



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931**

November 17, 2003

Tennessee Valley Authority
ATTN: Mr. J. A. Scalice
Chief Nuclear Officer and
Executive Vice President
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

**SUBJECT: BROWNS FERRY NUCLEAR PLANT UNIT 1 RECOVERY - NRC INTEGRATED
INSPECTION REPORT 05000259/2003010**

Dear Mr. Scalice:

On October 18, 2003, the US Nuclear Regulatory Commission (NRC) completed an inspection associated with recovery activities at your Browns Ferry 1 reactor facility. The enclosed integrated inspection report documents the inspection results, which were discussed on October 27, 2003, with Mr. John Rupert and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Based on the results of this inspection, no new findings of significance were identified. This report documents one Severity Level IV violation of NRC requirements that resulted from resolution of a previously documented unresolved item. However, the NRC is treating this finding as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest the NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Browns Ferry Nuclear Plant.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS).

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ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>
(the Public Electronic Reading Room).

Sincerely,

/RA/

Stephen J. Cahill, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket No. 50-259
License No. DPR-33

Enclosure: Inspection Report 05000259/2003010
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No: 50-259

License No: DPR-33

Report No: 05000259/2003010

Licensee: Tennessee Valley Authority (TVA)

Facility: Browns Ferry Nuclear Plant, Unit 1

Location: Corner of Shaw and Nuclear Plant Roads
Athens, AL 35611

Dates: July 20, 2003 - October 18, 2003

Inspectors: W. Bearden, Senior Resident Inspector, Unit 1
E. Christnot, Resident Inspector
R. Chou, Reactor Inspector, (Sections E1.3, E1.4)
B. Crowley, Senior Reactor Inspector, (Section E1.5)
R. Carrion, Project Engineer, (Section E1.1)
E. Testa, Senior Reactor Inspector, (Section R1.1)

Accompanying
Personnel: J. Fuller, Nuclear Safety Intern
W. Del-Valle, Nuclear Safety Intern
A. Vargas, Nuclear Safety Intern

Approved by: Stephen J. Cahill, Chief
Reactor Project Branch 6
Division of Reactor Projects

Enclosure

EXECUTIVE SUMMARY

Browns Ferry Nuclear Plant, Unit 1
NRC Inspection Report 05000259/2003-010

This integrated inspection included aspects of licensee engineering and modification activities associated with the Unit 1 restart project. The inspection program for the Unit 1 Restart Program is described in NRC Inspection Manual Chapter 2509. The report covers a 3-month period of resident inspection. In addition, NRC staff inspectors from the regional office conducted inspections of radiological controls and Unit 1 Special Programs in the areas of seismic cable tray and conduit supports, large bore pipe supports, the long term torus integrity program, inspections of cables subject to harsh environments, and intergranular stress corrosion cracking (IGSCC).

Engineering

- No violations or deviations were identified during the initial review of the licensee's Seismic Cable Tray and Conduit Supports Special Program for Unit 1. Inspectors found that the licensee was conducting walkdowns with highly-qualified Seismic Engineers and subjecting the results to independent review by another seismic expert (Section E1.1).
- No violations or deviations were identified during the review of Unit 1 modifications involving reactor building cable trays. Inspectors found the modifications were developed, reviewed, and approved per requirements (Section E1.2).
- Initial reviews of the Long Term Torus Integrity Program concluded the program was being adequately implemented with exception to concerns in the area of weld size verification. An Unresolved Item (URI) 50-259/2003-009-01, Inconsistency for Measurement of Welds in Pipe Supports WDP-BFN-1-CEB-003-01-02-SK-1 and 3 was resolved to a Severity Level IV Non-Cited Violation (NCV) 50-259/2003-010-01, Failure to Accurately Measure Welds During Walkdowns, which also includes additional examples of incorrectly measured welds found during the current inspection (Sections E1.3 and E1.4)
- No violations or deviations were identified during the review of the licensee's Intergranular Stress Corrosion Cracking Special Program for Unit 1. However, weld record and documentation errors indicated a weakness in this area (Section E1.5).
- No violations or deviations were identified during this review of the licensee's inspections of electrical cables subject to harsh environments (Section E1.6).
- Reviews of Nuclear Assurance assessments and observation reports indicated that adequate oversight of field walkdowns was being applied (Section E7.1).

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Plant Support

- Radiological facility conditions and housekeeping in health physics facilities, reactor building, drywell and refueling floor were observed to be good. Material was labeled appropriately, and areas were properly posted. Personnel dosimetry devices were appropriately worn. Radiation work activities were appropriately planned. Radiation worker doses were being maintained well below regulatory limits and the licensee was maintaining exposures ALARA. Contamination control was effective (Section R1.1).

REPORT DETAILS

Summary of Plant Status

Unit 1 has been shut down since March 19, 1985, and has remained in a long-term lay-up condition with the reactor defueled. The licensee initiated Unit 1 recovery activities to return the unit to operational condition following the TVA Board of Directors decision on May 16, 2002. Demolition and removal of selected portions of plant systems is continuing. Engineering and procurement activities to support replacement of plant components is ongoing. Some reinstallation of plant equipment and structures has occurred. Ongoing recovery activities include design walkdowns; replacement of drywell structural steel; removal and replacement of reactor coolant system piping safe end nozzles; reinstallation of balance-of-plant piping and turbine auxiliary components; and installation of new electrical penetrations, cable trays, and cable tray supports.

III. Engineering

E1 Conduct of Engineering

E1.1 Seismic Cable Tray and Conduit Supports (NRC Inspection Procedure [IP] 62002)

a. Inspection Scope

The inspectors reviewed the Browns Ferry Regulatory Framework for the Restart of Unit 1 and previous commitments for the restart of Unit 1. The inspectors particularly reviewed the licensee's program for ensuring that commitments with respect to the seismic qualification of cable tray and conduit supports were satisfied. Generic Letter (GL) 87-02, "Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue (USI) A-46," was issued on February 19, 1987, to implement the USI resolution which concluded that the seismic adequacy of certain equipment in operating nuclear power plants should be reviewed against seismic criteria not in use when the plant was licensed. Utility members formed the Seismic Qualification Utility Group (SQUG) which developed a generic program to satisfy the concerns identified in USI A-46. The program included the Generic Implementation Procedure (GIP), which outlined the steps to be taken by SQUG members. Browns Ferry is a member of SQUG and has committed to using its guidance for seismic cable tray and conduit supports. The GIP was reviewed and approved by the NRC, and the NRC specifically accepted the use of the GIP by Unit 1 in Enclosure 1 of its letter of November 19, 1992, to TVA with respect to Generic Letter 87-02, Supplement 1.

b. Observations and Findings

TVA Browns Ferry Regulatory Framework document, Table 3, references TVA's program for seismic qualification of cable tray and conduit and supports, which was completed for Unit 3 using the SQUG GIP.

The licensee has completed the walkdown inspections and evaluations, and plans to issue the Design Change Notice (DCN) for support modifications by late September. The inspectors reviewed the licensee's procedure, Walkdown Instruction WI-BFN-0-CEB-04, Seismic Verification Walkdown Instruction for USI A-46 and Seismic IPEEE Programs, used during walkdowns to evaluate the as-built cable tray and conduit supports in the Reactor Building and Drywell. The walkdowns were conducted by a Seismic Review Team consisting of two highly-qualified Seismic Capability Engineers. The results of these walkdowns were later independently reviewed by another seismic expert who concluded that the approach and results of the Seismic Review Team were consistent with the GIP, and acceptable to satisfy the requirements for resolution of USI A-46 for Unit 1. The inspectors reviewed selected Raceway Walkdown Data Packages and walked down several elevations of the Reactor Building and observed eight supports which were identified as outliers during the licensee's walkdowns. The inspectors verified that the licensee analyzed the outliers using methods allowed by the GIP. The modifications are scheduled to begin by February 2004 and be completed by October 2004.

c. Conclusions

No violations or deviations were identified.

E1.2 Permanent Plant Modifications (IP 37550)

a. Inspection Scope

The inspectors reviewed permanent plant modifications to install new electrical cable trays and supports in the reactor building. The inspectors reviewed criteria in licensee procedures SPP-9.3, Plant Modifications and Engineering Change Control, SPP-7.1, Work Control Process, SPP-8.3, Post-modification Testing, and SPP-8.1, Conduct of Testing, to verify that the risk-significant plant modifications were developed, reviewed, and approved per the procedure requirements. The inspectors observed field work to verify that the design basis, licensing bases, and TS-required performance for the system had not been degraded as a result of the modification.

b. Observations and Findings

The inspectors reviewed licensee activities associated with DCN 51227, Reactor Building Cable Trays. This ongoing permanent plant modification installs new electrical cable trays and raceway components in the Unit 1 reactor building. The intent of this DCN was to minimize the use of conduit in these areas and to provide for future planned cable installation during Unit 1 recovery. The inspectors reviewed criteria in licensee procedures and modification instructions to verify that the risk-significant plant modification was developed, reviewed, and approved per the procedure requirements. The inspectors observed field work for installation of cable trays and supports, and installation of concrete anchors.

c. Conclusions

No violations or deviations were identified.

E1.3 Long Term Torus Integrity Program (IP 62002, 70370)

a. Inspection Scope

The inspectors reviewed ongoing corrective actions associated with this program to correct deficiencies described in the TVA Nuclear Performance Plan, Section 3.1.2. This section stated that modification and configuration problems were found for torus internal structural components and attached pipe supports, such as undersized welds, excessive restraint gaps, and installation/ fabrication configurations differing from design drawing requirements. The inspectors reviewed documents and discussed the program status with licensee engineers. NUREG 1232 Vol. 3 and Supplements 1 and 2, Safety Evaluation Report (SER) on Tennessee Valley Authority: Browns Ferry Nuclear Performance Plan, were reviewed for acceptance criteria.

TVA procedures WI-BFN-0-CEB-02, Walkdown Instruction for Seismic Issues (Civil), and WI-BFN-0-CEB-01, Walkdown Instructions for Piping and Pipe Supports, were used to independently review the adequacy of walkdowns. The inspectors examined catwalk platforms, Safety Relief Valve Lines and T-Quenchers, and downcomer tie supports inside the torus. The inspectors examined cradles, tie down bolts, and ring girder reinforcements outside of the torus. The inspectors inspected the torus-attached piping and supports on the top of the torus.

b. Observations and Findings

The Browns Ferry Regulatory Framework document, Table 3, stated that the Long Term Torus Integrity Program will include inspections of safety-related torus and torus-related structures; catwalk inspections, which would be limited to welds and bolted connections; and resolution of torus-attached piping discrepancies. The torus-attached piping will be inspected and evaluated within the scope of the large bore piping and supports program.

The licensee has completed the structure walkdown inspection inside and outside of the torus and torus-attached piping around the torus. The licensee has also issued most of the Design Change Notices (DCNs) for the modifications. Modifications are expected to be completed by the end of 2005. The inspectors selected torus inside structures, torus outside bay ring girders and cradle tie down, piping systems and supports for independent walkdown verification with licensee personnel. The inspectors measured and had the licensee personnel verify the data and compared it to information documented in drawings made from the licensee's walkdown.

The inspectors examined catwalk platforms, working platforms, downcomer tie downs, and T-quenchers inside of the torus. The inspection attributes included member sizes and dimensions, locations, and weld sizes, lengths, and symbols. The inspectors identified a weld marked in the wrong location in the walkdown drawing. The licensee issued Problem Evaluation Report (PER) 03-015458-000 for corrective action.

The inspectors examined torus support cradles, ring girder reinforcements, and torus cradle tie-downs for Bays 3 and 11. The inspection attributes included member sizes and dimensions, diameters of tie down bolts, and weld sizes, lengths, and symbols. The inspectors identified a weld on each ring girder which was 1/16- or 1/8-inch undersized or smaller from the walkdown drawings. The licensee issued PER 03-015390-000 for corrective action.

The inspectors examined supports R-16, R-17, and R-18 and the piping length between these three supports on purge line 064 on the top of the torus. The inspection attributes included support location, member sizes and dimensions, weld sizes, lengths, and symbols, and base plates. The inspectors identified eight welds in support R-17 and four welds in support R-18, for which the welds were 1/16- or 1/8-inch undersized or smaller than documented in the walkdown drawings. All of the welds had been accepted by the original walkdown team and were actually undersized or smaller or with defects such as burn through, excess undercut, or excessive slag. The welds with defects should not have been accepted or considered as a structural weld for the design qualification, based on Section 3.3.3, Welds, of TVA Procedure No. WI-BFN-0-CEB-01, Walkdown Instruction for Piping and Pipe Supports. The licensee issued PER 03-0015570-000 for corrective action.

Section 2.1, Scope of the Walkdown, of Procedure WI-BFN-0-CEB-02, Walkdown Instruction for Seismic Issues (Civil), states that the walkdown will verify the as-built condition of the structural steel and embedded plates, as shown on existing TVA drawings as furnished by Civil Engineering. Section 8.2.2.1 of the same procedure provides the fillet weld size acceptance criteria: A fillet weld shall be permitted to be less than the size recorded by 1/16-inch for 1/4 of the length of the weld. An undersized weld is defined as a weld measured in the field with a size less than 1/16 inch for over 1/4 the length of the weld, when the weld is compared to the as-built drawings. The inspectors determined that multiple weld measurements in the as-built walkdown drawings were incorrect.

c. Conclusions

Initial reviews of the Long Term Torus Integrity Program concluded the program was being adequately implemented with exception of the concerns in the area of weld size verification. A Severity Level IV Non-Cited Violation (NCV) 50-259/2003-010-01, Failure to Accurately Measure Welds During Walkdowns was identified and is part of the documented NCV in the large bore piping and supports program (See Section E1.4).

Enclosure

E1.4 Large Bore Piping and Supports (IP 62002, 70370)

a. Inspection Scope

The inspectors reviewed the large bore piping and supports program and discussed the status of the program with licensee engineers. TVA Nuclear Performance Plan, Section 3.2, for Browns Ferry Plant, Rev. 2, dated October, 1986, stated that TVA did not previously complete commitments made regarding IE Bulletins 79-02, Pipe Support Base Plate Designs Using Concrete Expansion Anchors and 79-14, Seismic Analysis for As-Built Safety-Related Piping, and that TVA would perform inspections, evaluations, and modifications for safety-related large bore piping systems including torus-attached piping to meet requirements. The inspectors walked down one pipe support with the licensee's engineer and walkdown team to verify the licensee walkdown effectiveness. Procedure WI-BFN-0-CEB-01, Walkdown Instructions for Piping and Pipe Supports, was used for the walkdown acceptance criteria.

b. Observations and Findings

TVA Browns Ferry Unit 1 Regulatory Framework document, Table 3, references TVA's program for seismic qualification of large bore piping and supports, which was completed for Unit 3 using the Unit 2 precedent. Essentially, the Large Bore Piping and Supports Program for Units 2 and 3 was to complete the commitments and requirements for IE Bulletins 79-02 and 79-14.

The inspectors found inconsistent weld size measurements during the last inspection and identified Unresolved Item (URI) 50-259/2003-009-01, Inconsistency for Measurement of Welds in Pipe Supports WDP-BFN-1-CEB-003-01-02-SK-1 and 3. To resolve the URI, the licensee removed all the weld sizes from two support walkdown drawings. The licensee assigned a different walkdown team and a Quality Control (QC) team to independently measure and record the weld sizes on the walkdown drawings with blank weld sizes for two supports. Both teams found that two welds in walkdown drawing WDP-BFN-1-CEB-003-01-02 SK 1 (formerly support FW-H4) were smaller when compared to the original walkdown package. The inspectors discussed this URI with the licensee's engineers and reviewed the results. To verify the licensee's reverification effectiveness, the inspectors independently measured several welds on support drawing WDP-BFN-1-CEB-003-01-02 SK 3 (formerly support FW-H2) and found one discrepancy. One weld was 1/8-inch, which was 1/16-inch smaller when compared to the reverification results. The licensee issued PER 03-0015567-000 for corrective action.

Section 3.3.3.1.d, Weld Size of Procedure WI-BFN-0-CEB-01, Walkdown Instruction for Piping and Pipe Supports, in part, has a requirement to measure and record fillet weld size. Section 12, Weld Tolerances of Attachment 2 - Pipe Supports, of the same procedure, in part, states that fillet weld size may be undersized by 1/16-inch for up to 25 percent of the weld length. An undersized weld is defined as a weld measured in

the field with a size less than 1/16-inch for over 1/4 the length of the weld when the weld is compared to the as-built walkdown drawings.

Based on the licensee's reverification of the measured welds and subsequent validation of the two erroneous measurements, the licensee's identification of 12 more incorrectly measured welds as described in Section E1.3 of this report, and the inspectors' review and independent identification of one additional incorrectly measured weld discrepancy, URI 50-259/2003-009-01, Inconsistency for Measurement of Welds in Pipe Supports WDP-BFN-1-CEB-003-01-02-SK-1 and -3, this URI is considered closed. 10 CFR 50, Appendix B, Criteria V, Instructions, Procedures, and Drawings, in part, states that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. On August 14, 2003, contrary to the above, walkdown drawings of several piping supports were not appropriate in that they contained incorrect weld sizes. These walkdown drawings were used to evaluate the as-built condition for acceptability or modifications. This violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy and will be identified as a Severity Level IV Non-Cited Violation (NCV) 50-259/2003-010-01, Failure to Accurately Measure Welds During Walkdowns. The licensee issued PERs for the incorrectly measured welds concerning this violation.

c. Conclusions

Three examples of the incorrectly measured welds in two large bore supports FW-H2 and FW-H4 were confirmed by the licensee reverification and the inspectors' independent identification during this inspection. Unresolved Item 50-259/2003-009-01, Inconsistency for Measurement of Welds in Pipe Supports WDP-BFN-1-CEB-003-01-02-SK-1 and -3, when compared to the new drawings based on the walkdown inspection, was identified as a Severity Level IV Non-Cited Violation (NCV) 50-259/2003-010-01, Failure to Accurately Measure Welds During Walkdowns. This NCV also includes 12 incorrectly measured welds identified during this inspection as discussed in Section E1.3 of this report.

E1.5 Intergranular Stress Corrosion Cracking (IGSCC) - Welding of Replacement of Reactor Vessel Safe Ends (IP 55050)

a. Inspection Scope

As discussed in Section 3.6 of NUREG 1232 and in Section 7.0 of the Browns Ferry Nuclear Performance Improvement Plan, IGSCC was identified in a number of stainless steel piping systems and reactor vessel (RV) safe ends during nondestructive examination (NDE) of these systems in response to NRC Generic Letter 88-01. As part of the IGSCC Special Program, TVA is replacing the RV N1 (RECIRC Outlet), N2 (RECIRC Inlet), N5 (Core Spray), and N8 (Jet Pump Instrumentation) nozzle safe ends. As detailed in TVA Browns Ferry Unit 1 Regulatory Framework Letters dated December 13, 2002, and February 28, 2003, and Letter of Response to Request for

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Supplemental Information on the Regulatory Framework for the Restart of Unit 1, dated June 11, 2003, the applicable Codes for the safe end replacements are: (1) ASME Section XI, 1995 Edition, 1996 Addenda, and (2) ASME Section III, Class 1, 1995 Edition, 1996 Addenda.

For replacement of the RV nozzle safe ends, the inspectors observed in-process welding and reviewed in-process welding records, procedures, personnel qualification records, and material certification records.

b. Observations and Findings

1. Observation of Welding Activities

Refer to Inspection Report 50-259/2003-009 for documentation of a previous inspection in this area. During the current inspection, the inspectors observed/reviewed the following to verify compliance with the applicable Codes referenced above:

- Nozzle N2A (Weld RWF-1-W002-026) - observed fit-up activities, observed root pass welding, reviewed in-process Weld Data Sheet, and reviewed intermediate level (weld approximately 1/3 full) radiographic (RT) film
- Nozzle N2C (Weld RWF-1-W002-028) - observed root pass and fill pass welding, reviewed in-process Weld Data Sheet, and reviewed intermediate level (weld approximately 1/3 full) RT film
- Reviewed final RT film and Weld Data Sheets for: Nozzle to Safe End Welds RWR-1-W001-071 (Nozzle N1A), RWR-1-W002-031 (Nozzle N1B), RWR-1-W002-26 (Nozzle N2A), RWR-1-W002-27 (Nozzle N2B), RWR-1-W002-28 (Nozzle N2C), RWR-1-W002-29 (Nozzle N2D), RWR-1-W002-30 (Nozzle N2E), RWR-1-W002-70 (Nozzle N2F), and CS-1-W002-021 (Nozzle N5B)
- Reviewed Weld Data Sheets for Thermal Sleeve to Safe End and Thermal Sleeve Purge Port Welds for Nozzles N2A, N2B, N2C, N2D, N2F, N2E, and N2F
- Reviewed Welding Procedure Specification (WPS) 08-08-T-060, Revision 1, including applicable Procedure Qualification Records (PQRs)
- Reviewed Welder Qualification Records, including records of qualification maintenance, for welder Stamp Nos. KDB0229, RDG3704, DWL6912, KMB4698, DEN6632, DDA4489, DDT1612, DRG7989, DDT1612, SGL9153, ALS1392, TDE9384, DHL0445, KGG5429, JWB2576, MBH0896, DDM5284, WCS1283, RJV6616, RLA1203, RPR6568, RDH3010, JTS8355, JMW9228 and KMO0621

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- Reviewed Receiving Inspection Reports (RIRs) and Certified Material Test Reports for the following heats/lots of welding material: .035" ER 308/308L Spooled Wire - Heat PT243 and 1/8"&5/32" IN 308L Consumable Inserts - Lot M7832
- Reviewed RIR and Certified Material Test Report for seven N2 Nozzle Safe Ends, SA 182, F316NG, Heat 2857ANE2
- Reviewed Welding Services Inc. (WSI) Certificate of Qualification Records for 4 Welding and NDE Inspectors who inspected the above listed welds

During the above observations and reviews, the inspectors noted the following errors and inconsistencies:

- For Weld RWR-1-W002-26, the last entry on the Weld Data Sheet (the official weld record) for welding indicated that welding had been done using a consumable insert on 8/27/2003. The final VT inspection of the weld had been signed off on 8/26/2003. This was an obvious error since a consumable insert would have only been used on the root pass of the weld and there should not have been any welding after the final VT. When questioned by the inspectors, WSI QC personnel stated that the record had not had a final review and this error would have been identified in the final review. Based on further review of other welding documentation (welding material withdrawal slips and welder logs) QC was able to show that the entry should have been for 8/26 and should have been for welding wire instead of consumable insert. The inspectors observed that subsequent correction of the document was not appropriate. QC had the welder line-out the 8/27 entry and insert the correct entry for the use of welding wire on 8/26. The line-out was dated 9/9/03, the date the error was identified, but the new entry was dated 8/26/03 without annotation that this was a change to the record that occurred on 9/9/03. TVA issued PER 03-017368-000 to document this condition.
- Prior to the inspection, WSI had identified that for Nozzle N2D, the Thermal Sleeve Purge Ports had been welded and no entries had been entered on the Weld Data sheets. WSI Nonconformance Report (NCR) 03-031 was issued for this condition. TVA PER 03-017371-000 was also issued.
- The inspectors noted that for the N2 Nozzles, the Weld Data Sheets for the safe end to thermal sleeve welds listed the weld diameter and thickness for the safe end side of the weld as 12"X1.3275" when in fact it should have been 10"X0.365". The inspectors concluded that this was an error on the Weld Data Sheets, but should not affect the quality of the welds. TVA issued PER 03-017366-000 to document this condition.

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- A welder qualification continuity discrepancy for the machine process was noted in that qualification had expired by one day. Since records indicated maintenance of qualification by use of the process from that date to the present, this one day lapse was not considered technically significant.

In-process welding observed was found to comply with the applicable Codes. However, as noted, numerous record errors and inconsistencies were identified, indicating poor documentation and record keeping.

2. Weld Inspection Requirements

The inspectors reviewed existing licensee and WSI weld inspection requirements and noted that inspection requirements for surface examinations of accessible internal weld surfaces required by ASME III NB-5140 for Nozzles N1A and N1B were not consistent. The internal weld surfaces of safe ends other than N1A and N1B were not accessible. The work packages associated with safe end replacement for Nozzles N1A and N1B used by WSI included requirements for visual (VT) and liquid penetrant (PT) examinations of all accessible weld surfaces. However, TVA Drawing 1-47E408-8-03, Mechanical Recirc Outlet Safe End Modification, did not specifically include a requirement for PT examination of internal weld surfaces. WSI had performed PT examinations on the interior surfaces of the safe end welds for Nozzles N1A and N1B but the examinations had occurred because the interior surfaces of the welds had been ground smooth (blended) after welding was completed but prior to opportunity for surface examination. Based on discussions with WSI personnel, the PT examinations would have otherwise been waived due to the internal weld surfaces being considered as inaccessible because of radiological concerns. Level B PER 03-014627 was identified to address this problem.

3. TVA oversight of Safe End Welding

The inspectors reviewed various PERs associated with the ongoing safe end welding. PERS reviewed are listed in the attachment. Although several of these PERs identify weld inspection documentation errors, there were no problems with acceptability of completed welds.

Contractor welding activities on the four remaining new recirc inlet, one Core spray, and two jet pump instrument (N8) safe ends were suspended on September 8, 2003, due to a program documentation weakness. Restart was authorized by TVA on September 23, 2003 following review and acceptance of the contractor recovery plan. Level A PER 03-017186 was identified to address this problem. The inspectors reviewed the licensee's root cause determination and held discussions with Unit 1 management. In addition, the inspectors reviewed interim corrective actions including licensee plans for additional controls and increased contractor oversight after welding activities resumed. The inspectors concluded that the licensee's preliminary plans for increased oversight were reasonable.

c. Conclusions

No violations or deviations were identified during this review of the licensee's Intergranular Stress Corrosion Cracking Special Program for Unit 1. However, several weld record and documentation errors were identified indicating a weakness in this area.

E1.6 Inspections of Cables Subject to Harsh Environments (37550)

a. Inspection Scope

The inspectors reviewed ongoing activities associated with inspections of cables in harsh environment areas in Unit 1 electrical panels, boards, and junction boxes. This review included evaluation of selected technical risk assessments performed prior to intrusive inspections, the licensee's process for management approval of planned inspections, and observation of ongoing activities.

b. Observations and Findings

The electrical inspections are divided into two phases. Phase 1 inspections, which are in progress, consist of inspections to obtain cable jacket information. Phase 2 inspections, which have not yet started, will consist of inspections of cable splices. Any unacceptable cables identified under these inspections will be added to the cable replacement scope.

Phase 1 inspections consist of either intrusive or non-intrusive cable inspections. These inspections are being performed to collect cable jacket marking data, which will be used to identify cable manufacturer and contract information. This information will be evaluated to verify that any suspect cables meet Browns Ferry equipment environmental qualification (EEQ) criteria. All non-intrusive inspections are complete. Intrusive inspections involve cutting cable ties and moving cables. These activities will involve some risk because some of these cables are in areas that support Unit 2 operation. Intrusive cable inspections started in August 2003 and are scheduled to continue until December 2003. Cable jacket data is obtained at end devices if possible. Suspect cables are assumed to not be qualified and will be replaced unless walkdown data confirms each suspect cable is qualified.

A total of 155 cables in 60 panels are scheduled to receive intrusive inspections. Prior to approval of each inspection, management was briefed on potential consequences and risk-reduction methods. In addition, the licensee developed an inspection package which incorporated the identified risk, risk mitigation plan, and appropriate operating experience considerations. For sensitive inspections, management observers were assigned. At the end of the reporting period, 79 of 155 cable inspections were completed; 54 inspected cables were determined to be acceptable and 25 were not.

The inspectors reviewed selected technical risk assessments and attended management briefings prior to approval of inspections. During the inspections, the inspectors attended prejob briefings and observed ongoing inspections.

During the future phase 2 splice inspections phase, all cable pull points in the suspect cable routes will be inspected for splices and, if found, the cable will be evaluated to determine if it qualifies. If a splice exists, the cable on the other end will also be evaluated for qualification.

c. Conclusions

No violations or deviations were identified during the review of the licensee's program for inspection of cables in harsh environment areas.

E7 Quality Assurance in Engineering Activities (IP 37550, 71152)

E7.1 Licensee Quality Assurance Oversight Activities (Identification and Resolution of Problems)

a. Inspection Scope

The inspectors reviewed the licensee's program relative to QA oversight of Unit 1 walkdown activities. The inspectors also reviewed a sample of QA assessments and observation reports to ensure that adequate oversight was being applied.

b. Observations and Findings

The inspectors reviewed completed Nuclear Assurance (NA) assessments of Unit 1 field walkdown activities performed by the licensee since May 2002. The inspectors also reviewed a sample of NA Observation Reports documenting QA observations and findings for Unit 1 walkdown activities to ensure that adequate oversight was being applied. Specifically, the inspectors' review evaluated the effectiveness of the licensee's oversight and assessed whether issues were identified in a timely manner; documented accurately and completely; properly classified and prioritized; adequately considered for extent of condition, generic implications, common cause and previous occurrences; and that the root cause was identified and appropriate corrective actions to prevent recurrence were implemented. Also, the inspectors' review assessed whether the issues similar to the nonconservative weld measurements identified in Section E1.4 might exist for walkdowns on Unit 1 equipment other than supports.

The inspectors determined that licensee NA assessments and observations were performed to verify that walkdowns were performed in accordance with existing program instructions, to verify walkdown personnel qualifications, and to verify dimensional attributes obtained during ongoing walkdowns. Several negative observations were identified during these NA assessments and observations. However, those issues were mainly transposition errors where the correct attribute or measurement was still

available from field notes. Data contained in the NA assessment and observation reports indicated that the quality of field walkdowns improved as the result of feedback of NA findings to walkdown personnel.

c. Conclusions

Reviews of NA assessments and observation reports indicated that adequate oversight of field walkdowns was being applied. No violations or deviations were identified.

E8 Miscellaneous Engineering Issues (92701)

E8.1 (Closed) URI 50-259/2003-009-01, Inconsistency for Measurement of Welds in Pipe Supports WDP-BFN-1-CEB-003-01-02-SK-1 and -3

Unresolved Item 50-259/2003-009-01 was closed and resolved to a Severity Level IV Non-Cited Violation (NCV) 50-259/2003-010-01 for the undersized welds for the large bore pipe supports, including the Torus-Attached Pipe Supports in the Torus Long Term Integrity Program during this inspection (See Section E1.4).

E8.2 (Closed) Inspector Followup Item 50-259/88-02-02, Large Number of TACFs Still Outstanding

The licensee's corrective actions for Unit 2 were previously reviewed and documented in NRC Inspection Report, 50-259, 260, 296/88-28, closing the item for Unit 2. The inspectors reviewed the licensee's current program for closure of open TACFs on Unit 1 and determined that it was acceptable. The licensee has a total of 35 active TACFs for Unit 1. Each TACF is assigned to a responsible engineer for closure with the goal of no outstanding TACFs when systems are ready for turnover to operations. This item meets closure criteria established for Unit 1 recovery issues. This issue is closed for Unit 1.

E8.3 (Closed) IFI 259/89-35-01, Flexibility of Reactor Water Level Sensing Lines

This item addressed the inspectors' concerns associated with the replacement of flexible instrument piping on the reactor water level sensing lines on Unit 2 with one-inch rigid stainless steel piping. The licensee's corrective actions included an evaluation and determination that the system had been installed properly. The licensee's corrective actions for Unit 2 were previously reviewed and documented in NRC Inspection Reports, 50-259, 260, 296/91-26, closing the item for Unit 2. That review also administratively closed this item for Units 1 and 3. The inspectors determined that no additional unique actions were required for Unit 1. This issue is closed for Unit 1.

E8.4 (Closed) Violation 50-259/85-41-01, Inadequate Design Control for Safety-Related Cable Tray Supports.

This violation was originally identified in 1985 as a result of a review of design calculations for safety-related cable tray supports in various Category 1 structures. It was administratively closed in Inspection Report 50-259,260,296/95-52 when the licensee's corrective actions were evaluated and deemed to be acceptable to resolve the issues identified and to prevent recurrence. During the current inspection, the inspectors verified that the licensee has procedures and design criteria in place for the design of cable tray supports which incorporate the Generic Implementing Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment, and has used an independent consultant to perform a peer review of the seismic qualification of Unit 1 cable tray supports for the Unit 1 restart in response to NRC Unresolved Safety Issue A-46 (USI A-46) Seismic Adequacy of Mechanical and Electrical Equipment. The inspectors determined that no additional unique actions were required for Unit 1. This issue is closed for Unit 1.

E8.5 (Closed) Inspector Followup Item (IFI) 50-259/85-51-01, Inspection of Existing Cable Tray Support Systems.

This IFI was originally identified in 1985 during a follow-up inspection performed relative to Violation 50-259,260,296/85-41-01. This IFI was administratively closed in Inspection Report 50-259,260,296/95-52. In 1985, inspectors noted that the licensee did not have a written procedure to inspect existing cable tray support systems to assure that the as-built cable tray support systems complied with applicable design documents. During the current inspection, the inspectors verified that the licensee did have a written procedure in place and used it during the process of inspecting existing Unit 1 cable tray support systems and other mechanical and electrical equipment, and that it incorporated the NRC-approved Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment. The inspectors determined that no additional unique actions were required for Unit 1. This issue is closed for Unit 1.

E8.6 NRC Audit of Outstanding Open Inspection Items for Unit One

The inspectors conducted an audit of NRC open items for Unit 1 to identify any possible items (violations, LERS, URIs, IFIs) which would require further review prior to the restart of Unit 1. The existing Item Reporting System (RPS/IP) and other databases were compared against open item reviews documented in NRC inspection reports issued since 1984. The purpose for this review was to identify NRC open and closed items which need to be addressed prior to Unit 1 restart. As the result of this review, 28 open items were identified which require further review. These NRC open items, along with previously identified generic issues (NRC bulletins, generic letters, TMI action items), will require additional NRC review prior to the restart of Unit 1 and have been incorporated into the Unit 1 Recovery Inspection Plan as described in MC 2509.

IV. Plant Support**R1 Radiological Protection and Chemistry Controls****R1.1 External Occupational Exposure Control and Personal Dosimetry****a. Inspection Scope (IP 83724, 83725, 83728)**

Licensee activities for controlling worker access to radiologically-significant areas and tasks associated with the Unit 1 (U1) recovery activities were evaluated. In addition, "As Low As Reasonably Achievable" (ALARA) program guidance and its implementation for ongoing U1 recovery activities were evaluated. Radiation protection program guidance and implementation were evaluated against Title 10 Code of Federal Regulations (10 CFR) 19.12; 10 CFR 20, Subparts B, C, F, G, H, and J; Technical Specification (TS) Section 5.4, Procedures; and approved licensee procedures.

b. Observations and Findings

The inspectors directly observed implementation of administrative and physical access controls; appraised radiation worker and health physics technician (HPT) knowledge and proficiency in implementing radiation protection activities; and assessed procedural guidance for the control of access to radiologically-significant areas.

The inspectors discussed and assessed procedure and administrative guidance documents for posting areas and labeling containers, airborne radioactivity control, special radiological controls, development and use of Radiation Work Permits (RWPs), issuance of dosimetry, and contamination control. During facility tours, the inspectors directly observed the posting of areas and labeling of containers in the U1 drywell and reactor building. Area postings and controls were evaluated for consistency with regulatory requirements and procedural guidance. Independent dose rate measurements were conducted by the inspectors during the drywell tour.

The inspectors evaluated implementation and effectiveness of licensee internal exposure controls. Job task radiation controls, including ventilation engineering controls, established for safe-end welding were observed. Work-side air sample and alpha contamination analysis and evaluations were reviewed and discussed in detail for the observed tasks. Personnel Contamination Event (PCE) reports and Internal wholebody dose assessments for workers associated with the U1 recovery work activities were reviewed and independently evaluated.

Licensee corrective action program Problem Evaluation Reports (PERs) associated with access controls were reviewed. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with licensee procedure Standard Programs and Processes (SPP) SPP 3.1, Corrective Action Program, Revision (Rev.) 4. Licensee documents reviewed and evaluated in detail during inspection of this program area are identified in the report Attachment.

Development of dose expenditure goals for selected recovery tasks were reviewed and discussed with site management. The inspectors reviewed applicable ALARA Plans; Audit/Assessments Report No. SSA 0302, Health Physics Self-Assessments; and ALARA Planning Work Sheets.

The inspectors reviewed and discussed dose rate and cumulative dose expenditure data trends associated with selected systems, equipment, and tasks. For selected recovery activities, the inspectors compared current dose rate and dose expenditure results with data used in planning estimates. The inspectors evaluated selected data associated with dose reduction initiatives including U1 temporary shielding for safe end welding, temporary shielding, and cobalt reduction initiatives for valve replacements. During drywell tours the inspectors observed the welding and work on the H, G, F, and N2 nozzles on the 593-foot elevation.

Work knowledge of ALARA guidance and effectiveness of program implementation were evaluated through observation of selected work activities. In addition, program effectiveness was evaluated through comparison of estimated and current dose expenditure data for selected tasks, and discussions of selected outage tasks with responsible supervisors and managers.

Licensee PER documents associated with dose reduction initiatives and ALARA activities were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with SPP 3.1, Corrective Action Program, Rev. 4. Specific documents reviewed and evaluated are listed in the report Attachment.

c. Conclusions

Radiological facility conditions and housekeeping in health physics facilities, reactor building, drywell, and refueling floor were observed to be good. Material was labeled appropriately, and areas were properly posted. Personnel dosimetry devices were appropriately worn. Radiation work activities were appropriately planned. Radiation worker doses were being maintained well below regulatory limits and the licensee was maintaining exposures ALARA. Contamination control was effective.

V. Management Meetings

X1 Exit Meeting Summary

On October 27, 2003, the resident inspectors presented the inspection results to Mr. John Rupert and other members of his staff, who acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

R. Acree, Welding Services Inc. (WSI) QC Supervisor
T. Abney, Nuclear Site Licensing & Industry Affairs Manager
J. Corey, U1 Radiological and Chemistry Control Manager
W. Crouch, Mechanical/Nuclear Codes Engineering Manager, Unit 1
R. Cutsinger, Civil/Structural Engineering Manager, Unit 1
B. Ditzler, WSI Site Services Manager
R. Drake, Maintenance and Modifications Manager, Unit 1
B. Hargrove, U1 Radcon Manager
R. Jones, Plant Recovery Manager, Unit 1
J. Ownby, Project Support Manager, Unit 1
J. Rupert, Vice President, Unit 1 Restart
J. Schlessel, Maintenance Manager, Unit 1
J. Symonds, Modifications Manager, Unit 1
S. Tanner, Nuclear Assurance Manager, Unit 1
J. Valente, Engineering Manager, Unit 1
T. Wiggins, WSI Manager

INSPECTION PROCEDURES USED

IP 37550	Engineering
IP 49001	Erosion/Corrosion Program
IP 55050	Nuclear Welding General Inspection Procedure
IP 57050	Visual Testing Examination
IP 57060	Liquid Penetrant Testing Examination
IP 57080	Ultrasonic Testing Examination
IP 62002	Inspection of Structures, Passive Components, and Civil Engineering Features at Nuclear Power Plants
IP 70370	Piping Supports
IP 71111.08G	Inservice Inspection Activities
IP 71111.17A	Permanent Plant Modifications
IP 71111.23	Temporary Plant Modifications
IP 71152	Identification and Resolution of Problems
IP 73051	Inservice Inspection Program
IP 83724	External Occupational Exposure Control and Personal Dosimetry
IP 83725	Internal Exposure Control and Assessment
IP 83728	Maintaining Occupational Exposure ALARA
IP 92701	Followup

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

50-259/2003-010-01	NCV	Failure to Accurately Measure Welds During Walkdowns (Section E1.4)
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Closed

50-259/2003-009-01	URI	Inconsistency for Measurement of Welds in Pipe Supports WDP-BFN-1-CEB-003-01-02-SK-1 and -3 (Sections E1.4 and E8.1)
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50-259/88-02-02	IFI	Large Number of TACFs Still Outstanding (Section E8.2)
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50-259/89-35-01	IFI	Flexibility of Reactor Water Level Sensing Lines (Section E8.3)
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50-259/85-41-01	VIO	Inadequate Design Control for Safety-Related Cable Tray Supports (Section E8.4)
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50-259/85-51-01	IFI	Inspection of Existing Cable Tray Support Systems (Section E8.5)
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Discussed

None

LIST OF DOCUMENTS REVIEWED

Section E1.1: Seismic Cable Tray and Conduit Supports

Procedures, Instructions, and Guidance Documents

TVA Browns Ferry Unit 1 Regulatory Framework Letters dated December 13, 2002 and February 28, 2003

NUREG 1232 Vol. 3, Safety Evaluation Report (SER) on Tennessee Valley Authority: Browns Ferry Nuclear Performance Plan; Browns Ferry Unit 2 Restart, April 1989

NUREG 1232 Vol. 3, Supplement 1, SER, Browns Ferry Unit 2 Restart, October 1989

NUREG 1232 Vol. 3, Supplement 2, SER, Browns Ferry Unit 2 Restart, January 1991

Electrical Power Research Institute (EPRI) NP-5228-SL, Revision 1, Volume 1, Research Project 2925-1, Final Report, June 1991, Seismic Verification of Nuclear Plant Equipment Anchorage (Revision 1), Volume 1: Development of Anchorage Guidelines

EPRI NP-7150-D, Research Project SQ01-1, Final Report, March 1991, The Performance of Electrical Raceway Systems (Cable Trays and Conduit) in 14 Past Strong-Motion Earthquakes, Ranging in Richter Magnitude up to 8.1

EPRI NP-7151-D, Research Project SQ01-1, Final Report March 1991, Cable Tray and Conduit System Seismic Evaluation Guidelines

EPRI NP-7152-D, Research Project SQ01-1, Final Report, March 1991, Seismic Evaluation of Rod Hanger Supports for Electrical Raceway Systems

EPRI NP-7153-D, Research Project SQ01-1, Final Report, March 1991, Longitudinal Load Resistance in Seismic Experience Database Raceway Systems

Review Procedure to Assess Seismic Ruggedness of Cantilever Bracket Cable Tray Supports, Revision 3.0, March 1, 1991

Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment, Revision 2A, March 1993

Walkdown Instruction (WI)-BFN-0-CEB-04, Revision 0, Seismic Verification Walkdown Instruction for USI A-46 and IPEEE Programs

Records, Worksheets, and Data

Calculation CD-Q0000-931227, Revision 6, Qualification of Cable Tray and Conduit Systems by A-46 Program, Unit 0

Calculation CD-Q0000-940339, Calculation of Basic Parameters for A-46 and Individual Plant Examination of External Events (IPEEE) Seismic Program

Calculation CD-Q0999-940356, Revision 0, Concrete Anchors for USI A-46 and IPEEE Review

Calculation CDQ1 000 2003 2203, Revision 0, USI A-46 Seismic Verification of Cable Tray and Conduit Raceway Systems

Calculation CD-Q2999-940343, Revision 2, Qualification of Cable Tray and Conduit Systems by A-46 Program, Unit 2

Drawing 0-45N830-17, Revision 0, Conduit & Grounding Cable Trays Details - Sheet 4

Raceway Walkdown Data Package BFN1-CEB-RCWY-DW

Raceway Walkdown Data Package BFN1-CEB-RCWY-639

Raceway Walkdown Data Package BFN1-CEB-RCWY-621
 Raceway Walkdown Data Package BFN1-CEB-RCWY-593
 Raceway Walkdown Data Package BFN1-CEB-RCWY-565
 Raceway Walkdown Data Package BFN1-CEB-RCWY-519

Section E1.2: Permanent Plant Modifications

Modification Packages

DCN 51227, Reactor Building Cable Trays

Section E1.3: Long Term Torus Integrity Program

Procedures and Standards

Browns Ferry Unit 1 Restart Nuclear Assurance Verification and Oversight Plan, Rev. 0
 TVA procedure WI-BFN-0-CEB-01, Walkdown Instructions for Piping and Pipe Supports, Rev. 1
 TVA procedure WI-BFN-0-CEB-02, Walkdown Instruction for Seismic Issues (Civil), Rev. 0

Other Documents

TVA Browns Ferry Unit 1 Regulatory Framework Letters dated December 13, 2002 and February 28, 2003
 NUREG 1232 Vol. 3, SER, Browns Ferry Unit 2 restart, April 1989
 NUREG 1232 Vol. 3, Supplement 1, SER, Browns Ferry Unit 2 Restart, October 1989
 NUREG 1232 Vol. 3, Supplement 2, SER, Browns Ferry Unit 2 Restart, January 1991
 Drawing No. WD-1-48W1248-3-TRG-03, Rev. 0, Miscellaneous Steel Torus Ring Girder External, Detail L3
 Walkdown Package WDP-BFN-1-CEB-303-02-TRG-03, Miscellaneous Steel Torus Girder External, Page 14
 Drawing No. WD-1-48W1248-3-TRG-11, Rev. 0, Miscellaneous Steel Torus Ring Girder External, Details J3 and N3
 Walkdown Package WDP-BFN-1-CEB-303-02-TRG-11, Miscellaneous Steel Torus Girder External, Page 16
 Walkdown Sketch No. WDP-BFN-1-CEB-303-03-TOR-24, Mechanical Pressure Suppression Chamber Internal Modifications, Pages 7 to 11
 Walkdown Sketch No. WDP-BFN-1-CEB-303-03-TOR-28, Miscellaneous Steel Torus Walkway & Access Platforms - EL. 540'-5 1/2", Pages 7 to 11
 Walkdown Sketch No. WDP-BFN-1-CEB-001-02-03-SK-1, SRV Line Tailpipe
 Walkdown Sketch No. WDP-BFN-1-CEB-001-02-03-SK-7, T-Quenchers
 Walkdown Drawing No. WDP-BFN-1-CEB-064-03-02, Page 16 of 37, Support No. R-16
 Walkdown Drawing No. WDP-BFN-1-CEB-064-03-02, Page 10 & 11 of 37, Support No. R-17
 Walkdown Drawing No. WDP-BFN-1-CEB-064-03-02, Page 13 of 37, Support No. R-18
 Problem Evaluation Report (PER) Nos. 03-015390-000, 03-015457-000, 03-015458-000, and 03-015570-000

Section E1.4: Large Bore Piping and Supports Program

Procedures and Standards

Browns Ferry Unit 1 Restart Nuclear Assurance Verification and Oversight Plan, Rev. 0
TVA Procedure No. WI-BFN-0-CEB-01, Rev. 1, Walkdown Instructions for Piping and Pipe Supports

Other Documents

TVA Browns Ferry Unit 1 Regulatory Framework Letters dated December 13, 2002 and February 28, 2003
NUREG 1232 Vol. 3, SER, Browns Ferry Unit 2 restart, April 1989
NUREG 1232 Vol. 3, Supplement 1, SER, Browns Ferry Unit 2 Restart, October 1989
NUREG 1232 Vol. 3, Supplement 2, SER, Browns Ferry Unit 2 Restart, January 1991
IE Bulletin 79-02, Pipe Support Base Plate Designs Using Concrete Expansion Anchors
IE Bulletin 79-14, Seismic Analysis for As-Built Safety-Related Piping
Problem Evaluation Report (PER) Nos. 03-010789-000 and 03-015567-000
Walkdown Package (WDP) No. WDP-BFN-1-CEB-003-01-02, Rev. 1,
WDP No. WDP-BFN-1-CEB-003-01-02-SK1(Formerly Support FW-H4), Problem No.
NI-103-IRA (Marked Reverification Drawings Walkdown Performed by New Walkdown and QC for PER 03-010789-000)
WDP No. WDP-BFN-1-CEB-003-01-02-SK3 (Formerly Support FW-H2), Problem No.
NI-103-IRA (Marked Reverification Drawings Walkdown Performed by New Walkdown and QC for PER 03-010789-000)

Section E1.5 Intergranular Stress Corrosion Cracking (IGSCC) - Welding of Replacement of Reactor Vessel Safe Ends

Procedures and Standards

WSI QAP 2.1, Selection, Training, Qualification and Certification of Quality Control Inspection and Test Personnel to ANSI N45.2.6 and ANSI/ASME NQA-1, Revision 9
WSI Instruction WSI-BF-20.0, Procedure for RECIRC Inlet Safe End Replacement, Revision 1
WPS 08-08-T-060, Revision 1, including applicable PQRs

Other Documents

DCN 51045A, U1 Recovery Drywell mechanical Lead System C68
Work Order (WO) 02-010314-007, RPV RECIRC Inlet Safe Ends Loop B Nozzles N2A, N2B, N2C, N2D, and N2E
Sample of WSI Welder Qualification Records
Certified Material Test Reports for two heats/lots of welding material
Receiving Inspection Report and Certified Material Test Report for 7 N2 Nozzle Safe Ends, SA 182, F316NG, Heat 2857ANE2
WSI Certificate of Qualification Records for 4 Welding and NDE Inspectors
WSI Nonconformance Report 03-031, lack of inspection signature entries on weld data sheets for N2D safe end
WSI Letter 32182-11, September 23, 2003, Actions to address Stop Work Issues

Problem Evaluation Reports (PERs)

03-014354-000, Light buffing scratches on N1A and N1B safe ends which did not conform to machine surface finish requirements
 03-014624-000, Final PT examination for nozzle N1B revealed 2 rejectable indications
 03-014627-000, ASME III NB-5140 for visual and penetrant inspections of accessible pipe weld surfaces
 03-015235-000, Untimely initiation of RER 03-014627-000
 03-015258-000, Machining depth for N2C safe end not properly calculated
 03-015322-000, Machining chips lost into N2C safe end nozzle annulus
 03-015379-000, RT of N1A and N1B safe ends weld performed with film side penetrameters in lieu of source side penetrameters
 03-016612-000, During cutting process for N5A safe end thermal sleeve was scored
 03-016934-000, RT of N2A safe end final weld indicated foreign material
 03-017186-000, WSI machinist supervisor physically performed as found cleanliness inspection
 03-017189-000, ER308L filler material used in error for N2D safe end purge port weld
 03-017283-000, N2E safe end final weld RT indicated foreign material
 03-017366-000, Weld data sheet for N2A safe end weld listed incorrect data
 03-017368-000, Error on weld data sheet for N2A safe end weld
 03-017371-000, Data on weld data sheet for N2D safe end weld had not been recorded
 03-017378-000, Welder qualification continuity exceeds 6 months by 1 day

Section E1.6: Inspections of Cables Subject to Harsh EnvironmentProcedures and Standards

SPP-6.1, Work Order Process Initiation, Rev 3
 SPP-7.1, Work Control Process, Rev 4
 0-TI-367, BFN Dual Unit Maintenance, Rev 8

Other Documents

Risk assessments for cable inspections (various)

Section E7.1: Licensee QA Oversight ActivitiesAudits, NA Assessments, NA Observations, Self-Assessments, and Problem Evaluation Reports (PERs)

Assessment NA-BF-02-007, Restart Walkdown Program
 Bechtel Quality Assessment for Field Walkdowns, May 30, 2002
 Bechtel Quality Assessment for Field Walkdowns, November 14, 2002
 Bechtel Quality Assessment for Field Walkdowns, March 31, 2003
 Selected NA observation reports on field walkdowns

Section R1: Radiological Protection

Procedures, Instructions, and Guidance Documents

Radiological Control Instruction (RCI) RCI 1.1 Radiological Control Instruction, Revision (Rev.) 101
 Standard Programs and Processes (SPP) SPP-5.1 Radiological Controls, Rev. 4
 RCI 8.1 Internal Dosimetry Program Implementation, Rev. 32
 Radiological Control Dosimetry Program (RCDP) RCDP-7 Bioassay and Internal Dose Program Rev. 0

Radiation Work Permit (RWP) Documents

Unit 1 Number (#) 03110000 Unit 1 Drywell Areas All Elevations
 Unit 1 #03000100 Unit 1 All Buildings All Elevations
 Unit 1 #03111052 Unit 1 RXB Engineering Walkdowns and Inspections
 Unit 1 #03111101 Unit 1 Recovery-Operations Inspections Valve Operations and Surveillance
 Unit 1 #03111110 Unit 1 Radcon Inspections, Routines and Support Activities
 Unit 1 #03111290 Unit 1 Drywell Decon, Clean-up and Housekeeping
 Unit 1 #03111832 Unit 1 Drywell 584 foot (') N2 Safe-end Replacement and Associated Work
 Unit 1 #03111842 Unit 1 Drywell Core Spray Replacement (N5) Replacement and Associated Work

Records, Worksheets, and Data

Survey # 090203-8 Unit 1 Drywell 550 foot (') Elevation
 Survey # 082503-9 Unit 1 Drywell 563' Elevation
 Survey # 082503-6 Unit 1 Drywell Access Room 565 'Elevation
 Survey # 082603-3 Unit 1 Drywell 584 ' Elevation
 Survey # 082303-3 Unit 1 Drywell 604 ' Elevation
 Survey # 082303-2 Unit 1 Drywell 616 'Elevation
 Survey # 082303-1 Unit 1 Drywell 628 ' Elevation
 BFN Report by Audit/Assessment Report No. SSA0302
 BFN NA Observation ID: 29174 Follow up on Radcon Dose Rate Goals
 BFN NA Observation ID: 29089 ALARA Planning
 Airborne Radiation Surveys 0320248;0320253;0320257;0320268;0320271;0320274
 ALARA Planning Report 03-1001 Unit 1 Radcon Surveys, Inspections and Support Activities
 ALARA Planning Report 03-1002 Unit 1 Engineering Design/Walkdowns
 ALARA Planning Report 03-1003 Unit 1 Remove, Replace and Modify Drywell Steel
 ALARA Planning Report 03-1005 Unit 1 Drywell Decon, Clean-up and HouseKeeping Support Activities
 ALARA Planning Report 03-1006 Unit 1 RWCU Demolition
 ALARA Planning Report 03-1013 Unit 1 Safe-End Replacement
 ALARA Planning Report 03-1018 Unit 1 Operations Inspections, Valve Operations and Surveillances
 Project Engineering Specification N1M-007 Cobalt Reduction, Reference: R14940118201

Corrective Action Program Documents

PER 03-016104-00 Employee Entered Drywell on Wrong RWP

PER 03-016530-00 Wrong Dressout Requirements

PER 03-016528-00 Improper Hood Adjustment with Contaminated Gloves

PER 03-016526-00 Improper Shoe Removal at 639 ' Elevation Clean Island

PER 03-015930-00 Employee Signed on to Wrong RWP

PER 03-014552-000, Recovery Program Had Not Sufficiently Covered Reduction in Stellite

PCE 20030171 Facial Contamination

PCE 20030165 Wholebody Dose Assessment