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

Report Nos.: 50-259/92-03, 50-260/92-03, and 50-296/92-03

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

Docket Nos.: 50-259, 50-260, and 50-296

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

Facility Name: Browns Ferry Units 1, 2, and 3

Inspection at Browns Ferry Site near Decatur, Alabama

Inspection Conducted: January 17 - February 14, 1992

Inspector: Paul J Kellogg for 3/10/92
C. A. Patterson, Senior Resident Inspector Date Signed

Accompanied by: E. Christnot, Resident Inspector
W. Bearden, Resident Inspector
N. Merriweather, Regional Inspector

Approved by: Paul J Kellogg 3/10/92
Paul J. Kellogg, Section Chief Date Signed
Reactor Projects, Section 4A
Division of Reactor Projects

SUMMARY

Scope: This routine resident inspection included maintenance observation, operational safety verification, safety assessment, design changes and modifications, hydrogen leakage, concerns resolution program, Unit 3 restart activities, shutdown risk, fire protection, bulletins, reportable occurrences, and action on previous inspection findings.

Results: A violation with two examples of failure to follow plant procedures was identified, paragraphs two and three. The first example resulted in the inadvertent start and overspeed of a diesel generator during a routine surveillance. A hold order was released and breakers repositioned out of sequence with the procedure steps. This example was cited because measures to prevent reoccurrence were not implemented prior to reperformance of the procedure. The incident

investigation report was reopened as a result of inspector comments. The second example was for not using a procedure covering operation of the spent fuel pool transfer canal. This resulted in the transfer gates not being properly installed and leakage occurred. The detailed procedure contained steps for the refueling senior reactor operator and shift operations supervisor signatures and steps to secure the gates. This work was performed under a work order which did not reference the procedure.

An inspector followup item was identified concerning an alternate breach plan for secondary containment, paragraph four. The licensee is no longer planning to separate out Unit 3 reactor building from secondary containment. This is due to the high cost, schedule conflicts, and an alternate plan called combined zone secondary containment. The alternate plan is not described in the design basis or technical specifications. A previous technical specification change approved on an expedited basis may not have been required. The inspector will continue to evaluate this approach.

An unresolved item was identified concerning a configuration control problem, paragraph five. The licensee is conducting an incident investigation on the loss of the 4160 volt outside loop. An incorrect assessment of electrical loads resulted after a primary drawing was not updated following closure of a design change.

REPORT DETAILS

1. Persons Contacted

Licensee Employees:

O. Zeringue, Vice President, Browns Ferry Operations
H. McCluskey, Vice President, Browns Ferry Restart
*J. Scalice, Plant Manager
*J. Swindell, Restart Manager
*M. Herrell, Operations Manager
*J. Rupert, Project Engineer
*M. Bajestani, Technical Support Manager
R. Jones, Operations Superintendent
*A. Sorrell, Maintenance Manager
G. Turner, Site Quality Assurance Manager
*R. Baron, Site Licensing Manager
*J. McCarthy, Unit 3 Licensing
*P. Salas, Compliance Supervisor
*J. Corey, Site Radiological Control Manager
A. Brittain, Site Security Manager

Other licensee employees or contractors contacted included licensed reactor operators, auxiliary operators, craftsmen, technicians, and public safety officers; and quality assurance, design, and engineering personnel.

NRC Personnel:

P. Kellogg, Section Chief
*C. Patterson, Senior Resident Inspector
*E. Christnot, Resident Inspector
*W. Bearden, Resident Inspector
N. Merriweather, Regional Inspector

*Attended exit interview

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

2. Maintenance Observation (62703)

Plant maintenance activities were observed and/or reviewed for selected safety-related systems and components to ascertain that they were conducted in accordance with requirements. The following items were considered during these reviews: LCOs maintained, use of approved procedures, functional testing and/or calibrations were performed prior to returning components or systems to service, QC records maintained, activities accomplished by qualified personnel, use of properly certified parts and materials, proper use of clearance procedures, and implementation of radiological controls as required.

Work documentation (WR and WO) were reviewed to determine the status of outstanding jobs and to assure that priority was assigned to safety-related equipment maintenance which might affect plant safety. The inspectors observed the following maintenance activities during this reporting period:

a. The inspectors followed licensee actiivities associated with the planned outage conducted on the "B" SBGT train. The train was removed from service under a hold order and LCO 2-92-027-3.7.B entered at 8:45 p.m. on Feburary 4, 1992. The inspector noted that licensee personnel verified that the other two trains were operable prior to removing the "B" train from service and that a 7 day LCO was entered under TS 3.7.B. The inspector reviewed documentation associated with the following workorders:

   WO 91-46122-0, Lubrication of fan bearings.

   WO 91-44005-00, Adjustment/alignment of belt.

   WO 92-47355-00, Investigate seal vent. leakage on "B" SBGT.

   These work orders appeared adequate to support the intended work activities and no problems were identified with the documentation. Additionally, the inspector observed portions of the post maintenance testing contucted on February 6, 1992, in accordance with 0-SI-4.7.B.3.C, SBGT Operability, and 0-SI-4.7.B.3, SBGT Flow Distribution, after completion of the above work activities. The "B" SBGT train was declared operable at 2:00 p.m. on Feburary 6, 1992. No problems were identified during the review of licensee maintenance activities.

b. Unplanned Diesel Generator Start

   The inspectors continued to review circumstances associated with the event which occurred on December 18, 1991, where the 1A D/G experienced an unplanned fast start. This event occurred during performance of 1/2-SI-4.9.A.1.d(A), Diesel Generator Annual Inspection, when during step 7.7.14.1 a temporary jumper was placed between contacts on Relay PFD1 in order to verify the "Start Failure" alarm.

   The inspector reviewed incident investigation report, II-B-91-167, which documented the licensee's investigation of this event. The incident investigation report attributed the unplanned D/G start to personnel error by a craft foremen that was supervising the work activity. A significant amount of the annual inspection was already complete and the electrical foreman had requested that the existing hold order boundries be modified to allow further testing. This is allowed in accordance with section 3.2.4 of the licensee's clearance procedure. The foreman requested that operations place all components on the hold order in their normal position with the exception of four components. These components which were to remain tagged did not include the start circuit breakers. However, the hold order cards for the start circuit breakers should have remained in place, or at a minimum, operations should have been made aware that these breakers were to be left open. This resulted in those tags being removed and the start circuit breakers being closed which caused the D/G fast start when the jumper was installed. The licensee's report also attributed the event to improper communications and misuse of standard termininology (different opinion of what constituted "Normal" position).

The inspector identified several concerns associated with the licensee's investigation report. These concerns are as follows:

The report mentions that the D/G fast started and immediately tripped on overspeed but failed to address the reason for the overspeeding of the engine. The inspector discussed this subject with several members of licensee management and was given at least two different reasons for the overspeed event. Since no additional work was performed on the governor following the event and the D/G was subsequently started without problem, the overspeed may have been due to some personnel error that occurred during the event.

The surveillance instruction associated with the annual inspection includes a requirement in the prerequisites section that CB Start Breaker 1 and CB Start Breaker 2 be covered under a hold order. Later during the procedure specific direction is provided in steps 7.7.17.1.6 and 7.7.17.1.7 that these breakers are to be closed or verified closed. There is no specific step included in the instruction prior to step 7.7.17.1.6 which directs personnel to release the hold order or to close those breakers. Since the intent of this prerequisite was for the breakers to remain tagged until at least after step 7.7.14.1, it indicates that the procedure was not followed or that perhaps that the procedure could be considered inadequate. The licensee's report did not include this as part of the cause of the event.

SSP-12.3, Equipment Clearance Procedure, section 3.1.4 establishes special requirements for clearances established for testing. This section also includes a method for testing on previously tagged equipment. This section requires that clearances established for this purpose be carefully evaluated and that yellow clearance cover sheets be used to identify these clearances. There is no evidence that the licensee evaluated this hold order under section 3.1.4. This subject was not addressed in the licensees report.

Corrective actions specified in the licensee's report include additional training on the event and the clearance procedure, review of clearance procedure for possible revision, review of possibility of allowing craft personnel other than foremen to hold clearances, and determination by maintenance management of possible administrative action associated with the personnel error. These corrective actions were given due dates which varied from March 15 to March 31, 1992. These dates were not timely considering that several D/G annual inspections were scheduled to be performed prior to March 15.

The inspectors discussed these concerns with licensee management. The inspectors were informed that training on the specific event for all electrical maintenance personnel was conducted prior to the next scheduled D/G inspection. The inspectors were also informed that the incident investigation report associated with this event was being reopened to include a review by the licensee into the engine overspeeding and to evaluate possible problems with the surveillance instruction. This event constitutes a failure to follow procedure and serves as a first example of VIO 259, 260, 296/92-03-01, Failure to Follow Procedure for Diesel Generator Surveillance and Spent Fuel Pool Transfer Canal Operation. Use of a non-cited violation in this case was not warranted due to the lack of adequate and timely corrective action by the licensee.

One violation was identified in the maintenance observation area.

3. Operational Safety Verification (71707)

The NRC inspectors followed the overall plant status and any significant safety matters related to plant operations. Daily discussions were held with plant management and various members of the plant operating staff. The inspectors made routine visits to the control rooms. Inspection observations included instrument readings, setpoints and recordings, status of operating systems, status and alignments of emergency standby systems, verification of onsite and offsite power supplies, emergency power sources available for automatic operation, the purpose of temporary tags on equipment controls and switches, annunciator alarm status, adherence to procedures, adherence to LCOs, nuclear instruments operability, temporary alterations in effect, daily journals and logs, stack monitor recorder traces, and control room manning. This inspection activity also included numerous informal discussions with operators and supervisors.

General plant tours were conducted. Portions of the turbine buildings, each reactor building, and general plant areas were visited. Observations included valve position and system alignment, snubber and hanger conditions, containment isolation alignments, instrument readings, housekeeping, power supply and breaker alignments, radiation and contaminated area controls, tag controls on equipment, work activities in progress, and radiological protection controls. Informal discussions were held with selected plant personnel in their functional areas during these tours.

a. Unit Status

Unit 2 operated at power during this report period without any significant problems. The unit was online for 65 days at the end of the period.

b. Open Conduits

During a routine tour of Unit 2 reactor building on February 4, 1992, the inspector observed two open ends of conduit not connected. Both conduits ends were near the instrument racks near the RBCCW heat exchangers. One end was a two inch flexible conduit that connected into JB-1184. Other conduits that entered the JB had fire seal markings on them, but it was not apparent if the one end negated the fire seal. The second conduit was a one inch rigid conduit 12 feet above the instrument rack. It was not apparent where the other end was located. These two open conduit ends were discussed with Operations Management on February 4, 1992. On February . , 1992, the inspector observed the one inch conduit had been removed. The two inch was labeled as a spare and was connected into the junction box. These actions resolved the concern.

c. Log Review

On February 3, 1992, during a review of the SOS control room log the inspector learned that an incident investigation was being initiated for failure to properly secure the Unit 1 and 2 transfer canal gates. The gates had been leaking and equalizing level between the Unit 1 and Unit 2 spent fuel pools. The transfer canal was used to transfer material between the pools as part of the spent fuel pool cleanup effort. A shipping cask was placed in the one pool and material from the other pool transferred through the canal to the cask. After the transfer canal gates were installed, the swing nuts that secure the gate in place were not tightened. They were found finger tight. The Unit 1 skimmer surge tank high alarm is set at 5 inches below the ventilation ducts on top of the water. Unit 2 alarm is set at 3 inches. When the water level equalized between the pools Unit 1 alarmed a high level. When an attempt was made to drain the canal, the gates were observed to be leaking.

This event was discussed with refuel floor personnel. It was learned that health physics, GE contractors, Chem Nuclear, and an AUO were involved in the event. They were working to work order 92-47468-00. This work order did not reference plant operations procedure 1/2-POI-78-1, Non-Fuel Transfer Evolution Using Unit 1 and 2 Transfer Canal. The inspector reviewed this procedure which has detailed signatures for the refuel floor SRO and SOS. Steps are in the procedure to secure the swing nuts.

This detai d procedure containing precautions and limitations for radiation tection, refuel bridge operation, and crane operational restrictions along with 16 prerequisities was not used. This constitutes the second example of VIO 259, 260, 296/92-03-01, Failure to Follow Procedure for Diesel Generator Surveillance and Spent Fuel Pool Transfer Canal Operation.

d. Drywell CAM

During a tour of the control room on February 7, 1992, the inspector observed that the annunicator for drywell CAM RM-90-256 was in alarm. The operator stated this was because the filter paper had been replaced. This always occurred after replacing the filter paper and was addressed in the ARP for panel 9-3. The inspector questioned why and if a LCO condition should exist for the CAM while the annunicator was in an alarm condition. The inspector discussed this with operations and technical support management. They stated a paper would be prepared to explain this condition. The CAM was thought operable because of a local panel alarm and a rate of change alarm. The inspector will review this explanation once prepared.

e. EFPD Remaining this Cycle

The inspector met with members of the licensee's technical support staff to determine the licensee's schedule for the next refueling outage. A total of 402 EFPD were planned for this fuel cycle. The inspector was informed by licensee personnel that on January 1, 1992, core exposure since Unit 2 restart had resulted in a total of 114 EFPDs being expended. This left a total of 288 EFPDs in the cycle as of that date. A maximum of 70 EFPDs may be expended beyond that as part of coastdown. The licensee has determined that this will allow operation for approxiamately 368 days or until January, 1993, before refueling is required. The inspector noted that the licensee's calculations were based on a capacity factor of 88.1%. This value for capacity factor is based on the plant's actual capacity factor for the last four months of 1991. Use of a lower value would allow additional time before refueling is required.

One violation was identified in the Operational Safety Verification area.

4. Safety Assessment (40500)

The inspector noted in the Unit 3 plan of the day on February 3, 1992, that the licensee was no longer planning to remove the Unit 3 reactor building from secondary containment. TS changes Nos. 295 and 298T were requested on expedited basis and approved to allow these changes. Stated in the POD handout was that the decision was based on the high cost of separating Unit 3 out, schedule conflicts, and the availability of an alternative plan called combined zone secondary containment. This would result in cancellation of several DCNs and physical modifications.

The inspector reviewed the alternate plan called combined zone secondary containment. However, this has always been the method of operation of secondary containment. The refuel floor and each reactor building are treated as a combined zone because of inter-zonal leakage. The alternate plan would have a shared margin of area that can be breached at one time of 170 square inches verses the current Unit 3 reactor building margin of 14 square inches. This was a new concept and was not adequately explained to the inspector.

The inspector reviewed the last performance of secondary containment integrity test, 0-SI-4.7.C, performed on February 10, 1991. For TS requirements, secondary containment pressure shall be greater than 0.25 inches of water vacuum with a system inleakage flow of not more than 12,000 cfm. The last performance of this test the SBGT flow was 11,400 cfm and the combined secondary containment flow as measured by pitot tubes in each zone was 10,135 cfm. Historically, the licensee has had some difficulty meeting this TS and staying below 12,000 cfm due to in leakage. It is not clear how an additional 170 square inch hole will be allowable to meet the TS. This method is not described in the FSAR, TS, or SI. This approach, if used by the licensee, should be demonstrated by a 170 square inch hole while running the SI during an outage. Any new analysis should begin with the known leakage which has been demonstrated by the TS surveillance. This approach to meeting the secondary containment TS will be tracked as IFI 259, 260, 296/92-03-02, Alternate Breach Plan of Secondary Containment.

Additionally, the inspector noted this had been the second recent TS change that was submitted that was later determined not to be needed. TS change No. 305 was submitted for the CAD system because it was thought the CAD intertank was leaking and a new tank would be required. However, after testing it was determined to be only a leaking O-ring.

These examples are indications that the approach to solving problems has not been thoroughly evaluated prior to seeking TS changes from the NRC. Better evaluation and consideration of alternate plans, is needed by the licensee. Both of these changes requested an expedited review by the NRC.

5. Design Changes and Modifications (37700)

The licensee performed a technical audit, BFA 92204, of two DCNs prepared by SWEC. A number of errors were noted by the audit. The plant staff initiated an incident investigation to address the items. This was titled, "Loss of Outside 4160 Volt Loop (Drawing Problem)". The inspector reviewed the audit item and of particular concern was that a DCN was apparently not correctly closed. This resulted in primary drawing 0-35E713-2 not being updated until January 15, 1992, when the DCN was completed on September 30, 1991. This resulted in a configuration problem and incorrect assessment of electrical loads. This will be tracked as URI 259, 260, 296/92-03-03, Failure to Update Primary Drawing, until the final incident investigation is completed and reviewed.

6. Hydrogen Leakage

On January 18 and 19, plant systems engineering performed a leak inspection of all accessible portions of the Unit 2 main generator hydrogen system using an explosive gas detector. This inspection included the generator upper endbells, the generator core monitor, the hydrogen control station on elevation 565, the hydrogen control panel (2-25-114), and the accessible portions of the underside of the generator. Two leaks were identified and corrected during this inspection.

The first leak was found in the top of the generator core monitor inlet moisture trap. Operations isolated the generator core monitor to stop leakage and repairs were completed. No leak could be detected after repairs were completed.

A second leak was found at 2-FCV-35-603, the valve controlling hydrogen flow from the generator to the core monitor. This leak appeared to be a packing leak and could no longer be detected once the packing was tightened.

These two leaks appear to have been the major contributors to hydrogen consumption. The areas inaccessible to inspection will be checked during the Unit 2 cycle 6 refueling outage as part of the major maintenance scheduled for the generator.

Prior to correcting these leaks, the history of hydrogen consumption is as follows:

Month	Avg. Consumption (ft^3/day)
Jul 91	123*
Aug 91	94*
Sep 91	707*
Oct 91	910
Nov 91	990
Dec 91	777
Jan 92 (1/1-1/20)	1335
Jan 92 (1/21-1/29)	600

*It is believed that readings prior to calibration of the flow integrator in September, 1991, were erroneous based on the drastic change after calibration and an air test calculation of approximately 900 ft^3/day prior to unit startup.

7. Concerns Resolution Program

During this period, the inspector met with the concerns resolution supervisor to discuss current issues. There were nine concerns open and none related to Unit 3 activities. The number of concerns for the past six months averaged two to three concerns per month. There were 144 restart CATDs open for Units 1 and 3. These items were closed for Unit 2 and are being tracked by the licensee.

The contractor responsibilities for resolving concerns was discussed. In nuclear power standard STD-1.2, Concerns Resolution, the contractor responsibilities are discussed in section 3.2. The licensee will audit contractor programs. An audit report BFA 91112 - Corrective Action Audit, dated November 1, 1991, determined that Bechtel has an adequate and effective employee concerns program. The existing contract contains general provisions requiring the contractor to encourage their personnel to identify and report to it, any nuclear safety or quality related deficiencies. In addition, any employee who is badged at BFNP is afforded the opportunity to exit with the TVA ECP.

8. Unit 3 Restart Activities (30702)

The inspector reviewed and observed the licensee's activities involved with the Unit 3 restart. This included reviews of procedures, post-job activities, and completed field work; observation of pre-job field work, in-progress field work, and QA/QC activities; attendance at restart craft level, progress meetings, restart program meetings, and management meetings; and periodic discussions with both TVA and contractor personnel, skilled craftsmen, supervisors, managers and executives.

a. Prototypical/Pilot Programs

1) Prototypical Plans

On February 5, 1992, the inspector attended a kickoff meeting for three prototypical plans at the Bechtel office in Athens, Alabama. The plans were for commerical grade dedication, offsite design process, and integrated design. Two of the plans were approved but the integrated design was rejected. This was mainly because of the timeliness of completing the review and providing feedback to other activities. The schedule indicated the final report would be issued in August 1992 but this was not soon enough to correct any identified problems for the many other designs in progress or completed. A reduction in scope and phased approach were discussed as alternatives. Another meeting was conducted on February 12, 1992. The integrated design pilot will be a conceptual review of electrical cables. The final report would be issued in April, 1992. The inspector concluded this would provide timely feedback.

The objective of the commerical grade review was to evaluate the capability of Bechtel to perform commercial grade dedications. The items to be dedicated for this review are terminal lugs used in class 1E electrical or control circuits. Four different sizes of lugs will be dedicated.

The purpose of the offsite design process review is to evaluate the capability of Bechtel offsite locations to perform design work in accordance with project requirements. Piping local stress evaluations will be evaluated at the San Francisco office. One hundred twenty-five volt alternating current calculations will be evaluated at the Pottstown office. Two hundred fifty volt direct current non-1E battery work will be evaluated at the Los Angeles office.

The inspector observed that the Bechtel information bulletin board in the hall contained some outdated forms. NRC form 3 was not the latest revision and did not have the 800 telephone number for the NRC IG. The employee concerns program form was outdated identifying a previous supervisor of the concerns program and did not have the new concerns resolution form reflecting the program changes. This was discussed with a TVA manager. The inspector discussed with the Site Licensing Manager that all contractors should have the latest forms. The licensee stated action would be taken to address this issue.

2) Design Change Notice Issuance

The inspector observed and reviewed Bechtel and SWEC activities involved with the Prototypical/Pilot Program for the first DCN to be issued by Bechtel for implementation by SWEC. The activities involved the Unit 3 condenser upgrade and resulted in the issuance of DCN W14012A. This DCN was initiated to remove piping from the discharge of Greenhouse Water pump C to the 10" connection into the 12" Greenhouse Water header. A plate is to be welded on the cut 10" pipe and a blanking plate is to be placed on the 6" flange at the pump discharge. This piping was shown on drawing 47E870-1 Rev. C which is a color coded drawing. Valve 3-97-500 was designated as a Unit separation boundary and this valve is to be removed. Since the piping which allowed for the system to interact with other Units is to be removed, the welded cap will physically separate the Units. Additionally, new lifting lugs have been installed on the condenser waterbox covers and on the ceiling below the 586.0' elevation to allow for cover removal. Stiffeners have been added to existing lugs for strengthening.

The SWEC engineers commenced writting WP's 3001-92 and 3002-92 to implement this change. The inspector will continue to monitor this Prototypical/Pilot.

b. Stop Work Notice

On January 16, 1992, a licensee QA audit of Bechtel design activities identified significant problems. A significant corrective action report BFSCA920001 was issued to document that design criteria was not properly issued or controlled. Bechtel QA issued a stop work notice for issuance of all DCN packages. DCN's that contain no UVAs and no rollover design basis input, could be issued after verification that the DCN contains no UVA or rollovers. The rollover process consists of placing a cover sheet on the Unit 2 design criteria and issuing it. This created two sets of design criteria with one for Unit 2 and one for Unit 3. Also, the Unit 2 criteria was not verified as being current. A lesson learned from the Unit 2 recovery effort was to not use or restrict the number UVAs. The first two DCN's submitted contained UVAs.

To correct the problems, several specific actions were taken. First, Bechtel voided all rollover design criteria documents. Administrative controls were placed on rollovers. The use of UVAs will require the approval of both the Restart Engineering Manager and Site Engineering Manager. Additional training would be conducted on the calculation cross reference information system. With the implementation of these main steps and others, the stop work was released on January 31, 1992.

The inspector reviewed these activities with both the licensee and Bechtel QA organizations. Although this problem was identified by a QA audit, the inspector questioned why the technical assessment and lessons learned program did not prevent this. A licensee representative stated this was being reviewed. Later, QA discussed these items with the inspector. The technical assessments did not look at the rollover process. This was to be performed on February 13, 1992. Second, two areas of concern were found with the lessons learned program. A second look was needed for the lessons learned in the Unit 3 integrated restart plans and lessons learned responses needed to be more timely with more management involvement.

c. Electrical Walkdowns

The inspector reviewed initial results of the electrical walkdowns from 13 walkdown packages. The inspector noted that the contractor identified the cable and any problems identifying jacket information.

The inspector concluded from the review that the contractors are continuing the walkdown efforts and obtaining results consistent with the Unit 2 experience.

d. EQ Program

A regional inspector performed a routine inspection to review the licensee's program for EQ Unit 3 electrical equipment. The scope of the inspection was to review the licensee's walkdown program that had commenced on EQ cables. The inspector found that the licensee had implemented an integrated walkdown program for EQ cables to examine the installation for the following attributes:

ID jacket material for cable
Cable splices
Conduit seals
Electrical enclosure components

Internal wiring
Flex conduit
Missing conduit bushings in junction boxes
Cable bend radius
Vertical cable drops

Not all of the inspection attributes are required for EQ, however to minimize the number of walkdowns required for other programs the licensee developed walkdown verification forms to address other concerns and included these as part of the EQ cable walkdowns. The inspector accompanied a walkdown team in the field to observe the implementation of Walkdown Package EQ-23-01. This walkdown package included 19 cables in the RHR Service Water system. The walkdown package had been reviewed for impact on Unit 2 operations and had been approved by the appropriate organizations. The walkdown team consisted of a walkdown team leader, independent verifier and QC inspector. The inspector determined that the team performed in a professional manner and was able to capture information on the EQ cables for the above attributes. The inspector concluded that the team met the intent of the program procedures on this walkdown inspection. While performing the inspection the team did have several discussions regarding the need for a work request on a potential cable that may be overheating due to a bad crimp or connection in that their were signs of residue on the terminal block. The inspector was later informed that a work request (WR C034072) was initiated addressing the concern. The walkdown team also identified a splice or repair on a cable included in the package for walkdown in the 480 VAC Reactor MOV Board 3B. The inspector later learned from licensee EQ representatives that all EQ splices will be replaced as part of the EQ program. The walkdown team noted this splice in the field data.

The inspector also held discussions with personnel responsible for reviewing the walkdown packages for completeness after they come from the field. The EQ supervisor indicated that the packages would be reviewed by him prior to being submitted to Bechtel QA/QC for review to verify certain attributes of completed walkdown packages. After this review is complete the packages are transmitted to the Bechtel document control by the technical support group. At the conclusion of this inspection the walkdown verification forms had not been completed because the walkdowns were still in process.

The inspector also held discussions with EQ personnel involved in developing the 50.49 List and EQ binders. From these discussions the inspector determined that the walkdown program will examine 749 cables. Approximately six hundred cables were excluded from the walkdown program because they would be replaced due to planned modifications or for lack of qualification documentation. The results of these discussions indicated that the EQ 50.49 list and qualification binders would be completed in the second or third quarter of 1993.

e. Chemical Decontamination

The inspector continued to monitor the activities involved with chemical decontamination of the Unit 3 recirculation and RWCU system piping. The activities included chemical injection, flushing, resin bed slucing to a cask, equipment setups and take downs. All activities were controlled by approved procedures and excellent results were achieved. Additional, chemical decontamination was scheduled for Units 1 and 2 FPC system piping.

f. Cooling Tower Refurbishment

The inspector was informed by TVA Unit 3 Recovery Management that cooling towers 1, 5, and 6 were to be refurbished and returned to service. This refurbishment will also be used as a Prototypical/Pilot program to verify the SPAE and the SPOC processes. For the purpose of the prototypical program, the two main systems involved were designated as System 27C, Cooling Towers, and System 57-7, Cooling Tower Electrical Distribution.

g. Unit 3 Torus Walkdown

The inspec. conducted a walkdown of the Unit 3 Torus on February 1, 1992. The Unit 3 Torus is presently drained with a significant amount of scaffolding located within the torus. Several minor scratches in the protective coating were noted and a few rust stains which appeared to have been caused by tools dropped into the torus were observed during the tour. However the inspectors did not identify any significant material problems related to the condition of the torus. These tools and other debris had been removed by the licensee prior to the walkdown.

Upon exiting the stepoff pad used to control access and contamination from the torus one of the inspectors was found to be contaminated. The source of contamination was determined to be a single hot particle that had attached itself to the inspector's right knee. The presence of contamination was immediated detected by the licensee's BETAMAX monitors located in the Unit 3 reactor building. The attending HP technician used a hand frisker to locate the hot partical which was then removed by swiping. The hot particle was later determined to be a small Cobalt 60 source which read 5000 counts per minute on contact. The cause of the skin contamination was determined to be cross-contamination from protective clothing (hot particle was probably already on the modesty clothing used under the licensee's anti-contamination clothing and may have come from the laundry with the contamination already present). This skin contamination event was further documented in TVA PCR Number 92-008. The inspector discussed this event with members of the licensee's radiological controls section to determine the frequency of these type events. The inspector was informed that during fiscal year 91 a total of 75 PCRs were issued. Of these 6 (8%) were attributed to a cause similar to that of the above. The inspector noted that the response of the HP personnel at the scene and followup to the event was very good.

9. Shutdown Risk (TI 2515/113)

The inspector held discussions with the licensee outage manager and various other licensee management personnel to determine adequacy of the licensee's program to reduce any potential risk that could affect the adequacy of decay heat removal during plant outages. NRC Information Notice 91-22 addresses four recent events which occurred during plant outages at different sites. In each case non-routine plant configuration existed due to outage activities. These events were also mentioned in a NRR letter dated March 21, 1991, sent to the chief operating officer for each utility licensed to operate a nuclear plant. In that letter the Director of NRR stressed the need for a high level of management attention in planning, coordination and execution of shutdown operations. The next scheduled refueling outage for this site is to start in January 1993 although a short plant shutdown/outage is scheduled to occur during the next reporting period.

The inspector determined that the licensee's program for management of outage activities is being revised. SSP-7.2, Outage Management, is to be revised based on recent NUMARC initiatives to control outage activities such that risk is minimized. The inspector was informed that the revised program was to be implemented at Browns Ferry by December 1992, and would be in place for the next refueling outage. The exact details associated with these revised industry guidelines will not be available until after the results of the next NUMARC meeting are published. Based on information provided to the inspector it appears that the licensee plans to develope future outage schedules based on required safety system availability periods. Those periods of availability would generally require a greater minimum number of trains and/or components than that required by TS. This policy would include all plant systems important to safety up to and including offsite power sources. One of the goals of this effort is to be to optimize safety system availability. A high level of management approval would be required to deviate from this policy. The inspector was informed that some of the guidelines would be used to develope the schedule for the upcoming min-outage. The licensee commited to provide the inspectors with a copy of that schedule prior to the shutdown to start work.

Some strong evidence exists to support the licensee's position that management does consider shutdown risk as part of outage planning. The Trinity 161KV line has recently experienced various periods of being out of service for wooden pole replacement with metal poles. This activity is occurring part time and is not scheduled to be complete until March 31, 1992. However the inspector was informed that the licensee had made a conscience decision to temporarily suspend this work and have this offsite power source available during the upcoming mini-outage scheduled for the next reporting period.

The inspectors will continue to follow licensee progress in this area including close monitoring the upcoming mini-outage.

10. Fire Protection (64704)

The inspectors continued to review the licensees Fire Protection/Prevention Program for adequacy. Numerous tours of the Unit 1/2/3 Reactor Buildings, Diesel Generator Buildings, Turbine Building and Control Bays were conducted. During these tours, the inspector had the following observations:

A major portion of the Unit 3 Reactor Building and D/G fire protection piping was out of sevice for piping repairs. The inspector verified selected portions of the associated compensatory measures such as firehoses from adjacent areas and fire watches were in place.

The inspector noted that all the fire extinguishers checked by the inspector during these tours were within the required inspection period.

Various hose stations were checked. All assoicated equipment was in good condition and all hoses checked had been hydrostatically checked within the required three year period.

There were no excess accumulations of debris, trash, or other combustible materials that would require performance of transient loading analysis.

The inspector noted that required fire watches were in place due to blockage of Unit 3 sprinklers due to a large amount of scaffolding in the plant.

Various storage cabinets such as paint lockers were inspected to verify that excessive or non-approved materials were not stored within. In each case, the appropriate Attachment C approving of storage of combustible material was attached to the outside of the cabinets.

The licensee has replaced most of the fire retardent wood scaffolding boards used during the Unit 2 recovery effort with metal walkboards. This should be both a radiological benefit in addition to reduction of area fire loading.

No discrepancies were identified associated with this area. The inspector will continue to review the licensees program during the next reporting period.

11. Bulletins

(CLOSED) Bulletin 259, 296/88-10, Nonconforming Molded-Case Circuit Breakers.

In previous inspection reports, the inspector documented the licensee activities involved with the removal and replacement of nonconforming molded-case circuit breakers. The inspector previously determined that the licensee adequately address this bulletin for the restart of Unit 2. Additional reviews indicated that activities by the licensee were adequate for the restart of Units 1 and 3.

12. Reportable Occurrences (92700)

The LERs listed below were reviewed to determine if the information provided met NRC requirements. The determinations included the verification of compliance with TS and regulatory requirements, and addressed the adequacy of the event description, the corrective actions taken, the existence of potential generic problems, compliance with reporting requirements, and the relative safety significance of each event. Additional in-plant reviews and discussions with plant personnel, as appropriate, were conducted.

a. LER 259/85-16, Revision 2, Automatic Scram Due to Loss of Feedwater.

This LER was previously reviewed and closed in IR 87-33. Following the scram, relief valves were operated for pressure control. During the event the main steam line safety valve acoustic monitors would latch-up in a full scale condition until the power to the monitors was interrupted. The acoustic monitors were manufactured by Technology for Energy Corporation. They notified the NRC of the potential problem on July 18, 1985 and TVA on July 23, 1985.

On June 16, 1991, additional latch-up failures of the monitors occurred during testing of the main steam relief valves. These failures occurred after the components were tested in accordance with the guidance provided by the vendor. The affected monitors were replaced and shipped to the vendor for root cause testing. The vendor was unable to reproduce the failures. TVA considered the failures different from the ones discussed in LER 50-259/85016, Revision 1. Therefore, TVA revised this LER to address these additional failures. The inspector concluded the licensee actions as prudent to notify the NRC of these additional failures.

b. (CLOSED) LER 259/91-09, Fire Penetration Discovered Open Without Fire Watch in Place as Required by Plant Technical Specifications.

On August 24, 1991, a maintenance planner conducting a review of open work requests on Unit 1 discovered that a fire penetration under 480V RMOV Board 1B was not sealed. The planner notified the SOS of the condition and a fire watch was established. This penetration was opened on May 11, 1990 for a modifications cable pull and a fire watch established. On September 5, 1990 the fire watch was terminated.

The inspector reviewed the LER, dated September 23, 1991. The licensee determined the root caused of this event was inappropriate personnel action in that the cable pulling activity was signed off as completed without visual verification that the penetration was sealed. Contributing to this event was closure of the work plan without sealing the penetration, failure to immediately notify the SOS when the unsealed penetration was discovered, and failure of the SOS to recognize the open penetration placed the plant in a limiting condition of operation.

The inspector noted that the licensee's immediate corrective actions included sealing the open penetration and performing a review of open work request/work orders for similar problems. Followup corrective action included training of personnel in the work process on this LER.

c. (CLOSED) LER 260/91-14, Manual Scram [illegible] Due to Bulk Suppression Pool Water Temperature Exceeding Technical Specification Limit Caused by Inadequate Procedural Controls.

This event occurred as a result of suppression pool thermal stratification while operating RCIC. The reactor was operating in the startup/hot standby mode with RCIC in service for pressure control. Suppression pool temperature monitoring was being conducted at five minute intervals as required by TS. Later, a SI was performed on a RHR loop which caused mixing of the suppression pool water and temperature increased greater than the TS limit. A manual scram was initiated. The licensee determined that plant procedures did not provide information on the possibility of thermal stratification of the suppression pool water.

The inspector reviewed this event extensively when it occurred. The licensee closure package for this item was reviewed. Six plant procedures were revised to advise operators when suppression pool cooling is needed. An operations standing order was issued to provide specific details regarding the potential for thermal stratification. Expected temperature rises with adequate mixing for HPCI and RCIC operation were specified. Training was conducted for Operations and STA personnel. The inspector concluded these actions addressed the problem.

d. (CLOSED) LER 260/91-11, Dresser Coupling Failure Leading to a Condition That Could Have Prevented SBGT From Fulfilling Safety Function.

On May 14, 1991, SBGT system trains A, B, and C were started by the performance of a SI for groups 2, 3, and 8 PCIS logic. While securing the SBGT system, a licensed-utility unit operator noted the system flow was oscillating from 4,000 to 11,000 cubic feet per minute and the differential pressure was oscillating between 1.0 and 3.0 inches of water. Further investigation by Operations personnel could not identify the reason why the SBGT system was oscillating. The system was secured and the SBGT system and secondary containment were declared inoperable.

Following the event, TVA discovered approximately 5,500 gallons of standing water in the underground SBGT exhaust duct. This duct runs from the SBGT building to the plant off gas system stack. Three factors contributed to the accumulation of water in the duct: a leaking dresser coupling seal in one of the exhaust ducts; the capping of the drain line from the exhaust duct to the Radwaste system; and a high water table in the area due to significant rainfall.

The inspector reviewed the LER, dated January 14, 1991. The licensee's response to this event was to seal the dresser coupling, remove the cap from the drain line and replace the cap with a loop seal in the Radwaste building.

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

a. (CLOSED) VIO 259, 260, 296/91-07-01, Failure to Follow Refueling Procedures.

The licensee failed to stop refueling activities on February 21, 1991, when unexplained spiking occurred on the source range monitors. The licensee conducted an incident investigation of this event. This was reviewed as closed in IR 91-41 when ORAT Open Item 260/91-201-03 was closed. The inspector reviewed the licensee closure package for this item. General Operating Instruction 2-GOI-100-3, Refueling Operations, was revised to specify that if erratic or unexplained SRM/FLC response is observed, fuel loading shall be immediately stopped. These actions address the violation.

b. (CLOSED) IFI 260/91-21-03, Discrepancies in EECW Check Valve Testing.

This item had been left open pending TVA's receipt of NRC approval for Generic Letter 89-04 exception for reverse testing of EECW check valves. The generic letter requires that prior to taking this exception, formal request and approval must be obtained.

The inspector reviewed TVA letter Dated September 10, 1991, which proposed changes to the Browns Ferry inservice testing program for pumps and valves. The inspector determined that this proposed change included the EECW check valves in question as part of Relief Request Number PV-14. The inspector also noted that this relief request was approved in NRC letter and attached SER dated September 10, 1991.

c. (CLOSED) URI 259, 260, 296/91-43-01, Unintentional D/G Start. Valve Testing.

This item had been left open pending TVA's review of the circumstances associated with the unintentional start of the 1A D/G which occurred on December 18, 1991. The inspector reviewed the licensee's incident investigation report that documented their review of this event. The inspector's review of that report is covered in paragraph two of this report.

14. Exit Interview (30703)

The inspection scope and findings were summarized on February 14, 1992 with those persons indicated in paragraph 1 above. The inspectors described the areas inspected and discussed in detail the inspection findings listed below. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection.

The licensee commented that the two TS changes discussed in the safety assessment paragraph, were made based on the information available at the time of the submittal.

Item Number	Description and Reference
259, 260, 296/92-03-01	VIO, Failure to Follow Procedure for Diesel Generator Surveillance and Spent Fuel Pool Transfer Canal Operation, paragraph two and three.
259, 260, 296/92-03-02	IFI, Alternate Breach Plan of Secondary Containment, paragraph four.
259, 260, 296/92-03-03	URI, Failure to Update Primary Drawing, paragraph five.

Licensee management was informed that 3 LERs, 1 IFI, 1 URI, 1 VIO, and 1 BU were closed.

15. Acronyms and Initialisms

ARP	Annunicator Response Procedure
AUO	Auxiliary Unit Operator
BFNP	Browns Ferry Nuclear Plant
BU	Bulletin
CAD	Containment Atmospheric Dilution
CAM	Continuous Air Monitor
CATD	Corrective Action Tracking Documents
CFM	Cubic Feet Per Minute
CFR	Code of Federal Regulations
DCN	Design Change Notice

D/G	Diesel Generator
ECP	Employee Concern Program
EECW	Emergency Equipment Cooling Water
EFPD	Effective Full Power Days
EQ	Environmental Qualification
FLC	Fuel Loading Chamber
GE	General Electric
GOI	General Operating Instruction
HP	Health Physics
IFI	Inspector Followup item
IG	Inspector General
IR	Inspection Report
JB	Junction Box
KV	Kilovolt
LCO	Limiting Condition for Operation
LER	Licensee Event Report
MOV	Motor Operated Valve
NR	Not Recorded
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
ORAT	Operational Readiness Assessment Team
PCR	Personal Contamination Report
PCIS	Primary Containment Isolation System
P.M.	Post Meridiem
POD	Plan of the Day
POI	Periodic Operating Instruction
QA	Quality Assurance
QC	Quality Control
RBCCW	Reactor Building Closed Cooling Water
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
RMOV	Reactor MOV
RTP	Restart Test Program
RWCU	Reactor Water Cleanup
SBGT	Standby Gas Treatment System
SER	Safety Evaluation Report
SI	Surveillance Instruction
SOS	Shift Operations Supervisor
SPAE	System Plant Acceptance Evaluation
SPOC	System Pre-Operability Checklist
SRM	Source Range Monitor
SRO	Senior Reactor Operator
STA	Shift Technical Advisor
SWEC	Stone and Webster Engineering Corporation
TROI	Tracking and Reporting of Open Items
TS	Technical Specification
TVA	Tennessee Valley Authority
URI	Unresolved Item
UVA	Unverified Assumption
VIO	Violation
WO	Work Order
WR	Work Request