

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199



Report Nos.: 50-259/94-15, 50-260/94-15, and 50-296/94-15

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 Nuclear Power Station Units 1, 2, and 3

Inspection Conducted: June 13-17, 1994

Inspector:

Rich C. Chou

R. Chou

7/13/94

Date Signed

Approved by:

J. Blake

J. Blake, Chief
Materials and Processes Section
Engineering Branch
Division of Reactor Safety

7/13/94

Date Signed

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of platform steel and large bore pipe support modification in the Unit 3 drywell and previous open items.

Results:

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

One unresolved item was identified for pipe support spring can setting problems in the Long Term Torus Integrity Program (paragraph 4). Three open items were closed (paragraph 3). Despite the minor discrepancies that were found during this inspection, the modification of platform steel and large bore pipe supports, especially the weld quality, had been very well done.

REPORT DETAILS

1. Persons Contacted

- *T. Abncy, Technical Support Manager
- R. Baird, Civil Engineer
- *J. Beasley, Assessment Manager
- *R. Cutsinger, Lead Civil Engineer
- J. Davenport, Licensing Engineer
- *E. Hollins, Milestone Manager/Recovery
- *R. Jansen, Principal Civil Engineer
- *R. Jones, Operation Superintendent
- *J. Maddox, Maintenance and Modification Manager
- *L. Madison, Civil Engineer /Recovery
- *J. Rupert, Engineering Manager
- *P. Salas, Licensing Manager
- *A. Sorell, Acting Plant Manager
- *D. Stosov, Recovery Manager
- *J. Valente, Unit 3 Recovery Engineer
- *R. Wells, Compliance Licensing Manager

Other licensee employees contacted during this inspection included craftsmen, engineers, mechanics, technicians, and administrative personnel.

NRC Resident Inspectors

- *C. Patterson, Senior Resident Inspector
- *L. Wert, Senior Resident Inspector
- *R. Musser, Resident Inspector
- *A. Schnebli, Resident Inspector

2. Platform Steel and Large Bore Supports in Drywell (70370 and 50090)

The Unit 3 lower drywell floor framing inspected consisted of torus-shaped steel platform structures with radial beams extending out from the reactor shield wall to the drywell wall at elevation 563'-2" & 584'-11" (top of platform steel members is 1½" lower). The radial beams support tangential beams in the circumferential direction and bracing beams in the diagonal direction. Each floor segment between two consecutive radial beams is called a pie and is designated by the azimuth values enclosing it.

The segments randomly selected for inspection, for both elevations, were between azimuths 189° and 212°. Design Change Notice (DCN) No. W17536A and W17538A were issued for the modification of platform steel at Elevation 563'-2" and 584'-11" respectively.

The modifications to the platform steel members and connections were inspected. The elements inspected included new cover plates for steel member reinforcement; torsional stops to prevent the member rotation due to the torsional forces; stiffener plates to reinforce members or connections; weld sizes and symbols; weld quality; plate sizes; bolt sizes; bill of materials; etc. The inspection was completed with the



assistance of the licensee's engineers and Quality Control (QC) inspectors. The inspection was to check the installed modifications against the requirements of the detail drawings such as DCN, F-DCN, etc. which had been accepted by the licensee's QC inspectors. Table 1 lists members and connections inspected, drawings used, and discrepancies found by the inspector.

The inspector also performed inspections of modifications on large bore supports which were located in the area of the platform steel inspected. The inspector randomly selected 24 pipe supports in various systems for walkdown inspection. The inspection was completed with assistance from licensee engineers and a quality control inspector. The supports were partially inspected against detail drawings or sketches for configuration, identification, fasteners, member size, weld sizes, component identification numbers, component sizes and settings, dimensions, oxidation accumulation, maintenance and damage protection. The supports inspected are listed in Table 2. Minor discrepancies found by the inspector and remedies taken by the licensee are also listed in Table 2.

Overall, the modification on the platform steel and large bore supports performed by the licensee was in satisfactory condition and acceptable despite some minor discrepancies found by the inspector. The weld quality has been improved significantly by licensee. No violations or deviations were identified.

TABLE 1

PLATFORM STEEL MEMBERS AND CONNECTIONS INSPECTED

Platform Elevation	Members or Connections Inspected	Drawing No.	Discrepancies / Licensee Remedies
563' - 2"	Details 6, 7, 13, 14, 18, 19, 20, 125 to 128, 139 and Section D-D, E-E, and N-N	W 17536-015, 016, 027, 028, 034, 036, 038, 043, 044, 124, 145 to 148 and 153	Drawing W 17536-043 for Detail 18 showed four required of item No. 1; two were installed in the field. The licensee issued DCN No. A 30634A to revise drawing.
584' - 11"	Details 29, 36, 47, 48, 49, 54, 57, 59, 60, 62, 63, and 287	W 17536-024, 067, 075, 089, 091, 093, 096, 098, and 100	



TABLE 2

LARGE BORE SUPPORTS INSPECTED

<u>Item No.</u>	<u>Support No.</u>	<u>Rev. No.</u>	<u>Platform Elevation</u>	<u>Discrepancies/Licensee's Remedies</u>
1	3-47B400-76	1	563' - 2"	
2	3-47B400-99	0	584' - 11"	
3	3-47B400-211	0	563' - 2"	
4	3-47B400-212	1	563' - 2"	
5	3-47B400-218	0	563' - 2"	
6	3-47B400-229	0	563' - 2"	
7	3-47B401-41	1	563' - 2"	One jam nut on snubber was loose. Four nuts on pipe clamps had no locking devices. The licensee issued work request W.R. No. C-224133 to fix them.
8	3-47B401-42	0	563' - 2"	
9	3-47B401-51	0	563' - 2"	Four nuts on pipe clamps had no locking devices, The licensee issued W.R. NO.-224132 to provide the locking devices.
10	3-47B401-52	0	563' - 2"	One jam nut on snubber was loose. One nut on a pipe clamp had no locking device. The licensee issued W.R. No.C-224131 to fix them
11	3-47B401-53	0	563' - 2"	
12	3-47B415-67	1	584' - 11"	



<u>Item No.</u>	<u>Support No.</u>	<u>Rev. No.</u>	<u>Platform Elevation</u>	<u>Discrepancies/Licensee's Remedies</u>
13	3-47B456-630	1	584' - 11"	The field welds between tube steel, TS 3x3, and wide flange, W6, were welded all-around. The drawing showed the required weld to be two sides only. The licensee issued Problem Evaluation Report BFER 940238 to investigate the root cause and to revise the drawing and calculations.
14	3-47B456-635	1	563' - 2"	
15	3-47B456-649	1	563' - 2"	
16	3-47B464-420	1	549' - 11"	
17	3-47B464-430	0	563' - 2"	
18	3-47B464-438	1	563' - 2"	
19	3-47B464-445	1	549' - 11"	
20	3-47B464-446	1	563' - 2"	
21	3-47B464-455	1	549' - 11"	
22	3-47B464-498	0	563' - 2"	
23	3-47B464-507	0	549' - 11"	
24	3-47B465-431	2	563' - 2"	The load scale plate for the spring can setting was broken and half torn off. The setting cannot be performed based on the broken scale. The licensee will correct this problem.



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

a. (Closed) Inspector Followup Item (IFI) 50-259,260,296/92-32-01
Design Problems in Spring Supports

This inspector followup item was concerned with the fact that there are two different design criteria for Browns Ferry piping systems; the torus piping system was not included in the IEB 79-14 program; the licensee uses a large range for cold-load setting of spring hangers in torus piping systems; and there were two cold loads calculated for Recirculation System (System 068) instead of one cold load.

The inspector discussed the concerns with the licensee engineers and reviewed the information provided. Design Criteria BFN-50-C-7100 was established first for the torus piping system. This criteria involved the large forces in the torus during pool swelling, and used American Society of Mechanical Engineers (ASME) Code requirements. Design Criteria BFN-50-C-7107 was established later for the IEB 79-14 reconciliation program and is based on American National Standard Institute (ANSI) B31.1 Code. The licensee plans to maintain the two different design criteria since they provide guidance for different piping concerns and there are two different codes involved.

The torus piping systems were included in IEB 79-14 walkdown, but Design Criteria BFN-50-C-7100 was used for the re-analysis.

The licensee still plans to use a large range for the cold-load setting of spring hangers in torus piping system designs, because they believe that auxiliary systems or branches might have problems if the spring cans were reset to a narrow range. The licensee plans to review this issue of cold load settings because three spring hanger settings were found to be out of range during an Inservice Inspection (ISI) on June 14, 1994. The referenced documents for the ISI setting problems were Technical Operability Evaluation No. 2-94-073-9010, Rev. 0 and Problem Evaluation Report (PER) No. BFPER 940240, Rev. 0.

The question about the use of large range spring hanger cold load setting will be pursued as a part of new Unresolved Item 50-259, 260, 296/94-15-01 (Paragraph 4).

After the inspector identified the two cold loads calculated by the licensee engineers on System 068, the licensee expanded the investigation extent and found the following systems to have two cold loads problems: Unit 3 Recirculation System (068); Unit 3 Reactor Water Clean Up (RWCU) System (069,) large bore piping; N1-210-2R Problems and the Unit 2 RWCU large bore piping. The licensee revised 11 pipe stress calculations and 60 pipe support calculations; all stress calculations for these systems were originally performed by General Electric Company.

Based on the licensee actions taken, this IFI is considered closed.



b. (Closed) Violation 50-259, 260, 296/93-26-02, Failure of Updating the Pipe Support Calculations for the New Stress Loads

This violation concerned the fact that pipe support calculation number CD-Q2074-894005 was not updated and revised to qualify a new load increase. The inspector discussed the violation with the licensee engineers and reviewed the response, BFPER 930088, and samples of revised pipe stress and pipe support calculations.

The licensee's corrective action was to execute a sampling program to look at 64 pipe support calculations revised due to the F-DCN process in Unit 2 and found two additional cases. The sample was then expanded to include all support calculations in the 79-14 and Long Term Torus Integrity Program (LTTIP), where the stress calculations were revised with support load changes due to F-DCNS. The licensee reviewed 179 pipe stress calculations and identified 152 pipe supports with F-DCN related support load increases. From a review of the 152 pipe support calculations, 15 more instances were found where the pipe support calculations did not reflect the current, larger loads for the pipe stress calculations. Four pipe stress calculations were also identified to be required for updating.

The licensee has revised all deficient pipe stress and support calculations. The inspector randomly selected four pipe support calculations and one stress calculation for review on the new load increases; all were acceptable.

In addition, the licensee expanded the sample to review 64 pipe support calculations with load increases not related to F-DCNS. The licensee also reviewed 40 stress calculations and 70 pipe support calculations in Unit 3 79-14 and LTTI Systems, per Bechtel to TVA letter BFT 3-94/00/96, dated May 16, 1994. No deficiencies were found in those calculations.

Based on the licensee corrective actions taken, this item is considered closed.

c. (Closed) IFI 50-296/93-29-01, Review of Bechtel's EER Process

This item concerned the process for Error Evaluation Report (EER) initiation contained in Bechtel Engineering Department Procedure Instruction EDPI-4.65.01, and the fact that EER's had apparently not been used properly. The inspector concluded that there was a deficiency in the EDPI-4.65.01 procedure since the employee or originator needed to convince the group supervisor of the problem in order to have the EER even generated and get a tracking number.

The licensee Quality Assurance (QA) Department performed a review of Bechtel EER process and its impact. Assessment Reports, QA Assessment NA-BF-93-145 and Assessment No. NA-BF-94-0036, QA Assessment NA-BF-93-145 Followup, were generated for review.

NA-BF-93-145 Assessment included:

- Evaluation of TVA procedures Corrective Action Program (CAP) and Bechtel EDPI-4.65.01.
- Interview with TVA and Bechtel personnel (management and engineers) for determining if the CAP and its requirements are consistently understood or interpreted.
- Evaluations of Bechtel and TVA records of training.
- Review of 19 Documented EERs and 15 PERS.
- Technical Review of 107 revised calculations (Civil 73, Mechanical 25, and Electrical 9) and 91 F-DCN drawings (Civil 46, Mechanical 7, and Electrical 38).

The assessment concluded that :

- No major breakdown was found in the procedures. No major errors were found for the calculation revisions.
- SSP-3.4 requirement should be used for all TVA and Bechtel personnel.
- There is a perception, within Engineering, that supervisory approval/concurrence is needed to initiate a PER and obtain a tracking number.

Currently, the licensee is rewriting the contents of SSP-3.4 to use only PER, and divide it into four levels based on the significance of the problems. All Bechtel engineers will use SSP-3.4 for reporting problems on calculations. Supervisor approval for generating a PER is not required. Bechtel will revise EDPI 4.65.01 and eliminate the engineering error report program for use at Browns Ferry.

Based on the licensee actions taken as stated above, this item is considered closed.

4. Spring Settings Out Of Range on Unit 2 ISI Inspection (70370)

During an Inservice Inspection (ISI) of supports, on June 14, 1994, the current loads on variable springs 2-47B455H0056, 2-47B455H0059, and 2-47B455H0062 were found to be outside the load ranges evaluated in the design basis calculations. These three calculations are CD-Q2073-881765, CD-Q2073-881768, and CD-Q2073-881772. This event was documented in Technical Operability Evaluation No. 2-94-073-9010 Rev. 0 and PER No. BFPER 940240, Rev. 0.

All three supports are on top of the torus and those supports are part of Long Term Torus Integrity Program which uses Design Criteria BFN-50-



C-7100. Based on the seismic pipe displacements documented in stress calculations CD-Q2073-880990, none of the springs will bottom out during a seismic event and only 2-47B455H0059 will top out. The operability evaluation considered this condition to be acceptable with the expectation of possibly very minor deformation of the rod.

However, a similar condition of a load setting out of range was found on variable spring 2-47B455H0060, which is located on this same run of piping. This was identified in QC Inspection Report No. BFN-U-9400076 and evaluated in Technical Operability Evaluation 2-94-073-9008.

Based on the four spring settings out of acceptable range in the same run of piping, plus the large setting range allowed in Design Criteria BFN-50-C-7100, as noted (Paragraph 3a, herein) in the discussion of IFI 50-259,260,296/93-32-01, this problem is identified as Unresolved Item 50-259,260,296/94-15-01, Spring Can Setting Problems for Supports in Long Term Torus Integrity Program. The licensee's Technical Operability Evaluations for these problems only answers part of the question about the non-conforming spring hangers, therefore this item is unresolved pending a review of the root cause determination used to close out BFER 940240.

5. Exit Interview

The inspection scope and results were summarized on June 17, 1994, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

- (Open) Unresolved Item 50-259,260,296/94-15-01, Spring Can Setting Problems for Supports in Long Term Torus Integrity Program
- (Closed) IFI 50-259,260,296/92-32-01, Design Problems in Spring Supports
- (Closed) Violation 50-259, 260, 296/93-26-02, Failure of Updating the Pipe Support Calculations for the New Stress Loads
- (Closed) IFI 50-296/93-29-01, Review of Bechtel's EER Process

