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Division of Nuclear Engineering



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BFEP-PI 86-05

BROWNS FERRY NUCLEAR PLANT

TITLE: NRC-OIE BULLETIN 79-02/79-14 PROGRAM DOCUMENT
FOR BROWNS FERRY NUCLEAR PLANT

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1.0 DOCUMENT PURPOSE

The purpose of BFEP-PI 86-05 is to outline the essential elements of TVA's program to assure satisfactory address to the Nuclear Regulatory Commission (NRC) requirements found in Office of Inspection and Enforcement Bulletins (OIEB) 79-02 and 79-14, to coordinate and control the independent elements within the program and to define the Division of Nuclear Engineering (DNE) project organization and responsibilities for the completion of the scope work.

BFEP-PI 86-05 is an upper tier document that establishes the program plan. Section 4.1 provides a brief description of subordinate documents that prescribe specific procedural control associated with OIEB 79-02/79-14 reconciliation activities. 16

The scope of this document is limited to OIEB 79-02/79-14 issues for the Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3. 20

Due to the similarities of the two bulletins relative to systems to be inspected, inspection elements and reportability, as well as to minimize any duplication of effort, the two programs are merged.

NRC-OIE Bulletin 79-02, "Pipe Support Base Plate Designs Using Concrete Expansion Anchor Bolts" was issued March 8, 1979. Principal purposes of the bulletin were to verify that pipe support base plate flexibility was accounted for in the calculation of anchor bolt loads, that the anchor bolts were installed properly, and that adequate factors of safety were met.

NRC-OIE Bulletin 79-14, "Seismic Analysis for As-Built Safety-Related Piping Systems," was issued July 2, 1979. The purpose of the bulletin was to ensure that the as-built safety-related piping systems and supports are verified as being consistent with the seismic analysis model. The basic directive of the bulletin was "to verify that the seismic analysis applies to the actual configuration of safety-related piping systems."

The scope of this project instruction does not include the following piping:

- a) Piping included in the Long Term Torus Integrity Program (LTTIP). The controlling document for LTTIP is CEB Report 83-34. IEB 79-02/79-14 requirements are being reconciled through this program.
- b) Control Rod Drive (CRD) insert and withdraw piping. As constructed conditions are being reconciled through ECN P0880 (unit 1), P0859 (unit 2), and P0881 (unit 3).
- c) Control Rod Drive (CRD) scram discharge piping. IEB 79-02/79-14 requirements are being reconciled through ECN P0392 according to procedure SMMI 14.4.1.3-L.

2.0 BULLETIN REQUIREMENTS AND BFN SCOPE

2.1 IE Bulletin 79-02/79-14 Requirements

IE Bulletin 79-02 was issued March 8, 1979, first revised June 21, 1979, supplemented on August 20, 1979, and further revised November 8, 1979. The purpose of the bulletin was to ensure that concrete expansion anchor bolts used on safety-related piping meet design requirements.

IE Bulletin 79-14 was issued on July 2, 1979, revised on July 18, 1979, first supplemented on August 15, 1979 and further supplemented on September 7, 1979. The purpose of the bulletin was to ensure that as-built safety-related piping was reflective of the design document used as input into piping system seismic analysis. These requirements apply to all safety-related piping 2-1/2" in diameter and greater and to seismic Category I piping, regardless of size which was dynamically analyzed by computer. For older plants, where Seismic Category I requirements did not exist at the time of licensing, it must be shown that the actual configuration of safety-related systems, utilizing piping 2-1/2" in diameter and greater meets design requirements.

The bulletins request the licensee to inspect and verify certain design aspects of safety-related piping and pipe support components. The licensee is required to:

- 2.1.1 Identify inspection elements.
- 2.1.2 Initiate an inspection program.
- 2.1.3 Expedite inspections where nonconformances affect system operability and submit a description of the results.
- 2.1.4 Evaluate the effect of nonconformances on system operability and comply with applicable action statements in technical specifications.
- 2.1.5 For pipe supports that use concrete expansion anchor bolts, inspect and evaluate in accordance with OIEB 79-02 requirements.

2.2 BFN Program Scope

The BFN program scope for safety-related piping systems and components requiring inspections and reconciliation to IEB 79-02 and 79-14 is the same. Inspection and reconciliation will be performed on all safety-related piping (TVA Class 1 Seismic) 2-1/2" in diameter and greater and to all safety-related piping regardless of size which was dynamically analyzed by computer.

2.2.1 IEB 79-02 Scope

IEB 79-02 requires the inspection of expansion type anchor bolts. BFN did not use wedge bolts during the construction phase; only self-drilling type anchors were used. Wedge bolts were used in the repairs resulting from the 79-02/79-14 evaluations. Therefore, IEB 79-02 inspection and reconciliation requirements will be performed on all expansion type concrete anchor bolts employed on safety-related pipe supports within the BFN program scope. For the purpose of identifying remaining IEB 79-02 inspections, beginning May 1985 DNE prepared "tally" sheets to identify 79-02 inspections already performed; then "79-02 Master Copy" location plans were prepared to identify 79-02 inspections not yet performed. These location plans are marked to uniquely identify each support to be inspected along with sufficient information to locate same. These location plans are assigned a unique drawing number by the DNE Site Coordinator and will be updated for the duration of the IEB 79-02/79-14 program; they will be maintained as design input documents.

As IEB 79-02 inspections are completed and submitted to the Analysis and Support Design Project for evaluation, a listing of the supports will be maintained as part of the 79-14 hanger tracking program. Appendix A is a representative sample of the 79-14 hanger tracking program which lists all the supports and piping analysis within the scope of IEB 79-14. See Section 4.7 for a description of the hanger tracking program. A representative sample of this listing is presented in Appendix A. (Note: This listing will be constantly updated until the program is complete as inspections are being completed.)

2.2.2 IEB 79-14 Scope

The initial IEB 79-14 scope is based on TVA Class 1 functional boundaries as defined by NEB marked-up flow diagrams attached to standalone quality information memorandum NEB 840416 261.

The original version of these flow diagrams was developed using design input from Nuclear Engineering Branch (NEB) and Civil Engineering Branch (CEB). NEB is responsible for identification of all systems or portions of systems that are safety-related irrespective of pipe size, and CEB is responsible for identification of portions of systems dynamically analyzed by computer. It is the responsibility of each section performing IEB 79-02/79-14 reconciliation

tasks within the Analysis/Support Design Project to update, secure interface reviews, and maintain current a set of special "analysis/inspection boundary" schematics for units/systems within their scope.

The final scope of IEB 79-14 will be shown on these "analysis/inspection boundary" schematics. The boundaries will be extended beyond the functional boundary to a physical boundary, either an anchor point or through a combination of supports/restraints forming an equivalent anchor. All piping and supports within that boundary are subject to the provisions of IEB 79-02/79-14.

These schematics have been assigned unique drawing numbers and will be maintained for the duration of the 79-14 program. A schematic has been prepared for each safety-related system within the BFN scope for IEB 79-14 for each of the three units of the BFN plant. A listing of these drawings is provided in Appendix B.

Piping/anchorages outside the scope of 79-02/79-14 is either not shown or depicted by dashed line. This exclusion will generally include safety-related piping less than 2-1/2" in diameter that was not dynamically analyzed and non-safety-related piping. Exclusion criteria is defined in BFEP-PI 86-06. For those portions not under the 79-14 scope but initially identified under the 79-02 bulletin scope, DNE will provide independent justification by sampling. In the event small branch lines are included in the seismic analysis model, these lines will be included within the IEB 79-14 program. An accountability will be made prior to the completion of the IEB 79-02/79-14 program to assure all items have been addressed.

Appendix C contains a listing of pipe stress analysis problem numbers within the scope of IEB 79-14 along with applicable design documents. The original issue of this is considered preliminary information.

3.0 PROGRAM ORGANIZATION AND RESPONSIBILITIES

This section defines the organization within DNE responsible for the resolution of NRC IE Bulletins 79-02 and 79-14. This organization is presented in Figure 3.1. This reflects the matrix organization with the IEB 79-02/79-14 Lead Engineer accountable to both the Project Engineer and Chief Civil Engineer. Accountability to the Project Engineer includes schedule, budget, and progress. Accountability to the Chief Civil Engineer is manpower availability and technical adequacy. The following paragraphs delineate responsibilities for key IEB 79-02/79-14 project personnel.

3.1 IEB 79-02/79-14 Lead Engineer

- o Obtain schedule direction from BFEP Project Engineer.
- o Assure manpower availability to meet IEB 79-02/79-14 project requirements.
- o Reports progress to BFEP Project Engineer.
- o Implement criteria and guidelines controlled by Chief Civil Engineer.
- o Assure criteria and procedures employed by the Analysis and Support Design Project meet the 79-02/79-14 project requirement.
- o Facilitate interface between DNE Inspection and DNE Program Coordinators.
- o Coordinates and is the DNE representative for all 79-02/79-14 responses.

3.2 Project Controller/Contract Administrator

- o Develops and implements project control procedures to assist lead engineer in assigned responsibilities.
- o Coordinates schedular activities within the Analysis and Support Design Project.
- o Establishes and maintains a status monitoring program for IE Bulletin 79-02 and 79-14.
- o Coordinates contractor activities and approves contractor billings.

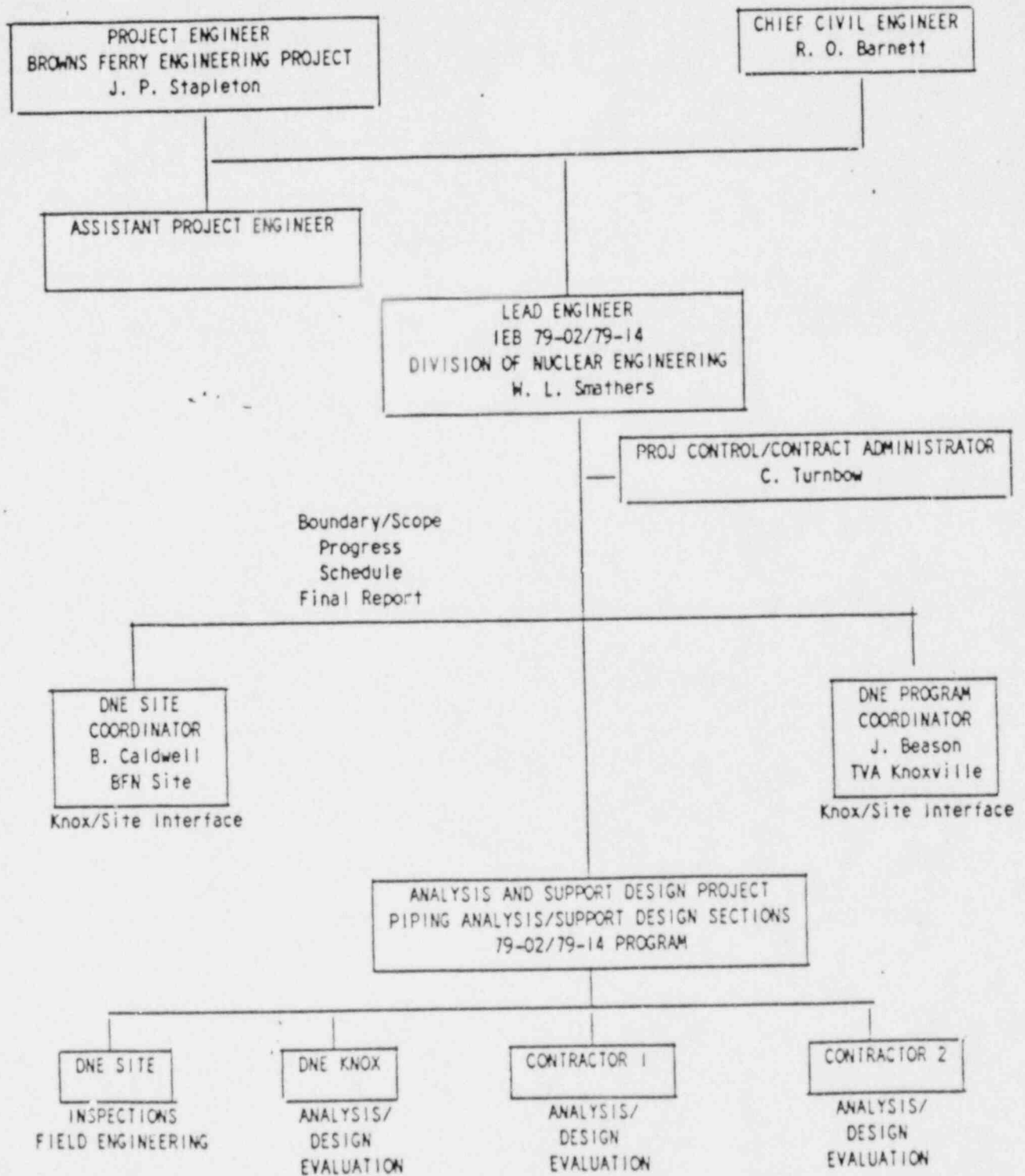
3.3 DNE Program Coordinator - Browns Ferry Analysis and Support Design Project

- o Coordinates implementation of the DNE program to meet the requirements of NRC IE Bulletins 79-02/79-14.
- o Ensures that discrepancy problems (deviations from or deficiencies in design which present potential safety concerns) are evaluated. See BFEP-PI 85-01.
- o Coordinates anchorage problems identified by IE Bulletin 79-02 inspection which have Bulletin 79-14 implications.

3.4 DNE Site Coordinator - Browns Ferry Analysis and Support
Design Project

- o Schedules inspection activities to bring about a complete and timely inspection of the physical areas covered by IEB 79-02 and 79-14.
- o Submits Phase I inspection data to DNE Program Coordinator for records control.
- o Ensures that Phase II data is transmitted to those performing the inspection review, design, or analysis.

FIGURE 3.1
DIVISION OF NUCLEAR ENGINEERING



3.5 Browns Ferry Analysis and Support Design Project 79-02/79-14 Piping Analysis and/or Support Design Section(s)

- o Evaluate deviations of the as-built versus as-designed piping and pipe support configuration.
- o Review the completed inspection data packages to determine if additional inspection information is needed.
- o Perform final piping analysis and/or support design as necessary in accordance with the Design Criteria for As-Built Piping Systems, BFN-50-D707 and DNE calculation BFEPC 51186 for support design methods.
- o Prepare unitized physical piping drawings (separate drawings for each BFN unit) for project mechanical group utilizing as-built data.
- o Initiate and approve design modifications to reconcile as-built condition of plant to licensing commitments.
- o Document the analysis of all safety-related piping and supports within the scope of the bulletin.
- o Perform walkdowns of piping and supports for which the analysis and support design will be based.
- o Update, interface review, and maintain current the IEB 79-14 Analysis/Inspection Boundary Drawings.

4.0 PROCEDURES/TASK IMPLEMENTATION GUIDE

4.1 Procedures

Due to the relative time of issuance, nature, and similarity of affected systems, TVA committed to reconcile NRC OIE Bulletins 79-02 and 79-14 simultaneously. TVA's total program for the reconciliation is a combination of procedures and programs intended to address specific issues contained in the two bulletins. The intent of this section is to provide an overview of the program for the technical resolution of IE Bulletins 79-02/79-14.

The following is a listing of subordinate documents that establish procedural control over associated IEB 79-02/79-14 reconciliation activities and shall be used for the Browns Ferry Nuclear Plant. These documents stand alone and are not an integral part of this document. The requirements of this document take precedence in the event of conflicting information or requirements. Figure 4.1 presents the 79-02/79-14 flowchart.

- 4.1.1 BF SMMI-5.1-A Browns Ferry Nuclear Plant
Office of Nuclear Power
Special Mechanical Maintenance Instruction
Controls the inspection and repair program for self-drilling type concrete anchors for all safety-related components within the BFN program scope. Provides a means of corrective action for systems and components within the IEB 79-02 scope.
- 4.1.2 BF MMI-99 Browns Ferry Nuclear Plant
Office of Nuclear Power
Mechanical Maintenance Instruction
Establishes procedural control for recording and documenting required inspections for implementation of IEB 79-14 requirements. Inspection requirements include supports, valves, configurations, penetration clearances, and spring hanger data.
- 4.1.3 BFEP-PI 86-06 Browns Ferry Nuclear Plant
Division of Nuclear Engineering
Project Instruction
Establishes procedural control for recording and documenting required inspections for implementation of Phase II requirements for IEB 79-14.
- 4.1.4 BFEP-PI 85-01 Browns Ferry Nuclear Plant
Division of Nuclear Engineering
Project Instruction
Establishes procedural requirements within the Division of Nuclear Engineering for implementation of IEB 79-14 requirements. Establishes procedural control for the review and evaluation of inspection data packages generated under BF SMMI-5.1-A and BF MMI-99 for the identification and processing of "potential safety concerns."

4.2 Inspections

Prior to May 1985, inspections were performed by the BFN Modifications Group. Beginning May 1985, all 79-02/79-14 inspections will be performed by engineers and/or design engineering associates within DNE Analysis and Support Design Project.

Inaccessible areas will be inspected during outage periods.
Difficult access areas will be addressed on a case by case basis.

4.2.1 IE Bulletin 79-02 Inspections

IE-Bulletin 79-02 addresses the improper installation and/or analysis of concrete expansion anchor bolts in safety-related systems including TVA Class 1 seismic systems. All inspections of anchor bolts to address IE Bulletin 79-02 shall be inspected in accordance with SMMI-5.1-A (Ref. 5.1.4). SMMI-5.1-A provides instruction for the recording of as-built measurements, establishes acceptable tolerances, and directs the repair of anchors built out of tolerance. All applicable SMMI-5.1-A data sheets are to be completed as the means of transmitting as-built data to DNE for evaluation.

4.2.2 IE-Bulletin 79-14 Inspections

IE-Bulletin 79-14 (Phase I) requires the verification that the seismic analysis of safety-related systems apply to the actual as-built configuration. The Phase II portion requires verification that the analysis and support design meet code compliance. All systems within the 79-14 program scope shall be field inspected in accordance with BF MMI-99 (Ref. 5.1.1). Inspectors shall be trained in accordance with QZN101.001 (Ref 5.1.9) and QZN101.002 (Ref. 5.1.10) so that they may be able to recognize potentially significant safety concerns requiring prompt evaluation and resolution. The intent of the training is not for quality acceptance of deviations but rather for purposes of gathering appropriate data for use in the evaluation of the as-built condition. Inspections will include the detailing of the pipe support attachment locations and configurations onto base plates. This is also a IEB 79-02 concern since it affects the plate flexibility.

BFN has implemented a separate program to address miscellaneous or supplementary steel. For purposes of gathering necessary data for input to support this program, the actual inspection boundaries will include limited portions of miscellaneous steel. This is addressed in BFEP-PI 86-06 and BF MMI-99.

4.2.3 Verification Walkdown

Walkdowns shall be per BFEP-PI 86-06 and the requirements of the following specified guidelines.

a. Piping and Support Verification Walkdowns

Any walkdown will include:

- A complete verification and documentation of all supports.
- A G-32 bolt spacing violation inspection to the requirements of Reference 5.1.5.
- Verification of piping configuration data including support location and direction of restraint and valve location and orientation.
- Any revised or added information will be clearly identified (e.g., additional items which may be supported from the supports or process piping).

- All walkdown data will have "Preparer" and "Verifier" sign and date.

b. Reverification Due to Omitted Information

In the event that a data package is determined to be incomplete or conflicting, it shall be returned for reverification. Only those items indicated as being additionally required must be "prepared and verified."

c. Final Piping Walkdown

After performing the analysis, the piping system shall be walked down to verify that the analysis is a true representation of the as-verified configuration. This verification is to include: A visual verification of the piping configuration to verify that the condition found at the time of the walkdown is consistent with the data used as analysis input, a thermal clearance check for anticipated movements, and a feasibility study to determine if any required new supports can be installed.

d. Final Support Constructability Walkdown

After the support design calculations have been performed but prior to issuing the design drawing, the system shall be walked down to verify the constructability of new supports or modification to existing supports.

4.3 Data Evaluation

4.3.1 79-14 Evaluation Program

DNE SEP 81-02 (Ref. 5.1.2) was developed within the guidelines of a three phase plan to specify DNE's method of evaluating as-built information to comply with IE Bulletin 79-14 (Note: The method described also satisfies the 79-02 requirement of those supports within 79-14 systems). The procedure was initially used by DNE to resolve the requirements of the bulletins until May, 1985. Changing responsibilities, organizations, and procedures caused DNE SEP 81-02 to become outdated. BFEP-PI 85-01 (Ref. 5.1.3) is the current procedure to be followed.

The framework for TVA's program to comply with OIE Bulletins 79-02 and 79-14 was first established in a June 18, 1981 letter from L. M. Mills to James P. O'Reilly. The following is a description of each phase.

4.3.1.1 Phase I

The initial evaluation of the inspection data for potential safety problems will be performed, completed, and documented almost concurrently with the inspection. As individual inspection deviations are discovered they will be sent to engineering for evaluation. At any time, if the deviation is determined to be a potential safety problem, a seismic analyst's discrepancy resolution input sheet (BFEP-PI 85-01, Attachment 6.1) will be initiated and action will be taken in accordance with facility technical specifications within the appropriate limiting condition for operation. Each discrepancy (nonconformance) received by engineering will be evaluated within two days utilizing engineering judgment and by rigorous analysis (if necessary) within 30 days. All significant safety problems evaluated as a definite potential for loss of pressure boundary or containment seal will be corrected within this time period. These will be promptly reported to the NRC in compliance with applicable action statements in technical specifications.

4.3.1.2 Phase II

The second phase of evaluation shall be to evaluate each system for code compliance. Following the receipt of the Phase I inspection data package (i.e., one system in one unit) and any verification walkdown information, engineering shall evaluate all data with respect to existing analysis and code requirements. If the piping analyst determines that a potential safety problem exists for any given analysis problem, appropriate action shall be taken in accordance with facility technical specifications.

4.3.1.3 Phase III

Modifications resulting from reanalysis and/or support design is the next step to ensure compliance.

4.3.2 Initial DNE Safety Evaluation

IE Bulletin 79-14 requires the performance of an evaluation of the significance of a nonconformance (discrepancy) as rapidly as possible to determine whether or not the operability of the system might be jeopardized during a safe shutdown earthquake as defined in the regulations. This evaluation is expected to be done in two phases involving an initial engineering judgement (within 2 days), followed by an analytical engineering evaluation (within 30 days). TVA procedural address to these NRC requirements is found in BFEP-PI 85-01 Paragraph 4.2.3 which requires:

- a. A 48-hour time limit for the potential effects of a discrepancy. This limit applies from the time the discrepancy is identified to the evaluating section until the safety evaluation, if required, is performed.
- b. If reanalysis is required to confirm engineering judgment, it must be completed within 30 days of when the discrepancy is identified in the evaluating section.

- c. Units in a cold shutdown condition are exempt from the requirements of 4.3.2.a and 4.3.2.b with the exception of those systems whose continued operation is necessary to maintain cold shutdown as identified by NEB and defined by plant technical specifications. For those units exempt from 4.3.2.a and 4.3.2.b the requirements of NEP-9.1 must be met.

4.3.3 Inspection Package Evaluation

The DNE Program Coordinator receives the completed inspection package from the DNE Site Coordinator and passes it on to the piping and/or support analysis sections. The inspection data package shall be reviewed for completeness, assembled, and evaluated per BFEP-PI 85-01. Any package found to be incomplete shall be returned for reverification.

4.4 Reconciliation Analysis and Support Design

4.4.1 Piping Analysis

When all inspection data has been assembled and evaluated per the requirements of SMMI 5.1-A and MMI-99, a final as-built analysis shall be performed in accordance with BFN-50-D707 (Ref. 5.1.6). Isometrics and load tables are issued within the 79-14 program schedule and a reverification is performed as described in Section 4.2.3. This analysis will demonstrate code compliance and establish the necessary design modifications.

4.4.2 Support Design

Once the final as-built analysis is complete, the configuration is field verified, the supports are evaluated, and if necessary redesigned. All support evaluations shall be done in accordance with DNE calculation BFEP C51186 (Ref. 5.1.8). All anchor bolt designs and the effects of baseplate flexibility shall be in accordance with DS-C1.7.1 (Ref. 5.2.7). Pipe support drawings shall be issued and calculations microfilmed within the program schedule.

4.5 Design Modifications

All necessary design modifications are required to reconcile the "as-built" configuration in order to be in compliance with the code and licensing commitments. Design additions and modifications shall be accomplished only through approved documents or work plans with QC inspection. The two principle documents governing implementation of IEB 79-02/79-14 design modifications are MAI-4 and MAI-23. Any subsequent relocation of supports shall be in accordance with Section 2.6 of MAI-23.

4.6 Program Records

All original IEB 79-02/79-14 program records are the property and responsibility of DNE. These are to be considered as design records and shall be controlled per the requirements of NEP-1.3.

Prior to the completion of the 79-14 program, modifications by others to the piping systems and/or piping supports under the 79-14 program require reporting to, and approval of, the BFN Analysis and Support Design Project Lead Engineer for the purpose of maintaining configuration control. The monitoring of post program modifications is addressed in subsection 4.9.

4.7 Hanger Tracking Program

A hanger tracking program shall be maintained by the Analysis and Support Design Project. This will be a computerized data base. The type of information will include:

- a. Cross-reference between analysis problem and support designation.
- b. IEB 79-02 applicability.
- c. Design status.
- d. Total work scope.

This program provides the mechanism to identify and track both design and modification work. It also provides information that may be used as a planning tool.

4.8 Final Report

At the completion of the 79-02/79-14 program, DNE shall prepare a final report for subsequent submittal to the Nuclear Regulatory Commission. This report shall contain a summary of all TVA actions performed and the results.

4.9 Post Program Change Control and Evaluation

Following the inspection, evaluation, and reanalysis associated with the 79-02/79-14 program, there is a continual need to monitor all changes affecting the system throughout the life of the plant. The procedures identified below have been established and shall be used to control all subsequent design modifications.

Following the issuance of the report to NRC, it shall become the responsibility of DNE to monitor all change documents as detailed in NEP-6.1 (Ref. 15). Incoming change documents can be in the form of FCR's, DCR's, etc. If an ECN is issued, documents revised to incorporate the change shall be listed on the ECN, and the reissue after revision of all documents listed is required before the ECN can be closed. Design Change Supplements (DCS's) shall also be listed and used on the ECN, and their incorporation on issued drawings is required before the ECN can be closed, as detailed in NEP-5.1 (Ref. 14).

General Construction Specifications G-29C, G-29M, G-32, G-43, and G-66 shall be the controlling documents for all modifications resulting from IEB 79-02 and 79-14 and all future modifications to piping systems and supports within the scope of IEB 79-02 and 79-14. Plant procedures must conform to these documents. It shall be the responsibility of plant QE to ensure that the appropriate procedures are in place to ensure that design requirements are met. Deviations outside acceptance criteria must be reported to DNE for approval.

79-02/79-14 INTERFACE LOGIC - FLOWCHART



5.0 REFERENCES AND DEFINITIONS

5.1 References:

1. TVA Browns Ferry Nuclear Plant, Mechanical Maintenance Instruction 99 (BF MMI-99) Instructions for the Implementation of NRC IE Bulletin 79-14 Units 1, 2, and 3.
2. Special Engineering Procedure (EN DES-SEP 81-02) Implementation of NRC OIE Bulletin 79-14 for Browns Ferry Nuclear Plant.
3. Project Instruction for Implementation of NRC OIE Bulletins 79-02/79-14 (BFEP-PI 85-01).
4. TVA Browns Ferry Nuclear Plant Standard Practice/Instruction (SMMI-5.1-A) Verifying Correct Installation of Self-Drilling-Type Concrete Anchors.
5. TVA General Construction Specification (G-32) for Bolt Anchors Set in Hardened Concrete.
6. TVA Browns Ferry Nuclear Plant (BFN-50-D707) Detailed Design Criteria for Analysis of As-Built Piping Systems.
7. Civil Design Standard (DS-C1.7.1) General Anchorage to Concrete.
8. 79-02/79-14 General Reference Instruction for Pipe Support Design (BFEP C51186).
9. TVA Nuclear Training Branch - QC/NDC Training Section "Weld Identification and Sizing Techniques for the Implementation of Browns Ferry Mechanical Maintenance Instruction 99" Course No. (QZN101.001).
10. TVA Nuclear Training Branch - QA/QC Training Unit Nuclear Quality Control Inspector Training "Mechanical and Program Requirements for the Implementation of BF MMI-99" Course No. (QZN101.002).
11. TVA General Construction Specification (G-43) Supports and Installation of Piping Systems in Category I Structures.
12. TVA BFNPP Rigorous Analysis Handbook.
13. TVA BFNPP Pipe Support Design Handbook.
14. Division of Nuclear Engineering's design output procedure NEP-5.1.
15. Division of Nuclear Engineering's change control procedure NEP-6.1.

16. Project Instruction for Implementation of NRC-OIE Bulletin 79-14 Phase II Verification (BFEP-PI 86-06).

NOTE: All documents referenced pertain to latest revision.

5.2 Definitions

1. Deviation - A difference between the as-built and the output document.
2. Discrepancy - Any deviation that results in a potential safety concern.
3. Nonconformance - (IEB 79-14) A discrepancy. Nonconformances shall be reported under NCR BFNCB 8103.
4. Final As-Built Analysis - Reanalysis incorporating all as-built information to meet code compliance.
5. Inspection - The act of recording information using measuring techniques of sufficient accuracy to describe the as-built condition of a piping/support system.
6. Walkdown - A configuration check to confirm pipe routing, relative location of piping components, hanger components, hanger location, direction of support/restraint. A walkdown may or may not include physical measurements.
7. Inspection Data Package - The completed package required to perform the Phase I evaluations.
8. Verification Walkdown Package - The data gathered as a result of the Phase II walkdowns.
9. Accessible (A) - Defines piping in an area with no restrictions for inspection.
10. Partially Accessible (PA) - Defines a piping subsystem that contains an inaccessible portion.
11. Inaccessible (IA) - Defines piping in an area of the plant that cannot be inspected during reactor operation.
12. Difficult Access (DA) - Areas where inspections are required by IEB 79-02 and/or 79-14 but are considered impractical even with the reactor shutdown. Information concerning the burden of performing the inspection and the safety consequences of not performing the inspection will be documented in the final report to the NRC by TVA.
13. As-Built - A term used to describe the installed configuration of piping and related supports.

APPENDIX A

BFN HANGER TRACKING PROGRAM
(PRELIMINARY)

Pages A.1 and A.2

APPENDIX E

LISTING OF DRAWINGS INDICATING IEB 79-14
ANALYSIS/INSPECTION BOUNDARIES
(PRELIMINARY)

Pages B.1 - B.3

BFN INDEX OF IEB 79-14
ANALYSIS/INSPECTION BOUNDARY DRAWINGS

47W400-401	Main Steam Unit 1
47W400-402	Main Steam Unit 2
47W400-403	Main Steam Unit 3
47W406-401	Reactor Water Clean-Up System Unit 1
47W406-402	Reactor Water Clean-Up System Unit 2
47W406-403	Reactor Water Clean-Up System Unit 3
47W415-401	Reactor Feedwater Unit 1
47W415-402	Reactor Feedwater Unit 2
47W415-403	Reactor Feedwater Unit 3
47W446-401	Raw Cooling Water Unit 1
47W446-402	Raw Cooling Water Unit 2
47W446-403	Raw Cooling Water Unit 3
47W450-401	RHR Service Water System Unit 1
47W450-402	RHR Service Water System Unit 2
47W450-403	RHR Service Water System Unit 3
47W451-401	Emergency Equipment Cooling Water Unit 1
47W451-402	Emergency Equipment Cooling Water Unit 2
47W451-403	Emergency Equipment Cooling Water Unit 3
47W451-404	Emergency Equipment Cooling Water Unit 4
47W452-401	Residual Heat Removal System (RHR) Unit 1
47W452-402	Residual Heat Removal System (RHR) Unit 2
47W452-403	Residual Heat Removal System (RHR) Unit 3
47W454-401	Fuel Pool Cooling System Unit 1
47W454-402	Fuel Pool Cooling System Unit 2
47W454-403	Fuel Pool Cooling System Unit 3
47W455-401	High Pressure Coolant Injection System Unit 1
47W455-402	High Pressure Coolant Injection System Unit 2
47W455-403	High Pressure Coolant Injection System Unit 3
47W456-401	Reactor Core Isolation Cooling System Unit 1
47W456-402	Reactor Core Isolation Cooling System Unit 2
47W456-403	Reactor Core Isolation Cooling System Unit 3
47W458-401	Core Spray System Unit 1
47W458-402	Core Spray System Unit 2
47W458-403	Core Spray System Unit 3
47W460-401	Containment Inerting System Unit 1
47W460-402	Containment Inerting System Unit 2
47W460-403	Containment Inerting System Unit 3

BFN INDEX OF IEB 79-14
ANALYSIS/INSPECTION BOUNDARY DRAWINGS (Continued)

47W461-401	Containment Atmosphere Dilution System Unit 1
47W461-402	Containment Atmosphere Dilution System Unit 2
47W461-403	Containment Atmosphere Dilution System Unit 3
47W462-401	Standby Liquid Control Unit 1
47W462-402	Standby Liquid Control Unit 2
47W462-403	Standby Liquid Control Unit 3
47W464-401	Reactor Building Closed Cooling Water System Unit 1
47W464-402	Reactor Building Closed Cooling Water System Unit 2
47W464-403	Reactor Building Closed Cooling Water System Unit 3
47W465-401	Nuclear Boiler Unit 1
47W465-402	Nuclear Boiler Unit 2
47W465-403	Nuclear Boiler Unit 3
47W468-401	CRD Hydraulic System Unit 1
47W468-402	CRD Hydraulic System Unit 2
47W468-403	CRD Hydraulic System Unit 3
47W482-401	Clean Radwaste & Decon Drainage Unit 1
47W482-402	Clean Radwaste & Decon Drainage Unit 2
47W482-403	Clean Radwaste & Decon Drainage Unit 3
47W482-404	Floor & Dirty Radwaste Drainage Unit 1
47W482-405	Floor & Dirty Radwaste Drainage Unit 2
47W482-406	Floor & Dirty Radwaste Drainage Unit 3
47W553-401	Condensate Storage and Supply System Unit 1
47W553-402	Condensate Storage and Supply System Unit 2
47W553-403	Condensate Storage and Supply System Unit 3
47W586-401	Diesel Generator Intake/Exhaust Unit 1/2
47W586-402	Diesel Generator Intake/Exhaust Unit 3
47W588-401	Fuel Oil System Unit 1
47W588-402	Fuel Oil System Unit 2
47W588-403	Fuel Oil System Unit 3
47W590-404	CO ₂ Storage, Fire Protection & Purging System Unit 3 & Common
47W600-401	Control Air System Unit 1
47W600-402	Control Air System Unit 2
47W600-403	Control Air System Unit 3
47W935-401	Air Conditioning Chilled Water Unit 1
47W935-402	Air Conditioning Chilled Water Unit 2
47W935-403	Air Conditioning Chilled Water Unit 3
47W831-401	Condenser Circulating Water Unit 1
47W831-402	Condenser Circulating Water Unit 2
47W831-403	Condenser Circulating Water Unit 3

APPENDIX C

ANALYSIS LIST AND
ASSOCIATED DESIGN DOCUMENTS
(PRELIMINARY)

Pages C.1 - C.28

SYSTEM NAME - Main Steam

FLOW DIAGRAM - 47W801-1 GE 719E597

PHYSICAL DRAWING - 47W400-Series, GE Dwg. 729E229 (Cont. 90744)

BILL OF MATERIAL - 47BM400-Series, 47BM435-1, 47BM404-7

ANALYSIS ISOMETRIC DRAWING - 47W400 - (200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-101-1RA			1	IA
N1-201-1RA	201,202,203	N	2	IA
N1-301-1RA			3	IA
N1-101-2RB			1	IA
N1-201-2RB	204 Thru 209	N	2	IA
N1-301-2RB			3	IA
N1-101-3R			1	PA
N1-201-3R	210 Thru 213	N	2	PA
N1-301-3R			3	PA
N1-101-4R			1	IA
N1-201-4R	214 Thru 217	N	2	IA
N1-301-4R			3	IA
N1-101-5R			1	IA
N1-201-5R	200	N	2	IA
N1-301-5R			3	IA
N1-101-6R			1	IA
N1-201-6R	200	N	2	IA
N1-301-6R			3	IA

ORIGINAL ISOMETRIC - 47W335-1

ORIGINAL LOAD TABLES - GE729E401

ORIGINAL SUPPORT DETAILS - GE729E401, 47A400 Series

ORIGINAL HANGER LOCATION DRAWING - GE729E401

ESTIMATED SUPPORTS UNIT 1 - 115
UNIT 2 - 118
UNIT 3 - 115

ISOMETRIC, HANGER - (CONT. 90744) Teledyne L-3802, D-3803, D-3806 Thru
& RESTRAINTS D-3809, D-3826 Thru D-3829, D-3822, D-3831 etc.)
LOCATIONS

SYSTEM NAME - Feedwater

FLOW DIAGRAM - 47W803-1

PHYSICAL DRAWINGS - 47W415-Series

BILL OF MATERIAL - 47BM435-10, 47BM415-Series

ANALYSIS ISOMETRIC DRAWING - 47W415 - (200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-103-1RA	202	N	1	IA
N1-203-1RA	200	N	2	IA
N1-303-1RA	203	N	3	IA
N1-103-1RB	204	N	1	IA
N1-203-1RB	201	N	2	IA
N1-303-1RB	205	N	3	IA
N1-101-1P				

ORIGINAL ISOMETRIC - 47W335-2, -3

ORIGINAL LOAD TABLES - None

N1-101-1P

ORIGINAL SUPPORT DETAILS - BP 951 Thru 957, BP 395, BP 397 Thru 408, BP 1750
BP 1752 Thru 1756, 2000, 2002 Thru 2007

ORIGINAL HANGER LOCATION DRAWING - GE729E152, 731E872, 729E401, BP 396,
1751-2, 2001

ESTIMATED SUPPORTS UNIT 1 - 36
UNIT 2 - 40
UNIT 3 - 36

SYSTEM NAME - Cond. Storage and Supply

FLOW DIAGRAM - 47W818-1

PHYSICAL DRAWINGS - 47W553-Series

BILL OF MATERIAL - 47BM553-Series

ANALYSIS ISOMETRIC DRAWING - 47W553 - (200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM

NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-002-2R			1,2,3	A
N1-102-1R	200, 201	N	1	A
N1-202-1R	202, 203	N	2	A
N1-302-1R			3	A

ORIGINAL ISOMETRIC - 47W335-19

ORIGINAL LOAD TABLES - 47B553-21, -31

ORIGINAL SUPPORT DETAILS - 47A553-51 Thru -147

ORIGINAL HANGER LOCATION DRAWING - 47W553-H-1, -2

ESTIMATED SUPPORTS UNIT 1 - 30

UNIT 2 - 30

UNIT 3 - 30

SYSTEM NAME - Reactor Drains & Vents

FLOW DIAGRAM - 47W817-1

PHYSICAL DRAWINGS - 47W465-Series

BILL OF MATERIAL - 47BM465-Series

ANALYSIS ISOMETRIC DRAWING - 47W465 - (200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-110-1RA			1	I
N1-210-1RA	200	N	2	I
N1-310-1RA			3	I
N1-110-2R			1	IA
N1-210-2R	210	N	2	IA
N1-310-2R			3	IA

ORIGINAL ISOMETRIC - None

ORIGINAL LOAD TABLES - 47B465-21, -22, -23, -24, -25, -26, -27, -28, -29, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -40, -41, -42, -43, -44, -45, -46, -47

ORIGINAL SUPPORT DETAILS - 47A465-Series

ORIGINAL HANGER LOCATION DRAWING - 47W465-H Series

ESTIMATED SUPPORTS UNIT 1 - 10

UNIT 2 - 10

UNIT 3 - 10

SYSTEM NAME - Fuel Oil

FLOW DIAGRAM - 47W840-1

PHYSICAL DRAWINGS - 47W588-Series, 47W586-Series

BILL OF MATERIAL - 47BM588-Series, 47BM586-Series

ANALYSIS ISOMETRIC DRAWING - 47W588 - (200 Series), 47W586- (200 Series)

INSULATION/MODE -

ANALYSIS PROBLEM
NUMBER

79-14 ISO

ISSUED?

UNIT

ACCESSIBILITY

N1-018-1D

1 & 2

A

N1-318-1D

3

A

N1-018-2D

1 & 2

A

N1-318-2D

3

A

N1-018-3D

1 & 2

A

N1-318-3D

3

A

ORIGINAL ISOMETRIC - None

ORIGINAL LOAD TABLES - None

ORIGINAL SUPPORT DETAILS - None

ORIGINAL HANGER LOCATION DRAWING - None

ESTIMATED SUPPORTS UNIT 1 -

UNIT 2 -

UNIT 3 -

SYSTEM NAME - RHR Service Water (In Reactor Bldg.)

FLOW DIAGRAM - 47W858-1

PHYSICAL DRAWINGS - 47W450-Series

BILL OF MATERIAL - 47BM435-26, 47BM450-Series

ANALYSIS ISOMETRIC DRAWING - 47W450 - (200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-123-1R	200	N	1	A
N1-223-1R	205	N	2	A
N1-323-1R	203	N	3	A
N1-123-2R			1	A
N1-223-2R	205	N	2	A
N1-323-2R	204	N	3	A
N1-123-3R			1	A
N1-223-3R	206	N	2	A
N1-323-3R	203	N	3	A
N1-123-4R			1	A
N1-223-4R	206	N	2	A
N1-343-4R	202	N	3	A
N1-123-5R			1	A
N1-223-5R	207	N	2	A
N1-323-5R	201	N	3	A
N1-123-6R			1	A
N1-223-6R	208	N	2	A
N1-323-6R	202	N	3	A

ORIGINAL ISOMETRIC - 47W450-5, -6, -7

ORIGINAL LOAD TABLES - 47B450-8 Thru -14, -19

ORIGINAL SUPPORT DETAILS - 47B450-16, -17, -18 & -20 Thru -40

ORIGINAL HANGER LOCATION DRAWING - 47W450-Series

ESTIMATED SUPPORTS UNIT 1 - 50
UNIT 2 - 46
UNIT 3 - 46

SYSTEM NAME - RHR Service Water Pumping Station

FLOW DIAGRAM -

PHYSICAL DRAWINGS - 37W205-Series

BILL OF MATERIAL -

ANALYSIS ISOMETRIC DRAWING - 37W205 - (200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-023-1R	200	Y	1,2,3	A
N1-023-2R	201	N	1,2,3	A
N1-023-3R	202	Y	1,2,3	A
N1-023-4R	203	Y	1,2,3	A
N1-023-5R	204	Y	1,2,3	A
N1-023-6R	204	Y	1,2,3	A
N1-023-7R	204	Y	1,2,3	A
N1-023-8R	204	Y	1,2,3	A

ORIGINAL ISOMETRIC -

ORIGINAL LOAD TABLES -

ORIGINAL SUPPORT DETAILS -

ORIGINAL HANGER LOCATION DRAWING -

ESTIMATED SUPPORTS UNIT 1 -

UNIT 2 -

UNIT 3 -

SYSTEM NAME - RHR Service Water Tunnel Piping (One Tunnel Each Unit)

FLOW DIAGRAM -

PHYSICAL DRAWINGS -

BILL OF MATERIAL -

ANALYSIS ISOMETRIC DRAWING -

INSULATION/MODE -

ANALYSIS PROBLEM

NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-123-7R	---	Y	1,2,3	A
N1-223-7R	201	Y	1,2,3	A
N1-323-7R	202	Y	1,2,3	A
N1-123-8R	---		1	A
N1-223-8R	---		2	A
N1-323-8R	---		1,2,3	A
N1-123-9R	---		3	A
N1-223-9R	---		2	A
N1-323-9R	---		3	A
N1-123-10R	---		1	A
N1-223-10R	---		2	A
N1-323-10R	---		3	A
N1-123-11R	---		1	A
N1-223-11R	---		2	A
N1-323-11R	---		3	A
N1-123-12R	---		1	A
N1-223-12R	---		2	A
N1-323-12R	---		3	A
N1-123-13R	---		1	A
N1-223-13R	---		2	A
N1-323-13R	---		3	A
N1-123-14R	---		1	A
N1-223-14R	---		2	A
N1-323-14R	---		3	A
N1-323-15R	---		3	A
N1-323-16R	---		3	A

ORIGINAL ISOMETRIC -

ORIGINAL LOAD TABLES -

ORIGINAL SUPPORT DETAILS -

ORIGINAL HANGER LOCATION DRAWING -

ESTIMATED SUPPORTS UNIT 1 -

UNIT 2 -

UNIT 3 -

SYSTEM NAME - Control Bay Air

FLOW DIAGRAM - 47W866-7, -3

PHYSICAL DRAWINGS - 47W935-Series

BILL OF MATERIAL - 47BM935-Series

ANALYSIS ISOMETRIC DRAWING - 47W935-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM

NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-031-2RA	200, 201, 202	Y	1 & 2	A
N1-031-3RA	200, 201, 202	Y	1 & 2	A
N1-031-3R			1 & 2	A
N1-031-4R			1 & 2	A
N1-031-5R			1 & 2	A
N1-031-6R			1 & 2	A
N1-331-3R			3	A
N1-221-4R			3	A
N1-331-5R			3	A
N1-331-6R			3	A
N1-331-7R			3	A
N1-331-8R			3	A

ORIGINAL ISOMETRIC - None

ORIGINAL LOAD TABLES - None

ORIGINAL SUPPORT DETAILS - None

ORIGINAL HANGER LOCATION DRAWING - 47W935-Series

ESTIMATED SUPPORTS UNIT 1 -

UNIT 2 -

UNIT 3 -

SYSTEM NAME - CO₂ Storage, F.P.

FLOW DIAGRAM - 47W843-1

PHYSICAL DRAWINGS - 47W950-Series

BILL OF MATERIAL - 47BM591-Series, 47BM590-Series

ANALYSIS ISOMETRIC DRAWING - 47W590-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM
NUMBER

79-14 ISO

ISSUED?

UNIT

ACCESSIBILITY

N1-039-1C

1,2,3

A

N1-039-2D

1,2,3

A

ORIGINAL ISOMETRIC - None

ORIGINAL LOAD TABLES - 47B591-1, 47B590-1

ORIGINAL SUPPORT DETAILS - 47B590-2, -3 & 591-2, -3

ORIGINAL HANGER LOCATION DRAWING - 47W590-1, 47W591-1

ESTIMATED SUPPORTS UNIT 1 -

UNIT 2 -

UNIT 3 -

SYSTEM NAME - Standby Liquid Control

FLOW DIAGRAM - 47W854-1

PHYSICAL DRAWINGS - 47W462-Series

BILL OF MATERIAL - 47BM462-Series

ANALYSIS ISOMETRIC DRAWING - 47W462-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM

NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-163-1R	202, 203	N	1	PA
N1-263-1R	204, 205	N	2	PA
N1-363-1R	200, 201	N	3	PA
N1-163-2R			1	IA
N1-263-2R	206	N	2	IA
N1-363-2R			3	IA
N1-163-3R			1	A
N1-263-3R	207	N	2	A
N1-363-3R			3	A

ORIGINAL ISOMETRIC - 47W462-4

ORIGINAL LOAD TABLES - 47B462-1, -2, -3

ORIGINAL SUPPORT DETAILS - 47B462-4 Thru -11

ORIGINAL HANGER LOCATION DRAWING - 47W462-Series

ESTIMATED SUPPORTS UNIT 1 - 76

UNIT 2 - 76

UNIT 3 - 76

SYSTEM NAME - EECW

FLOW DIAGRAM - 47W859-1, -2

PHYSICAL DRAWINGS - 47W451-Series

BILL OF MATERIAL - 47BM435-30, 47BM451-Series

ANALYSIS ISOMETRIC DRAWING - 47W451-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-DGB-A1	223	Y	1,2,3	A
N1-167-1RA	200,201	Y	1	A
N1-167-1RB	202	N	1	A
N1-267-1R	222	N	2	A
N1-367-1R			3	A
N1-167-2RA	203	N	1	A
N1-167-2RB	204	N	1	A
N1-367-2R			3	A
N1-167-3RA			1	A
N1-167-3RB			1	A
N1-267-3RA			2	A
N1-267-3RB			2	A
N1-367-3RA	214	N	3	A
N1-367-3RB	215	N	3	A
N1-167-4RA	207	N	1	A
N1-167-4RB	208	N	1	A
N1-167-4RC	212	N	1	A
N1-167-4RD	213	N	1	A
N1-267-4RA			2	A
N1-267-4RB			2	A
N1-267-4RC	232,233	Y	2	A
N1-267-4RD			2	A
N1-367-4RA	216,221	N	3	A
N1-367-4RB	217	N	3	A
N1-367-4RC	218, 219	N	3	A
N1-367-4RD	220	N	3	A
N1-167-5RA	209	Y	1	A
N1-167-5CB			1	A
N1-367-5R			3	A
N1-167-6RA			1	A
N1-167-6RB			1	A
N1-167-6RC			1	A
N1-167-6RD			1	A
N1-367-6R			3	A
N1-367-7R			3	A

SYSTEM NAME - EECW

FLOW DIAGRAM - 47W859-1, -2

PHYSICAL DRAWINGS - 47W451-Series

BILL OF MATERIAL - 47BM435-30, 47BM451-Series

ANALYSIS ISOMETRIC DRAWING - 47W451-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-DGB-A1	223	Y	1,2,3	A
N1-167-1RA	200,201	Y	1	A
N1-167-1RB	202	N	1	A
N1-267-1R	222	N	2	A
N1-367-1R			3	A
N1-167-2RA	203	N	1	A
N1-167-2RB	204	N	1	A
N1-367-2R			3	A
N1-167-3RA			1	A
N1-167-3RB			1	A
N1-267-3RA			2	A
N1-267-3RB			2	A
N1-367-3RA	214	N	3	A
N1-367-3RB	215	N	3	A
N1-167-4RA	207	N	1	A
N1-167-4RB	208	N	1	A
N1-167-4RC	212	N	1	A
N1-167-4RD	213	N	1	A
N1-267-4RA			2	A
N1-267-4RB			2	A
N1-267-4RC	232,233	Y	2	A
N1-267-4RD			2	A
N1-367-4RA	216,221	N	3	A
N1-367-4RB	217	N	3	A
N1-367-4RC	218, 219	N	3	A
N1-367-4RD	220	N	3	A
N1-167-5RA	209	Y	1	A
N1-167-5CB			1	A
N1-367-5R			3	A
N1-167-6RA			1	A
N1-167-6RB			1	A
N1-167-6RC			1	A
N1-167-6RD			1	A
N1-367-6R			3	A
N1-367-7R			3	A

ANALYSIS PROBLEM
NUMBER

79-14 ISO

ISSUED?

UNIT

ACCESSIBILITY

N1-367-8R			3	A
N1-367-8RB			3	A
N1-367-8RC			3	A
N1-367-8RD			3	A
N1-167-9R	211	N	3	A

ORIGINAL ISOMETRIC - 47W451-8, -9

ORIGINAL LOAD TABLES - 47B451-Series

ORIGINAL SUPPORT DETAILS - 48N1217-Series, 47A451-Series

ORIGINAL HANGER LOCATION DRAWING - 47W451-Series

ESTIMATED SUPPORTS UNIT 1 - 267
UNIT 2 - 269
UNIT 3 - 269

SYSTEM NAME - Recirculation Loop

FLOW DIAGRAM - 47W817-1

PHYSICAL DRAWINGS - GE153F754

BILL OF MATERIAL - Contract 90744, 91750

ANALYSIS ISOMETRIC DRAWING - 47W408-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM

NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-168-1R	200,201,202*	Y	1	IA
N1-268-1R	203,204,**	N	2	IA
N1-368-1R			3	IA

ORIGINAL ISOMETRIC - None - 200

ORIGINAL LOAD TABLES - GE729E461

ORIGINAL SUPPORT DETAILS - 47A465-200 & Grinnell SK. 200 Thru 211

ORIGINAL HANGER LOCATION DRAWING - GE729E462, GE729E461

ESTIMATED SUPPORTS UNIT 1 - 61
UNIT 2 - 39
UNIT 3 - 61

* Also 47W452-269 Y

** Also 47W452-270 N

SYSTEM NAME - RWCU

FLOW DIAGRAM - 47W810-1

PHYSICAL DRAWINGS - 47W406-Series

BILL OF MATERIAL - 47BM406-Series

ANALYSIS ISOMETRIC DRAWING - 47W406-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-169-1R	202, 203	Y,N	1	IA
N1-169-2R	200	N	1	A
N1-269-2R	204	N	2	A
N1-369-2R	201	N	3	A
N1-169-4R	205	N	1	PA
N1-269-4R	206	N	2	PA
N1-369-4R			3	PA

ORIGINAL ISOMETRIC - 47W335-14

ORIGINAL LOAD TABLES - None

ORIGINAL SUPPORT DETAILS - 47A406-Series

ORIGINAL HANGER LOCATION DRAWING - 47W406 Series

ESTIMATED SUPPORTS UNIT 1 - 15

UNIT 2 - 7

UNIT 3 - 14

SYSTEM NAME - RBCCW

FLOW DIAGRAM - 47W822-1

PHYSICAL DRAWINGS - 47W464-Series

BILL OF MATERIAL - 47BM464-Series

ANALYSIS ISOMETRIC DRAWING - 47W464-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM

NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-170-1R	204, 205	N	1	IA
N1-270-1R	221, 222	N	2	IA
N1-370-1R	200, 201	N	3	IA
N1-170-2R	202, 203	N	1	IA
N1-270-2R	219, 220	N	2	IA
N1-370-2R	206, 207	N	3	IA
N1-170-3R	212, 213	N	1	A
N1-270-3R	223, 224	N	2	A
N1-370-3R	208, 209	N	3	A
N1-170-4R	211, 212	N	1	A
N1-270-4R	225, 226	N	2	A
N1-370-4R	210, 216	N	3	A
N1-170-5R	214, 215	N	1	A
N1-270-5R	228, 229	N	2	A
N1-370-5R	217, 218	N	3	A
N1-170-6R			1	A
N1-270-6R			2	A
N1-370-6R			3	A
N1-170-7R			1	IA
N1-270-7R			1	IA
N1-370-7R			3	IA
N1-270-8R			2	IA
N1-270-9R			2	IA

ORIGINAL ISOMETRIC - 47W464-15 Thru -18

ORIGINAL LOAD TABLES - 47B464-31

ORIGINAL SUPPORT DETAILS - 47B464-21, 47A464-Series

ORIGINAL HANGER LOCATION DRAWING - 47W464-X Series

ESTIMATED SUPPORTS UNIT 1 - 184

UNIT 2 - 184

UNIT 3 - 184

SYSTEM NAME - RCIC

FLOW DIAGRAM - 47W813-1

PHYSICAL DRAWINGS - 47W456-Series

BILL OF MATERIAL - 47BM456-Series, 47BM435-0, -1, -4, -5, -10 & -29

ANALYSIS ISOMETRIC DRAWING - 47W456-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-171-4R	212	N	1	PA
N1-271-4R	214	N	2	PA
N1-371-4R			3	PA
N1-171-5R	213	N	1	PA
N1-271-5R	215, 216	N	2	PA
N1-371-5R			3	PA

ORIGINAL ISOMETRIC - 47W335-16, -17

ORIGINAL LOAD TABLES - 47B456-21, -22, -23, -31

ORIGINAL SUPPORT DETAILS - 47A456 Series

ORIGINAL HANGER LOCATION DRAWING - 47W456-H Series

ESTIMATED SUPPORTS UNIT 1 - 77

UNIT 2 - 77

UNIT 3 - 77

SYSTEM NAME - HPCI

FLOW DIAGRAM - 47W812-1

PHYSICAL DRAWINGS - 47W455 Series

BILL OF MATERIAL - 47BM435-0, -1, -3, -4, -5, -7, -9, 47BM455 Series

ANALYSIS ISOMETRIC DRAWING - 47W455-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM

NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-173-6R	211, 212	N	1	PA
N1-273-6R	216, 217, 218	N	2	PA
N1-373-6R			3	PA
N1-173-8R	200	N	1	A
N1-273-8R	219	N	2	A
N1-373-8R			3	A
N1-273-9R			2	A
N1-173-10*	200	N	1	IA
N1-273-10*	215	Y	2	IA
N1-373-10*			3	IA

ORIGINAL ISOMETRIC - 47W335-9 Thru -13

ORIGINAL LOAD TABLES - 47B455-21 Thru -27, -31, -32

ORIGINAL SUPPORT DETAILS - 47A455 Series

ORIGINAL HANGER LOCATION DRAWING - 47W455-H Series

ESTIMATED SUPPORTS UNIT 1 - 132

UNIT 2 - 132

UNIT 3 - 132

*COMPLETELY LAPPED BY N1-201-2RB IS PROB. NECESSARY?

SYSTEM NAME - RHR

FLOW DIAGRAM - 47W811-1

PHYSICAL DRAWINGS - 47W452-Series

BILL OF MATERIAL - 47BM435-1, -3, -5, -8, -10, -11, 14, -29, 47BM452-Series

ANALYSIS ISOMETRIC DRAWING - 47W452-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-174-1R	250, 261	N	1	A
N1-274-1R	281	Y	2	A
N1-374-1R			3	A
N1-174-5R	249, 257	N	1	A
N1-274-5R	280	N	2	A
N1-374-5R			3	A
N1-174-6R	254	N	1	A
N1-174-7R	253, 256	N	1	A
N1-374-7R			3	A
N1-174-8R	252	N	1	A
N1-174-9R	258, 259	N	1	IA
N1-274-9R	284, 286	N	2	IA
N1-374-9R			3	IA
N1-174-10R	275	N	1	A
N1-374-10R	264, 278	N	3	A
N1-174-11R	255, 279	Y,N	1	IA
N1-274-11R	273	Y	2	A
N1-374-11R	272	Y	3	A
N1-374-12R	265	N	3	A
N1-174-14R	251	N	1	A
N1-374-14R	266	N	3	A
N1-174-16R	277	N	1	A
N1-174-17R	267	N	1	A
N1-274-17R				
N1-174-18R	268	N	1	A
N1-274-18R			2	A
N1-174-19R			1	A
N1-274-23R			2	A

ORIGINAL ISOMETRIC - 47W335-4 Thru -8

ORIGINAL LOAD TABLES - 47B452-21 Thru -37

ORIGINAL SUPPORT DETAILS - 47B452-38, 47A452-Series

ORIGINAL HANGER LOCATION DRAWING - 47W452-H Series

ESTIMATED SUPPORTS UNIT 1 - 296, UNIT 2 - 296, UNIT 3 - 296

SYSTEM NAME - RHR X TIE

FLOW DIAGRAM - 47W811-1

PHYSICAL DRAWINGS - E21, E55, 148, 171, Thru 174

BILL OF MATERIAL - E21, E32, E56, E57, 148, 173, 174

ANALYSIS ISOMETRIC DRAWING - 47W452-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM
NUMBER

79-14 ISO

ISSUED?

UNIT

ACCESSIBILITY

N1-274-7R

282

N

2

A

N1-274-14R

283

N

2

A

ORIGINAL ISOMETRIC - None

ORIGINAL LOAD TABLES - None

ORIGINAL SUPPORT DETAILS - E32, E56, E57, 117C, 47B452-39

ORIGINAL HANGER LOCATION DRAWING - E52, E56, E57, 117C

ESTIMATED SUPPORTS UNIT 1 - 16

UNIT 2 - 16

UNIT 3 - 16

SYSTEM NAME - DSH

FLOW DIAGRAM - 47W811-1

PHYSICAL DRAWINGS - E21, E55, 148, 171, 172, 173, 174

BILL OF MATERIAL - E21, E32, E56, E57, 148, 173, 174

ANALYSIS ISOMETRIC DRAWING - 47W452-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM
NUMBER

79-14 ISO

ISSUED?

UNIT

ACCESSIBILITY

N1-174-20R			1	IA
N1-174-21R			1	IA
N1-274-20R			2	IA
N1-274-21R			2	IA
N1-374-20R			3	IA
N1-374-21R			3	IA

ORIGINAL ISOMETRIC - None

ORIGINAL LOAD TABLES - None

ORIGINAL SUPPORT DETAILS - E32, E56, E57, 117C, 47B452-39

ORIGINAL HANGER LOCATION DRAWING - E32, E56, E37, 117C

ESTIMATED SUPPORTS UNIT 1 - 12

UNIT 2 - 8

UNIT 3 - 16

SYSTEM NAME - CORE SPRAY

FLOW DIAGRAM - 47W814-1

PHYSICAL DRAWINGS - 47W458-Series

BILL OF MATERIAL - 47BM458-Series, 47BM435-1, -3, -5, -8, -10, -11

ANALYSIS ISOMETRIC DRAWING - 47W458-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-175-4RA	222	Y	1	IA
N1-275-4RA	224	N	2	IA
N1-375-4RA	226	N	3	IA
N1-175-4RB	223	Y	1	IA
N1-275-4RB	225	N	2	IA
N1-375-4RB	227	N	3	IA

ORIGINAL ISOMETRIC - 47W335-15

ORIGINAL LOAD TABLES - 47B458-21, -22, -23, -31

ORIGINAL SUPPORT DETAILS - 47A458

ORIGINAL HANGER LOCATION DRAWING - 47W458-H-Series

ESTIMATED SUPPORTS UNIT 1 - 160

UNIT 2 - 160

UNIT 3 - 160

SYSTEM NAME - RADWASTE

FLOW DIAGRAM - 47W852-1, -2

PHYSICAL DRAWINGS - 47W482-Series

BILL OF MATERIAL - 47BM482-Series

ANALYSIS ISOMETRIC DRAWING - 47W482-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-177-1R	200, 205	N	1	IA
N1-277-1R	208, 209	N	2	A
N1-377-1R			3	A
N1-177-2R			1	IA
N1-277-2R	210, 211	N	2	IA
N1-377-2R			3	IA
N1-177-3R			1	A
N1-277-3R			2	A
N1-377-3R			3	A
N1-177-4R			1	IA
N1-277-4R			2	IA
N1-377-4R			3	IA
N1-177-5R			1	A
N1-277-5R			2	A
N1-377-5R			3	A

ORIGINAL ISOMETRIC - None

ORIGINAL LOAD TABLES - 47B482-1, -2

ORIGINAL SUPPORT DETAILS - 47B482-3, -4

ORIGINAL HANGER LOCATION DRAWING - 47W482 Series

ESTIMATED SUPPORTS UNIT 1 - 73

UNIT 2 - 73

UNIT 3 - 73

SYSTEM NAME - FPCS

FLOW DIAGRAM - 47W855-1

PHYSICAL DRAWINGS - 47W454-Series

BILL OF MATERIAL - 47BM454-Series

ANALYSIS ISOMETRIC DRAWING - 47W454-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-178-1R	200, 201	N	1	PA
N1-278-1R	210, 211	N	2	PA
N1-378-1R	227, 228	N	3	PA
N1-178-2RA	213 Thru 217	N	1	PA
N1-278-2RA			2	PA
N1-378-2RA	220 Thru 224	N	3	PA
N1-178-2RB			1	IA
N1-228-2RB			2	IA
N1-378-3RB			3	IA
N1-178-2RC			1	IA
N1-278-2RC			2	IA
N1-378-2RC			3	IA
N1-178-2RD			1	IA
N1-278-2RD			2	IA
N1-378-2RD			3	IA
N1-178-2RE			1	IA
N1-278-2RE			2	IA
N1-378-2RE			3	IA
N1-178-3R	206	N	1	A
N1-278-3R	219	N	2	A
N1-378-3R	226	N	3	A
N1-278-4R	219	N	2	A
N1-378-4R			3	A

ORIGINAL ISOMETRIC - None

ORIGINAL LOAD TABLES - 47B454-1, -2, -16

ORIGINAL SUPPORT DETAILS - 47B454-5 Thru -15 & -17 Thru -28

ORIGINAL HANGER LOCATION DRAWING - 47W454-Series

ESTIMATED SUPPORTS UNIT 1 - 134

UNIT 2 - 134

UNIT 3 - 118

SYSTEM NAME - CONTROL ROD DRIVE (RL)

FLOW DIAGRAM - 47W820-2

PHYSICAL DRAWINGS - 47W468-Series

BILL OF MATERIAL - 47BM600-23

ANALYSIS ISOMETRIC DRAWING - 47W468-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	IFSUED?	UNIT	ACCESSIBILITY
N1-185-1R	218	N	1	PA
N1-285-1R			2	PA
N1-385-1R	216	N	3	PA

ORIGINAL ISOMETRIC - None

ORIGINAL LOAD TABLES - None

ORIGINAL SUPPORT DETAILS - 47W600-72

ORIGINAL HANGER LOCATION DRAWING - 47W600-72

ESTIMATED SUPPORTS UNIT 1 - 100
UNIT 2 - 106
UNIT 3 - 89

SYSTEM NAME - CONTROL ROD DRIVE (SDM)

FLOW DIAGRAM - 47W820-2

PHYSICAL DRAWINGS - 47W468-Series

BILL OF MATERIAL - 47BM600-23

ANALYSIS ISOMETRIC DRAWING - 47W468-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-185-2R	200 Thru 202, 207	Y	1	
N1-285-2R	203 Thru 206	Y	2	
N1-385-2R	210 Thru 212	Y	3	

ORIGINAL ISOMETRIC - None

ORIGINAL LOAD TABLES - None

ORIGINAL SUPPORT DETAILS - 47W600-72

ORIGINAL HANGER LOCATION DRAWING - 47W600-72

ESTIMATED SUPPORTS UNIT 1 - 100
UNIT 2 - 106
UNIT 3 - 89

SYSTEM NAME - DRYWELL CONTROL AIR

FLOW DIAGRAM - 47W847-4, -5, -5A

PHYSICAL DRAWINGS - 47W400-Series

BILL OF MATERIAL - 47BM600-Series

ANALYSIS ISOMETRIC DRAWING - 47W600-(200 Series, See Below)

INSULATION/MODE -

ANALYSIS PROBLEM NUMBER	79-14 ISO	ISSUED?	UNIT	ACCESSIBILITY
N1-132-1R	260	Y	1	A
N1-232-1R	262	Y	2	A
N1-332-1R	261	Y	3	A

ORIGINAL ISOMETRIC - None

ORIGINAL LOAD TABLES - None

ORIGINAL SUPPORT DETAILS - 47W600-155

ORIGINAL HANGER LOCATION DRAWING - 47W600-116

ESTIMATED SUPPORTS UNIT 1 - 41

UNIT 2 - 41

UNIT 3 - 41