



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

Report Nos.: 50-259/92-12, 50-260/92-12, and 50-296/92-12

Licensee: Tennessee Valley Authority
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 1101 Market Street
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Docket Nos.: 50-259, 50-260, and 50-296

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

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

Inspection at Browns Ferry Site near Decatur, Alabama

Inspection Conducted: March 16 - March 27, 1992

Inspectors: *C. A. Patterson* *for* 4/15/92
 C. A. Patterson, Senior Resident Inspector Date Signed

E. Christnot *for* 4/15/92
 E. Christnot, Resident Inspector Date Signed

Approved by: *Paul J. Kellogg* 4/17/92
 Paul J. Kellogg, Chief, Date Signed
 Reactor Projects, Section 4A
 Division of Reactor Projects

SUMMARY

Scope: This special resident inspection included a review of contractor activities associated with the 4160 volt loop upgrade. The licensee incident investigation report, advance authorized forms, drawing updates, design change closure, and previous enforcement actions were reviewed.

Results:

One violation with two examples for failure to control design activities was identified, paragraph four. The first example was that a construction contractor signed for design engineering on several design documents without proper authorization. The second example was that a primary drawing was not updated for four months after modifications had been installed and the system returned to service.

Weaknesses were identified in the licensee's incident investigation of event, paragraph five. The root cause was incorrect. Procedures are in place to control update of drawings. Organization interfaces between Unit 2 and Unit 3 were questioned by the Operational Readiness Team Inspection. The licensee established controls prior to restart of Unit 2.

Continuing problems have occurred with contractor controls, paragraph nine. This includes removal of fire wrap, boot incident, telecommunication contractors, access control, and Bechtel stop work.

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

*Attended exit interview

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

2. Statement of Problem

During routine plant meetings, the inspector became aware of the delays associated with completing Incident Investigation (II) II-B-92-006, Primary Drawing Configuration Discrepancies Discovered During Restoration of 4160 Loop Line. Also, another II concerning SWEC doing unauthorized design work for a TACF associated with temporary power from the 4160 Loop Line

had recently been completed. After careful review of the II-B-92-006, the inspector concluded the root cause and root cause statement were incorrect. The II was defensive, contained inaccurate statements, and only addressed the specific event.

Further review revealed that three IIs, 4 DCNs, 1 ECN, 1 FDCN, 1 TACF, and 1 primary drawing were involved in the configuration control problem. This represented a significant breakdown in design control. The unit had been shutdown for several years to reestablish the design baseline and regain configuration control. Procedures were in place to close designs and update the drawings necessary to restore Unit 2 to operation.

The three IIs involved are as follows:

II-B-91-160	Inadequate Control of Contractor and Sub Contractor Work Activities on Communication and Telephone Equipment
II-B-91-168	Unit 3 Temporary Power Alteration Control Form Approval
II-B-92-006	Primary Drawing Configuration Discrepancies Discovered During Restoration of 4160 V Loop Line.

3. Description of the Event

May 8, 1986

ECN P5235 was issued for the design of a new 4KV Loop Line. This design interfaces with the 4KV Cooling Tower Switchgear C and D. WP No. 0009-86, which was written for the ECN, closed on May 27, 1988, modifying only Switchgear D. When the drawings were updated, primary drawing 35W713-2 was "as-constructed" to reflect both Switchgear C and D being complete, which was the "as-designed" condition, not the "as-constructed" configuration. Therefore, the configuration of the new 4KV Loop Line was incorrectly depicted on the "as-constructed" drawing prior to Unit 2 restart.



- Prior to January 13, 1992 Four other DCNs (W9277A, W9278A, W16713A, and W16836A) had been issued and partially or totally implemented. None of the DCNs had been closed and associated drawings had not been updated.
- January 13, 1992 A storm knocked out the Athens 161 KV line tripping power to the 4160 Loop Line. During restoration, Operations personnel discovered discrepancies between primary drawing 0-35E713-2 RC, the single-line wiring diagram of the loop line, and the actual field configuration.
- January 14, 1992 Complete restoration of the line.
- January 15, 1992 Site Engineering issued drawing 0-35E713-2 R000 to supersede as-constructed drawing 0-35E713-2 RC and added the four DCNs.
- | | |
|------------|---|
| DCN W16713 | 4KV North Loop for Outage Contractor Facility and Contractor Specialty Trailers |
| DCN W16836 | 4KV South Loop for Unit 3 Change Houses and Restrooms |
| DCN W9277 | 4KV Cooling Tower Switchgear C Loop for the Nuclear Telecommunications System Project Node 2 Building |
| DCN W9278 | 4KV Loop for the Telecommunications and Computer Center Building |
- January 17, 1992 TACF 3-91-004-100 R4 issued for drawing No. 0-35E-713-1 R001 to relocate S4 substation, correct switch positions, add ground and minor revisions, add temporary power for Unit 3 reactor building.

The problems associated with the TACF were addressed in II-B-91-168.

The problems associated with the control of subcontractors in DCN W9277 and W9278 were addressed in II-B-91-160. Violation 91-42-02 was issued for not following a site procedure for control of contractors.

The total configuration problem is addressed in II-B-92-006.

4. Problems with Design Control (37700, 37702)

Two problems occurred with the 4160 volt loop upgrade. First, SWEC performed the design work without adequate authorization from SE. A Unit 3 PM gave verbal authorization to SWEC and followed up with a task description with the FPB out of Knoxville. The FPB tended to act independently from SE even though SE had been given responsibility for the 4160 volt loop line calculation. The FPB was recently dissolved during a corporate reorganization. The Unit 3 PM overlooked the design interfaces. SWEC signed for design engineering on DCN W16836A, on 12 AA forms for F-DCN F16903, on TACF 3-91-004-100, on drawing approval for work orders 91-44565-00 and 91-44565-01 and to a 10 CFR 50.99 safety assessment for a temporary alteration. Site procedure SSP-9.3 (formerly SDSP 8.11), Plant Modifications and Design Control, establishes the controls for design change. This is the first example of VIO 259, 260, 296/92-12-01, Failure to Control Contractor Design Activities.

The second problem was that the primary drawing (control room drawing) was not updated after modifications were completed and the system returned to service. Nuclear Engineering Procedure, BFEP PI 89-06, requires that prior to return to service primary and critical drawings be revised and issued. This is the second example of VIO 259, 260, 296/92-12-01, Failure to Control Contractor Design Activities.

The inspectors noted that the onsite fire protection 1000 KVA bladder tank load (138.8 amps) is powered from the 4160 volt loop. This fact was discussed in NQA&E Audit No. BFA 92204. Also, discussed was that the safety assessment did not address loads listed in FSAR tables. Periodic testing of the outside loop fire pump is covered in Fire Protection Program Plan Procedure, FPP-2. This procedure is identified as a quality related procedure.

5. Review of Incident Investigation Report (II-B-92-006) (40500)

The inspector reviewed the II and noted several items that were not adequately assessed.

a. Root Cause Incorrect

The root cause and root cause statement were incorrect. The root cause stated the DCN process does not specify a timeframe for updating primary/critical drawings after work completion/appropriate testing or overall accountability for processing the DCN through RTD.



These requirements are in SSP-9.3 (formerly SDSP 8.11), Plant Modifications and Design Change Control; and SSP-2.11, Drawing Deviation Control. These procedures or earlier versions were used to recover Unit 2 for restart. Also, a previous deviation issued July 13, 1990, was for 260/90-18-02, Failure to Correct Drawing Discrepancies, emphasized the importance of updating drawings. The time limits are clearly discussed in the applicable procedures.

b. Contributing factor statement incorrect

The II stated a contributing factor was that neither the TSD nor applicable procedures established a division of responsibility and appropriate organizational interfaces between SWEC and Bechtel, SE, or RE.

The NRC conducted an ORAT inspection prior to restart of Unit 2. ORAT item 260/91-201-01 was to establish administrative controls delineating responsibilities of communications between Unit 2 and Unit 3 site organizations at management levels.

The licensee issued a memorandum from H.F. McCluskey, V.P. Browns Ferry Restart, and O.J. Zeringue, V.P. Browns Ferry Operations to their respective supervisors dated April 18, 1991, to delineate responsibilities and lines of communication between BFN Operations and BFN Restart Organizations. In addition, SSP-1.51, Unit 1 & 3 Restart Administration and Control was issued May 24, 1991. This procedure defines the Unit 1 & 3 Restart organization principle duties, responsibilities, and authorities, and its interface with the BFN organization.

c. Corrective action statements incorrect

It was stated that a process to verify adequacy of a TSD and the readiness of a contractor to perform work did not exist.

A procedure did exist. This was SDSP-16.17, Contractor and Contractors Equipment Control. This was the subject of a previous violation 50-259, 260, 296/91-41-02.

Also, after violation 91-26-02 concerning removal of fire wrap, steps were taken to control contractor activities. This was establishment of a contractor work release program in August, 1991. Additionally, after a deviation 296/91-41-02 concerning work on a secondary



containment penetration by SWEC personnel not authorized to do the work, retraining of the CWL was performed.

In general, the II imputed the problems on inadequate procedures and situations not covered. The inspector did not agree with this assessment. The assessment was narrow in scope and only addressed the specific event. A negative trend was identified in the quality of Level III incident investigations. Another example of this is contained in IR 92-03 concerning an inadvertent start of the DG. For Level III IIs, the highest level of signature is the Plant Manager.

6. Use of Advanced Authorized FDCNs (37700, 37702)

a. Procedures for AAs

The inspector reviewed the BFN AA-FDCN process. The overall controlling procedure SSP-9.3, Plant Modifications and Design Change Control, Section 3.2, Final Engineering, sub-section 3.2.9, F-DCN Origination stated: During the implementation of a DCN, the implementing organization may identify the need for a revision to the design of the modification that is within the scope of the original design. The F-DCN is intended to fulfill this need.

The Browns Ferry Engineering Projects implementing procedure, BFEP PI 89-06, Design Change Control, Section 1, Purpose stated: This procedure provides the Browns Ferry Engineering Project requirements necessary to implement the design change control process and maintain configuration control. This process will be implemented by the DCN as described herein.

The inspector noted during a review of these procedures that the SSP did discuss AA-FDCNs in section 3.2, Final Engineering, Sub 3.2.9, Step 3.2.9.A.2.d.

It was also noted that the BFEP PI, Section 18 discussed AA-FDCNs and Steps 18.1 through 18.7 stated:

- 18.1 An AA is the approval which allows modification work to proceed on a risk basis prior to final approval of the DCN.
- 18.2 AA to proceed with urgent changes may be allowed when all of the following conditions apply:



- a. The requested change is clearly understood and documented for granting the authorization to perform work.
 - b. The time needed to obtain required NE approvals would cause substantial and unwarranted delay in modification activities.
 - c. The responsible LE reviewing the change can demonstrate to the PE a high degree of confidence that the change as authorized will receive NE final approval.
 - d. Rework or repair can be accomplished without undue impact on cost or schedule in the event that the change is not subsequently approved.
- 18.3 Approval of AA shall be limited to the PE. This authority may be delegated only to the LEs, and those personnel assigned these functions in the absence of these engineers, i.e., second shift and weekend project personnel.
- 18.4 The PE may delegate AA authority to individuals outside NE. This authorization must be documented via a memo.
- 18.5 The originator shall clearly mark the DCN as "Advance Authorization Requested."
- 18.6 An AA is not the ISSUE of a revision level of the DCN, it is a status of a revision prior to issue but shall include an approved 10 CFR 50.59 review to support the authorized change.
- 18.7 The final approval DCN must clearly state that no changes were made from the advance authorized DCN or identify the changes from the advance authorized DCN.

The inspector concluded from this review that FDCNs were to be used to facilitate field work activities and the AA-FDCNs could be used to allow the modifications activities to proceed on a risk basis.

A review of recent design activities, that were completed from May 23, 1991 to present, indicated that the use of AA-FDCNs was in accordance with the design control process. The DCN assignment log indicated that for DCN W17480A, and AA-FDCN number, F17612 was issued in order to revise material. A review of the AA indicated that it was also used to change wiring. An additional review of DCN

W16951A indicated that an AA-FDCN, number F16952A was issued and had two parts. One part was to add a correction to a cable schedule and remove some notes from DCAs. The second part was to add notes to DCAs and a cable schedule. Although this did not result in hardware changes that were detrimental to the affected plant systems, this process of initiating an AA-FDCN for a specific purpose and using it for other purposes is considered a weakness in the process. This item was discussed with TVA Nuclear Engineering Management.

b. PORC Approval of AAs

Additional reviews of the AA-FDCN process indicated that to initiate an AA-FDCN the responsible engineer does not have to obtain PORC approval. This is clearly stated in procedure BFEP PI 89-06, section 18, step 18.1 which indicated that AAs can be used prior to the final approval of the design change.

7. Drawing Updating and DCN Closure (37700, 37702)

The inspector met with the Site Engineering Manager and Technical Support Manager to discuss generic issues with closure of DCN's and DD for Unit 2.

a. Drawing Update

The inspector reviewed procedures SSP 9.3, Plant Modifications and Design Change Control and BFEP PI 89-06, Design Change Control. Both procedures clearly outline the drawing updating requirements. The inspector noted there is no clearly indicated timeframe in which drawings are to be updated. The inspector did note that procedure SSP 9.3, section 3.4, Return to Operation, clearly indicates a verification of primary drawing updates associated with the design change and before returning a system to service.

The inspector reviewed a list of DDs involving secondary drawings and noted that the licensee identified a total of 1269 discrepancies on September 29, 1991. The total number of discrepancies at the end of this inspection was 831. The inspector noted that the discrepancies are being worked by the licensee at the rate of approximately 75 per month. The inspector also reviewed a list of discrepancies involving 28 primary drawings and noted that seven were behind schedule, three were due during this inspection and 18 were being worked. A licensee representative informed the inspector that for DDs discovered



on primary drawings a self imposed 30 day limit was in place. The inspector discussed these reviews with TVA design management.

b. DCN Closure

The inspector reviewed a total of 21 closed DCNs dated from May 23, 1991 to present. The inspector noted that the DCNs involved field work by electrical, mechanical, and civil disciplines and included such items as change the diameter and thickness of flow element 2-FE-2-191, notch a tube steel plate and widen a flange, and install wiring from main relay board panel 32 to turbine trip auxiliary relay 294T. The DCNs reviewed appear to have been closed in accordance with applicable TVA procedures.

The inspector reviewed the licensee closure of DCNs process in previous IR 92-05. The activities were controlled by SSP 9.3, Plant Modifications and Design Change Control, and applicable engineering program instructions. The ongoing observations by the inspector indicated that the licensee continued to follow the process in accordance with the approved procedures.

The inspector concluded that adequate tracking and closure of DCN's and DDs was occurring for Unit 2. No backlog was occurring. Although, the Unit 3 list were not reviewed, the only work thought to be completed and energized was the 4160 volt loop. The other equipment and systems will undergo rigorous review when returned to service.

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

(CLOSED) URI 259, 260, 296/92-03-03, Failure to Update Primary Drawing.

This item was identified when during an audit it was discovered that primary drawing 0-35E713-2 had not been updated as prescribed by procedure. This URI has been upgraded to a violation in this report.

9. Summary

Although the licensee's II on this event was narrow in scope and contained inaccurate statements, followup reviews by the inspectors indicate this problem concerned contractor activities for Unit 3. Unit 2 engineering and technical support are updating primary drawings prior to returning a systems to service and have time limits for resolving drawing discrepancies. The main concern of this event was that a TVA Project Manager exceeded his



authority and authorized SWEC to perform design work without the knowledge of site engineering or restart engineering. SWEC was unfamiliar with the design procedures and requirements. Several problems involving control of contractors have occurred since August 1991. NRC enforcement action has occurred for the following:

VIO 91-26-02	Fire Wrap Removal
DEV 91-41-01	Boot Incident
VIO 91-41-02	Control of Telecommunication Contractor
VIO 91-43-02	Access Control of Contractors

In addition, the licensee's QA finding resulted in a Bechtel Stop Work for DCN issue. A DEV concerning drawing update occurred within the last two years on July 13, 1990, DEV 260/90-18-02.

Although procedures and organization controls were in place, control of contractors continues to be a problem. The actions of the project manager are an indication of weaknesses in the licensee's project supervision of contractor activities. In addition, lessons learned from Unit 2 restart regarding drawing update and DCN closure were not utilized.

10. Exit Interview (30702)

The inspection scope and findings were summarized on March 27, 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 V.P. Browns Ferry Operations commented this system did not undergo a SPOC review. The inspector commented that the onsite diesel driven fire pump and bladder tank was powered from the 4160 volt loop. The V.P. of Browns Ferry Operations stated that the SPOC of fire protection system would be reviewed.

The V.P. Browns Ferry Restart commented that the summary of previous enforcement concerning fire wrap removal was performed by TVA personnel and not contractors although TVA personnel did what Bechtel told them to do.



<u>Item Number</u>	<u>Description and Reference</u>
259, 260, 296/92-12-01	VIO, Failure to Control Contractor Design Activities

Licensee management was informed that 1 URI was closed.

11. Acronyms and Initialisms

AA	Advance Authorization
BFEP	Browns Ferry Engineering Project
BFNP	Browns Ferry Nuclear Plant
CFR	Code of Federal Regulations
DCA	Design Change Authorization
DCN	Design Change Notice
DD	Drawing Discrepancies
DEV	Deviation
DG	Diesel Generator
ECN	Engineering Change Notice
FDCN	Field Design Change Notice
FPB	Facilities Planning Branch
FPP	Fire Protection Program
FSAR	Final Safety Analysis Report
II	Incident Investigation
IR	Inspection Report
KV	Kilovolt
LE	Lead Engineer
NE	Nuclear Engineering
NQA&E	Nuclear Quality Assurance & Engineering
NRC	Nuclear Regulatory Commission
ORAT	Operational Readiness Assessment Team
PE	Project Engineer
PM	Project Manager
PORC	Plant Operations Review Committee
QA	Quality Assurance
QDCN	Quality Design Change Notice
RE	Restart Engineering
SDSP	Site Director Standard Practice
SE	Site Engineering
SPOC	System Pre-Operability Checklist
SSP	Site Standard Practice
SWEC	Stone & Webster Engineering Corporation
TACF	Temporary Alteration Change Form



TSD
TVA
URI
VIO

Task Scoping Document
Tennessee Valley Authority
Unresolved Item
Violation