from monthly to weekly.

On December 22 and 24, 1989, the 120V AC ESF static inverter 1Y96 tripped causing a division one reactor half scram. The inverter trip also caused a half MSIV isolation; a half isolation on ventilation radiation monitors for fuel handling area, fuel pool sweep, containment ventilation, and control room ventilation. In both cases, a failed fuse was found. On December 28, 1989, the licensee conducted troubleshooting and found a cold

solder joint on the gate transformer assembly. Additionally the filter capacitors, SCR gating board and SCR gate transformer assembly were replaced. The inverter was returned to service.

On December 30, 1989, at 5:29 p.m, with reactor power at approximately 83 percent, the unit lost all plant service water pumps due to a loss of the 18AG and 28AG busses. The licensee started rapidly reducing power at 5:50 p.m. and entered the scram required region of the "power to flow map." The plant was manually scrammed at 5:58 p.m, in accordance with Off-Normal Event Procedure (ONEP) 05-1-02-V-11, Loss of Plant Service Water and TS Figure 3.4.1.1-1, Power-Flow Stability Region. The MSIVs were also closed in accordance with the ONEP. As a result of the MSIV isolation, a high pressure RPS trip and an ATWS-ARI trip signal was received which tripped the reactor recirculaton pumps. RCIC was initiated and reactor pressure was controlled by SRVs. All systems functioned as required. Prior to the manual scram, SSW was aligned to supply the CCW heat exchangers. Suppression pool cooling was initiated to maintain and control suppression pool temperature.

PSW pump breaker control, bus breaker control (18AG and 28AG), and PSW pump indications are all transmitted by a microwave system. The power supply for channel A in the microwave system failed, causing the B microwave channel to also malfunction. Also, the squelch on the microwave receiver channel A' at the radial well switchgear house was improperly set which resulted in excess telemetry noise. These failures resulted in the 18AG and 28AG bus breakers tripping and locking out, which caused a loss of PSW pump power. The microwave power supply failure was caused by condensation getting inside the power supply.

During the scram recovery, SSW B cooling tower basin level decreased below TS level. The operators isolated all PSW auxiliary building isolation valves, thereby stopping the SSW basis level loss. During a loss of offsite power or a LOCA these valves would have isolated. The SSW level loss appeared to be caused by a leaking check valve (P44F012). The licensee issued a night order to instruct the operator to isolate the PSW auxiliary building isolation valves prior to lining up SSW cooling for CCW.

The PSW pumps were returned to service and RCIC was placed in standby at 12:20 a.m. on December 31, 1989. The unit commenced a restart at 8:19 a.m., on December 31, 1989. Criticality was achieved at 12:37 p.m., and the plant entered Mode 1 at 5:33 p.m. The PSW pumps are being controlled locally and the microwave system is deactivated.

The off-shift scram report, dated January 15, 1990, determined that the reactor vessel bottom head drain experienced a heatup of about 95°F in ten minutes and then after the ATWS/ARI recirculating pump trip, a cooldown of 125°F in one hour. TS 3.4.6, specifies a maximum reactor coolant cooldown

rate of 100°F in any one hour period, and if the limit is exceeded requires restoration the temperature to within limits within 30 minutes. Additionally, an engineering evaluation is required to determine the effects of the out-of-limit condition on structural integrity of the reactor coolant system to determine if the reactor coolant system remains acceptable for continued operations or be in at least hot shutdown within 12 hours and cold shutdown with the following 24 hours. The on-shift scram report, completed December 31, 1989, failed to determine if heatup/cooldown rates were exceeded. During the performance of the off-shift scram report, the excessive cooldown was identified and reported in an incident report dated January 12, 1990. However, the preliminary engineering evaluation was not initiated and completed until January 15, 1990. The preliminary evaluation determined that there was no structural integrity concerns. The failure to identify the excessive cooldown prior to restart on December 31, 1989, and the failure to perform an engineering evaluation on January 12, 1990, when identified by the off-shift scram report, is a violation of TS 3.4.6. (89-30-01).

On January 15, 1990, at 9:52 a.m., five SRVs unexpectedly opened with reactor power at 100% power. Plant power was reduced to 93% and the SRVs were closed using the control room handswitchs. A division one low-low set function initiation was received on five of six SRVs. Preliminary investigation indicated that a static electricity discharge caused the low-low set function master and slave trip units to actuate. The licensee performed the low-low set trip unit surveillance to verify proper operation and limited personnel access to the trip unit panels. The licensee plans to install anti-static mats around the panels and is reviewing a proposed design change to prevent recurrence.

4. Maintenance Observation (62703)

During the report period, maintenance observations included a review of the MWOs and other related documents for adequacy; adherence to procedure, proper tagouts, technical specifications, quality controls, and radiological controls; observation of work and/or retesting; and specified retest requirements. The following activities were reviewed:

MWO	DESCRIPTION
EL 2615	Inspect slip ring, megger rotor and stator at generator for SDG 12.
EL 3591	Change lube PED bearing for SDG 12.
ME 4485	Clean PSW side of CCW heat exchanger.
WO 983	RCIC turbine trip/throttle valve mechanical trip.

WO 1768	Replace water accumulator for HCU 48-45
WO 2743	Perform overhaul on TBCW pump B.
WO 2827	Record actual tail pipe pressure at several SRVs.
WO 1766	Rebuild HCV 16-21

The inspector reviewed work order 1766 to rebuild control rod drive HCU 16-21. This work encompassed the replacement of the water accumulator; replacement of the diaphragm and seat in the scram inlet and outlet valves; clean and inspect filters; and inspect ball check valves. The work instructions were detailed with completion sign offs for each step.

The inspector observed the adjusting of the linkage on the RCIC trip and throttle valve. Work Order 983 required mechanics to adjust the throttle valve linkage using the vendor manual as a reference and to replace the tappet nut on the trip assembly. During the replacement of the tappet nut, the mechanic determined that the replacement nut did not fit properly, so the old tappet nut was cleaned and reinstalled. The trip and throttle valve successfully past retesting. The review of the completed work order indicated that the work instructions were clear and the work activities were well documented. However, the mechanic failed to remove the deficiency tag, S73759, from the control room panel after the work was completed, as required by the work instructions. Administrative procedure 01-2-06-38, Maintenance Work Order Deficiency Tagging System, step 6.3.2, states, the maintenance personnel actually performing the work must remove the tag or sticker when the job and maintenance retest are complete. This NRC identified violation is not being cited because criteria specified in section V.A of the NRC Enforcement Policy were satisfied, (89-30-02). The licensee performed an audit on January 11, 1990, of all deficiency tags in the control room and identified that five additional tags were still hanging. These tags were removed.

Following the December 30, 1989 reactor trip and using SRVs to control reactors temperature and pressure, 12 SRVs were found weeping. On January 13, 1990, the inspector witnessed the cycling of 12 SRVs for proper seating to reduce weeping. Work order 2827 provided special instructions to control the evolution. Prior to opening selected SRVs, suppression pool cooling was placed in service and SRV tail pipe temperatures were recorded. The SRV weeping increased from 12 to 17 valves after cycling. Additionally, drywell unidentified leakage increased from approximately .8 gpm to 1.2 gpm. The estimated SRV leakage is approximately 2 gpm. The licensee is monitoring drywell temperature and SRV leak rate. The licensee decided to ship 20 spare SRVs to Wylie laboratory for certification and refurbishing. Prior to shipping the SRVs, a pre-inspection in accordance with procedure 07-S-14-357, Revision 1, was performed. Plans are being made to conduct a 16 day outage to replace the leaking SRVs.

5. Surveillance Observation (61726)

The inspectors observed the performance of portions of the surveillances listed below. The observation included a review of the procedures for technical adequacy, conformance to technical specifications and LCOs; verification of test instrument calibration; observation of all or part of the actual surveillances; removal and return to service of the system or component; and review of the data for acceptability based upon the acceptance criteria.

06-IC-1B21-M-1003, Reactor Pressure Vessel High/Low Level RPS, Channel D, Functional Test.

06-IC-1E22-M-0003, Suppression Pool High Water Level, Channel C.

06-OP-1B21-V-0001, MSIV Operability Test.

06-OP-1P75-M-0001, Standby Diesel Generator II, Functional Test.

The results of the inspection in this area indicate that the program was effective with respect to meeting the safety objectives.

No violations or deviations were identified.

6. Reportable Occurrences (90712 & 92700)

The event reports listed below were reviewed to determine if the information provided met the NRC reporting requirements. The determination included adequacy of event description and corrective action taken or planned, existence of potential generic problems and the relative safety significance of each event. Additional inplant reviews and discussions with plant personnel as appropriate were conducted for the reports indicated by an asterisk. The event reports were reviewed using the guidance of the general policy and procedure for NRC enforcement actions, regarding licensee identified violations.

(Open) LER 89-18, Design basis review of instrumentation reveals apparent nonconformances. On December 15, 1989, the licensee reported the identification of 71 instrument devices that may not have been adequately isolated from interfacing class 1E electric circuits in accordance with Regulatory Guide 1.75, Physical Independence of Electric Systems. An additional 6 instrument devices were identified on December 20, 1989. The licensee performed an engineering safety evaluation (Engineering Reports 89-0034 and 89-0035) to determined the following items: 1) review maintenance history to establish component reliability; 2) review component design configuration and documentation to confirm that non-conforming conditions exist;

3) perform circuit analysis to assess the potential for component failure to adversely affect class 1E circuits and; 4) if potential adverse interaction exist, evaluate events that could create failure mechanism.

This review determined that 4 devices were in fact class 1E components; 61 components were found to have no potential impact on safety related circuits or functions; and for 12 components, the evaluation was unable to confirm no potential impact existed. However, the 12 components are located in the control room, a mild environment. Each device was evaluated for the direct effect of a seismic events, flooding events, jet impingement and fire and no new adverse interactions were introduced. The PSRC, on December 19, 1989, concurred with the conclusions reached in the engineering assessment that there is reasonable assurance that the conditions identified would not degrade safety circuits and functions. This LER will remain open pending review of the licensee's final disposition.

On January 2, 9, and 10, 1990, the licensee made 10 CFR 50.72 (b)(1)(v) reports on the out of service condition of the operational hot lines (emergency notification) to the state and local agencies. The telephone company was installing new equipment. Additionally, on January 17, 1990, the licensee made a 10 CFR 50.72 (b)(1)(v) report on the failure of 4 of 8 operational hotlines to ring.

No violations or deviations were identified.

7. Action on Previous Inspection Findings (92701, 92702)

(Closed) Unresolved Item 88-21-02, Use of non"Q"Permatex on division 1 diesel generator. MNCR 279-89 was written to evaluate the application of Permatex to a "Q" gasket on the EDG A. The disposition was accepted as the justification that the use of Permatex in no way degraded or jeopardized the integrity of the gasketed connection and would not prevent the gasket from performing its intended functions. This item is closed.

(Closed) Inspector Followup Item, 89-23-03, Revise procedure 01-S-06-2 to include requalification requirements. The inspector reviewed the revised procedure 01-S-06-2 which provided for immediate removal from licensed duties those individuals who do not pass the requalification examination. This item is closed.

(Closed) Violation 89-23-01, Failure to follow procedures, three examples. In the first example an operator closed the instrument air system cross-tie valve without logging the repositioning or tagging the valve. In the second example an I&C technician incorrectly placed the APRM switch in the "test" position. The third example consisted of an operator failing to correctly place the RWCU "bypass" switch to "normal" instead of

placing the RCIC isolation bypass switch to "bypass". The licensee admitted the violation in letter dated November 20, 1989. The corrective actions associated with the above example satisfactorly addressed the problem. This item is closed.

(Closed) Violation 89-21-01, Failure to follow procedures. This violation occurred due to seven individuals assigned to the emergency organization not being trained in accordance with attachment C of emergency preparedness administrative procedure No. 203 or Section 6.4 and 6.5 of administrative procedure 01-S-04-21. The licensee admitted the violation in letter dated October 30, 1989.The corrective action associated with this violation consisted of a monthly verification of training status prior to placing an individual on the on-call list. In addition, SERI Operating Manual (SOM), Policy Number 7.601 was changed to include the following requirement:

- The emergency preparedness on-call list for onsite and offsite personnel will be updated and distributed on a monthly basis instead of quarterly.

- Deviations from emergency training requirements will be escalated to the next level of management for appropriate actions.

- Emergency response organization (ERO) positions will be identified by responsible management personnel who will ensure these positions are adequately filled and maintained with qualified individuals.

- Assign responsibility for a uniform method for tracking onsite and offsite ERO personnel qualification status.

This item is considered closed.

8. Exit Interview (30703)

The inspection scope and findings were summarized on January 19, 1990, with those persons indicated in paragraph 1 above. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. The licensee had no comment on the following inspection findings:

Item Number	Description and Reference
VIO 89-30-01	Failure to identify an excessive reactor cooldown rates and perform a timely engineering evaluation once identified, paragraph 3.
NCV 89-30-02	Failure to remove deficiency tag from the RCIC trip and throttle valve, paragraph 4.

10. Acronyms and Initialisms

APRM	-	Average Power Range Monitor
ATWS	-	Anticipated Transient Without Scram Rod Insertion System
CCW	-	Component Cooling Water
CRD	-	Control Rod Drive
DG	-	Diesel Generator
ECCS	-	Emergency Core Cooling System
ESF	-	Engineering Safety Feature
GPM	-	Gallons Per Minute
HPCS	-	High Pressure Core Spray
I&C	-	Instrumentation and Control
IFI	-	Inspector Followup Item
LCO	-	Limiting Condition for Operation
LER	-	Licensee Event Report
LPCI	-	Low Pressure Core Injection
LOCA	-	Loss of Coolant Accident
MNCR	-	Material Nonconformance Report
MSIV	-	Main Steam Isolation Valve
MWO	-	Maintenance Work Order
NPE	-	Nuclear Plant Engineering
NRC	-	Nuclear Regulatory Commission
ONEP	-	Off-Normal Event Procedure
PDS	-	Pressure Differential Switch
PSW	-	Plant Service Water
RCIC	-	Reactor Core Isolation Cooling
SCR	-	Silicon Controlled Rectifier
SERI	-	System Energy Resource Incorporation
SOI	-	System Operating Instruction
SRV	-	Safety Relief Valve
SSW	-	Standby Service Water
TS	-	Technical Specification