



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

Report Nos.: 50-259/91-36, 50-260/91-36, and 50-296/91-36

Licensee: Tennessee Valley Authority
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Docket Nos.: 50-259, 50-260 and 50-296

License Nos.: DPR-33, DPR-52,
 and DPR-68

Facility Name: Browns Ferry 1, 2, and 3

Inspection Conducted: September 16-20, 1991

Inspector: J. J. Lenahan *J. J. Lenahan* 10/8/91
 Date Signed
F. Jape (9/16-17/91) *Frank Jape* 10/9/91
 Date Signed

Approved by: J. J. Blake *J. J. Blake* 10/11/91
 Date Signed
 J. J. Blake, Chief
 Materials and Processes Section
 Engineering Branch
 Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of the licensee's design verification program for Unit 3 structural steel, housekeeping, requirements for storage of non-permanent equipment in safety-related areas, thermal expansion test data review; and a review of the effectiveness of the Nuclear Quality Inspection Organization.

Results:

In the areas inspected, deviations were not identified.

One non-cited violation was identified pertaining to storage of temporary equipment in violation of licensee procedures, paragraph 4. An unresolved item was identified pertaining to clarification of requirements not addressed by licensee procedures for anchoring non-permanent plant equipment in safety-related areas to comply with seismic design criteria, paragraph 4. A weakness was identified in housekeeping, paragraph 4. A strength was identified regarding the licensee's program for design verification of structural steel platforms, which will document all changes made to structural steel during and since construction. Performance of the Nuclear Quality Inspection Organization was satisfactory following the planned reduction in staffing.



REPORT DETAILS

1. Persons Contacted

Licensee Employees

- J. Bodner, Maintenance
- L. Clardy, Operations and Technical Support Supervisor
- R. Cooper, QC Inspector
- *R. Cutsinger, Lead Civil Engineer, Nuclear Engineering
- R. Hollingsworth, Civil Engineer, Nuclear Engineering
- S. Kammer, Compliance/Licensing - Unit 3
- D. Kehoe, Restart Quality Manager Supervisor
- J. Lewis, Supervisor Engineer, Technical Support.
- *J. McCarthy, Restart Licensing Manager
- W. McCullough, Operations Support
- *P. Salas, Compliance Licensing Manager
- *J. Scalice, Plant Manager
- *C. Shew, Compliance Licensing - Unit 2
- M. Thompson, QC Supervisor
- *G. Turner, Site Quality Manager

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

Other Organizations

- *B. Thind, Lead Civil Engineer (Bechtel)

NRC Resident Inspectors

- *C. Patterson, Senior Resident Inspector
- *W. Beardon, Resident Inspector
- *E. Christnot, Resident Inspector

*Attended exit interview

2. Structural Steel Walkdown and Design Verification Program - Unit 3 (37700)

The Browns Ferry Nuclear Plant Unit 3 Integrated Restart Action Plan requires the licensee to perform a walkdown of various components to field verify as-built plant conditions. The components affected are listed on the Restart Equipment List (REL). The inspector examined controlling procedures for field verification of structural steel commodities in Unit 3. These include structural steel platforms in the drywell and the reactor building, the torus structure, miscellaneous building steel, and equipment supports not covered by other walkdown programs. The walkdown inspections are being conducted by Bechtel engineers in accordance with requirements specified in Bechtel procedures.



After completion of the walkdown inspections, as-built drawings will be prepared. A detailed design analysis will then be performed on the as-built structures incorporating the actual as-built conditions using updated seismic response criteria, actual dead loads acting on the steel structures, and the live loads specified in the revised design criteria. Portions of the structures found to be overstressed will be modified by the licensee as required to reduce all stresses in beams, columns, and connections to those permitted by applicable design codes. Procedures examined by the inspector were Bechtel Instruction Nos. BC-016, General Requirements for Integrated Walkdown; and BC-001, Walkdown Instruction for Structural Steel Platforms and Miscellaneous Steel Support Frames. Instruction BC-016 contains the generic walkdown instructions, including training and qualifications of walkdown personnel, precautions and limitations, ALARA requirements, data collection criteria, detailed walkdown instructions, and requirements for verification and quality review of the field data. Instruction BC-001 contains the specific instructions for obtaining as-built data for structural steel, including specific data to be obtained, tolerances for various measurements, information on weld data, special inspection requirements and steps to be followed when data is not obtainable. Instruction BC-001 was prepared to resolve various problems previously identified with structural steel construction. These problems are outlined in documents entitled Seismic Issues (SI). The inspector reviewed SI-002, Bolting; SI-003, Cracked Clip Angles; SI-031, Lower Drywell Platform (E1 584); and SI-041, Upper Drywell Access Platform - Drywell Elevations 628, 616, and 604, and verified that issues identified in these documents were addressed in Instruction BC-001.

The inspector accompanied a Bechtel walkdown inspection team and observed the preparation of an as-built sketch on a portion of the drywell elevation 616 platform. Data obtained by the Bechtel personnel included connection details (bolt size and type; weld size, type and length), size of members (beam flange and web dimensions, beam length, clip angle size, length and thickness), platform geometry, location and identification of attachments to platforms, results of special inspections (e.g., inspection of obtuse bent plates/angles for possible cracking), construction defects, and differences between construction drawings and as-built conditions (e.g., additional members in frame, missing members, changes to connection details, etc.).

The inspector, accompanied by Bechtel field inspection personnel, walked down portions of the Elevation 584 drywell platform steel between azimuths 9 and 30 degrees and azimuths 98 to 120 degrees. The inspector compared data recorded on the field inspection data sheets, including as-built sketches, to actual as-built field conditions. The inspector field checked various dimensions (beam length, member size, thickness, etc.), verified attachments were shown on the as-built sketches, compared structural steel platform geometry to that shown in the sketches, and verified that discrepancies between original construction drawing details and as-built conditions were identified. The inspector did not identify any significant deficiencies in the Bechtel field walkdown data. The inspector noted that the program was very comprehensive, and that field data was being recorded in accordance with the walkdown procedure requirements.

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

3. Thermal Expansion Test - Unit 2 (70370)

The inspector reviewed the test data for the piping system thermal expansion test performed by the licensee during restart of Unit 2 in accordance with Technical Instruction 2-TI-190. Data examined included the final test report, the chronological test log, test results, and test deficiency reports.

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

4. Securing Non-permanent Equipment in Safety-related Areas - Maintenance (Units 1-3) (62700)

The inspector examined the licensee's program to secure non-permanent equipment in safety-related areas to reduce the potential damage to safety-related components during a seismic event. These requirements were previously addressed in procedure SDSP-19.25, Requirements for Non-permanent Equipment in Safety-related Areas. Prior to restart of Unit 2, licensee maintenance and operations supervisory personnel performed evaluations of non-permanent items of equipment and documented the acceptability of storing the equipment in a safety-related area on Attachment A to SDSP-19.25, or if they could not determine whether the equipment met the requirements of SDSP-19.25, the supervisors completed Attachment B to SDSP-19.25 which requested an evaluation of the non-permanent item by the Civil Design Engineering Section of Nuclear Engineering. The inspector examined completed Attachment B's for various items stored in safety-related areas which had been sent to engineering for evaluation. The evaluations were documented in calculations which were completed in accordance with the licensee's design program. The inspector reviewed the following calculations:

- Number CD-Q0000-894450 for the CRD nitrogen bottle carts in the reactor buildings, elevation 565
- Number CD-Q2000-894449 for chart storage cabinets in the Units 1-2 control room; elevation 617
- Number CD-Q2000-894452 for the SCBA storage cabinet in the Unit 2 control room.
- Unnumbered calculation for 4KV circuit breakers which may be temporarily stored in the Units 1-3 diesel generator board room during maintenance.

The design calculations specified details for anchoring the various items to comply with seismic design criteria. The inspector noted that the assumptions contained in the above calculations, specifically, the weight (mass) of the articles to be restrained were very conservative, which resulted in a restraint systems which appeared to be overdesigned to serve their intended function.

The engineering resolutions were noted on the individual Attachment B's for each item identified and were transmitted to operations-maintenance managers for implementation.

The inspector conducted a walkdown inspection of the Unit 2 reactor building, the Units 1-2 control room, and the Units 1-2 diesel generator building (DGB) and board rooms, and examined the items addressed by the above calculations. The inspector noted that the method for anchoring the CRD nitrogen bottle cart and the SCBA cabinet was different than shown in the design calculations. The chart cabinets/supply cabinets did not appear to be anchored, and there were no 4KV circuit breakers temporarily stored in the DGB board rooms. Discussions with operations personnel disclosed that the equipment anchor details shown on Attachment B to SDSP-19.25 had not been implemented because SDSP-19.25 was canceled and replaced by Plant Maintenance Instruction (PMI) 6.29, Material Condition Inspection, and SDSP-14.6, Building and Facilities Housekeeping and Cleanliness. Attachment E to SDSP-14.6 addresses methods to secure non-permanent equipment in safety-related areas. PMI 6.29 contains requirements for performing a walkdown inspection prior to turnover and restart of a unit after an extended outage. A walkdown was performed in accordance with PMI 6.29 prior to restart of Unit 2. The inspector reviewed the completed Unit 2 PMI 6.29 data sheets and noted that the unanchored chart cabinets in the control room had been identified during the PMI 6.29 walkdown. The inspector observed that the SCBA cabinet and the CRD nitrogen bottle cart were restrained in accordance with criteria specified in Attachment E to SDSP-14.6. The inspector noted, however, that numerous other potential material conditions problems were identified during the PMI 6.29 walkdown which to date had not been corrected. Discussions with plant maintenance personnel and further review of the PMI 6.29 data sheets disclosed that all problems identified as restart issues had been resolved. The remaining items, including the anchoring of the control room chart cabinet were to be addressed during the routine maintenance program. The inspector questioned licensee design engineers regarding the acceptability of anchoring the non-permanent equipment using methods other than those specified in the above listed calculations or, in the case of the control room chart and supply storage cabinets, not anchoring them at all. Licensee civil design engineers were in the process of reviewing the above listed calculations to determine if the alternative anchoring methods specified in Attachment E to SDSP-14.6 complied with seismic design criteria. The licensee will also review other SDSP-19.25 Attachment B forms and referenced calculations to determine if other non-permanent plant equipment items may require review to ascertain if it is secured in accordance with seismic design requirements. Pending further review by the licensee and NRC, and clarification of criteria for securing non-permanent equipment in safety-related areas, this problem will be identified as Unresolved Item 260/91-36-01, Requirements for Restraining Non-permanent Equipment in Safety-related Areas.



During the walkdown of the reactor building and Units 1 and 2 DGB, the inspector identified three non-permanent items of equipment which were not restrained in accordance with Attachment E of SDSP-14.6. These items were a step ladder resting against the wall adjacent to the jet pump instrumentation rack on elevation 565 of the Unit 2 reactor building (the ladder was not stored in a ladder rack), an unattended wheeled tool cart on elevation 565 in the southwest corner of the Unit 2 reactor building, and a wheeled battery charger cart stored adjacent to the batteries in diesel generator room B. The wheels were not locked in the latter two pieces of equipment. Attachment E to SDSP-14.6 requires that non-permanent equipment stored in safety-related areas, such as the three listed above, be secured to reduce potential damage to safety-related components during a seismic event. Methods to meet these requirements are locking of wheels on unattended carts with wheel locks, and placing ladders not in use in ladder racks. The licensee implemented immediate corrective actions to restrain the above three items after the problems had been identified by the inspector. Criterion V of Appendix B, 10 CFR 50, as implemented by the licensee's Quality Assurance Program, requires that procedures be implemented. The failure of the licensee to store non-permanent equipment in safety-related areas in accordance with instructions contained in procedure SDSP-14.6 was identified to the licensee as a violation. Since the licensee took immediate actions to correct the violation, and the problems were considered to be of minor safety significance, the violation is not being cited because the criteria specified in Section V.A. of the NRC enforcement policy were satisfied. This item will be tracked as NCV 260/91-36-02, Storage of Non-permanent Equipment in Safety-related Areas in Manner Contrary to Procedural Requirements. This item is considered closed.

During the walkdown inspection discussed above, the inspector identified numerous minor material condition problems which were contrary to good housekeeping practices. These included the following: Numerous burnt out lights resulting in poor lighting conditions in diesel generator rooms C and D, storage of NDE equipment and empty NDE equipment cases in diesel generator room D, a broken door on 4160V logic relay cabinet 25-45B in the DGB board room, and dirt and debris on floors in Units 1 and 2 DGB. The above examples are indicative of a weakness in the licensee's housekeeping/material condition program in these areas.

Within the areas inspected, deviations were not identified.

5. QA/QC Organization - Units 1-3 (35702)

The size of and scope of work for the Nuclear Quality Inspection Organization (NQIO) at Browns Ferry Nuclear Plant was reduced recently due to a decision by TVA to contract virtually all work, other than plant operation. NQIO had over 100 QA/QC inspectors in 1989. In 1990 NQIO began to reduce its staff and by February 1991, there were about 50 inspectors on hand. This was further reduced to a current staffing level of 11 inspectors.



The effect of this reduction in staff was examined by the inspector to ensure activities were being audited properly.

The number of assessments performed has decreased. The reduction was due to completion of work activities and therefore less assessments are required for maintenance, management controls, and engineering. At the same time the number of assessments were increased in areas such as Operations, Chemistry and Radiological Controls.

Peer observations activities continued as needed. Selected records of peer observations from December 1990 to August 1991 were reviewed and found complete with comments and observations. The observations covered items such as: anchor installation, fire seal installation, torquing dry well head, mechanical support inspection, torquing bolted connection on EDG, and lug termination

The comments were corrected on-the-spot, except for the torquing of bolted connection on EDG. This finding was that the work order instructions were inadequate for the job. The item was resolved by returning the work request to the planners for revision.

Another area examined was the walkdown observations conducted by QA/QC personnel. The review covered selected walkdowns performed in September, 1991 for Unit 2. The checklist used to document this activity identifies 14 types of items that the observer may find during the walk down. Generally during each walkdown a number of items were found. Corrective action documentation was prepared to correct each item. Each walkdown covers major areas of the plant. Once the appropriate documentation is issued, the items are tracked and corrected.

The training program for the QA/QC inspectors was also examined. It was noted, through a review of training records, that several QA/QC inspectors had been trained in additional areas or disciplines. Therefore, these inspectors may be used for more inspections on a variety of disciplines. The subject of training inspectors to increase their usefulness was discussed with the managers of QA and QC. The concern was that even though the QA/QC inspectors attended training, their proficiency may not be attained for sometime. The managers all stated that they are the ones who determine assignments and that when an inspector is assigned a task for which he was only recently trained, additional observation and review is performed by the manager. In addition, more guidance and preparation is used to improve their proficiency.

Within the areas inspected violations or deviation were not identified. It was concluded that the performance of NQIO was satisfactory.



6. Exit Interview

The inspection scope and results were summarized on September 20, 1991, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

Unresolved Item 260/91-36-01, Requirements for Restraining Non-permanent Equipment in Safety-related Areas, paragraph 4.

Noncited Violation 260/91-36-02, Storage of Non-permanent Equipment in Seismic Areas in Manner Contrary to Procedure SDSP-14.6, paragraph 4.

