

TENNESSEE VALLEY AUTHORITY

NUCLEAR ENGINEERING

FOR INFORMATION ONLY



BFNP PI PI86-26 032691 4

INTERIM ORDER 1

000461-001

BROWNS FERRY NUCLEAR PLANT

BFEP PI 86-26



BASELINE TEST REQUIREMENTS TITLE:

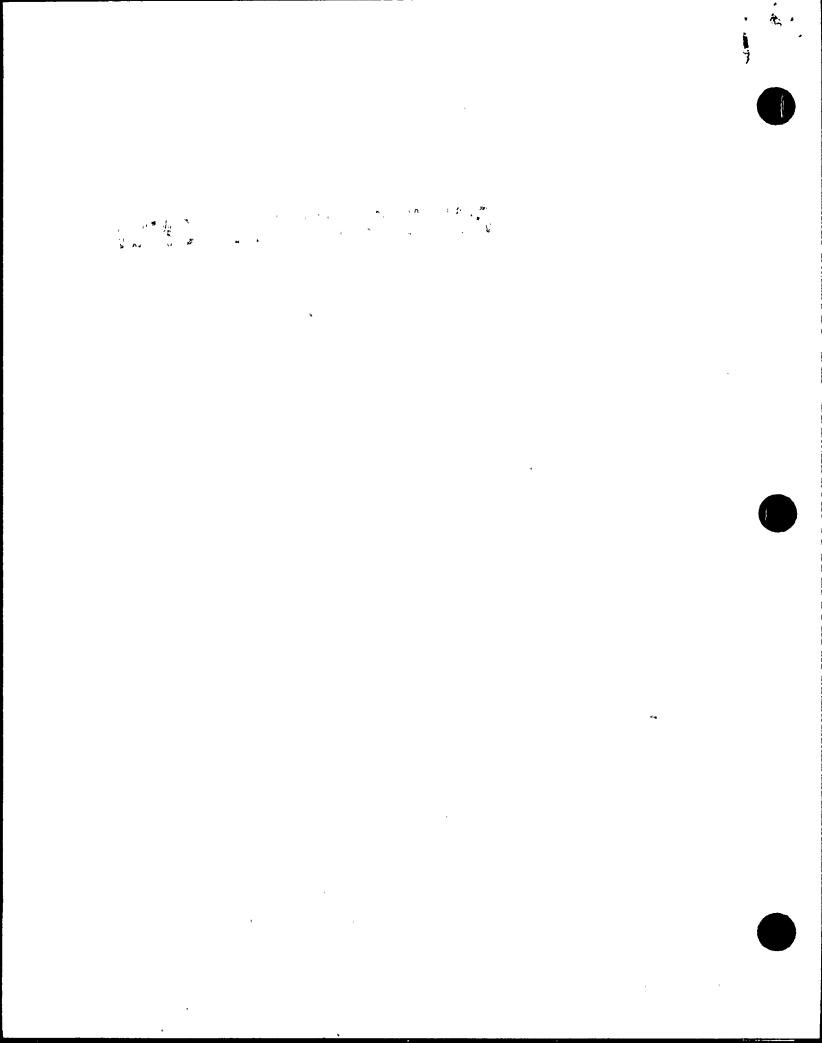


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INTERIM ORDE	R 1 00046.	1-001				
	REVISION RO	R1	R2	R3	R4	R5
EFFECTIVE DATE					MAR-26	1991
PREPARED	09/24/86 J.K. Herrick	04/24/87 J.Gasbarro	12/21/87 J.Gasbarro	08/04/88 J.Gasbarro	2-13-91 W.Vose	
REVIEWED	09/26/86 J. F.Weinhold	05/22/87 J.L.Walton	12/22/87 D.P.Burre	08/08/88 lBurrell	H. Gron	
DC REVIEWED	NA	NA	NA	NA .	75 Punls	<u></u>
PE APPROVED	10/02/86 J.P.Stapleton	06/01/87 r.G.Chapme	12/22/87 nP.J.Speid	08/09/88 el Speidel	J.S.Malla	
APPROVAL DATE	10/04/86	07/30/87	12/22/87	08/09/88	MAR 12	1991



QA Record

RT4 93 0428 202

Browns Ferry Engineering Project (BFEP) Manual Holders APR 28 1993

BROWNS FERRY NUCLEAR PLANT (BFN) - BFEP PROJECT INSTRUCTION (PI) 86-26 REVISION 4 - INTERIM ORDER (IO) NO. 2

The purpose of this memorandum is to issue an IO to the subject PI. This IO is issued to remove the requirement to issue copies of the Baseline Test Requirement Document (BTRD) by memorandum to the Plant Manager.

This IO shall be effective upon approval of this memorandum and shall be incorporated into the subject PI during the next revision.

L. Walton Design Control

EDB 1B-BFN

JV:WCW:PA Attachment

cc (Attachment):

J. N. Kaelin, TCE 6A-BFN

RIMS, ET SLP-K

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BFNP PI BFEP PI 86-26 INTERIM ORDER 2

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Engineering Manager

EDB 1A-BFN

QA Record

Browns Ferry Engineering Project (BFEP) Manual Holders JUN 1 9 1992

BROWNS FERRY NUCLEAR PLANT (BFN) - BFEP PROJECT INSTRUCTION (PI) 86-26 REVISION 4 - INTERIM ORDER (IO) NO. 1

The purpose of this memorandum is to issue an IO to the subject PI. This IO is issued to update the Baseline Test Requirement Document (BTRD) numbering requirements to be consistent with the System Requirement Calculation (SRC) number.

This IO shall be effective upon approval of this memorandum and shall be incorporated into the subject PI during the next revision.

J. L. Walton
Design Control
EDB 1B-BFN

Engineering Manager

JV:RNL:SGM:DH Attachment

cc (Attachment):

RIMS, ET SLP-K

J. N. Kaelin, TCE 6A-BFN

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REVISION LOG

Title: BAS	SELINE TEST REQUIREMENTS	IO No. 2. Pg 2 of 2
Revision No.	DESCRIPTION OF REVISION	APR 2 8 1993 Approved
, ₩	Interim Order No. / R14 92 0618 Revise Section 5.4 on page 3 of 5 to the BTRD numbering requirements Revise Saction 5.9.1 (also on page 3 of 5). The example consistent with the example Section 5.4. Total pages 20 Training is required. R14 93 0428 Interim Order No 2 Revise section 5.6 to remove the required issue copies of the BTRD by me to the Plant Manaiger. (Page 3 of Total pages 20)	b moke in 2 199
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Title: BASELINE TEST REQUIREMENTS

REVISION LOG BFEP PI 86-26 REVISION 4

little: BAS	ELINE TEST REQUIREMENTS REVISION 4	<u>'</u>
Revision No.	DESCRIPTION OF REVISION	Date ' Approved
1	Revised 1.0 - Purpose of Procedure to coincide with the Scope of Design Baseline and Verification Program.	7-3-87
	Revised 2.0 - Scope of Procedure to coincide with the Scope of Design Baseline and Verification Program. Clarified last sentence of paragraph on nonexistent component data.	
	Revised 3.2 - Definition of SRC to be consistent with other Browns Ferry Engineering Procedures.	
	Added 3.5 - Definition of System Design Criteria.	
j	Added 3.6 - Definition of Restart Test Engineer.	
	Added 4.3 - Design Criteria as input information to the preparation of the BTRD. Also added Attachment F - List of Design Criteria.	
	Revised Section 5.0 - Procedure to Reflect the Actual Process of Preparing the BTRD.	
	Paragraph 5.4 was revised to reflect the identification number of the BTRD.	
	Added interdiscipline review to the cover sheet of the BTRD. See Attachment E.	
	Added Attachment C - Format of BTRD.	
	Added Attachment D - Format of Test Scoping Document.	
	Added Section 7.0 - List of Attachments.	
2	This revision addresses overall changes to the procedure where interfaces between procedures have not been adequately addressed. These areas are marked by revision bars.	12/22/87
3	The purpose of this revision is to allow partial change notices to be issued against the Baseline Test Requirements. These areas are marked by revision bars.	8/9/88
4	on test exception disposition, and test results review and to transfer test scoping document preparation instructions from NEP 10.4, which has been superseded. These changes are marked by revision bars.	1 2 199
	Training Required.	
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R4

R4

1.0 PURPOSE-

The purpose of this procedure is to provide a document that specifies the scope of the functional tests considered necessary to demonstrate that the systems identified by the Design Baseline and Verification Program (DB&VP) (Phase I - Pre-Restart; Phase II - Post-Restart) will meet their safe shutdown requirements.

2.0 SCOPE

The scope of this procedure applies to the systems (or portions of systems) identified in the DB&VP (Phase I - Pre-Restart; Phase II - Post-Restart). This includes any detailed component testing or partial system testing as necessary to ensure the functional ability of the system as it is constructed.

3.0 DEFINITIONS

3.1 Baseline System Engineer (BSE)

A Nuclear Engineering (NE) engineer having responsibility for the safety evaluation portions of the DB&VP activities for a given system.

3.2 System Requirements Calculation

A NE calculation which defines for a given system all requirements for safe shutdown. See Attachment A for a list of calculation numbers by system.

3.3 Plant System Engineer

The BFN plant engineer cognizant of system activities.

3.4 Reviewer

An independent and technically qualified engineer assigned to verify the work of the preparer for correctness, technical adequacy, and compliance with design input.

3.5 System Design Criteria

Functional and design requirements that govern the design of structures, systems, and components.

3.6 Restart Test Engineer

The BFN person cognizant of assigned System Test Specification (STS), Restart Test Program (RTP), test preparation, and RTP test conduct.

3.7 NE Testing Coordinator

The NE engineer who has overall administrative responsibility for coordinating NE testing activities and maintaining the nuclear testing program within NE.

3.8 Baseline Test Requirement Document

A design document that identifies the functional testing required on a system to demonstrate the safe shutdown design requirements for that system.

3.9 Joint Test Group

A group of personnel acting as a Subcommittee of the Plant Operation Review Committee (PORC) with authority to review STS and RTP tests as described in SDSP-27.4.

4.0 INPUT INFORMATION

- 4.1 Application design drawings such as a flow diagram, control diagram, elementary diagram, or connection diagram.
- 4.2 System Requirements Calculations, (Attachment A).
- 4.3 System Design Criteria.

5.0 PROCEDURE

- 5.1 The BSE refers to the System Requirements Calculation and System Design Criteria for the source definitions of all operating modes required of the system and using the checklists given in Attachment B for guidance, the BSE prepares a list of functional tests that demonstrate the system/component performance required for each system mode.
- 5.2 The BSE prepares the Baseline Test Requirement Document (BTRD) to cover all functional tests for the system and/or components in accordance with the format of Attachment C.

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- 5.3 Utllizing the guidance and format in Attachment D, the BSE shall prepare a test scoping document (TSD) for each functional test. All individual TSDs will be included as attachments to the BTRD.
- 5.4 The BSE prepares one BTRD cover sheet (Attachment E). The number assigned to the document shall be BFN-BTRD-XXX where XXX coincides with the last three numbers on the System Requirement Calculation number. (Example: BFN-BTRD-000 for the Fuel Oil System)

 Three digit TVA system designation.
- .5.5 The BSE forwards the BTRD to the NE Testing Coordinator who shall a coordinate review in accordance with NEP 5.2 to confirm incorporation of all identified operating modes, technical adequacy and conformance to the nuclear testing program. The BTRD shall be approved by the Lead Discipline Engineer in the discipline having prepared the BTRD, RIMS'd, and issued.
- 5.6 The NE Testing Coordinator shall issue copies of the BTRD by memorandum to the Plant Hanager and Technical Support Services at BFW.

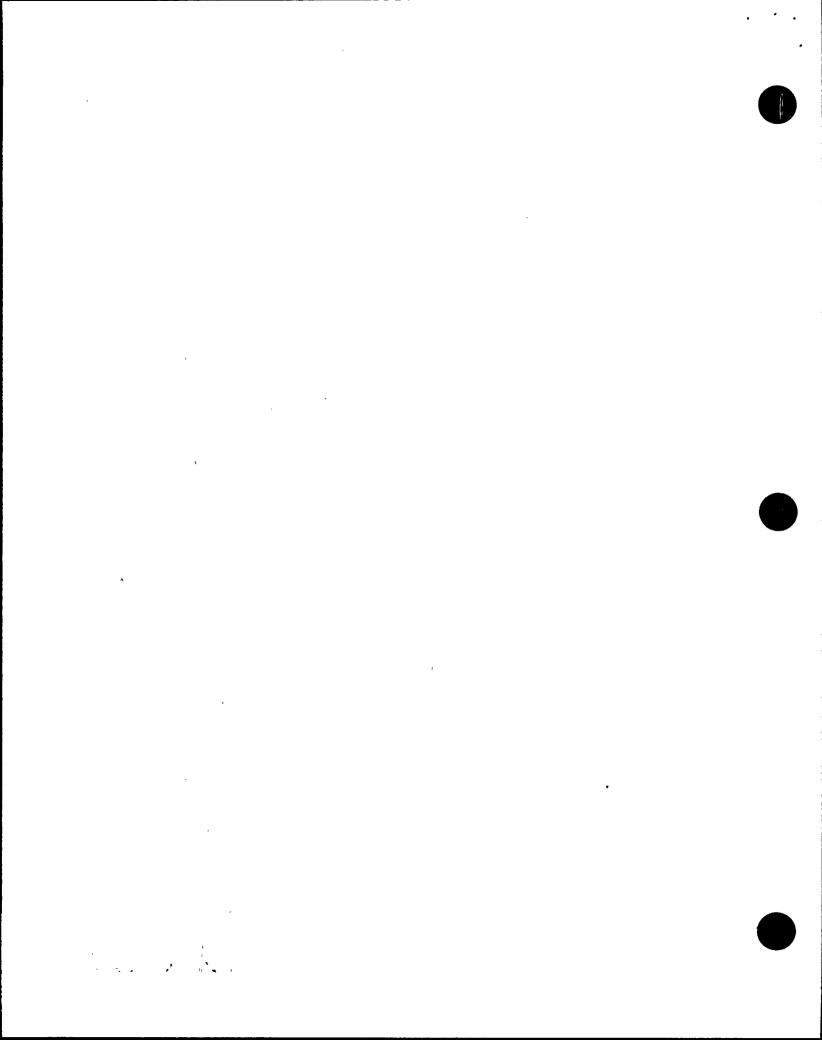
IO2

- 5.7 Overall revisions to the BTRD shall be processed with the same procedure as the original issue, i.e., steps 5.1 through 5.6 above.
- 5.8 Clarifications to the BTRD can be made via formal memorandum provided the technical content or the acceptance criteria of the BTRD is not changed.
- 5.9 Partial revisions to the BTRD can be made by issuing Change Notices in the following manner:
 - 5.9.1 Use Attachment F to prepare and document the Change Notice to the BTRD. Change Notices are numbered sequentially. Each Change Notice shall clearly be identified with the BTRD revision level for which the Change Notice is issued. (Example: Change Notice No. 2 to BFN-BTRD-600, Revision 1.)

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- 5.9.2 Forward the Change Notice to the NE Testing Coordinator who shall ensure that review, approval, and distribution are handled by the same organizations and method as the original BTRD.
- 5.9.3 A limit of four Change Notices may be issued for a given BTRD revision level then, on the next required change, the BTRD shall be given an overall revision as described in sections 5.7 and the Change Notices shall be incorporated into this revision.

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- 5.10 Implementation of the BTRD for actual testing is covered by SDSP 12.1 and 12.2 (References 6.4 and 6.5). NE approval of the STS, RTP, changes to STS's and RTP's, test results approval, and test exception final acceptance is accomplished through NE's representation on the Joint Test Group (JTG) per SDSP 27.4 (Reference 6.7). The NE Testing Coordinator shall serve as the central point of contact between NE and the site organization performing the testing during this phase of DB&VP conduct.
 - 5.10.1 STSs, RTPs, and Change Notices thereto, are transmitted to the NE Testing Coordinator who shall coordinate NE review to ensure that testing requirements of the BTRD are incorporated into these test documents and that overall restart testing is adequate to satisfy DB&VP requirements.
 - 5.10.2 RTP test results are transmitted to the NE Testing Coordinator who shall coordinate the NE review to verify that BTRD acceptance criteria are met and that DB&VP requirements are satisfied.
 - 5.10.3 All RTP test exceptions shall be evaluated against the criteria of SDSP 3.13 (Reference 6.8) and a Condition Adverse to Quality Report (CAQR) initiated, if required. Test exceptions may be dispositioned by DCNs, WR's, Change Notices, CAQRs or design output documents. Formal memorandum from NE may be used for clarification purposes, however, memorandum shall not be used to change or delete testing requirements or acceptance criteria specified by a design output document.

6.0 REFERENCES

- 6.1 System Requirements Calculation for the given system (Attachment A).
- 6.2 NEP 10.3, Nuclear Testing Program.
- 6.3 NEP 5.2, Review.

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- 6.4 SDSP 12.1, Restart Test Program.
- 6.5 SDSP 12.2, Development of System Test Specifications.
- 6.6 NE Calculation, ND-Q2999-90039, "System Mode Requirements for DB&VP Restart Plan (B22 901208 115).
- 6.7 SDSP 27.4, Plant Operations Review Committee.
- 6.8 SDSP 3.13, Corrective Action.

7.0 ATTACHMENTS

- 7.1 Attachment A List of System Requirements Calculations
- 7.2 Attachment B Checklist for Baseline Test Requirements
- 7.3 Attachment C Format for Baseline Test Requirement Document
- 7.4 Attachment D Format for Test Scoping Document .
- 7.5 Attachment E Baseline Test Requirement Document Cover Sheet
- 7.6 Attachment F Baseline Test Requirement Document Change Form

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SYSTEM REQUIREMENTS CALCULATION

Water

The following calculations have been voided. The listing is being retained in this procedure in order to document the basis for deriving the testing requirements presently specified in the BTRD's. These calculations represent the original engineering evaluations used to develop the Design Baseline and Verification Program.

Calculation Title

System Requirements for Diesel Air System System Requirements for Main Steam System System Requirements for Condensate Storage and Transfer System System Requirements for Reactor Feedwater System System Requirements for Boiler Drains and Vents System Requirements for Fuel Oil System System Requirements for RHR Service Water System Requirements for Raw Cooling Water System Requirements for Raw Service Water System Requirements for Condenser Circulation System Requirements for Ventilation System

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Ident. Number

BFN-BFS3-002

BFN-BFS3-004

BFN-BFS3-005

BFN-BFS3-006

BFN-BFS3-007

BFN-BFS3-008

BFN-BFS3-009

BFN-BFS3-010

BFN-BFS3-011

BFN-BFS3-012

BFN-BFS3-013

BFN-BFS3-014

BFN-BFS3-015

BFN-BFS3-016

BFN-BFS3-017

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System Requirements for CO2 System

System Requirements for Air Conditioning System

System Requirements for Control Air System

System Requirements for Service Air System

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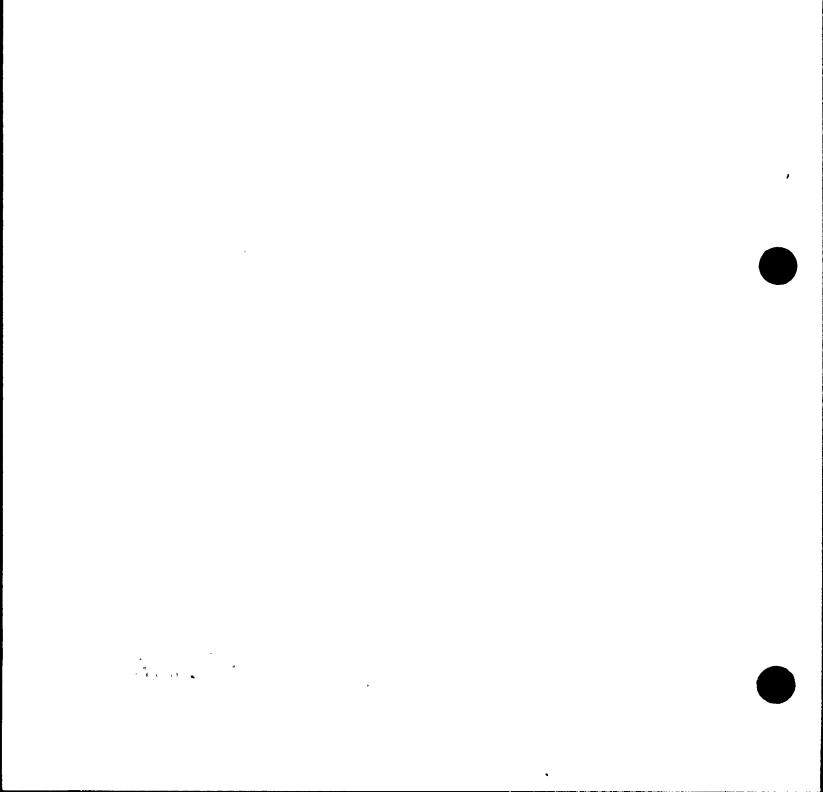
ATTACHMENT A

SYSTEM REQUIREMENTS CALCULATION (Continued)

BFN-BFS3-018	System Requirements for Sampling and Water Quality
BFN-BFS3-019	System Requirements for Backup Control Communication
BFN-BFS3-020	System Requirements for Turbine Generator EHC System
BFN-BFS3-021	System Requirements for Standby Liquid Control System
BFN-BFS3-022	System Requirements for Primary Containment Isolation System
BFN-BFS3-023	System Requirements for 4KV Distribution System
BFN-BFS3-024	System Requirements for Secondary Containment System
BFN-BFS3-025	System Requirements for Switchyard and Miscellaneous Distribution
BFN-BFS3-026	System Requirements for EECW System
BFN-BFS3-027	System Requirements for Reactor Water Recirculation System
BFN-BFS3-028	System Requirements for Reactor Water Cleanup System
BFN-BFS3-029	System Requirements for Standby Gas Treatment System
BFN-BFS3-030	System Requirements for RBCCW System
BFN-BFS3-031	System Requirements for RCIC System
BFN-BFS3-032	System Requirements for HPCI System

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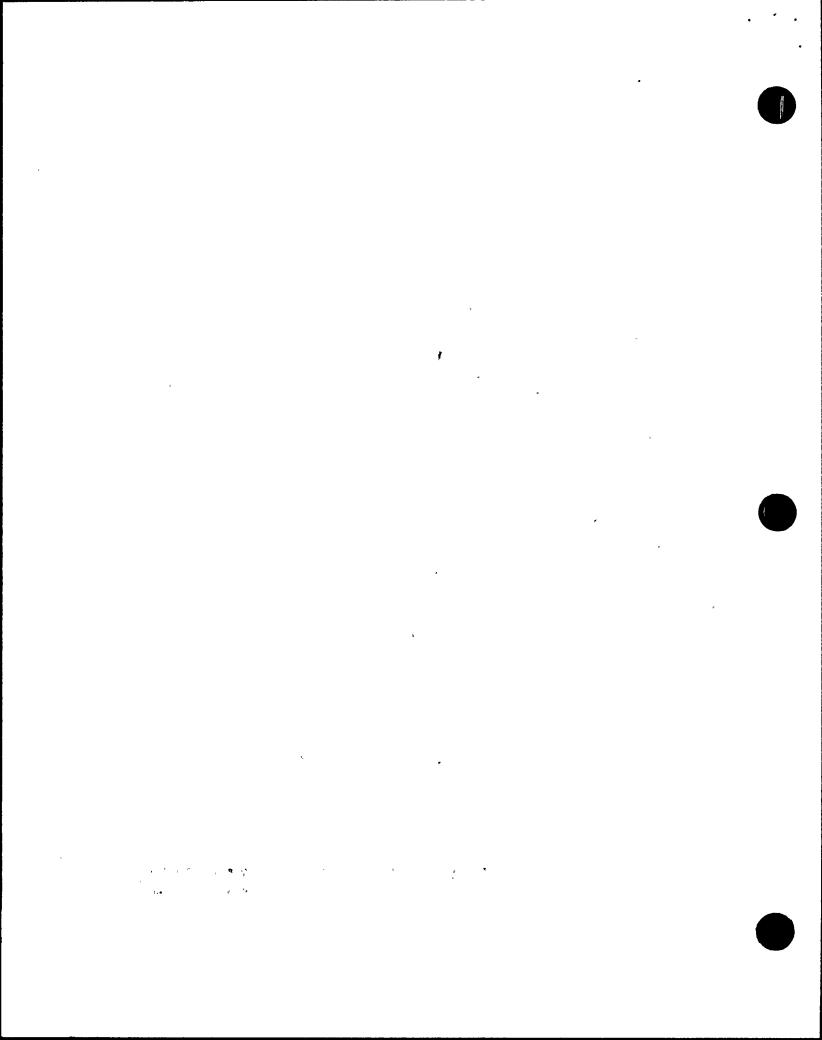
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ATTACHMENT A

SYSTEM REQUIREMENTS CALCULATION (Continued)

BFN-BFS3-033	System Requirements	for RHR System
BFN-BFS3-034	System Requirements	for Core Spray System
BFN-BFS3-035	System Requirements	for Containment Inerting
BFN-BFS3-036	System Requirements	for Radwaste
BFN-BFS3-037	System Requirements	for Fuel Pool Cooling
BFN-BFS3-038	System Requirements	for Fuel Handling and Storage
BFN-BFS3-039	System Requirements	for Diesel Generator System
BFN-BFS3-040	System Requirements Dilution	for Containment Atmospheric
BFN-BFS3-041	System Requirements	for Control Rod Drive
BFN-BFS3-042	System Requirements	for Radiation Monitoring
BFN-BFS3-043	System Requirements	for Neutron Monitoring
BFN-BFS3-044	System Requirements	for Transversing Incore Probe
BFN-BFS3-045	System Requirements	for Reactor Protection System
BFN-BFS3-046	System Requirements	for 125 V Diesel Battery
BFN-BFS3-047	System Requirements	for 208/120 V Supply Systems
BFN-BFS3-048	System Requirements	for 250 V Distribution System
BFN-BFS3-049	System Requirements	for 480 V Distribution System



ATTACHHENT B

CHECKLIST FOR BASELINE TEST REQUIREMENTS

- 1. Have all the system operating modes been considered that are documented in the System Requirement Calculation (system mode data sheets), including all pertinent plant operating states?
- 2. Do the test requirements adequately cover the change in position (normal to mode position) of the tested components?
- 3. Do all parameters have acceptance criteria and numerical tolerance where appropriate?
- 4. Are all necessary interlocks included?
- 5. Is automatic positioning from a test mode to the operating mode included where applicable?
- 6. For some cooling and ventilating systems, the significant system performance is during plant power operation, when the normal heat loads are present. For those cases (if necessary), prepare a data sheet requesting historic power operation data, including a list of the parameters and instruments (by number) for which data is needed.
- 7. If the system conditions or plant conditions of interest (such as post-accidental environmental temperature or pressure) cannot be readily established during test, or were not present during normal power operation, sufficient and specific data should be requested to permit extrapolation to the conditions of interest as necessary.
- 8. If redundant chains are involved, is it necessary to test both chains?

ATTACHMENT C

FORMAT FOR BASELINE TEST REQUIREMENT DOCUMENT

Contents of Baseline Test Requirement Documents (BTRD) shall consist of the following:

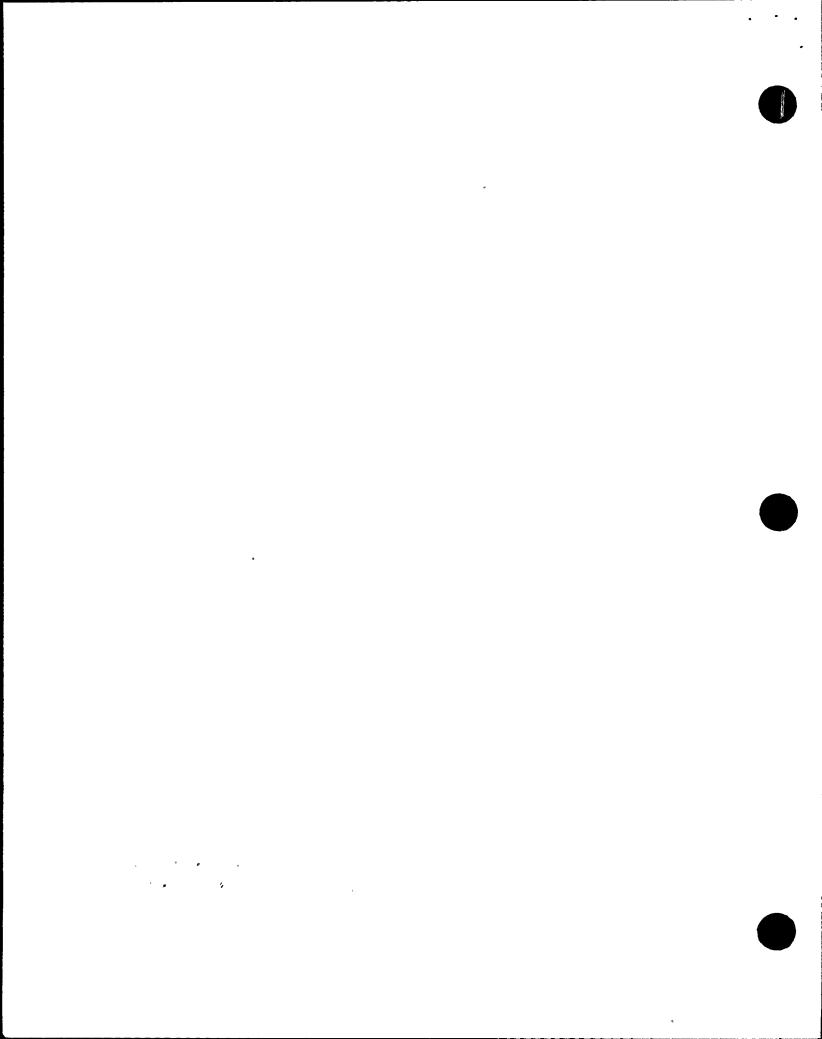
Cover Sheet (Attachment E)

Revision Log

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- 1.0 PURPOSE
- 2.0 SCOPE
- 3.0 ASSUMPTIONS
- 4.0 REFERENCE DOCUMENTS
- 5.0 DOCUMENTATION OF ASSUMPTIONS
- 6.0 ANALYSIS
- 7.0 SUMMARY
- 8.0 CONCLUSION
- 9.0 LIST OF ATTACHMENTS

D A



ATTACHMENT D

FORMAT FOR TEST SCOPING DOCUMENT

Test Scoping Documents (TSDs) shall be numbered as BFN-TSD-NNN-X where NNN is the three digit number designation of the system being tested and X is the alphabetical sequence letter of the attachment starting with "A". (Example: BFN-TSD-031-B would be the second test scoping document attached to the System 31 BTRD.) The TSD number goes at the top of the first page of the attachment. Sections of the scoping document are designated with the alphabetical sequence letter assigned for that , attachment. Contents of the scoping document sections are defined as follows: (The letter "A" is shown as an example. Subsection examples would be A.1.1, A.9.3.3, etc.)

TEST SCOPING DOCUMENT BFN-TSD-000-A

A.1 SCOPE OF TESTING

Refer to the table of required tests contained in Section 6.0 of the BTRD. Provide a brief description of the extent of the test, i.e., system boundaries, functional scope, etc. Identify the major component(s), equipment, system(s) to be tested, and describe the type of testing to be performed.

A.2 TEST OBJECTIVES

Describe specifically what is to be verified by the test (e.g., capability of the system to supply rated flow; ability to isolate containment during an accident; etc.). Define specifically what must be achieved in order to determine that the test is satisfactory (e.g., upon receipt of an initiate signal, the HPCI pump will automatically start and inject water from the Condensate Storage Tank (CST) into the reactor vessel at rated flow; upon receipt of an accident signal, the Group 6 containment isolation valves will close; etc.).

A.3 REQUIRED SYSTEM CONFIGURATION

Refer to the list of required component positions contained in Section 6.0 of the BTRD. Specify the component(s) position/state expected during the normal operating mode ("normal" condition) and the position/state desired for conduct of the test ("test" condition). This may be accomplished by generating Component Position tables for various test configurations in the TSD.

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ATTACHMENT D

FORMAT FOR TEST SCOPING DOCUMENT (Continued)

A.4 INITIAL SYSTEM CONDITIONS

Describe the required plant conditions and system initial conditions necessary to perform the test. Define what system(s) must be operating or operable to perform the test. Indicate operating parameters such as whether the system should be operating at normal temperature and pressure, high or low level, full or drained, etc. Identify equipment that should be removed or installed for the test with special consideration for boundary or support systems which might be adversely affected if the system is operated.

A.5 SPECIAL TEST PRECAUTIONS

Identify any adverse conditions or actions associated with unique test configurations which plant operation or test personnel might not normally expect during this test. Other precautions to consider are: actions which might place the plant in a Limiting Condition for Operation (LCO), actions which might start ECCS systems, limitations as identified in the Technical Specifications, limitations as identified by vendor manuals or administrative policy.

A.6 ACCEPTANCE CRITERIA

Specify the qualitative or quantitative requirements which the testing must meet in order to determine success or failure of the test results. Where quantitative values or limits are used, tolerances or a range of acceptable values must be specified.

A.7 SPECIAL TEST EQUIPMENT OR INSTRUMENTS

Identify any special test equipment or instruments required to perform the test. The accuracy should be identified, if known. Permanent plant instruments used to acquire test data and commonly used test equipment (e.g., voltmeters, pressure gauges, oscilloscopes, etc.) are not considered special test equipment. The intent here is to identify any unique equipment that might require special purchase, rental, custom fitting or fabrication, or acquisition of vendor special test equipment which might delay performance of the test. If such equipment is not required, indicate "None".

ATTACHMENT D

FORMAT FOR TEST SCOPING DOCUMENT (Continued)

A.8 ADEQUATE DETAILED DATA IN LIEU OF FULL ENVIRONMENTAL SIMULATION

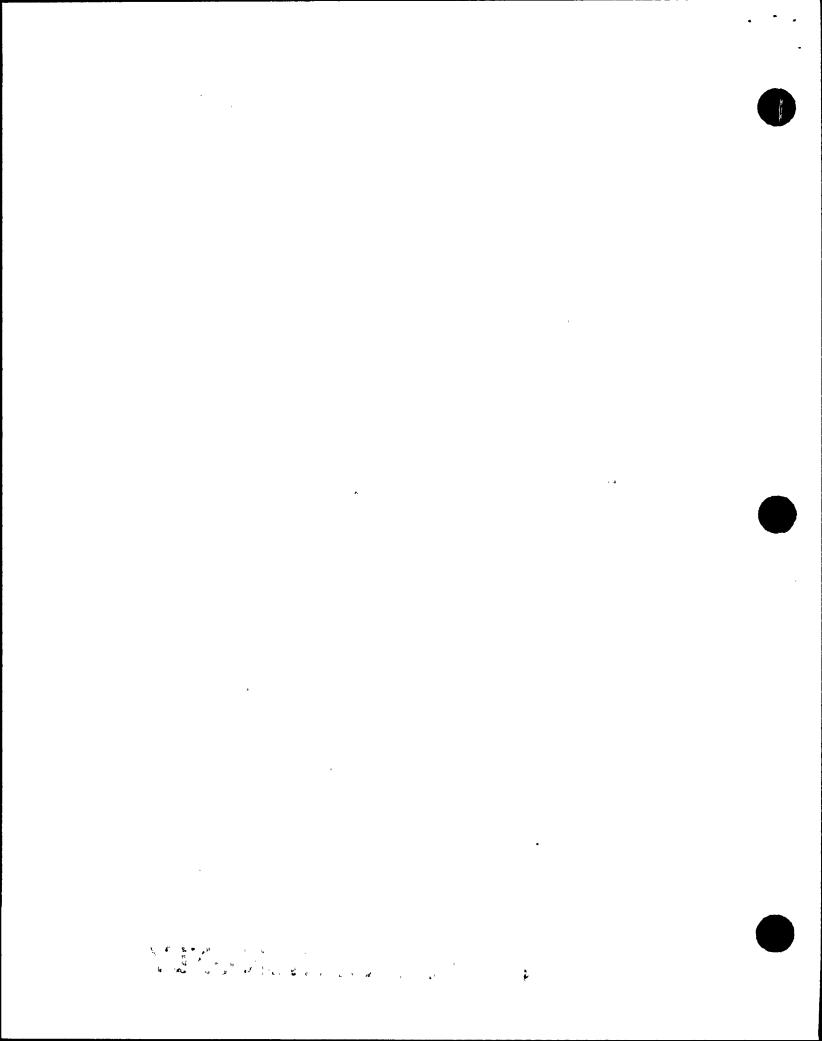
For those test where it is not practical or possible to simulate the environmental conditions necessary to fully test the component or system in its intended operational mode (e.g., provide post-accident conditions of high pressure and temperature in the drywell in order to functionally test the Post Accident Sampling System), describe the alternative test method or data collection necessary to allow extrapolation to the conditions of interest.

A.9 TEST RECORD DRAWING LIST

As required, list the flow diagrams that are used to define the boundary/scope of the test. Also, list any schematic diagrams or control diagrams that define the system functional logic.

A.10 REFERENCES

List references that define the basis for the acceptance criteria, provide design input, provide test requirements or that support the technical aspects of the test. <u>DO NOT</u> list administrative or programmatic procedures or references.



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ATTACHMENT E

	, BAS	ELINE TEST REQUIRE NUMBER: BFN-BTR	MENT DOCUMENT	
System Name:			Syste	em Number:
REVISION	<u>R0</u>	<u>R1</u>	<u>R2</u>	<u>R3</u>
Prepared: _				
Reviewed: _				
Interface Re	view:			
M/N _				
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APPROVED: _				
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REV (f	or RIMS use)		RIMS AC	cession Number
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ATTACHMENT F

{ Heading: appears on each page. }	
BASELINE TEST REQUIREMENT DOCUMENT	
BFN-BTRD, REV	
CHANGE NOTICE NO Pag	e 1 of
(Body: use as many pages as required.)	l.
{ Title of BTRD, first page only }	
PURPOSE: { Describe the reason for the change to the BTRE { e.g., Test Exception, configuration change, et); } :c. }
REFERENCES: { Reference all applicable design input that { supports the change to the document.	}
JUSTIFICATION: { Document the technical basis for the change ar { show no adverse impact on system capability to { meet its design bases requirements.	ad } > }
DESCRIPTION: (List the section(s) of the BTRD that are affect and describe the changes that are to be made.	eted} }
{ Reviews/Approvals: appears on last page only. }	
Prepared by: Interface Review: M/N	
Reviewed by:	
Approved by: CE	
Date:	

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