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

Report Nos.: 50-327/92-21 and 50-328/92-21

Licensee: Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Docket Nos.: 50-327 and 50-328 License Nos.: DPR-77 and DPR-79

Facility Name: Sequoyah Units 1 and 2

Inspection Conducted: June 15 through June 19, 1992

Inspectors: L.S. Mellen 7/15/92
L. Mellen, Reactor Inspector Date Signed

L.S. Mellen 7/15/92
L. King, Reactor Inspector Date Signed

Accompanying Personnel: C. Rapp, Reactor Inspector

Approved by: Thomas A. Peebles 7/15/92
Thomas A. Peebles, Chief Date Signed
Operations Branch
Division of Reactor Safety

SUMMARY

Scope:

This inspection was conducted in the area of engineering and technical support for operations, maintenance, outages, testing, and surveillance.

Results:

Based on the review of the Engineering and Technical Support area, the inspectors concluded that the licensee had an effective program and had addressed the specific weakness contained in the previous SALP report.

Strengths and weaknesses of the current program are noted below:

a. Reactor Engineering experience remained low but was being adequately addressed. (paragraph 2.A.)

b. System Engineers lacked formal systems training and the formal training program was not fully implemented. (paragraph 2.E.)

c. System Engineers had a significant work backlog due to outside support requests and lack of adequate resources. (paragraph 2.B.)

d. Lack of computer resources adversely affected the system engineers ability to control work backlog and perform proactive trending. (paragraph 2.B. and 2.C.)

e. Systems Engineers actively supported Operations and Maintenance activities and were perceived positively. (paragraph 3.A. and 3.B.)

f. Incident Investigations were technically correct and root causes were well founded. (paragraph 4.B.)

g. Temporary Alterations were numerous and some were being used instead of plant modifications. (paragraph 5.)

No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

M. Chattin, System Engineer
D. Cooper, Group Leader
*M. Cooper, Site Licensing Manager
*T. Flippo, Quality Assurance Manager
*M. Frye, Nuclear Steam Supply System Manager
H. Koehler, System Engineer
N. Lehberger, ASME Section XI Engineer
*R. Rogers, Technical Support Manager
*J. Staub, Nuclear Engineer - Operations Support Group
*S. Taylor, Technical Training Manager
*R. Thompson, Compliance Licensing Manager
*P. Trudel, Nuclear Engineering
*C. Whitemore, Licensing Engineer
*J. Wilson, Site Vice President

Other licensee employees contacted included office, operations, engineering, maintenance, and corporate personnel.

NRC Representatives

*B. Wilson, Chief Reactor Projects - Branch 4

*Attended exit interview

Acronyms are listed in the last paragraph.

2. Technical Support Work Activities (37700)

A. Reactor Engineering Group

Previous NRC inspections identified a lack of experience within the Reactor Engineering group. The inspectors discussed the reactor engineering staffing and experience level with the supervisor. The reactor engineering group had five engineers; two with reactor engineering experience and two in reactor engineering training. The remaining engineer was the system engineer for the NIs and did not have any reactor engineering responsibilities. The supervisor has been in the reactor engineering group for two years. To compensate for the lack of reactor engineering experience, an intensive training program was established and other experienced personnel were used to supplement the staffing. While the experience level remained low, the inspectors determined the licensee was taking adequate corrective actions.

B. Work Load

There was a significant work backlog in the ETS area. A substantial portion of the backlog was due to back-to-back refueling outages. The outages contributed to ETS devoting significant resources to procedure revisions and a variety of unplanned outage activities. A large portion of the work backlog was generated in support of other groups. During interviews, ETS management stated there was sufficient staff to complete the work backlog. The lack of computer resources adversely affected the systems engineers ability to track and control work backlog. However, ETS was able to provide proactive and timely support when requested. ETS resolved RCDT inleakage during Unit 2 startup and a problem with the annunciator for high ERCW flow to the station air compressors.

The inspectors also reviewed the engineering management monthly reports and found a significant backlog of problem event reports, drawing deviations, and procedure reviews. The licensee's monthly report identified a problem with NE resources for PER/SCAR actions that could defer closure of several items until the end of fiscal 1992.

C. Trending

The inspectors interviewed several system engineers and determined the level of proactive trending was minimal. The work load of the system engineers and the inefficient manual tracking system made proactive trending impractical. The licensee stated they were looking for a more effective way of capturing and analyzing available system information. Increased availability of computer resources would also facilitate the trending of system status and components. ETS has dedicated engineers to trend both valve and pump data. The responsible systems engineer was notified when a problem existed with an assigned system. Operations was also made aware of any problems and the necessity for increased testing. A maintenance trending program identified when repetitive failures occurred and the responsible systems engineer was notified.

D. Reporting

The inspectors questioned the licensee about the reportability of IR N-36 miscalibration. The licensee stated the miscalibration was not reportable because the rack error was within the TS allowable limits and the miscalibration was not safety significant. The licensee cited the Instrumentation Society of America standard for setpoint methodology and the Eagle-21 SER as the reason for considering only rack error. The inspectors will review the licensee's reportability determination during future inspections. This will be identified as URI 50-328/92-21-01, Reportability of IR N-36 Miscalibration.

E. System Engineer Training

The inspectors interviewed several system engineers to determine the level of formal and informal training. Most system engineers interviewed indicated they only received a two week general systems class and no formal training for their assigned system. The engineers interviewed stated that backup system engineers received primarily on-the-job training from the system engineer. None of the system engineers interviewed had received formal training for their assigned backup systems.

The inspectors reviewed the licensee's proposed system engineering training and certification program. The inspectors found the licensee had not fully implemented a formal system engineering training program. However, the licensee had issued SSP-8.50, Conduct Of Technical Support, Revision 1, that contained the requirements for certification of system engineers. SSP-8.50 required the certification process be completed as soon as practical. Included in the certification process was the completion of an eight week basic plant systems course followed by a written examination. The inspectors reviewed the course agenda and determined the topics covered were consistent with the information that a system engineer would need.

An additional written examination followed the completion of all SSP-8.50 requirements. The licensee was developing examinations for approximately 12 system engineers, 5 program engineers, and 3 lead engineers. According to the licensee's schedule, examinations will be completed by September 30, 1992. The inspectors were informed the examinations will cover the engineer's specific responsibilities. The questions were to be of the same type and complexity as those asked of licensed reactor operators. Since the lead engineers have supervisory responsibility for the system engineers and program engineers, their examinations will include administrative requirements

3. Technical Support Interface With Other Organizations (37700)

A. Technical Support Interface With Operations

The system engineers were required to review test data only when a test failed the acceptance criteria. The system engineers reviewed the test to ensure the test methodology was adequate and the test was correctly performed. The system engineers also reviewed tests if a TS evaluation was required. The system engineers reviewed surveillance procedure changes to ensure the procedure's functionality was not affected.

The reactor and BOP engineering groups actively support reactor prestartup and startup activities. The reactor engineering group generated all the pre-startup NI calibration data based on the

vendor's predictions. The BOP engineering group provided necessary calorimetric data for control and protection system calibration.

B. Technical Support Interface With Maintenance

Maintenance personnel were interviewed to determine if ETS was perceived as a delay in responding to work requests. Maintenance personnel stated ETS engineers were responsive and supportive. A review of monthly engineering reports did not indicate that safety related work was delayed as a result of ETS. ETS engineers have been called out to respond to maintenance work. For example, the responsible systems engineer was called out as required by procedure 0-MI-MVV-000-029.0, Maintenance of Pressure Seal Valves. The engineer discovered that interference between a packing stud and a counterweight arm prevented the valve from closing. An II was written and the problem was resolved. System engineers also reviewed post-maintenance test data when requested by maintenance.

4. Emergent Technical Issues

A. Operational Events

The licensee reviewed all NI calibration procedures and found and corrected errors in methodology and instruction. However, the licensee identified and investigated two instances of improper NI calibration. The inspectors reviewed II reports S-92-049, Intermediate Range N-36 Miscalibrated, and S-92-002, Delta Flux Calibration Values Incorrect. These two IIs indicated all problems with NI calibration were not identified.

Incident Investigation S-92-049

Following Unit 2 Cycle 6 refueling, the NIs were adjusted based on the last at-power incore/excore calibration data and the new core prediction data. The licensee used 0-PI-NUC-092-081.0 Revision 2, Prestartup NIs Calibration Following Core Load, to derive the prestartup calibration data. IM used the prestartup calibration data and adjusted IR N-35 using 2-PI-ICC-092-N35.1 Revision 1, Channel I Gamma-Metrics Full Power Alignment, and IR N-36 using 2-PI-ICC-092-N36.2 Revision 1, Channel II Gamma-Metrics Full Power Alignment. After initial startup and low power physic testing was complete, 0-PI-NUC-092-082.0 Revision 1, Poststartup NIs Calibration Following Core Load, was performed at 4% thermal power. This procedure determines the actual IR reactor trip setpoint. Using this procedure, IR N-36 reactor trip setpoint was determined to be 33.7%. This value was greater than the TS allowable value of 30.0%. Reactor power was held at 4% power until IR N-36 reactor trip setpoint was adjusted within TS limits. The miscalibration was internally investigated by personnel from Operations, IM, and Engineering departments. The licensee's investigation determined incorrect weighting factors were the most

probable cause. Inaccurate power determination and IR N-36 instrument drift in the nonconservative direction were contributing causes.

The weighting factors used for prestartup NI calibration account for the effect of immediate fuel bundles on the excore NIs. After discussion with contract engineers, the licensee concluded these weighting factors may have overestimated the neutron leakage from the immediate fuel bundles. The overestimation caused the prestartup calibration data to be non-conservative. The inspectors reviewed the procedures used for both prestartup and poststartup calibration of the NIs and independently verified all data and calculations. The inspectors did not find any errors.

The licensee found that IR N-36 had drifted 0.034 Vdc non-conservative when performing 0-PI-NUC-092-082.0 at 4% thermal power. When reviewing 2-PI-ICC-092-N36.2, the inspectors noted IR N-36 as found calibration value was 0.024 Vdc non-conservative compared to the prestartup calibration data. This was within the 0.025 Vdc acceptance criterion; therefore, no adjustment was required and IR N-36 was left "as found." The licensee used the PR detectors full power currents and compared them to the PR detectors currents at 28%. Using this comparison, the licensee found IR N-36 would have tripped at 32.3%.

During interviews with the responsible system engineer, the inspectors found the manufacture's tolerance for the Gamma Metrics NIs was 0.100 Vdc. According to the licensee, the difference between the reactor trip setpoint of 25% and the TS allowable value of 30% was 0.079 Vdc. The licensee attempted to maintain a 0.025 Vdc tolerance on all NI calibrations. The licensee noted the required tolerance of 0.025 Vdc was more restrictive than the design tolerance of 0.100 Vdc.

The licensee was proactive in the testing and adjustment of IR N-36. The miscalibration was found before reactor power was increased to a significant level. Reactor power was not increased until IR N-36 was recalibrated and the reactor trip function verified within TS limits.

Incident Investigation S-92-002

Reactor Engineering performed 0-PI-NUC-092-002.0 Rev 0, Incore Excore Detector Single Point Alignment, to obtain calibration data for the PR NIs $\Delta\Phi$ adjustment. The IM technicians adjusted PR NI N-41 top and bottom detector currents using the data supplied by Reactor Engineering. The IM technicians then tested N-41 to obtain the proper $\Delta\Phi$ values and found the $\Delta\Phi$ values could not be obtained. As required by procedure, the IM technicians stopped any further adjustment of the PR NIs and notified Reactor Engineering. The II concluded that a procedural change to 0-PI-NUC-092-081.0 resulted in the incorrect use of initial data.

Additionally, the II found the training on single point alignment was in error. The licensee revised O-PI-NUC-092-002.0 to use the data from the most recent incore/excore detector calibration and to be more specific about where to obtain the data. The licensee also provided corrected training on single point alignment methodology. Reactor Engineering reperformed O-PI-NUC-092-002.0 using the most recent incore/excore calibration data. The PR NIs were adjusted and tested without any additional problems.

B. Feedback Of Technical Issues

The license compliance group received industry notices and distributed the notices to the proper engineering group supervisor. There was no consistent policy for internal processing of these notices, however; these notices were forwarded to the responsible engineer for review. If the responsible engineer determined no action was necessary, the notice was reviewed for informational content. There was no requirement to maintain a record or copy of these notices unless action was required. If the notice required a response, the license compliance group generated a tracking item. The licensee could not determine the disposition of some notices, it was not clear whether an item required no disposition or was not reviewed.

The inspectors reviewed several IIs for completeness, clarity, and accuracy. The inspectors found the IIs were generally complete and technically accurate. Indepth analysis of the incidents was evident. The root causes identified were well founded and the corrective actions were appropriate. However, the IIs lacked adequate chronology causing the sequence of events to be difficult to understand.

5. Engineering Evaluations

The inspectors reviewed several IIs to determine ETS involvement. II S-92-035, MSCV (2-VLV-1-625) Closure Problem Due To Packing Stud Interference, was an example of ETS involvement in identifying and resolving a main steam check valve closure problem. Other IIs reviewed included II S-92-040, Unit 1 Reactor Trip/Turbine Trip on 4/28/92. ETS conducted a detailed review and developed a test in an attempt to duplicate the incident.

IQRs and CDRs on operations procedures are performed by Technical Support when requested. Technical Support provided the engineering analysis to resolve nuisance alarms to establish a blackboard. Safety Assessment/Evaluations were written by Technical Support for those annunciators that could not be disabled through the Annunciator Disablement program.

The inspectors reviewed trip investigations and TACFs to determine the extent and quality of technical support. The technical support was accurate and detailed. The inspectors reviewed SSP-12.4, Temporary

Alterations Control Program, Revision 2. No problems were noted with the procedure. The procedure stated "TAs should be minor in scope, be of short duration, and be few in number." It also required Plant Manager approval to extend the expiration date. However, eight TACFs were over a year old and six additional TACFs were more than two years old. TACF 85-70-30 involved changes to the controllers for the auxiliary building ventilation system dampers. After the immediate problem was corrected, support for a permanent design change was not apparent. This was indicated by the fact this change was open after seven years. The licensee had a schedule for reducing the number of changes from 28 to 10 by the end of 1992.

6. Exit Interview (30703)

The inspection scope and results were summarized on June 19, 1992, with those individuals identified in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection findings. The licensee provided two items that were identified as class 2 Westinghouse proprietary. No information from these proprietary documents has been included in this inspection report. Following the inspection the licensee was informed that there would be an unresolved item regarding the reportability of IR N-36 miscalibration.

Item	Status	Description
50-327,328/92-21-01	OPEN	URI - Reportability of IR N-36 Miscalibration (paragraph 2.E.)

7. Acronyms

CDR	CORRECTIVE DEFICIENCY REPORT
ERCW	EMERGENCY RAW COOLING WATER
ETS	ENGINEERING TECHNICAL SUPPORT
II	INCIDENT INVESTIGATION
IM	INSTRUMENT MAINTENANCE
IQR	INDEPENDENT QUALIFYING REVIEW
IR	INTERMEDIATE RANGE
NE	NUCLEAR ENGINEERING
NI	NUCLEAR INSTRUMENT
PER	PROBLEM EVENT REPORT
PR	POWER RANGE
RCDT	REACTOR COOLANT DRAIN TANK
SCAR	SIGNIFICANT CORRECTIVE ACTION REPORT
TA	TEMPORARY ALTERATION
TACF	TEMPORARY ALTERATION CONTROL FORM
TS	TECHNICAL SPECIFICATION

NRC FORM 766

U.S. NUCLEAR REGULATORY COMMISSION

INSPECTOR'S REPORT

Office of Inspection and Enforcement

PRINCIPAL INSPECTOR: Kellogg

REVIEWER: Kellogg

INSPECTORS: MELLEN, KING, RAPP

LICENSEE/VENDOR: TVA, SEQUOYAH

TRANSACTION TYPE:
- [X] I - INSERT
- [ ] M - MODIFY
- [ ] D - DELETE
- [ ] R - REPLACE

	DOCKET NO. (8 digits) OR LICENSE NO. (BY PRODUCT) (9 digits)	REPORT NO.	SEQ.
A	05000327	92-21	A
B	05000328	92-21	B

PERIOD OF INVESTIGATION/INSPECTION: FROM 06 15 92 TO 06 19 92

INSPECTION PERFORMED BY:
- [X] 1 - REGIONAL OFFICE STAFF
- [ ] 2 - RESIDENT INSPECTOR
- [ ] 3 - PERFORMANCE APPRAISAL TEAM

OTHER

ORGANIZATION CODE OF REGION/HQ CONDUCTING ACTIVITY: REGION II, DIVISION III, BRANCH II

REGIONAL ACTION (Check one box only):
- [X] 1 - NRC FORM 591
- [ ] 2 - REGIONAL OFFICE LETTER

TYPE OF ACTIVITY CONDUCTED (Check one box only):
- [X] 02 - SAFETY
- [ ] 03 - INCIDENT
- [ ] 04 - ENFORCEMENT
- [ ] 05 - MGMT AUDIT
- [ ] 06 - MGMT VISIT
- [ ] 07 - SPECIAL
- [ ] 08 - VENDOR
- [ ] 09 - MAT ACCT
- [ ] 10 - PLANT SEC
- [ ] 11 - INVENT VER
- [ ] 12 - SHIPMENT EXPORT
- [ ] 13 - IMPORT
- [ ] 14 - INQUIRY
- [ ] 15 - INVESTIGATION

INSPECTION FINDINGS (Check one box only): A ✓, B ✓
- 1 - CLEAR
- 2 - VIOLATION
- 3 - DEVIATION
- 4 - VIOLATION & DEVIATION

TOTAL NUMBER OF VIOLATIONS AND DEVIATIONS: A 0, B 0

ENFORCEMENT CONFERENCE HELD: 1 - YES

REPORT CONTAINS 2.790 INFORMATION: 1 - YES

LETTER OR REPORT TRANSMITTAL DATE:
- NRC FORM 591 OR REG. LETTER ISSUED: 07 15 92
- REPORT SENT TO HQ FOR ACTION:

MODULE INFORMATION

REC. ORD. TYPE	MODULE NUMBER INSP.	SEQ.	PRIORITY	DIRECT INSPECTION EFFORT	PERCENTAGE COMPLETED TO DATE	STATUS	MODULE REQ. FOLLOWUP
8	537700	A					

CIRCLE SEQ. IF MODULE IS ... INVESTIGATION

INSPECTOR'S REPORT
(Continuation)
Office of Inspection and Enforcement

DEVIATION CODE -