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

APR 21 1988

Report Nos.: 50-327/88-16, and 50-328/88-16

Licensee: Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2901

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

Facility Name: Sequoyah Units 1 and 2

Inspections Conducted: February 29 - March 4, 1988

Inspector: _____ 4/15/88
S. Elrod, Inspection Team Leader Date Signed

Team Members: B. Bonser
M. Branch
M. Lewis
P. Moore
T. O'Conner
W. Orders
G. Suh

Approved by: _____ 4/20/88
F. McCoy, Section Chief Date Signed

SUMMARY

Scope: This special announced inspection was conducted to partially assess TVA's readiness to support Sequoyah Unit 2 heatup and startup past mode 3 to mode 2. The areas reviewed included operational staffing, review committee activities, maintenance status, status of testing, status of MC 94300 items associated with startup and review of TVA's operational readiness assessment.

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

One Unresolved Item was identified concerning the technique used for end-of-cycle moderator temperature coefficient measurement.

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REPORT DETAILS

1. Licensee Employees Contacted

*H. Abercrombie, Site Director
*R. Beecken, Maintenance Superintendent
*R. Birchell, Employee Concerns Assistant Site Representative
*J. Boyles, Employee Concerns Site Representative
*R. Buchholz, Sequoyah Site Representative
*M. Frye, PORS Section Supervisor
*W. Hannum, Chairman, Nuclear Safety Review Board (NSRB)
*T. Howard, Operations Surveillance Support
*H. Jones, Assistant Manager, Engineering Assurance (Knoxville)
*G. Kirk, Compliance Licensing Manager
*T. Knight, Assistant to Site Director
*D. Kunsemiller, SAL Closure Project Manager
*J. Kurtz, Sequoyah Audit Manager (QA)
*S. Littrell, Environmental Qualification Program Coordinator
*F. Mashburn, Sequoyah ISEG Lead Reviewer
*A. Rosenberg, Engineering Assurance Engineer
*E. Sliger, Manager of Projects
*S. Spencer, Nuclear Engineer (Compliance)
*W. Wilburn, Assistant to Maintenance Superintendent
*B. Willis, Operations Superintendent
*C. Wilson, Sequoyah, NSRB Technical Secretary
*E. Whitaker, Independent Safety Engineering Group Manager

Other licensee employees contacted included technicians, operators, shift engineers, security force members, engineers and maintenance personnel.

NRC Personnel

*G. Zech, Assistant Director for TVA Projects
*K. Jenison, Senior Resident Inspector
*W. Orders, Senior Resident, McGuire
*S. Elrod, Section Chief
*P. Moore, Reactor Engineer
*G. Suh, Resident Inspector, Trojan
*M. Lewis, Reactor Inspector
*B. Bonser, Project Engineer
*T. O'Connor, Reactor Engineer

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized with site director and members of his staff on March 4, 1988. The licensee acknowledged the inspection findings. The licensee did not identify as proprietary any of the material reviewed by the inspectors during this inspection. During

the inspection period, frequent discussions were held with the licensing manager and other managers concerning inspection findings. Unresolved Item 327,328/88-16-02 was identified to TVA on April 19, 1988. A tabulation of formal inspection items identified or addressed during this inspection is as follows.

Item Number	Status	Description/Reference Paragraph
327/88-14-02 328/88-14-02	Closed	IFI - Operator Training on ECA's, PAM Instrumentation and Head Vent System (Paragraph 4)
327/87-59-01 328/87-59-01	Closed	IFI - Site Oversite of Division of Power Systems Operation (DPSO) Work (Paragraph 4)
327/88-16-01 328/88-16-01	Open	IFI - Training Program for DPSO Personnel (Paragraph 4)
327/88-16-02 328/88-16-02	Open	URI - Technique for End of Cycle MTC Measurement (Paragraph 5(K)(5)(c))
327/87-30-02 328/87-30-02	Closed	Violation - Inadequate NSRB reviews (Paragraph 5(B)(2))

3. Unresolved Items

Unresolved Items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. One new unresolved item was identified in Paragraph 5(B)(1).

4. Licensee Actions on Previously Identified Inspection Findings (92701)

(Closed) Inspector Followup Item 327,328/88-14-02; Operator Training on ECAs, PAM Instrumentation and Head Vent System.

During NRC inspections of TVA's Emergency Operating Procedures (EOP), TVA committed to conduct licensed operator training on recently developed Emergency Contingency Action (ECA) procedures, Post-Accident Monitoring (PAM) instrumentation, and head vent system related changes to Functional Restoration Guidelines (FRGs). Specifically, TVA committed to complete the described training for licensed operators involved in startup prior to Unit 2 restart. These commitments are documented in Inspection Report Nos. 327,328/87-61 and 327,328/88-14, and as Inspector Followup Item 327,328/88-14-02.

Training on the ECAs and PAM instrumentation was conducted during week one of requalification training. The inspectors reviewed the attendance records for week one training and determined that all licensed operators designated by TVA to be involved in Unit 2 restart had satisfactorily completed training. Training on revisions to FR-I.3, "Response to Voids in Reactor Vessel," to address head vent system deficiencies was

documented on "AOI and EP Revision Verification Data Sheets". A review of these data sheets revealed that all operators designated to be involved in restart had signed the data sheet indicating their review and understanding of the revisions. This practice is in accordance with revision procedures. The inspectors concluded that the training has been completed as committed to by TVA. This item is closed.

(Closed) IFI 327,328/87-59-01, "Site Oversight of Division of Power Systems Operations (DPSO) Work." Deficiencies had been noted in the areas of DPSO staffing, plant supervisory oversight, and systems familiarization training.

Concerning DPSO Staffing, the inspector interviewed the DPSO Engineering Unit Supervisor regarding recent DPSO changes made in response to this IFI. A memorandum of note from an interdivisional meeting between ONP and DPSO, dated January 26, 1988, detailed some of the organizational and staffing changes that have been made. Among these was the establishment of a position to relieve the Unit Supervisor of hands-on field test work so that he could spend full time with supervisory duties and coordination with the power plant staff. In addition, a scheduler has been dedicated to work with DPSO in the scheduling of their work. ONP will also provide a person to liaison with DPSO on transmission system operations and maintenance and one for construction/modification work on all nuclear plant switchyards. These actions satisfactorily address the concern of inadequate staffing.

Concerning plant supervisory oversight, DPSO still reports only functionally to the electrical maintenance group supervisor. This was noted in the inspection report, but no specifics were given that indicated that there was a problem associated with this particular organization. Most groups that perform switchyard work at nuclear plants belong to an offsite group that is within the utility organization. This setup requires that an adequate interface be established to ensure that both organizations are cognizant of the activities being performed. The liaisons detailed in the interdivisional meeting memorandum as well as the increased staffing dedicated to the DPSO group should enhance the functional oversight of the group.

QA regularly audits all aspects of the DPSO work performed on site. The inspector reviewed recent audits and found them to be adequate in scope. There were no significant findings that would suggest further problems beyond those noted in the inspection report.

The licensee is planning to steadily increase the scope of switchyard work performed by DPSO and appears to be seriously addressing the deficiencies noted in the referenced inspection report. Overall, the changes made do address the shortcomings of the group and resolve concerns that had caused this item to be a pre-startup item. IFI 87-59-01 is closed while a new IFI is being opened to cover the noted remaining training deficiencies - which are not considered to require pre-startup resolution.

The training deficiencies noted in inspection report 327,328/87-59 concerned systems familiarization training on components which include the protective relays on the 480 and 6900 volt systems. DPSO personnel do not presently receive training specifically addressing the ESF inputs from the shutdown boards to the diesel generator start system. TVA had not yet addressed this item as the referenced inspection report, which they had received on March 8, 1988, left some confusion about what the NRC required in this area. The inspector clarified that training on these protective relays and their inputs to the ESF system should be covered in their regular training and not in a specialized course given sporadically as the need arose. TVA was unable to render a comprehensive response to this concern within the time frame of this inspection. TVA committed to develop training for the DPSO personnel to ensure that they were aware of the inputs to the ESF diesel generator start system. Establishment and implementation of the aforementioned training will be followed as IFI 327,328/88-16-02.

5. Readiness For Startup Inspection (Hold-Point No. 2, Mode 3-2)

This inspection was performed to provide, in part, the basis for determining the readiness of Sequoyah Unit 2 to commence plant startup, i.e., Mode 3-2 change. Since the issuance of the Sequoyah Nuclear Performance Plan (SNPP), the NRC has been performing program improvement inspections which are documented in numerous inspection reports. Additionally, Inspection Report (IR) 327,328/87-60 documented that portion of the overall readiness-to-heatup inspection effort which was directed toward the plant's operational readiness assessment discussed in the SNPP and the plant's Operational Readiness Report. Inspection Report 327,328/87-73 documented an independent NRC assessment in the areas of conduct of operations, plant material conditions, mode 4-3 (Shakedown), OPERABILITY determination for the Containment Spray System (CS), and the use of compensatory measures to allow plant heatup with degraded equipment. This present report primarily focuses on two areas: (a) licensee actions occurring subsequent to the unit entering Mode 4 and (b) Followup of certain conditions or programs not needed for entering Modes 4 or 3 (heatup) but believed needed for entering Mode 2 (startup).

The inspections performed, along with the inspectors findings are grouped using the format of the overall inspection plan issued February 19, 1988, with the numbers in parenthesis representing those from the inspection plan.

(A) Operational Staffing (36301, 41301, 36700)

(1) Qualification and Staffing Level, Operators

RESULTS

Currently, Sequoyah is utilizing a 6 crew rotation which involves 3- shifts-per-day manning. The manning and alertness of TS required positions, including control room positions and other plant equipment operators, are being monitored by the NRC

during the 24 hour per day NRC shift inspector coverage. This evaluation has been an ongoing process and is documented in IRs 327,328/88-02 and 88-17. Questions have been raised as to the amount of reactor power operations experience (at their current position) possessed by the control room operators. This issue is of current concern to the NRC as several of the operational problems documented in IRs 327,328/88-02 and 88-17 have been attributed to control room operators not being familiar with hot plant and heatup operation. Since the simulator is unable to closely model actual plant response at low steam pressure, many operators have not previously been presented with conditions that they are currently being subjected to. Although the amount of power operations experience is not great, it meets NRC regulations, is understandable for a two and one half year shutdown and would compare to that possessed by a new plant prior to licensing.

(2) Training on Recent Modifications, Operators and STAs

RESULTS

Plant Administrative instruction AI-19, (Part IV), "Plant Modifications After Licensing", includes in Attachment 2, section XIII, a form used during modification planning to specify recommended training required, both prior to declaring equipment operable and subsequent to declaring the equipment operable, if applicable. The vehicles used to communicate this information to the operating crews are the Night Order (OSLA-30) for quick dissemination of information, e.g., Operability concerns; required reading; and operator requalification training. Both the STAs and the control room operators receive the above training.

The inspector discussed with several operators and STAs the above process and attended several pre-shift briefings for oncoming operation crews where recent modifications to the plant were discussed and presented in the form of a "Night Order". It appears that the current practice is providing the required detail of knowledge to the shift crews without creating an administrative burden on them.

(3) Qualification and Staffing, PORS and STAs

RESULTS

The qualification requirements of the PORS group is specified in their position description. This instruction requires that administrative training as well as basic radiological training be provided to engineering graduates as part of their indoctrination. The qualification and specialized training of the PORS staff was reviewed as part of NRC Order EA-85-49 closure as documented in NRC inspection report 327,328/88-15,

since the PORS group is the group that TVA relies on to make equipment/system OPERABILITY determinations at Sequoyah. Currently, there is no requirement to have the PORS group manned around the clock. However, there is a roster maintained where the operating crew can phone a member of the PORS staff when needed. The inspector witnessed this process during several of the recent operational events and it appears that the current practice is effective and timely enough to support the operating crews.

STA qualification and staffing are outlined in AI-27, "Shift Technical Advisor", and minimum staffing is specified in TS Table 6.2-1. Currently there are 7 qualified primary STAs assigned to the shift and there are 5 trained STAs assigned to the shifts for on-the-job training. The training records of the STAs were reviewed and found acceptable. The TS-required STA staffing is being monitored by the NRC shift inspectors and has been found to be acceptable.

(4) New Managers

RESULTS

This area was reviewed during previous inspection 327,328/87-76 and found to be acceptable. Since that inspection, a new Superintendent of Maintenance has been assigned. The inspector reviewed his experience and education and determined that he met the current staff qualification requirements specified in TS 6.3.1.

(B) Review Committee Activities (40700, 40701)

The Sequoyah Plant Operations Review Committee (PORC), Nuclear Safety Review Board (NSRB), and Independent Safety Engineering Group (ISEG) were reviewed in order to verify compliance with applicable requirements. In each case, the committee or group was evaluated in terms of TS requirements, previous enforcement and industry standards.

(1) Review PORC Staffing and Functionability

RESULTS

The Sequoyah PORC was reviewed to verify regulatory compliance as defined in, but not limited to, the Sequoyah TS.

The PORC charter was reviewed to verify incorporation of:

- Purpose
- Scope
- References

- Organization
- Duties and Responsibilities
- Authority
- Method of Operation

The PORC is a committee composed of Plant Management and Supervisory Personnel with diverse technical backgrounds. The PORC meets at least once per calendar month to review matters required by the TS related to safe plant operation. The PORC is composed of the following members:

- Chairman: Plant Manager
- Member: Nuclear Power Plant Superintendent or Maintenance Superintendent
- Member: Operations Group Manager or Assistant Operations Group Manager
- Member: Site Radiological Control Superintendent
- Member: Technical Support Services Group Manager
- Member: Quality Engineering & Control Manager
- Member: Maintenance Group Manager (I), (E), or (M)

A quorum of the committee exists when all of the following conditions exist:

- Either the Plant Manager, Assistant to the Plant Manager, or the Nuclear Power Plant Superintendent must be present and preside as chairman.

- At least four members or their alternates, in addition to the chairman, must be in attendance. No more than two alternates shall participate as voting members in PORC activities at any one time.

PORC serves in an advisory capacity to the Plant Manager and as an investigating and reporting body to the NSRB in matters related to safety in plant operations. The Plant Manager has the final responsibility in determining the matters that should be referred to the NSRB.

The responsibilities of the committee include but are not limited to:

- # Provide an oversight review of selected safety evaluations for: (a) procedures and (b) changes to procedures, equipment, systems or facilities to verify that such actions do not constitute an unreviewed safety question.

- Be alert to and consider common mode interactions, or failures, when performing its duties and responsibilities.

- *# Review of all proposed tests and experiments that affect nuclear safety. For clarification, this applies to tests

and experiments not described in the Safety Analysis Report (SAR) per 10 CFR 50.59.

- *# Review all proposed changes to Appendix "A" TS.

- * Review reports covering evaluations and recommendations to prevent recurrence of all violations of TS.

- Performance of special reviews, investigations, or analyses and reports, thereon, as requested by the Plant Manager or the NSRB.

- Review all Reportable Events.

- Review unit operations to detect potential nuclear safety hazards.

- Review of proposed procedures and changes to procedures, programs, equipment, systems or facilities which involve an unreviewed safety question, as defined in 10 CFR 50.59.

- Review every unplanned onsite release of radioactive material to the environs, including the preparation and forwarding of reports covering the evaluation, recommendations, and disposition of the corrective action to prevent recurrence, to the Site Director and to the NSRB.

- Provide oversight review of the Independent Qualified Review (IQR) process.

The PORC also has the responsibility to:

- Recommend in writing to the Plant Manager approval or disapproval of items considered under responsibilities designated above with a #.

- Render determinations in writing with regard to whether or not each item considered under responsibilities designated above with a * constitutes an unreviewed safety question.

- Provide written notification within 24 hours to the Site Director and the NSRB of disagreement between the PORC and the Plant Manager; however, the Plant Manager or his designated representative shall have responsibility for resolution of such disagreements.

The PORC meets once each month, or more frequently, as required. A special PORC meeting may be convened, as requested by management. In the event that committee business must be transacted on an expedited basis during non-work hours, a member may be considered present if he is in telephone communication

with the committee. No more than four members, including the chairman, may be offsite and in communication by telephone with the committee. A majority vote (if taken) by the members present is required for the committee to approve recommended action to be taken on agenda matters. The Sequoyah PORC normally operates on a consensus basis and a formal vote is normally not performed or recorded. Dissenting opinion will be recorded in the PORC minutes. If a member or alternate in telephone contact with PORC voices a dissenting opinion, PORC will not recommend that item for approval.

The PORC is required to maintain written minutes of each PORC meeting that, at a minimum, document the results of all PORC activities performed under the responsibility and authority provisions of the TS.

During an inspection conducted by American Nuclear Insurers (ANI) on December 8-11, 1987, a number of concerns were identified which have not been fully resolved. The ANI areas of concern include but are not limited to:

- Who should be required to chair PORC meetings
- PORC member attendance at meetings; use of alternates
- Attendance of non-members
- PORC presentation preparation
- Formal PORC presentation
- PORC member training
- PORC member performance during meetings
- The quality of previous PORC decisions

The NRC inspector was able to confirm through review of PORC meeting minutes and personnel interviews that improvements have been made in all areas - yet not enough information was available on which to base final issue closure. The PORC had not had any recent opportunity to function during power operations.

No inspector concerns were identified that would preclude plant startup. The issue of PORC enhancement and functioning during power operations will be reviewed during routine resident inspections using Procedure 40700.

(2) Review NSRB Staffing and Functionability

RESULTS

The Sequoyah NSRB was reviewed to verify that the NSRB charter, "Office of Nuclear Power Organization Description number 13.5, Rev. 1", implements the TS and entails the following:

- The function of the NSRB
- The responsibilities of the NSRB members
- The organization of the NSRB
- Personnel qualification requirements of the NSRB member
- Appointment mechanism of NSRB members
- The training received by the NSRB member
- The NSRB review process
- NSRB meeting requirements
    - o Agenda
    - o Quorum
    - o Conduct of Meetings
- NSRB records requirements

NSRB Function

The NSRB is the senior-level committee which reviews the total TVA nuclear program with respect to nuclear safety. The NSRB reviews include line organization activities which could affect safety and also the activities of other review, audit, and verification organizations. The NSRB provides recommendations and advice in writing to the Manager of the Office of Nuclear Power (ONP) by meeting minutes and memoranda An NSRB consisting of senior TVA nuclear managers and utilizing outside senior advisers is constituted for each TVA operating nuclear site.

The NSRB functions to provide independent nuclear safety review and audit cognizance in the areas of:

- Nuclear power plant operations
- Nuclear engineering
- Chemistry and radiochemistry

- Metallurgy
- Instrumentation and control
- Radiological safety
- Mechanical and electrical engineering
- Quality assurance practices
- Nondestructive testing
- Other appropriate fields associated with the unique characteristics of nuclear power production

The NSRB is responsible for the review of:

- The safety evaluations for (a) changes to procedures, equipment, or systems, and (b) tests or experiments completed under the provision of 10 CFR 50.59, to verify that such actions did not constitute an unreviewed safety question.
- # Proposed changes to procedures, equipment, or systems which involve an unreviewed safety question as defined in 10 CFR 50.59.
- # Proposed tests or experiments which involve an unreviewed safety question as defined in 10 CFR 50.59.
- # Proposed changes to TS.
- Violations of codes, regulations, orders, TS, license requirements, or of internal procedures or instructions having nuclear safety significance.
- Significant operating abnormalities or deviations from normal and expected performance of plant equipment that affect nuclear safety.
- All reportable events.
- All recognized indications of an unanticipated deficiency in some aspect of design or operation of structures, systems or components that could affect nuclear safety.
- Reports and meeting minutes of the PORC and the Radiological Assessment Review Committee (RARC).

Review of the above listed items may be after the fact except items designated by a # above, which shall be reviewed before

implementation. Proposed changes to TS and licenses must be reviewed before submittal to the NRC.

With respect to the NSRB review process, as specified in the charter:

- The technical secretary is to screen and transmit appropriate documents for review to the NSRB or to the appropriate subcommittee.

- Review of material is to be accomplished by the NSRB or an appropriate subcommittee consisting of at least three designated reviewers who meet the qualification requirements of NSRB members.

- NSRB and subcommittee members are to review the material sent to them in a timely manner and furnish comments to the technical secretary.

- The technical secretary is to coordinate the resolution of comments or place the subject on a meeting agenda as requested, update the tracking and records system, and ensure resolutions are documented and provided to the NSRB or subcommittee, as appropriate, for review.

Herein lies an area of concern. Previous violation 328/87-30-02, which dealt with inadequate review of issues, reads as follows:

> "TS Section 6.5.2 requires that the Nuclear Safety Review Board (NSRB) review specific activities and be cognizant over certain audit activities. This TS also requires that a quorum be present to conduct these activities.
>
> Contrary to the above, the requirements of the TS are not being satisfied, in that, the current practice of using a ballot method (in lieu of discussion in formal meeting) to conduct the TS required reviews and audit oversight does not ensure a quorum is present for those reviews and does not provide the required oversight."

TVA admitted the violation. In their first response to the violation, dated August 27, 1987, TVA stated that:

> "NSRB procedures will be revised to provide better evidence of collegial review of the topics listed in the technical specifications. Concurrently, a review and potential revision of section 6 of the technical specifications are being undertaken with the intent of clarifying them, aligning them among TVA sites, and aligning them with standard technical specifications."

In their second response to the Violation, dated November 10, 1987, which was forwarded due to the inadequacy of the first response, the licensee stated that:

> "Balloting will not be used as the basis for any future NSRB action, recommendation, or conclusion. All technical specification reviews previously based on balloting have been collegially re-reviewed in a formally constituted NSRB meeting (SQN meeting No. 226 and Browns Ferry Nuclear Plant [BFN] meeting No. 93). NSRB procedures will be reissued by January 1, 1988, consistent with this."

A review of the NSRB charter revealed that section 6.4.4, which delineates the review process, required that the technical secretary coordinate the resolution of comments or place the subject on a meeting agenda as requested, update the tracking and records system, and ensure resolutions are documented and provided to the NSRB or subcommittee, as appropriate, for review."

Taking that one step further, if the technical secretary were to resolve the comments and not place the subject on a meeting agenda, which appears to be allowed, even if not advocated, the secretary would have committed the same act that brought about violation 328/87-30-02. This appears to be inconsistent with TVA's second response to violation 328/87-30-02, which stated that TVA would, by January 1, 1988, reissue NSRB procedures to prohibit balloting.

Extensive discussions with the NSRB Chairman and the technical secretary on March 2-3, 1988, led the NRC staff to believe that what appears to be allowed in the charter's review process is not actually allowed in practice. The process, as explained to the NRC, appears to be adequate. However, the charter, which is the governing procedure of the NSRB, and which should have been revised to prohibit the practice of balloting, pursuant to TVA's response of November 10, 1987, is still flawed.

As of March 4, 1988, Violation 328/87-30-02, remained open as a pre-startup item pending completion and inspection of corrective actions.

During the period March 16-18, 1988, this item was again reviewed for closure.

The inspector reviewed the revised NSRB charter, Office of Nuclear Power Organization Description number 13.5, Rev. 2. TVA recently made two document changes of substance to address the violation.

- In Section 6.4.4, an "or" was changed to an "and" in the first sentence describing the secretaries duties.

- Section 6.4.5 was added and states the following: "All formal NSRB actions, including the closing of tracking of review documents, and of comments, concerns, and recommendations, will be based upon NSRB action at a duly constituted meeting".

These changes to the NSRB charter satisfy the administrative aspects of this violation.

The inspector interviewed the chairman of the NSRB concerning the changes made to the charter, the items covered under the improper balloting process, and the present method for reviewing the large volume of subjects that require NSRB approval. Most important was the NSRB re-review of those items that were covered by the balloting process and that also involved TS changes, unreviewed safety questions, or operating license amendments. The chairman produced a memorandum dated July 28, 1987, titled, "Minutes of Meeting No. 93 of the Sequoyah NSRB, July 14-15, 1987". This memorandum listed all of the items that were re-reviewed under a "duly constituted NSRB". The inspector determined through the interview, a review of the charter, and a review of the aforementioned meeting minutes, that TVA had satisfactorily addressed the circumstances that led to the violation, and that the NSRB was functioning properly.

Violation 327,328/87-30-02 is closed.

(3) Review ISEG Staffing and Functionability

RESULTS

The Sequoyah ISEG was reviewed to verify, among other things, that the program has been prepared and contains the following:

- The responsibilities of the ISEG members
- Description of the ISEG function
- The organization and authority of the ISEG members
- The qualifications of ISEG members
- The training of ISEG members
- A description of the ISEG process
- A description of the ISEG escalation process
- A description of the record retention requirements for ISEG documents

The current ISEG program was also compared to the applicable TS, 6.2.3, to verify program compliance in terms of function, composition, responsibilities and authority.

In general terms, the ISEG function includes, but is not limited to, the following:

- Independent reviews of site and corporate nuclear-safety-related activities, programs, and events.

- Surveillance of the site and other divisions to ensure that human error is minimized and the activities are performed in accordance with the governing documents.

- ISEG surveillance activities, which may include:

  - o Attendance at the Plant Manager's morning meetings

  - o Daily control room visits to review operating logs

  - o Review and evaluation of operations and maintenance activities

  - o Review and evaluation of plant design changes

  - o Review and evaluation of nuclear-safety-related procedures

- Examining the plant operating characteristics, NRC issuances, Nuclear Experience Review (NER) evaluations, and other sources of design and operating experience information.

- Developing and presenting detailed recommendations for nuclear safety improvements as appropriate to resolve negative findings.

It should be noted that, from this point forward, positions, titles and chains of command may be inaccurately stated due to a TVA reorganization effective December 7, 1987, which had not been reflected in applicable procedures. This issue will be discussed later in this report.

The Sequoyah ISEG is comprised of three full-time-dedicated ISEG reviewers which are augmented by five ISEG reviewers located at the ONP central office within the Division of Nuclear Safety and Licensing (DNSL). The five central office reviewers are shared among the TVA sites.

The ISEG members (reviewers) have access to all TVA nuclear facilities, records and documents necessary to perform their duties and responsibilities.

The ISEG has access to advice and services of technical specialists within TVA with the concurrence of appropriate management. Outside consulting services are required to be available, as needed, through contractual arrangements.

ISEG reviewers performing ISEG activities have the following qualifications:

- Bachelor of Science (B.S.) degree in engineering or physical science or equivalent experience

- Three years of experience in a specialty area

- The lead ISEG reviewer must have six years of nuclear experience, of which three years are in a safety-related activity, in addition to a B.S. degree in engineering or physical science, or equivalent

- Staff Specialists must have five years experience in their area of specialty.

- The Manager, ISEG, must have eight years nuclear experience, of which four years are in a safety-related activity, in addition to the B.S. or equivalent.

The qualifications, indoctrination and training records of ISEG personnel were found to be documented in accordance with Nuclear Safety Branch instructions.

An ongoing training program for ISEG personnel is intended to assure that they are familiar with different assessment techniques and remain cognizant of new industry developments.

The ISEG review, evaluation, and reporting process is conducted in accordance with instructions prepared by the Manager, ISEG, and approved by the Manager of Nuclear Safety in accordance with requirements established by the Director, DNSL. The following major elements of the ISEG Program are covered by such instructions.

- Selection of the review topics

- Conduct of ISEG reviews

- Reporting of ISEG reviews

- Tracking and follow-up of ISEG nuclear safety findings

- ISEG surveillance activities

Upon ISEG completing its evaluations following an ISEG review, the Manger, Nuclear Safety approves and issues reports to the

affected division, site director, or staff manager as appropriate. Approved reports are also distributed to the Chairman, Nuclear Safety Review Boards.

Organizations receiving the results of ISEG reviews, evaluations, or surveillance must identify and implement corrective actions as appropriate. Such organizations must respond within 30 days of receipt of the ISEG report. It is the responsibility of the organization receiving an ISEG evaluation report to initiate any required CAQRs.

The Manager, Nuclear Safety, interfaces with the site or division directors (or their designees) to resolve identified ISEG findings. If a finding cannot be satisfactorily resolved, then it is escalated to The Director, DNSL, for resolution. Findings still under dispute are brought to the attention of the Manager of Nuclear Power for ultimate resolution.

During this inspection, the following documents were reviewed:

- ISEG Implementation Charter
- ISEG Implementing Procedures
    - o 0604.05 - "ISEG Evaluations"
    - o 6.1-1, Rev. 0 - "Selection of ISEG Review Topics"
    - o 6.1-2, Rev. 0 - "Conduct of ISEG Reviews"
    - o 6.1-3, Rev. 0 - "Reporting of ISFG Reviews"
    - o 6.1-4, Rev. 0 - "Tracking of ISEG Findings"
    - o 6.1-5, Rev. 0 - "ISEG Surveillance activities"
    - o 6.1-6, Rev. 0 - "ISEG Personnel Training"
- ISEG position descriptions
- ISEG member resumes
- TS 6.2.3
- Inspection Report 327,328/87-30
- ISEG Section Instruction Letter SIL-ISEG-1
- ISEG Report 87-03-SQN-I, "Clearance Procedure Review"
- ISEG Surveillance, July 30, 1987, "Refueling and Fuel Handling Operations"

- ISEG Report 87-01-SQN-I, "Containment Isolation Valve Leakage Review"

- ISEG Monthly Reports, 87-13-SQN-I, 87-15-SQN-I, 87-16-SQN-I and 87-17-SQN-I

- Procedure 0600.01, "Regulating Reporting Requirements"

- Procedure 0600.02, "Reporting of Defects and Noncompliances Per 10 CFR 21"

- Procedure 0601.01, "Nuclear Experience Review"

- Procedure 0602.03, "Technical Specification Changes and Operating License Amendments"

- Procedure 0604.04, "Evaluation of Changes, Tests and Experiments"

- Procedure 0604.06, "Technical Specification Interpretations"

- Procedure 0605.01, "Commitment Management and Tracking"

One area of concern discussed in previous report 328/87-30 was that, at the time of that inspection, the new ISEG had not developed an auditable system to ensure compliance with the TS requirements.

ISEG Section Instruction Letter SIL-ISEG-1 was reviewed to determine if the system of screening, reviewing and documenting described therein constitutes an "auditable system" as discussed above. The system appears to be adequate and auditable.

An area of current concern involves the reorganization effective December 7, 1987, which, among other things, removed certain people from the ISEG upper management structure, changed the ISEG report chain and changed selected position titles.

As of March 4, 1988, this reorganization had not been reflected in the following documents:

- SIL-ISEG-1, "ISEG Section Instruction Letter"

- Procedure 0604.05, "ISEG Group Evaluation"

- Standard Practice SQA 117

- ISEG-I-6.1-1, "Selection of ISEG Review Topics"

- ISEG-I-6.1-2, "Conduct of ISEG Reviews"

- ISEG-I-6.1-3, "Reporting of ISEG Reviews"
- ISEG-I-6.1-4, "Tracking and Followup of ISEG Nuclear Safety Findings"
- ISEG-I-6.1-5, "ISEG Surveillance Activities"
- ISEG-I-6.1-6, "Indoctrination and Training of ISEG Personnel"
- Procedure 0600.01, "Regulating Reporting Requirements"
- Procedure 0600.02, "Reporting of Defects and Noncompliance Per 10 CFR.21"
- Procedure 0601.01, "Nuclear Experience Review"
- Procedure 0602.03, "Technical Specification Changes and Operating License Amendments"
- Procedure 0604.04, "Evaluation of Changes, Tests and Experiments"
- Procedure 0604.06, "Technical Specification Interpretations"
- Procedure 0605.01, "Commitment Management and Tracking"
- Technical Specification 6.2.3

With the exception of the administrative difficulties described above, on March 4, 1988, the ISEG appeared to be functioning adequately and in accordance with TS requirements. Correction of the administrative procedures was made a pre-startup item.

During a followup visit on March 16-17, 1988, an inspector reviewed the recently revised ISEG procedures that had previously made reference to the Nuclear Safety Manager. The ISEG manager explained the changes in the organization that led to the elimination of this position, and walked the inspector through each of the affected procedures. The inspector concluded that the revisions adequately resolved the pre-startup item.

(4) Review ANI Assessment Resolution

RESULTS

This review was combined with paragraph b.(1) above.

(C) Maintenance Status (71707, 72701, 62703)

(1) General Material Condition of Plant

RESULTS

The general condition of equipment in the plant is very good. This observation acknowledges that the plant has been in an outage for over two years. Based on this, it is expected that the condition of equipment and systems reflect the attention that has been paid to them. This is apparent and has been verified and reported in several recent inspections related to operability and readiness. A number of changes have recently been undertaken to improve the physical layout and appearance of the service building. A new M&TE lab is being constructed in order to be closer to the power block access point and to improve the overall quality of M&TE. Housekeeping appears to be much improved over past efforts.

(2) Annunciator Alarm Status

RESULTS

It was previously noted that an excessive number of annunciator alarms were either tripped, out of service, or had outstanding work requests. Many of these alarms were out due to false signals that were being used during the outage. TVA's Instrumentation Technicians have recently devoted a great deal of effort to restore these alarms to service. Inspectors performing watch in the control room noted that, with the exception of testing being performed to enable mode changes, there were fewer than a dozen outstanding work requests on the main control board annunciator alarm panels.

(3) Post Maintenance Testing Complete or Scheduled

RESULTS

Inspectors reviewing the TVA's maintenance program for mode 2 readiness noted that almost all post maintenance testing had been completed. Post maintenance testing that had not been performed was scheduled. Overall, the inspectors detected no problems in this area that would indicate that the licensee was experiencing difficulties with the schedule, or was placing equipment back in service without performing required post maintenance testing.

(4) Previous Maintenance Concerns

RESULTS

The "Report of Sequoyah Readiness Review" dated January 5, 1988, and further discussed in Section O of this report, identified

three concerns in the maintenance area. These concerns were:

- Dedication of extra resources to compensate for existing maintenance program inadequacies may not be maintained after startup or be adequate for the new plant modes. The report observed that improvements were needed in the areas of work generation, work input control, work load planning, shop scheduling, and job acceptance.

- The need for operations control room staff to support maintenance activities, by approving and controlling work, was causing excessive distraction to the control room operators. There may be several instances in processing a maintenance work request which require the approval of and/or actions to be taken by the on-shift operations staff. The demands on the control room staff, during periods of extensive maintenance and modification work, reduce the effectiveness of the operators in monitoring plant operations. Major work will still be in progress on Unit 1 after Unit 2 restart and there will be a backlog of Unit 2 post startup work. It was stated that other nuclear plants perform this work control function outside the control room.

- The existing facilities for storing test meters and equipment in the instrument shop were inadequate. The room was crowded and some sensitive equipment was stored on the floor - reducing the walkway space. There was no test bench which could be utilized to test instruments before they went out to be sure they were working properly. Some equipment was out on semipermanent loan because the storage facility would not hold the full inventory.

The inspector reviewed the maintenance program as it is presently established and implemented. TVA has made extensive changes to their maintenance program organization as well as the procedures that govern maintenance activities.

The maintenance department organization has been redefined to create two separate organizations for scheduling and planning. The scheduling department reports to the plant manager while the planning department reports to the maintenance superintendent. This was assessed as being a positive change since it freed the planners to concentrate on the generation of work packages and allowed the scheduling group to concentrate more on the overall coordination of the maintenance work being performed and its relationship to the plant operability status.

Procedure SQM-2, "Maintenance Management System, Rev. 29," dated February 29, 1988, establishes the method and responsibilities for managing and tracking the initiation, planning, scheduling and coordination, execution and post work evaluation, control and documentation of maintenance work activities. The inspector reviewed the procedure, which has essentially been overhauled to

support the new organization and to implement an ongoing streamlining process. The procedure is quite large and cumbersome and contained a few minor errors in referencing. The planning superintendent was in the process of reviewing and making corrections to the document and stated that TVA was planning to split the procedure up into four or five parts, i.e., 2.1, 2.2, 2.3..., to make it easier to train personnel with various work functions on the particular procedure sections that they must be familiar with. The intent of rewriting the procedure was to streamline the maintenance process by eliminating the excessive signature requirements; establish generic maintenance requests (MRs) for simple, repetitive, non-safety-related maintenance activities; and reduce the maintenance package generation time for the maintenance planners. Additionally, SQM-2 is intended to eliminate open ended repair orders such as "troubleshoot and repair" and replace them with more explicit instructions. Troubleshooting MRs now reference specific vendor manuals or maintenance instructions. A troubleshooting MR could be successively "re-planned" as more information about the nature of the problem became known. The "re-planning" mechanism has also been simplified.

One inspector concern was that SQM-2 did not establish and implement a TS operability determination when a MR was first generated. TVA had already noted this deficiency and was adding corrective instructions. TVA committed to alter SQM-2 prior to entering Mode 2 operations. Altering SQM-2 was made a pre-startup item by the NRC staff.

During a followup visit on March 16-17, 1988, the inspector reviewed Revision 30 to SQM-2, issued March 16, 1988. Section 7.3.4, "Submission of the WR for Planning and Work", now reads: "If the WR affects plant installed equipment, the initiator or his supervisor shall submit the WR to the Work Control Group (WCG) SRO, the on-shift SRO, or the Unit Manager for review within the shift the WR was initiated prior to being submitted for planning". This addition to the procedure adequately addresses the inspector concern and resolves the pre-startup item.

The inspector interviewed a planner concerning the recent maintenance organization changes and SQM-2. Planners are required to have five years of maintenance experience and two years of nuclear experience. The planner demonstrated the work planning process using the available reference documents: 10 CFR 50.49 environmental qualification, CSSC vs. non-CSSC, and post maintenance testing (PMT).

- It appeared that the CSSC determination is still difficult and time consuming. Many other nuclear units use a Q-list that renders safety-related classifications via equipment

identifying numbers. TVA is presently developing a Q-list system for the whole of TVA.

- The planner demonstrated the process for determining the PMT requirements. The planners use a document, SQM-66, that contains several matrices for PMT requirements. This document had recently been revamped to better support the planners. However, the document was still being developed. The planners are concurrently assisting in developing a database, as an appendix to SQM-66, that will detail PMT requirements that encompass the whole of PMT testing for a given specific repair activity.

- The planner had no problems using the 10 CFR 50.49 environmental qualification reference documents. Environmental qualification has, in the past, received extreme scrutiny, resulting in this material being a strength in the planner's reference library.

It was not clear to the inspector that TVA understood that the concurrent development of the maintenance program, documents, and reference material, along with the Unit 2 startup, Unit 1 preparation, and planned Unit 2 refueling outage, may impact the effectiveness of the program by taxing the personnel and the organization beyond their abilities. TVA management responded and detailed to the inspector their anticipated plans for designating maintenance supervisors for each unit and pre-planning all foreseeable activities for the refueling outage. This indicated to the inspector that the TVA is well aware of the pending schedule and is taking action to address it.

The previously expressed concern that control room operators were distracted from their duties to support the demands of the maintenance departments has been addressed by the formation of the WCG. The WCG is presently staffed with SRO qualified individuals who serve as an interface between the craftsperson executing the work package and the control room operators. The WCG will eventually be staffed by SROs, ROs, maintenance personnel, scheduling personnel, and systems engineers. The primary functions of the WCG are as follows:

- Review all work packages for completeness, including the Plant Operation Impact Evaluation (impact study). The impact study will assess work activity for plant impact. This includes identification of prerequisites, plant alarm and system responses, and configuration control. The impact study will be part of the work package preparation and will be reviewed by qualified individuals;

- Clearance preparation and acceptability;

- Control and coordinate work activities;

- Provide authorization for non-system maintenance;

- Provide communication to the Shift Supervisor regarding planned system activities;

- Obtain approval from the Shift Supervisor/Assistant Shift Supervisor to commence work; and

- Verify work package closeout and equipment restoration.

The inspector observed a noticeable decrease in the amount of traffic in the control room in contrast with observations made during past inspections. The operators expressed satisfaction with the WCG in that it reduced the amount of operator attention to detail required for routine maintenance - allowing them to focus on more pertinent duties at hand. Maintenance personnel were less enthusiastic about the WCG as it appeared to be yet another obstacle for a work package; however, all interviewed were aware of the benefits of the program. The inspector concluded that the establishment of the WCG adequately addressed the finding in the readiness review report and helped to fortify other changes made to the maintenance program.

The licensee has responded to the shortcomings in the area of Measuring and Test Equipment (M&TE) storage in the instrument shop by formulating a plan with internal commitments to have a new M&TE shop established by July 1, 1988. This shop is planned to be under the purview of the Instrumentation and Control Department, located close to the entry to the power block, and use independent computer tracking. Procedure AI-31, "Control of M&TE", is being rewritten to accommodate the new program and is targeted for issue by April 1, 1988.

The new M&TE lab is planned to employ transfer standards to perform a quick check of equipment being returned from use. Maintenance personnel will be instructed to fill out a form listing the data points that were used to perform the maintenance. This method of checking equipment following use in the field is designed to eliminate any backlog of recalls resulting from out-of-tolerance equipment.

The inspector discussed the plans for the new M&TE program with the licensee and concluded that, while the existing program is adequate, the new program provides for improvement in an area that is crucial to performing good maintenance.

While reviewing TVA's responses to the Sequoyah Readiness Review Report, the inspector observed the quality of work packages, the material condition of the plant, and the status of maintenance items to be completed prior to entering Mode 2. The work

packages were well planned and there were no maintenance items that were considered to significantly impact entry into Mode 2.

Overall, it was determined that TVA has established and put in place a maintenance program that addressed noted weaknesses from the Sequoyah Readiness Review Report. The organization and implementation is sufficiently in place to support Mode 2 operations.

(D) TVA Non-Restart List and Outstanding Items Review for a Selected System (71711)

The Sequoyah Unit 2, Hold Point #2 (Mode Shift 3-2) Release inspection required the inspectors to review, for the systems chosen, those items designated by the licensee to be non-restart items.

The inspectors selected the safety injection and charging systems for the review of outstanding items for Sequoyah Unit 2. Specific systems included in the review were the safety injection portion of the chemical and volume control system, upper head injection system, and the residual heat removal system.

The inspectors performed walkdowns of those systems located in the Unit 2 auxiliary building. The physical condition of the equipment was generally good with very few maintenance work requests outstanding. Several non-restart items were brought to the attention of TVA. These items were quickly addressed. In the areas sampled, the NRC concurred with TVA's classification of the items.

(1) Outstanding Clearances

RESULTS

The Configuration Log and Hold Order, Clearance Book for Unit 2 were reviewed. No outstanding items for the selected systems were identified. The inspectors also conducted a walkdown of the applicable control room boards. There were no tags and no annunciators were annunciated for the safety injection and charging systems. The walkdown of the control room panels identified no discrepancies in valve lineups or control switches for pumps or power operated valves.

(2) Temporary Alterations Outstanding for That System

RESULTS

The inspector reviewed the licensee's Temporary Alteration Change Form (TACF) log book for items listed against the CVCS, RHR, UHI, and SIS systems. A cursory review of the TACFs indicated that control room drawings reflect system alterations were appropriate. Although the log book contained no TACFs which could have been considered restart issues, the inspector noted a large number of TACFs which were greater than two years

old. The licensee has committed to the Institute of Nuclear Power Operations to significantly reduce the number of outstanding TACFs.

(3) Nonconforming Conditions and Conditions Adverse to Quality (CAQ)

RESULTS

A listing of all open and closed Condition Adverse to Quality Reports (CAQRs) for Sequoyah safety injection and charging systems was obtained from TVA's Tracking and Reporting of Open Items (TROI) System. The inspectors reviewed the following sample of open CAQRs:

- SQA 871670801 which dealt with the fabrication of a replacement valve stem for charging flow control valve 2-FCV-62-0093, based on a field drawing that had not received appropriate approvals.

- SQA 871671801 which dealt with the failure to identify a CAQ within the corrective action program for valve 2-FCV-62-0093.

- SQP 870015 which was written for the failure of relief valve 1-VLV-63-511, on the suction piping to the Unit 1 safety injection pumps, to pass surveillance testing. The corresponding Unit 2 valve showed no failures in its surveillance testing.

- SQP 870159 which dealt with the stroke time requirements for the upper head injection system isolation valves for Units 1 and 2. The vendor supplied revised response time requirements to address isolation valve reliability concerns as part of the corrective actions taken in response to this CAQ.

For each CAQR, the inspectors verified that an appropriate restart determination was made based on the information presented in the CAQR. SQA 871670801, SQA 871671801, and SQP 870015 were determined to not affect restart for Unit 2. SQP 870159 was a restart item for entry into Mode 3. SQP 870159 restart actions have been completed with the CAQR remaining open because post-restart actions remain.

Open CAQRs which affect restart for Unit 2 are being addressed by Sequoyah Activities List (SAL) umbrella item 970. A review of the SAL 970 listing of open CAQRs showed one CAQR related to the safety injection and charging systems which required additional actions prior to entry into Mode 2. SQP 880035 was initiated for high axial vibration experienced in the coupling between the motor and gear case for centrifugal charging pump 2 B-B. This CAQR required, prior to entering Mode 2, the

performance of preventive maintenance for couplings for the main feedwater pumps and drain tank pumps. The couplings for other pumps such as the centrifugal charging pumps, safety injection pumps, auxiliary feedwater pumps, and the condensate booster pumps were addressed previously prior to entering Mode 3.

(4) TVA's New Employee Concerns Program Backlog for That System

RESULTS

The inspector reviewed TVA's new Employee Concerns Program for items which pertain to the CVCS, RHR, UHI, and SIS systems. The program does not currently have concerns pertaining to the aforementioned systems. A cursory review of several other concern issues in the program indicated an effective approach and thorough examination of the concern with appropriate conclusions and corrective actions taken. Additionally, it was noted that the licensee reviews all concerns for applicability to other TVA sites. No restart issues were identified during this review.

(5) Possible Impact of Outstanding Work Requests for That System

RESULTS

The inspector reviewed the Maintenance Request (MR) log for the appropriate inclusion of restart items pertaining to the CVCS, RHR, UHI, and SIS systems. Additionally, the MR log was compared to the restart MR log for the appropriate inclusion of restart items. The inspector considers that all MR issues have been evaluated into restart/non-restart MRs. No restart issues were identified during this review.

The inspector reviewed the Engineering Change Notices (ECN) issued after August 16, 1984, for Unit 2. The Department of Nuclear Engineering (DNE) has completed all ECNs pertaining to the CVCS, RHR, UHI, and SIS systems. A review of current activities associated with these ECNs indicates that a majority of the items have had the work completed and are awaiting final clerical close out. The inspector considers that the remaining items have been adequately evaluated into restart/non-restart items. No restart issues were identified during this review.

(6) Sequoyah Activities List (SAL) Closure Process

RESULTS

During the inspection period, a number of SAL items remained to be completed prior to entering mode 2. For example, SAL item 970 for restart disposition of open CAQRs remained to be completed. As discussed in paragraph (3) above, one CAQR related to the safety injection and charging system remained

open for restart. CAQRs for other systems also remained open for restart. Outstanding work requests were discussed in paragraph (5) above. SAL item 318 which addressed closure of all restart work requests remained open.

The licensee was working to close out all restart SAL items. The closure process for each SAL item included an independent review by Division of Licensing and Regulatory Affairs personnel. During the inspection period, approximately 50 SAL items required for restart were still open. Many of these were umbrella SAL items which encompassed many subtasks and often dealt with many of the Unit 2 systems, including the safety injection and charging systems. Examples of umbrella SAL items were SAL 318 for maintenance work requests, SAL 358 for corrective action reports and deficiency reports, and SAL 400 for NRC inspector followup items. The SAL included both items categorized as restart items and items characterized as non-restart items. The inspectors reviewed a sample of SAL items categorized by the licensee as non-restart items for Unit 2. The review included information from the SAL database, the Corporate Commitment Tracking System (CCTS) and documents referenced in the SAL and CCTS. The results indicated that the licensee's determination of non-restart status was appropriate for items reviewed in the sample, as follows:

- SAL 301 dealt with continuing actions in response to a July 1985 leak at the sample connection on the Unit 2 letdown line. This included a review of the design analyses for similar lines on the chemical and volume control system, collection and analysis of vibration data on the letdown line, and monitoring of similar lines to provide early warning of failures. The licensee categorized this SAL item as non-restart. The inspector determined this to be appropriate based on the corrective actions that had been completed, including replacement of the sample lines for both Units 1 and 2 and addition of a support on each line. The licensee planned to obtain further vibration data after restart with the Units at power.

- SAL 558 required the installation of sealant for various electrical conduits passing through fire barriers at both ends of the conduit or at the fire barrier. Licensee Event Report (LER) 85-03 identified various unsealed conduits for Unit 2. This SAL item was designated as a non-restart item. The inspectors verified this restart determination to be appropriate given the licensee's commitment in LER 85-03 to maintain fire watches until compliance with the fire protection plan was achieved.

- SAL 679 called for an evaluation of the need to revise the channel calibration technical specification requirement for a flow indicator on the condensate demineralizer regenerate

effluent line. The licensee determined this SAL item to be a non-restart item. The inspector verified this to be appropriate based on the licensee's commitment to install a calibrated flow indicator on the effluent line at each calibration due date, pending a possible technical specification change. Thus, the existing TS surveillance requirement was being met.

(7) System Walkdowns

RESULTS

- TVA was requested to provide the seismic qualification for ASCO Solenoid Valve 2FCV-67-182, which controls the cooling water to the "A" HPSI pump room cooler and the sister valve for the "B" HPSI pump room. These valves had 1 1/2" electrical condulet boxes extending out about a foot from the coil housings. Seismic Simulation Test Report 17746-1 dated June 23, 1986, was provided. It qualified such valves with a 2" elbow condulet and 6' of flexible conduct attached. The installed valves were well within the test configuration.

- Control valve 2-LCV 62-136, in the line between the refueling water storage tank and the charging pump, had an area of the downstream weld joint marked as a "repair area." This was evaluated as an original construction marking that had never been removed -- not a unevaluated repair area.

- A broken flexible conduit was found near the outboard pump bearing for the 2A-A centrifugal charging pump. The conduit was completely severed, exposing the internal wires. In response, the licensee initiated a work request to replace the flexible conduit. The conduit enclosed the sensing circuit for a bearing temperature thermocouple which did not have a control function and was not required to be environmentally qualified.

- In the 2A-A centrifugal charging pump room, two long-term temporary alterations where found. These had been in place prior to the outage. Temporary alteration 82-2037-63, associated with the pump balance drum, was dated February 13, 1982. Temporary alteration 2-84-2016-62, for a motor bearing temperature monitor was dated July 17, 1984. In response, TVA determined that temporary alteration 82-2037-63 had actually been released in May 1985 but the tag had not been removed. For temporary alteration 2-84-2016-62, TVA representatives stated that the modification will be reviewed and a design change package prepared at the next refueling outage.

TVA's program for use and control of temporary alterations on safety-related systems is further discussed in Inspection Reports 327,328/87-08, 327,328/87-15, 327,328/86-27, and 327,328/87-14

- The seismic qualification of the overhead monorail and trolleys utilized in the various safety-related pump rooms was questioned. Review by the licensee indicated that the monorail and trolley are qualified for a seismic event. Additionally, the licensee indicated that the qualification does not require the trolley to be secured in one particular position on the monorail. There are no procedures in the maintenance group which specify where or how the licensee is to secure the trolley or associated chains when not in use. The walkdown revealed that the licensee had the associated chains attached to various pipes, conduits and safety-related pump motors. Subsequent to the inspection, TVA specifically evaluated the seismic aspects of the overhead hoist chains and determined that they could not cause equipment damage.

- Four control instruments and eight flow gauges for the essential raw cooling water lines to the lower containment vent coolers and control rod drive vent coolers were indicating off scale or out of range. The ERCW system had been modified by blocking open the flow control valves for the lower compartment coolers. It was determined that having the instruments and flow indicators indicating off scale or out of range was not detrimental to system operation because they no longer served a useful purpose. While not a restart issue, TVA indicated that the items would be ultimately removed.

- Tygon tubing was found on the air side of an AOV associated with the Surge Tank Drain Flow Control Valves 2-FCV-87-5 and -16. The tygon tubing encases the tube which comes off the AOV and goes to the solenoid which either vents or pressurizes the AOV. TVA and their contractor found that this configuration is as-designed by the vendor.

(E) Health Physics Program (84523, 84524, 83526, 83524)

(1) Liquid-Control, Sampling, Monitoring and Release

See RESULTS below.

(2) Gases and Particulates-Control, Sampling, Monitoring and Release

RESULTS (1 and 2)

Onsite inspection 327,328/88-03 was conducted during the period January 11-15, 1988, using the following inspection procedures: Liquid and Liquid Wastes (84723), Gaseous Waste System (84724),

and Radiological Environmental Monitoring (80721). The inspection purpose was to review the radiological environmental monitoring program and the liquid and gaseous radioactive waste management programs to determine if there had been any changes or developments in the licensee's programs which would adversely influence Unit 2 restart. The inspector determined that the licensee was performing at an acceptable level in the program areas. One area, involving the extensive personnel changes in the licensee's chemistry department, was identified for further review during subsequent inspections. This is not considered a prerequisite for Unit 2 startup. No violations or deviations were identified.

(3) Control of Rad Material and Contamination Survey and Monitoring

See RESULTS below.

(4) Personnel Monitoring

RESULTS (3 and 4)

Onsite inspection 327,328/88-04 was conducted during the period January 25-29, 1988, using the following inspection procedures: Organization and Management Controls (83722), External Exposure Control and Dosimetry (83724), Internal Exposure Control and Assessment (83725), Facilities and Equipment (32727), Control of Radioactive Materials and Contamination, Surveys and Monitoring (83726), and Maintaining Occupational Exposures ALARA (83728). The inspection purpose was to review the health physics and radioactive waste management programs to determine if there had been any changes or developments in the licensee's programs which would adversely influence Unit-2 restart since the previous restart inspection (327, 328/87-56). The inspection determined that the licensee was performing at an acceptable level in both program areas and that numerous initiatives were in various stages of completion to effect program enhancements. Four areas were identified for further review during subsequent inspections: (1) reduction of administrative errors in administration of radiation work permit program (88-04-01); (2) evaluation of reliability of digital alarming dosimeters issued to personnel in high radiation areas (88-04-02); (3) development of a unified procedure for monitoring post-accident radioactive iodine concentrations in vital areas (88-04-03); and (4) development of criteria for reassessment of preplanned ALARA dose estimates when work scope changes (88-04-04). Licensee action on these issues is not considered a prerequisite for Unit-2 startup. No violations or deviations were identified.

(F) Security (81070, 81172, 81052, 81054)

(1) Access Control, Personnel

(2) Access Control, Packages

(3) Physical Barriers-Protective Area

(4) Physical Barriers-VA and Controlled Access Area

RESULTS (1, 2, 3, and 4):

An onsite physical security inspection was conducted during the period January 25-29, 1988. The purpose of the inspection was to review the physical security program to determine if there had been any changes or developments in the licensee's program which would adversely influence Unit 2 restart. Particular emphasis was given to Inspection Procedures 81052 (Physical Barriers-Protected Areas), 81054 (Physical Barriers-Vital Areas), 81070 (Access Control-Personnel), and 81072 (Access Control-Packages). The inspectors determined that the licensee was performing at an acceptable level in these areas. One item was identified which required review during subsequent inspections and was considered significant to Unit 2 restart. This item related to four physical barriers which did not meet security requirements and is further described in IR 327,328/88-11. No violations were identified. The above item was reinspected and found satisfactory by an NRC security inspector on March 3, 1988. IR 327,328/88-21 discusses this in more detail.

(G) Emergency Planning (82701)

(1) Review impact of additional personnel on site (site area notification and response)

RESULTS

An onsite emergency preparedness inspection was conducted during the period September 1-4, 1987. One of the purposes of that inspection was to review the emergency response impact of the personnel assigned to the Design Services Complex on site. During that inspection, the inspector reviewed Sequoyah Engineering Procedure SQEP-AI-20, Rev. 0, "Sequoyah Nuclear Plant Design Services Complex (DSC) Emergency Plan," which was developed to compensate for the inaudibility of the emergency siren to persons located inside DSC buildings. A management representative of the security force briefed the inspector on compensatory measures that would be ordered by the Security Shift Captain in the event of a site assembly evacuation, including use of bull horns by security personnel to alert DSC staff. General Employee Training (GET) was required for all site personnel, including those working in the DSC. Review of lesson outlines verified that GET 2.4 included training in site accountability/evacuation. Based on these reviews and interviews, the inspector concluded that TVA had provided

adequate means to notify DSC personnel in the event that site accountability and/or evacuation is ordered. IR 327,328/87-58 discusses this in more detail.

(H) Sustained Control Room and Plant Observation (71715)

(1) Control Room Conduct

(2) Control Room Operations

(3) Shift Turnover and Relief

(4) Shift Logs and Records

(5) Event Response

(6) Surveillance Testing

(7) Accomplishment of Maintenance

RESULTS (1 through 7)

This area was monitored by the NRC shift inspectors and is documented in bi-weekly IRs 327,328/88-02, 88-17 and 88-20.

With a few exceptions documented in the inspection reports, reviews of items (1), (2), (3), (5), (6) and (7) have found acceptable performance. However, recent observations indicate that the control room logs, item (4), may not be reflecting sufficient detail for events, equipment problems, or TS LCO entries. This item had been discussed with the Plant Manager and the NRC is currently anticipating improvements in this area. TVA's corrective actions for this item will be reviewed by the NRC and will be followed up in IR 327,328/88-20.

(I) Information Meeting With Local Officials (94600, 94703) (if required)

(1) If needed, meet with local, state and federal officials to explain the NRC restart inspection effort

(2) Respond to media inquires as necessary

RESULTS (1 and 2)

Information meetings were not held with local, state or federal officials during this inspection period. Media inquiries were responded to as they occurred.

(J) Implementation of New CAQ Process (36700, 90714)

(1) Ensure that the process is still working and evaluate several issues to ensure that all reportability requirements as to sensitivity and timing are still being satisfied.

(2) Evaluate process backlog and screening procedure to ensure that important issues are receiving the proper amount of attention.

(3) Evaluate management involvement with new CAQ process.

RESULTS (1 through 3)

Onsite team inspections were conducted February 8-12, 1988 (327,328/88-15) and March 7-18, 1988 (327,328/88-19). The purpose of these inspections was to determine if the program and corrective actions implemented were effective in assuring adverse conditions, including generic conditions, were dispositioned adequately. The three attributes listed above were considered during these inspections.

The results of NRC inspection 327,328/88-15 were that TVA's corrective action system needed improvement in some specific areas in order to support the restrictions applied to Sequoyah. The NRC inspection team that performed inspection 327,328/88-15 unanimously considered TVA's corrective action system to be adequately implemented if the specific items identified in that report were improved. Items requiring improvement were:

- Improve the speed and reliability of operability/ significance determinations.

- Ensure those personnel who make operability/significance determinations in the Generic CAQ and Nuclear Experience Review (NER) processes are adequately trained and possess the correct qualifications to make operability/significance determinations.

- Improve the completeness and auditability of CAQ documentation required for adequate management reviews prior to closure.

- Ensure managerial CAQR training requirements imposed by order EA 85-49 were current.

- Resolve specified technical questions unique to certain individual CAQRs.

During inspection 327,328/88-19, the items listed above as requiring improvement were again reviewed and the team concluded that TVA has devoted a significant amount of managerial attention to effect these recent changes. In order to maintain these identified improvements, the managerial attention may have

to be directed long term. The team also concluded that the implementation of the CAQR system is adequate to support the operation of Unit 2 and that it is appropriate to recommend the removal of Order EA 85-49 from Sequoyah.

(K) Evaluation of Testing (61728, 61702, 61705, 61707, 61726, 72701)

(1) Independent measurement of RCS leak rate

This area is considered acceptable for restart and inspection assessments are documented in NRC Inspection Report 327, 328/87-73 and Restart Task Force shift coverage inspection reports.

(2) Witness special tests

RESULTS

The NRC shift inspectors have been closely monitoring the licensee's performance of testing associated with this heatup. The tests monitored by the inspectors have been selected by the NRC Sequoyah Restart Shift Managers. The equipment involved and groups responsible for performance represent a range of technical disciplines. The tests monitored, as well as the inspectors findings, are documented in the bi-weekly inspection reports 327,328/88-02 and 88-17. Generally, the licensee performance has been acceptable.

(3) Review ECP

(4) Review shutdown margin

(5) Monitor control rod testing (72700)

RESULTS (3, 4 and 5)

Shutdown Margin, Estimated Critical Position, Reactivity Anomaly, and Moderator Temperature Coefficient procedures were reviewed during the period 16-19 February 1988.

(a) Documents Reviewed

- SI-38, Rev. 23, "Shutdown Margin"
- SI-120, Rev. 5, "Overall Reactivity Balance"
- SI-139, Rev. 6, "Determination of Moderator Temperature Coefficient"
- TI-7, Rev. 10, "Measurement of At-Power Moderator Temperature Coefficient"
- TI-4, Rev. 8, "Reactivity Anomaly Analysis"
- TI-21, Rev. 27, "Calculation of Estimated Critical Conditions"

- TI-22, Rev. 24, "Shutdown Margin Calculation"
- TI-28, Rev. 68, "Plant Curve Book"
- TI-33, Rev. 2, "Calculation of Xenon Worth"
- TI-34, Rev. 2, "Calculation of Samarium Worth"
- WCAP-10753 (December 1984), Nuclear Parameters and Operations Package for Sequoyah Unit 2, Cycle 3,

(b) Analysis of Procedures

- SI-38, section 5.0, C, is used to perform shutdown margin analysis in modes 1 and 2 to satisfy TS surveillance requirements 4.1.1.1.1.a and 4.1.1.1.1.d. The former is performed after detection of an inoperable rod and the latter prior to exceeding 5% RTP after a refueling. Step 5.A.1 directs the user to TI-22, Procedure A, which at step 5 directs the user to step 13 of Appendix A of TI-4. To complete that step it is necessary to refer to Table 3 of TI-21. Then the reactivity worth of the inserted control rods is returned to TI-22, Procedure A, step 5. At step 7 of Procedure A, the user is again returned to TI-21 - this time to Table 5 of Appendix 1 or 2 (unit dependent) to obtain the value of power defect.

  Thus to perform one surveillance, the user is required to obtain four procedures (SI-38, TI-4, TI-21, and TI-22) and verify them to be current prior to completing the job. Furthermore, it may not be obvious to the user that all four procedures are required at the outset of the job. Surveillance 4.1.1.1.a and LCO 3.1.3.1, action statement "a", require that the calculation of shutdown margin be completed within one hour of detecting an immovable or untrippable control rod. This cumbersome, but workable, approach to the surveillance does not contribute to meeting the time restraints.

  Though not a pre-startup item, the utility agreed that it would be advantageous to make the shutdown margin surveillance procedures less cumbersome to use, and identified a rewrite of the procedures as a long term goal. These and other procedures will be reviewed by the NRC during future routine inspections.

- Instruction 5.B of SI-38 is used to satisfy the estimated critical control rod position calculation required by surveillance 4.1.1.1.1.c. Step 1 directs the user to perform TI-21. Step 1.1 directs the result to be entered on data sheet 7. There is no data sheet 7 in either SI-38 or TI-21.

This procedural problem was identified to TVA and promptly corrected.

- Appendix 2 of TI-21 has been revised to account for delay of certain isotopes not usually considered in these calculations, but which have become important by virtue of the extended shutdown. Four processes have been shown to be significant:

  241Pu to 241Am,
  147Pm to 147Sm,
  Eu to Gd (mixed isotopes)
  239Np to 239Pu.

  The net reactivity effect is negative and will be increasingly so, as much as -593 pcm, as the shutdown continues. However, following resumption of operation the extended shutdown reactivity contribution will become as much as +73 pcm.

  WCAP-10753 provides a completed example of an ECP calculation. The inspector made the same calculation using the licensee's procedures, primarily TI-21 Appendix 2. In three places within the discussion of the delta Axial Offset Formulation there are references to non-existent steps of Data Sheet 2; the reference to step C.13 is, apparently, to step C.12.3; and the discussion of rod worth formulation does not reference a source for hot-full-power rod worths, which are required if the reference case was at power.

  Subsequent to the inspection, TVA issued revisions to TI-21 that corrected the identified errors.

(c) Measurement of Moderator Temperature Coefficient at Power

The monthly reactivity anomaly check (SI-120 and TI-4) is used to predict when RCS boron concentration will reach 300 ppm, which requires the measurement of moderator temperature coefficient at power using SI-139 and TI-7. That procedure and section 8.5 of WCAP-10753 both describe a measurement based upon use of the reactivity computer at power. Though used in the past, the validity of reactivity computer outputs at power is questioned. To calculate the reactivity resulting from any perturbation, the reactivity computer must be able to sample a changing flux that is responding only to the initiating event. At power, any flux increase results in an instantaneous increase in doppler absorption, negative reactivity, whereas the instrument response time of the reactivity computer is finite. A flux decrease at power does not lead to an instantaneous decrease in doppler absorption; because the

fuel pin time constant is relatively long, and until the pellet cools, the absorption will remain high. This asymmetric response of doppler effect to flux changes challanges use of a push-pull technique for at-power rod calibrations.

The licensee was referred to another utility that measures the at-power moderator temperature coefficient without use of a reactivity computer.

Because TVA's method was recommended and endorsed by Westinghouse, TVA did not agree to change the method used but agreed to evaluate and consider alternate methods.

The Unit 2 end-of-cycle moderator temperature coefficient measurement will be required when the boron concentration in Unit 2 decreases to 300 ppmB - about two months after its return to power. Use of the reactivity computer to measure at-power moderator temperature coefficient is URI 327, 328/88-16-02 pending TVA and Contractor justification of the technique.

(d) Control Rod Drop Time Measurement (72700)

Measurement of control rod (rod cluster control assembly) drop time is to be performed in accordance with SI-43 (Revision 10), Rod Drop Time Measurement. Review of the procedure prior to use raised no questions. Its performance is currently scheduled to be monitored by the shift inspectors and will be documented in a subsequent bi-weekly IR.

(e) Criticality of Unit 2 Following the Extended Outage (72700)

Procedurally, the recriticality of Unit 2 will be treated as a post-refueling restart under the control of RTI-3 (Revision 2), Initial Criticality. Following withdrawal of control rods in normal overlap sequence to a D-bank position corresponding to 100 pcm reactivity remaining inserted, a slow dilution of the RCS boron concentration will be initiated. The inspector expressed concern that the condition for terminating dilution RTI-3, Rev. 2, (ICRR = 0.1) did not provide sufficient margin to prevent a reactivity overshoot during mixing. Such an occurrence is more likely if a large volume of dilution water is added to the VCT, either in normal dilute mode or in alternate dilute without the VCT spray isolated. In either case, the VCT would become far more dilute than the RCS, which would lead to a continuous reactivity increase during mixing. This could cause, under certain conditions, the need to insert control rods to maintain the power level. This would be a potential problem if criticality occurred near

the rod insertion limit. This is not expected to be the case for Unit 2.

The licensee has made revisions to the procedure. The current procedure (Revision 4) appears adequate.

(L) Review Of Licensing Activities Needed to Support Mode 3-2 Change (94702)

(1) Resolution of items listed on Attachment 8 of Enclosure 2 to IE MC 94300 letter

RESULTS

This review was conducted separately from this inspection as part of the holdpoint release decision.

(M) Review of Outstanding Employee Issues (TI 2515/74)

(1) Open NRC Allegations and Employee Concerns

RESULTS

The inspectors discussed the status of open allegations and employee concerns listed in attachments to the MC 94300 letter with the respective coordinators in the Office of Special Projects. During the inspection period, open items required for restart were actively being resolved and closed. Closure of these items will continue to be tracked through the use of the MC 94300 process.

(2) For one selected system, review TVA's New Employee Concern Program backlog and assess any issues that could effect restart

RESULTS

The inspector reviewed TVA's new Employee Concerns Program for items which pertain to the CVCS, RHR, UHI, and SIS systems. The program does not currently have concerns pertaining to the aforementioned systems. A cursory review of several other concern issues in the program indicated an effective approach and thorough examination of the concern with appropriate conclusions and corrective actions taken. Additionally, it was noted that the licensee reviews all concerns for applicability to other TVA sites. No restart issues were identified during this review.

(3) For one selected system, review status of corrective actions for old Employee Concern Program issues and assess them for effects on restart

RESULTS

The inspector reviewed the licensee's old Employee Concern Program for items which pertain to the injection portion of CVCS, RHR, UHI, and SIS systems. The data base sort of the program and specific review of concerns again indicated an effective approach and thorough examination of the concerns with appropriate conclusions and corrective actions taken. No restart issues were identified during this review.

(N) Review Status of NRC Identified Issues (92700, 92701, 92703, 92703)

(1) Review NRC outstanding items that may effect restart, Attachments 1-6 of Enclosure 2 to IE MC 94300 letter

RESULTS

This review was conducted separately from this inspection as part of the holdpoint release decision.

(O) Review of Licensee Operational Readiness Assessment

- Sequoyah Unit 2 Operational Readiness Report.

- Report of Sequoyah Readiness Review, 1/5/88.

RESULTS

The licensee conducted two reviews of their operational readiness during the period of November 1986 to present. These reviews included one conducted by onsite personnel and another independent review performed by non-licensee persons.

The onsite Operational Review (OR) team evaluated five major program elements: Sequoyah Activities List (SAL) item closure, Sequoyah Nuclear Performance Plan text intention closure, closure of major issues, evaluations of site organizations, and development of the restart prerequisite checklist. The OR team findings were documented in the report entitled "Sequoyah Unit 2 Operational Readiness - Second Interim Report", and resolutions of these findings were documented in the February 29, 1988 report entitled "Sequoyah Unit 2 Operational Readiness Report Supplement".

The independent Operation Readiness Review (ORR) team evaluated the qualifications and motivations of personnel at SQN Unit 2, and the availability of necessary supportive resources prior to unit startup. This team's findings are documented in the report entitled "Report of Sequoyah Readiness Review", dated January 5, 1988, and the licensee's response to the restart findings are provided in the February 10, 1988 report entitled "Response to Report of Sequoyah Readiness Review - Restart Issues".

The inspectors reviewed the licensee response to the restart findings to determine if the corrective measures had been implemented, and more importantly, to assess if the licensee had adequately considered

the findings of both of the teams. In summary, the inspectors concluded that the licensee had satisfactorily responded to the findings and, in most cases, had completed corrective measures to resolve the concerns. The licensee management was cognizant of both reports and was assuring that the findings were being adequately considered by the staff.

The following provides a brief description of findings of the reports and the status of corrective measures which were reviewed by the inspectors. The independent ORR team review of operational readiness is discussed first.

Report of Sequoyah Readiness Review

(1) STANDARDS OF OPERATIONS

(a) One of the findings of the ORR team indicated improvement is needed to achieve the desired standards for excellence of operations in several areas. These areas included: formality, knowledge of plant conditions, and conservative plant operations with a questioning approach. The licensee, in their response to the ORR report, addressed these areas of concern. New standards were established and documented in a new administrative instruction (AI-30) entitled "Nuclear Plant Conduct of Operations". Some of the specific areas covering formality which were addressed in AI-30 were communications, control room access, watch relief, log keeping, alarms, respect for reactivity and personnel conduct. Other sections of AI-30 covered knowledge of plant conditions and conservatism in plant operations with a questioning approach. The licensee also stated that special training has been conducted to convey to the operations staff the importance of these areas. These new standards have been incorporated into regular training. The licensee has also implemented a Shift Operating Advisor (SOA) position to monitor the effectiveness of the conduct of operations. The SOA is a manger who reports daily to the Plant Manager and the Site Quality Manager. Administrative Instruction AI-50, "Shift Operating Advisor" documents the duties and responsibilities of the SOA.

To determine that commitments made by the licensee in their response to the ORR report were being carried out effectively, the inspectors performed the following:

- Review of AI-30, "Nuclear Plant Conduct of Operations"
- Observation of shift turnover and Control Room functions

- Interview of NRC staff members on watch in the Control Room

- Interview of Shift Engineers concerning changes committed to in the ORR report response

- Interview of SOAs concerning responsibilities and effectiveness of the program

- Review of AI-50, "Shift Operating Advisor"

- Observations of simulator training

- Review of training lesson plans

A check of AI-30 showed that the information the licensee said would be incorporated in the instruction was contained in the instruction. Observation of a shift brief and turnover and observation of Control Room functions indicated that the conduct of operations was in accordance with AI-30.

Discussion with NRC staff members in the Control Room confirmed that improvements had taken place in the conduct of operations. Specific areas that were mentioned were formality in response to annunciators, a more questioning approach in conduct of operations and a reduction of distractions.

Two TVA shift engineers were specifically asked about responses to the ORR report regarding operations. They were aware of and had seen the ORR report. They were knowledgeable of the commitments that had been made and had received training on them as indicated in the TVA response to the ORR report. They also felt that the conduct of operations had improved.

Observations of simulator training provided further evidence that operators were familiar with the conduct-of-operations policy. Prior to actual simulator exercises, the proper use of formality was emphasized by the instructors. The inspectors noted that the operators exhibited proper conduct in accordance with AI-30 by utilizing effective communications skills and demonstrating conservatism in Technical Specification interpretations and applications.

Classroom training in formality was presented during the 1988 requalification training, week No. 1. The inspector reviewed lesson plan OPL 273C110, Rev. 0, "Improving Communications Inside the Control Room and With Other Operations Team Members - Formality of Communications", and determined that the lesson plan adequately addressed the

ORR concerns. The training placed emphasis on the communication process, addressed professionalism, and described the requirements of AI-30. Operators designated by the licensee to be involved in restart satisfactorily completed training in this area.

b. Another ORR team concern in the Standards-of-Operations area related to the readiness of the chemistry and radiological control staff to support restart and subsequent plant operations. In particular, the report cites the high percentage of chemistry shift staff with no operating plant experience, the lack of training emphasis for the chemistry group in obtaining accurate results in a timely manner, and the need for improvements in training concerning airborne radiological activity situations and radiological casualties. The licensee identified a number of corrective measures in their response to these findings. These corrective measures included increased training and plant drills, institution of quality control (QC) check sample analysis on a regular basis, trending of analytical data, and reassignment of personnel to complement each shift with an experienced individual.

The inspectors verified, by reviewing lesson plans and training records, and by conducting interviews with several chemistry technicians, that the licensee provided each technician with adequate training on the use of gamma spectroscopy. Lesson plan LP CHM 005.001, "Radiochemical Laboratory Analyst Continuing Training", and contractor training program titled "Gamma-Ray Spectroscopy Analyses Techniques", were included in the review. Interviews with technicians also revealed that accountability has been greatly stressed, and that the shift complement has been revised such that an experienced individual was placed on each shift. The technicians stated that they participated in the periodic analysis of QC samples and in the trending of plant sample analysis, as described to in the licensee's response to the ORR report. The programs appeared to improve the confidence and awareness of the analyst in performing assigned tasks.

The inspectors also reviewed training provided for health physics (HP) technicians on airborne radiological activity situations and radiological casualties. The training programs reviewed included Operations of Plant at Power; Air Sampling Methods, Counting and Gamma Scan; and Radiological Control Responsibilities During Responses to Fire/Medical Emergencies. The training was determined to be adequate, and interviews with HP technicians verified that the training has been effective.

(2) PROCEDURES

The ORR report had stated that anomalies were found in the accuracy of and compliance with formal procedures. The concerns were that operational problems could occur if procedural compliance was not closely adhered to, that positive steps to correct specific operating procedure deficiencies sometimes were not taken and that management support for procedural compliance was not always evident. In brief, the licensee's response stated that they addressed these concerns with training for operations personnel on AI-30 and other subjects related to procedural compliance. The licensee also stated that requirements for procedural compliance have been clearly defined through both procedures and training.

To determine if the commitments made by the licensee were being carried out as indicated in their response, Shift Engineers were interviewed as mentioned earlier, AI-30 was checked for this specific area, Potential Reportable Occurrence (PRO) reports were reviewed for trends with problems in procedural compliance and SOAs were interviewed.

The interviews with Shift Engineers and SOAs indicated training was given and procedural compliance was being stressed and that there was an effort to correct inadequate procedures. Also, throughout the interviews a more questioning approach associated with performance of procedures was mentioned. A review of PROs did not reflect a trend in procedural compliance problems.

(3) SHIFT TECHNICAL ADVISOR

The ORR report had stated a concern that the role and use of the Shift Technical Advisor (STA) was found to differ from the objectives sought by NUREG-0737. They felt the STA was not being utilized to accomplish the intended function of providing technical advice pertaining to safe operation of the plant. The ORR concerns were based upon observation of relationships between the STA and the shift engineer, the STA's knowledge of the plant and the STA's performance in simulator exercises. In brief, the licensee's response stated that the STA is now assigned to a specific crew and will rotate with the crew, including all shifts, periods of operation and training. Other actions the licensee said were taken to improve the STA position included the removal of some clerical duties.

The inspectors interviewed two STAs to determine if the actions in the licensee response to the ORR report were being performed. The STAs confirmed the new crew assignment, acceptance by the operators on the crew and the rotation with the crew through all phases of operation and training. The STAs interviewed also felt their responsibilities were clear.

(4) ASSISTANT UNIT OPERATOR QUALIFICATION MAINTENANCE

The ORR report had stated a concern that the current rotation schedule for Assistant Unit Operators (AUO) did not assure that an AUO assigned to a specific station had maintained watchstanding proficiency for that station from an operational familiarity standpoint.

The licensee's response to the ORR report stated that a new watchstanding proficiency program was being implemented. Each AUO was being assigned to a limited number of watchstations and was to be certified only on those watchstations.

The inspectors interviewed a training supervisor responsible for oversight of the AUO training program and determined that the AUO certification program was in place and being performed.

(5) PLANT ADMINISTRATIVE CONTROL

The ORR report found administrative controls dealing with night orders, operator aids, independent verification, tagouts, and temporary alterations to be less than adequate. The licensee responded to each specific item by describing a number of corrective measures. The ORR concern, licensee resolution, and inspector conclusions are described below.

(a) With regards to night orders, the ORR team found that night orders were being employed as a substitute for preparing or changing procedures. The licensee responded by emphasizing to the operators the proper use of the Night Order Book; revising OSLA-30, "Night Order Book", to delineate its usage; and reviewing the Night Order Book for discrepancies. The licensee also indicated that the SOA will be conducting evaluations in this area.

The inspectors' review of procedure OSLA-30, dated October 20, 1987, verified that the procedure contained adequate guidance on the proper use of night orders. The inspectors also reviewed the Night Order Book to determine if the book was being used in accordance with OSLA-30. No discrepancies were noted.

The inspectors conducted interviews with Shift Engineers and SOAs, and determined that emphasis has been placed on the proper use of night orders, and that evaluations are conducted by SOAs in this area. The licensee appears to have effectively implemented corrective measures.

(b) The use of operator aid postings in lieu of caution or hold tags was also a concern of the ORR team. The licensee noted corrective actions of revising SQA-142; conducting an audit of the use of existing operator aids for compliance to SQA-142; and continuing evaluations of operator aids by the SOA.

The inspectors reviewed SQA-142 and determined that the procedure revisions address the concerns identified by the ORR team. A selection of operator aids were reviewed by the inspectors, and proper use was observed. No discrepancies were noted.

(c) The ORR report also identified a concern that the current SQN independent verification does not fully assure correct lineups. The licensee responded by stating that the current independent verification program is adequate, and that a complete separation of independent verifiers would be implemented by June 1, 1988. At the time of this inspection, the new policy on independent verification had not yet been implemented. The inspectors therefore reviewed PROs to determine if the licensee's existing independent verification program exhibited deficiencies. Of nearly 50 PROs reviewed, only one had resulted from failure to properly verify a system lineup. The inspectors concluded that performance deficiencies in the existing independent verification process were not evident, and that the revised policy, when implemented, should be an improvement.

Independent verification activities have also been recently addressed in IRs 327,328/87-66 (Valve line up), 88-06 (Valve line up followup) and 87-78 (Composite maintenance crews). Violations 88-06-01 and 87-78-02 addressed the lack of personnel qualification requirements for operations and composite maintenance crew personnel respectively. These issues do not involve technical inadequacies that impact on unit restart.

(d) Other administrative controls addressed in the ORR report included tagouts and temporary alterations. These items are discussed in Sections (C) and (D) of this report, respectively.

(6) TECHNICAL KNOWLEDGE

The ORR report identified that the operations staff had weak knowledge of core reactivity and the safety parameter display system (SPDS). The licensee cited special startup training for operations personnel emphasizing core reactivity and SPDS as means to resolve this concern.

The inspectors reviewed the following lesson plans:

EGT 222.018 "Neutron Kinetics, Core Design Parameters and Reactivity Effects, Rev. 0";

EGT 222.019 "Techniques for Predicting and Monitoring Subcritical, Critical, and Approach to Critical Conditions, Rev. 0;

and

OPL274A001 "TSC/SPDS Computer System, Rev. 0".

The training addresses the ORR team's concerns. The satisfactory completion of startup training for operators involved in restart was also verified by review of course completion records. The inspectors conducted interviews with Shift Engineers and STAs, and discussed the startup training. No discrepancies were noted.

(7) PLANT RESPONSIBILITIES

The ORR team had been concerned because it appeared that responsibility and accountability for plant systems was lacking. The ORR team also felt that actions taken to implement the concept of plant "ownership" by operations could lead to confusion as to the responsibilities of various support organizations.

The licensee's response stated that actions were being taken to improve the System Engineer concept. Most of the actions were not complete and not checked by the inspectors.

The licensee also responded to the plant "ownership" concept potentially causing confusion of responsibility among support groups. The licensee reiterated their current policy as described in AI-30. The inspectors observed training on plant "ownership" at a shift brief and verified through interviews with operations personnel that they understood the plant "ownership" concept. No mention was made of confusion of responsibility.

Sequoyah Unit 2 Operational Readiness - Second Interim Report

Sequoyah Unit 2 Operational Readiness Report Supplement

The TVA Operational Readiness (OR) Assessment was reviewed. The report had been discussed and evaluated previously in IR 327,328/87-60.

The inspectors checked closure status documentation on two performance objective criteria for operations:

- First line supervisors personally observing and discussing the performance of four or more instructions being used by their employees; and

- A meeting with group personnel is held and documented to ensure responsibilities and interfaces are clearly understood, to review the impact of startup on section activities and to ensure that proper work ethics are adhered to.

The documentation appeared to be adequate and the performance objectives satisfactorily closed.

The inspectors also noted the status of findings in the areas of TVA SAL, closure of major issues, and the Sequoyah Nuclear Performance Plan text intention closure. Those items that have not been resolved in these areas have been placed either on a restart or non-restart activities list. Review of restart/non-restart items is discussed in Section D of this report.

6. List of Abbreviations Unit 1 and 2

AI	-	Administrative Instruction
ALARA	-	As Low As Reasonably Achievable
Am	-	Americium
ANI	-	American Nuclear Insurers
AOV	-	Air Operated Valve
AUO	-	Assistant Unit Operator
BFN	-	Browns Ferry Nuclear Plant
B.S.	-	Bachelor of Science Degree
CAQ(R)	-	Conditions Adverse to Quality (Report)
CCTS	-	Corporate Commitment Tracking System
CS	-	Containment Spray (System)
CSSC	-	Critical Structures Systems and Components
CVCS	-	Chemical and Volume Control System
DNE	-	Division of Nuclear Engineering
DNSL	-	Division of Nuclear Safety and Licensing
DPSO	-	Division of Power Systems Operations
DSC	-	Design Services Complex
ECA	-	Emergency Contingency Action
ECP	-	Engineering Critical Position
EDN	-	Engineering Change Notice
EOP	-	Emergency Operating Procedure
ESF	-	Engineered Safety Feature
Eu	-	Europium
FRG	-	Functional Restoration Guideline
Gd	-	Gadolinium
GET	-	General Employee Training
HP	-	Health Physics
IFI	-	(NRC) Inspector Followup Item
IR	-	Inspection Report
IQR	-	Independent Qualified Review(er)
ISEG	-	Independent Safety Engineering Group
LCO	-	Limiting Condition for Operation

LER	-	Licensee Event Report
Maintenance Groups:		
(E)		Electrical
(I)		Instrumentation
(M)		Mechanical
M&TE	-	Measuring & Test Equipment
Mode 2	-	Startup (less than 5% power)
Mode 3	-	Heatup to 350°F or above
Mode 4	-	Heatup above 200°F and below 350°F
MR	-	Maintenance Request
NER	-	Nuclear Experience Review
Np	-	Neptunium
NRC	-	Nuclear Regulatory Commission
NSRB	-	Nuclear Safety Review Board
ONP	-	Office of Nuclear Power
OR	-	Operational Review
ORR	-	Operational Readiness Review
PAM	-	Post-Accident Monitoring (equipment, etc.)
PCM	-	Percent-milli (0.00001)
Pm	-	Promethium
PMT	-	Post Maintenance Test
PORC	-	Plant Operations Review Committee
PORV	-	Power Operated Relief Valve
PPM	-	Part per Million
PRO	-	Potentially Reportable Occurrence
Pu	-	Plutonium
QA	-	Quality Assurance
QC	-	Quality Control
RARC	-	Radiological Assessment Review Committee
REV	-	Revision
RHR	-	Residual Heat Removal (System)
RTD	-	Resistance Temperature Detector
RTP	-	Reactor Thermal Power
SAL	-	Sequoyah Activities List
SAR	-	Safety Analysis Report
SIS	-	Safety Injection System
Sm	-	Samarium
SNPP	-	Sequoyah Nuclear Performance Plan
SOA	-	Shift Operating Advisor
SPDS	-	Safety Parameter Display System
SQN	-	Sequoyah Nuclear Plant
SRO	-	Senior Reactor Operator
STA	-	Shift Technical Advisor
TACF	-	Temporary Alteration Change Form
TROI	-	Tracking and Reporting of Open Items (System)
TS	-	Technical Specifications
TSC	-	Technical Support Center
TVA	-	Tennessee Valley Authority
UHI	-	Upper Head Injection (System)
URI	-	(NRC) Unresolved Item
VCT	-	Volume Control Tank
WCG	-	Work Control Group