Docket

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 13, 1994

Docket Nos. 50-259
and 50-296

LICENSEE: Tennessee Valley Authority

FACILITY: Browns Ferry Nuclear Plant, Units 1 and 3

SUBJECT: SUMMARY OF THE DECEMBER 14, 1993 MEETING REGARDING THE RESTART TEST PROGRAM FOR THE BROWNS FERRY NUCLEAR PLANT, UNITS 1 AND 3

On December 14, 1993, representatives of the NRC staff, NRC contractors, and the Tennessee Valley Authority (TVA) met in Rockville, Maryland to discuss the restart test program (RTP) for the Browns Ferry Nuclear Plant (BFN), Units 1 and 3. Meeting attendees are listed in Enclosure 1. Enclosure 2 contains handouts provided by TVA.

The NRC staff has established a position for programs supporting restart of BFN Units 1 and 3. The NRR staff will evaluate the differences from similar programs previously approved for the BFN Unit 2 restart. Programs that remain the same will not be re-evaluated. All programs are subject to inspection to verify proper implementation. This meeting was intended to ensure the staff has a thorough understanding of the RTP, with an emphasis on the differences from the Unit 2 program. The meeting also provided a mechanism to identify staff questions and concerns, and communicate these to TVA so that any additional information required to complete the staff review could be provided in a timely manner.

TVA's presentation was based upon the enclosed handouts. TVA emphasized that the BFN RTP is not an initial or pre-operational test program, such as that discussed by Regulatory Guide (RG) 1.68. Rather, the RTP verifies that the plant equipment required for safe shutdown of the unit is capable of meeting design requirements. The NRC agreed with TVA's characterization of the RTP, but noted since there is no direct guidance for plant restart from extended shutdowns, the staff often depends on RG 1.68 to provide a framework for review.

The fundamental difference between the BFN Unit 2 RTP and the revised program is the integration of test requirements from all sources in an effort to eliminate duplicative testing. The flowchart included in the TVA handout shows that the RTP requirements are combined with other requirements to develop integrated test procedures.

TVA has provided several submittals describing the BFN Units 1 and 3 RTP. These submittals discuss the integrated testing approach, and provide a summary of tests to be performed to fulfill RTP requirements. The presentation also included a discussion of the differences between the Units 1 and 3 RTP and the safety evaluations on the Unit 2 RTP. In response to a

staff request, TVA indicated it would prepare a letter with a more detailed description of the revised RTP differences from the Unit 2 safety evaluation.

TVA expressed the view that the revised RTP is bounded by the staff's safety evaluations for the Unit 2 RTP. The NRR staff plans to prepare a safety evaluation of the changes in the Units 1 and 3 RTP from the previously-approved Unit 2 program, verifying the differences do not diminish the program's effectiveness. Program implementation, including the scope and performance of testing, will be evaluated by inspection.

Original signed by

Joseph F. Williams, Project Manager
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Enclosures:
1. Attendance List
2. TVA Handout

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See next page
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Enclosures 1 and 2
Docket File
PDR & LPDR
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DATE	1/13/94	1/13/94	1/13/94	1/13/94	

DOCUMENT NAME: G:\BFN\RTPMTTG.SUM

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ENCLOSURE 1

ATTENDEES

DECEMBER 14, 1993 TVA/NRC MEETING

BROWNS FERRY UNITS 1 AND 3 RESTART TEST PROGRAM

NAME	ORGANIZATION
Masoud Bajestani	TVA - Technical Support
Jeff Lewis	TVA - Restart Test
Pamela Newman	Energy Daily
Roger Huston	TVA - Rockville
Joe McCarthy	TVA - Mechanical/Nuclear Project Engineer
Tim Abney	TVA - Licensing
Tim Mitts	Battelle PNL
Robert Gruel	Battelle PNL
Ray Ramirez	NRR/DRIL
Juan Peralta	NRR/DRIL
Joe Williams	NRR/PDII-4
Linda Watson	Region II
Dave Trimble	NRR/PDII-4

AGENDA
RESTART TEST PROGRAM PRESENTATION

I. Introduction - T. Abney

II. Presentation
   A. RTP background - J. Lewis
   B. Unit 3 Program Overview - M. Bajestani
   C. Baseline Test Requirements - J. McCarthy
   D. Program Demonstration with SLC - J. McCarthy, J. Lewis
   E. Comparison of Unit 3 RTP to NUREG 1232 - J. Lewis
   F. Power Ascension Program - J. Lewis

III. Discussion
   A. Followup topics
   B. Action items

RESTART TEST PROGRAM BACKGROUND

- RTP WAS ESTABLISHED TO VERIFY THAT SYSTEMS WERE CAPABLE OF MEETING THEIR SAFE SHUTDOWN REQUIREMENTS FOR BFN UNIT 2 RESTART
  - RTP WAS ESTABLISHED AS A SEPARATE PLANT ORGANIZATION STAFFED PRIMARILY BY CONTRACTORS WITH A RTP MANAGER HAVING EXTENSIVE EXPERIENCE IN PERFORMING AND MANAGING BOILING WATER REACTOR PLANT TESTS
  - TVA TECH SUPPORT SYSTEM ENGINEERS INTERFACED WITH RTP ENGINEERS AND PROVIDED TECHNICAL REVIEWS
  - RTP ENGINEERS EVALUATED THE FOLLOWING AREAS TO DETERMINE TEST REQUIREMENTS:
    * PLANT MODIFICATIONS AND INTERACTION BETWEEN COMPLETED DESIGN CHANGES
    * PLANT MAINTENANCE HISTORY
    * PLANT OPERATOR FEEDBACK
    * CONDITION ADVERSE TO QUALITY REPORTS AND LICENSING COMMITMENTS
    * VENDOR MANUAL RECOMMENDATIONS

- AS PART OF THE DESIGN BASELINE VERIFICATION PROGRAM, TVA IDENTIFIED CERTAIN SYSTEM SAFE SHUTDOWN FUNCTIONS WHICH REQUIRED VALIDATION DUE TO CONFIGURATION CHANGES THAT OCCURRED AFTER PREOP TESTING
  - A DECISION WAS MADE TO VERIFY THESE SYSTEM FUNCTIONS BY TEST VIA THE RTP
  - TVA DESIGN ENGINEERING DEVELOPED BASELINE TEST REQUIREMENTS DOCUMENTS (BTRD's) TO COMMUNICATE THESE TEST REQUIREMENTS TO THE RTP

- TEST REQUIREMENTS IDENTIFIED FROM THE BTRD AND RTP REVIEWS WERE COMPILED AND DOCUMENTED BY THE RTP ENGINEERS IN SYSTEM TEST SPECIFICATIONS (STS)

RESTART TEST PROGRAM BACKGROUND

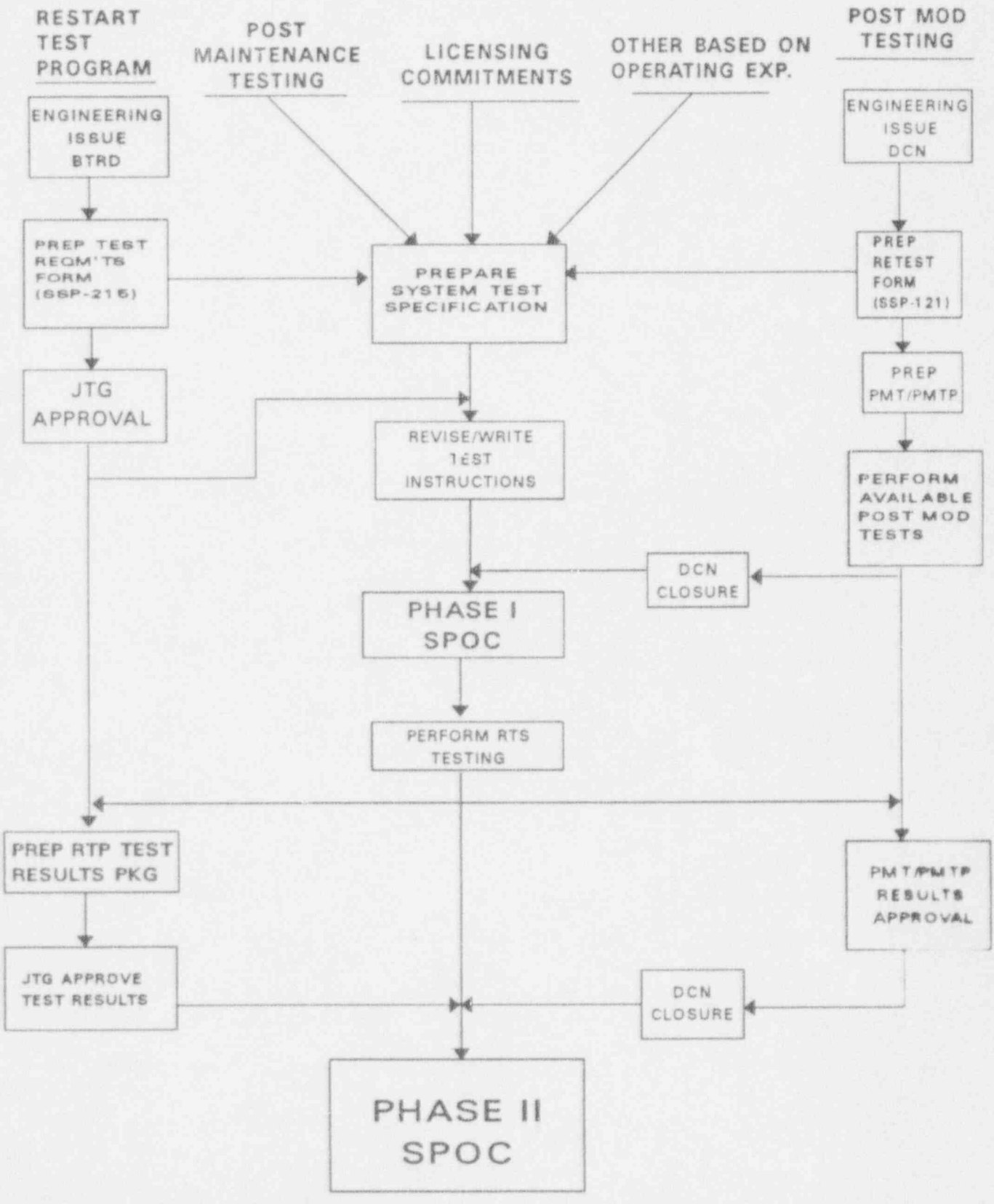
- RTP TEST INSTRUCTIONS WERE WRITTEN BY THE RTP ENGINEERS BASED ON THE STS

- A PORC SUBCOMMITTEE (JOINT TEST GROUP) WAS ESTABLISHED TO REVIEW AND APPROVE RTP DOCUMENTATION

- THE RTP WAS IMPLEMENTED AS A SEPARATE PROGRAM FROM POST MODIFICATION AND POST MAINTENANCE TESTING
  - DUPLICATE TESTING WAS PERFORMED DUE TO EXISTENCE OF SIMILAR TEST REQUIREMENTS IN OTHER PROGRAMS
  - NUMEROUS TEST EXCEPTIONS RESULTED FROM PARALLEL IMPLEMENTATION OF MODIFICATIONS, MAINTENANCE, AND THE RTP

- KEY LESSONS LEARNED FROM THE UNIT 2 RTP WERE:
  - TEST THE SYSTEM ONCE, AFTER THE COMPLETION OF MODIFICATIONS OR MAINTENANCE, WHERE POSSIBLE
  - CONDUCT TESTS USING NORMAL PLANT ADMINISTRATIVE PROCEDURES FOR TEST CONTROL. THIS WILL MINIMIZE PLANT TESTING COORDINATION PROBLEMS.
  - USE EXISTING PLANT PROCEDURES (e.g., SURVEILLANCE INSTRUCTIONS) TO OBTAIN REQUIRED TEST DATA WHERE POSSIBLE. THIS EFFECTIVELY ELIMINATES DUPLICATION IN TEST PREPARATION AND ENHANCES TEST PERFORMANCE.
  - SCHEDULE WORK AND SYSTEM COMPLETION DATES TO MINIMIZE REQUIRED TEST EXCEPTIONS.

BFN UNIT 3 INTEGRATED TESTING FLOW CHART



RTP IMPLEMENTATION PROCESS

- JOINT TEST GROUP (JTG) APPROVES RTP TEST REQUIREMENTS FORM

- INSTRUCTIONS ARE SCHEDULED FOR PERFORMANCE FOLLOWING COMPLETION OF FIELD WORK
  - SYSTEM READINESS FOR TESTING IS EVALUATED BY COMPLETION OF A CHECKLIST
    - 3-STM-001 (STARTUP TEST MANUAL) FOR TESTING PRIOR TO PHASE I SPOC
    - SSP-12.55 (SYSTEM PRE-OPERABILITY CHECKLIST) FOR TESTING AFTER PHASE I SPOC
  - ALL TESTING IS CONDUCTED IN ACCORDANCE WITH THE BFN SITE STANDARD FOR CONDUCT OF TESTING SSP-6.1
  - TEST DIRECTOR EVALUATES POTENTIAL AFFECT OF TEST ON THE OPERATING UNIT AND COMMUNICATES THIS TO PLANT OPERATIONS DURING PRETEST BRIEFING
  - TEST DEFICIENCIES ENCOUNTERED DURING TEST CONDUCT ARE DOCUMENTED ON FORM SSP-96 AND EVALUATED FOR:
    - CONDITION ADVERSE TO QUALITY (CAQ)
    - TECHNICAL SPECIFICATION CRITERIA
    - POTENTIAL LIMITING CONDITION FOR OPERATION (LCO)

- TECH SUPPORT ENGINEER EVALUATES TEST RESULTS AGAINST RTP ACCEPTANCE CRITERIA FROM SSP-215 FORM
  - TEST DEFICIENCIES ARE EVALUATED TO DETERMINE IMPACT ON RTP CRITERIA
  - ALL TEST DEFICIENCIES DETERMINED TO BE WITHIN THE SCOPE OF THE RTP ARE TRACKED AND TRENDED
  - RTP MANAGER PROVIDES UPPER MANAGEMENT PERIODIC REPORTS ON PROGRAM STATUS INCLUDING TD TRENDING
  - ACCEPTANCE CRITERIA OF SSP-215 IS SIGNED OFF WHEN SATISFACTORY TEST RESULTS ARE OBTAINED

- TECH SUPPORT ENGINEER PREPARES RTP TEST RESULTS PACKAGE FOLLOWING COMPLETION OF ALL TESTS INCLUDING:
  - TEST SUMMARY
  - SYSTEM PUNCHLIST
  - SYSTEM TEST SPECIFICATION
  - SIGNED OFF SSP-215
  - APPLICABLE TEST DATA

- JOINT TEST GROUP APPROVES RTP TEST RESULTS PACKAGE

COMPARISON CHART

RESTART TEST PROGRAM UNIT 2 VS UNITS 1 AND 3

NUREG 1232 VOLUME 3

RTP WAS IMPLEMENTED BY WRITTEN RTP TEST PROCEDURES

SYSTEM TEST SPECIFICATION DEFINED RTP SCOPE ONLY

RTP INCLUDED A SYSTEM CHECKLIST AND GROUPED SYSTEMS BY IMPORTANCE TO SAFETY

STS REVIEW CRITERIA INCLUDED VENDOR REQUIREMENTS AND MODIFICATIONS INTERACTION

RTP SCOPE INCLUDED INTEGRATED SYSTEM TESTS

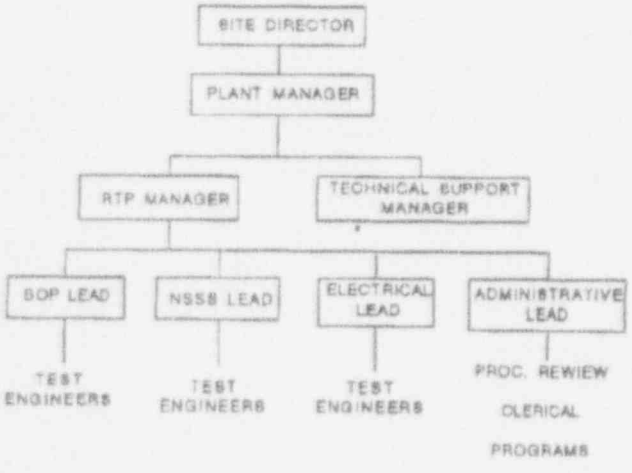
JTG RECOMMENDED APPPROVAL TO THE PLANT MANAGER

RTP WAS A SEPARATE ORG REPORTING TO SITE DIRECTOR

JTG MEMBERSHIP INCLUDED THE UNIT 2 OPS MANAGER AS CHAIRMAN, AND MODIFICATIONS & RTP MEMBERS

PROGRAM PROCEDURES WERE SDSP-12.1, 12.2, SIL'S

UNIT 2 ORGANIZATION



UNIT 3 RTP

SITE INSTRUCTIONS USED TO SATISFY RTP TEST REQMTS

STS INCLUDES ALL TEST REQMTS FOR SYSTEM RTS

SSP-12.55 GROUPS SYSTEMS, PROVIDES A PREOPERABILIY CHECKLIST AND A TEST RELEASE PROCESS

STS TAKES CREDIT FOR UNIT 2 REVIEW AND UPGRADED SITE PROCEDURES AND POST MOD TEST PROGRAMS

INTEGRATED SYSTEM TESTING IS CONTROLLED VIA OPERATING PROCEDURES AND SCHEDULE MILESTONES

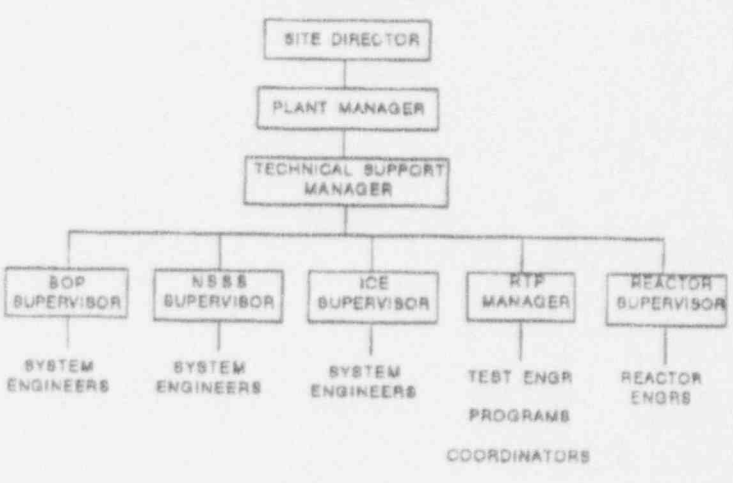
TECH SUPPORT MANAGER IS FINAL APPROVAL AUTHORITY

RTP IMPLEMENTED WITHIN TECH SUPPORT, RTP MGR REPORTS TO THE TECH SUPPORT MANAGER

A TECH SUPPORT MANAGER IS CHAIRMAN, MODIFICATIONS NOT A MEMBER, RTP NOT INCLUDED AS A SEP. MEMBER

PROGRAM PROCEDURES ARE SSP-6.50, 3-STM-001

UNIT 3 ORGANIZATION



RTP MANAGER IS RESPONSIBLE FOR COORDINATION OF UNIT 3 RECOVERY ACTIVITIES, INCLUDING THE RTP, THROUGH THE RESPECTIVE SYSTEMS SUPERVISORS.

SYSTEM TESTING NOT PERFORMED BY OTHER SITE ORGANIZATIONS IS PERFORMED BY SYSTEM ENGINEERS

TABLE 1

CORRELATION BETWEEN BFN UNITS 2 AND 3 PAT PROGRAMS
AND REGULATORY GUIDE 1.68

BFN TEST	TEST NAME	UNIT 2 TEST	TEST FOR UNIT 3	OPEN VESSEL	0-55%	55 - 100%
SI 4.6.B.1-4	CHEMICAL/RADIOCHEMICAL	YES	YES	X/N	X/N	X/N
RCI 1	RADIATION MEASUREMENTS	YES	YES		X/N	X/N
SI 4.3.A.1	REACTIVITY MARGIN TEST	YES	YES		X/N	
TI 20	CONTROL ROD DRIVE SYSTEM	YES	YES	X/N	X/N	N
GOI-100-1A	SOURCE RANGE MONITOR	YES	YES		X/N	
TI 149	WATER LEVEL MEASUREMENTS	YES	YES		X/N	X
SI 4.2.C-3	INTERMEDIATE RANGE MONITOR	YES	YES		X/N	
SI 4.1.B-3	LOCAL POWER RANGE MONITOR CALIBRATION	YES	YES		X/N	X/N
TI 136	AVERAGE POWER RANGE MONITOR (CONSTANT HEATUP)	YES	YES		X/N	
SI 4.1.B-2	AVERAGE POWER RANGE MONITOR CALIBRATION	YES	YES		X/N	X/N
TI 135	PROCESS COMPUTER	YES	YES		X/N	X/N
TI 188	REACTOR CORE ISOLATION COOLING SYSTEM	YES	YES		X/N	
TI 189	HIGH PRESSURE COOLANT INJECTION SYSTEM	YES	YES		X/N	X/N
TI 149	SELECTED PROCESS TEMPERATURE	YES	YES		X/N	X/N
TI 190	SYSTEM EXPANSION	YES	YES		X/N	
TI 137	CORE POWER DISTRIBUTION	YES	YES		X/N	X/N
SI 2.1	CORE PERFORMANCE	YES	YES		X/N	X/N
NA	CORE POWER VOID MODE RESPONSE	NA	NA		N	
TI 130	PRESSURE REGULATOR	YES	YES		X/N	X/N
TI 131	FEEDWATER SYSTEM	YES	YES*		X/N	X/N
SI 4.1.A.15	TURBINE SURVEILLANCE	YES	YES		X/N	X/N
SI 4.7.D	MAIN STEAM ISOLATION VALVE	YES	YES		X/N	N
SI 4.6.D	SAFETY RELIEF VALVE	YES	YES		X/N	
NA	TURBINE TRIP	YES	NO*			N
TI 73	SHUTDOWN FROM OUTSIDE CONTROL ROOM	YES	YES*	X	N	N
TI 132	RECIRCULATION SYSTEM TUNING	YES	YES	X	X/N	X/N
NA	RECIRCULATION SYSTEM	NA	NA		N	N

X BROWNS FERRY TEST
N REQUIRED BY NEAR TERM OPERATING LICENSE (RG 1.68)
* DIFFERS FROM BFN UNIT 2 PAT PROGRAM
NA NOT APPLICABLE
TBD TO BE DETERMINED

TABLE 1

CORRELATION BETWEEN BFN UNITS 2 AND 3 PAT PROGRAMS
AND REGULATORY GUIDE 1.68

BFN TEST	TEST NAME	UNIT 2 TEST	TEST FOR UNIT 3	OPEN VESSEL	0-55%	55 - 100%
NA	LOSS OF OFFSITE POWER TURBINE TRIP	NA	NA		N	
TBD	DRYWELL PIPING VIBRATION	YES	YES	X/N	X/N	
NA	REACTOR PRESSURE VESSEL INTERNALS VIBRATION	NA	NA		N	N
TI 174	RECIRCULATION FLOW CALIBRATION	YES	YES		N	X/N
TI 183	REACTOR WATER CLEANUP SYSTEM	YES	YES		X/N	
NA	RESIDUAL HEAT REMOVAL SYSTEM	NA	NA		/N	N
TI 82	DRYWELL TEMPERATURES	YES	YES		X/N	X/N
SI 4.8.B.1.a.1	OFFGAS SYSTEM	YES	YES		X/N	X/N

X BROWNS FERRY TEST
N REQUIRED BY NEAR TERM OPERATING LICENSE (RG 1.68)
* DIFFERS FROM BFN UNIT 2 PAT PROGRAM
NA NOT APPLICABLE
TBD TO BE DETERMINED

RESTART TEST PROGRAM EXAMPLE SYSTEM

STANDBY LIQUID CONTROL

SYSTEM 63

6.0 ANALYSIS

6.1 Methodology

The SLCS System Requirements Calculation (reference 4.2) and the SLCS System Design Criteria Document (reference 4.4) were reviewed and a list of functional tests developed to cover all system modes required to support safe shutdown. Test Scoping Documents (TSD) define the functional test requirements for each mode addressed in the System Requirements Calculation. Each separate functional test is covered by a TSD in the form of an attachment to this test requirements document.

6.2 Required Tests

The modes listed in Table 1 define the functional operations required of the SLCS for the safe shutdown of BFN Unit 3 following all the applicable events listed in reference 4.2. The functional tests required to demonstrate that the Standby Liquid Control System meets the safe shutdown design requirements are provided in the Test Scoping Documents (Attachments A through D).

TABLE 1 - REQUIRED TESTS

MODE NUMBER	MODE DESCRIPTION	ATTACHMENT
63-01	Manual Injection of Boron Solution into Reactor given Indication of Incomplete Insertion of Control Rods (CRD, System 085) and Reactor not Being in Subcritical Condition (NMS, System 092)	A,B,C,D
63-02	Provide SLCS Initiation Signal to the RWCU System (069) for Isolation of RWCU System from the Reactor to Prevent Loss or Dilution of Boron Solution	D
63-03	Provide Reactor Coolant Pressure Boundary	See section 6.4
63-04	Provide Primary Containment Boundary	See section 6.5

Note: The test in Attachment A should be completed before running test C.

6.3 Required Component Positions

Component mode positions required to perform the functional test have been addressed in each TSD based upon the applicable mode in the System Requirements Calculation. Unless otherwise noted, all of the system components shall be in normal operating condition per plant procedures.

SYSTEM TEST SPECIFICATION

3-STS-063

STANDBY LIQUID CONTROL SYSTEM

Prepared by: _____ / 12/3/93

Concurrence with testing currently planned for Return to Service:

_____ / 12/3/93
Technical Support System Engineer / Date

_____ / 12/3/93
Systems Supervisor / Date

Concurrence with testing performed for Return to Service:

_____ / _____
Technical Support System Engineer / Date

_____ / _____
Systems Supervisor / Date

_____ / _____
Restart Test Manager / Date

TEST REQUIREMENT	BASIS	TEST PROCEDURE	COMPLETION DATE	COMMENTS
I. DESIGN BASELINE VERIFICATION PROGRAM				
1) ESPB concentration shall be greater than or equal to the value listed for its associated minimum pump flowrate	BFN-TSD-063-A (A.6.1)	3-SI-4.4-C.2	_____	The concentration requirement need only be demonstrated for one pump flowrate. ESPB concentration shall not exceed 9.2 weight percent. Implemented by DCN W19260
2) The total volume of solution in the tank shall be greater than or equal to the lower process limit associated with the concentration and flowrate demonstrated in 1) above	BFN-TSD-063-A (A.6.2)	3-SI-4.4-C.2	_____	Implemented by DCN W19260.
3) The total calculated quantity of Boron stored in the Borated Volume shall be greater than or equal to 186 lbs.	BFN-TSD-063-A (A.6.3)	3-SI-4.4-C.3	_____	Implemented by DCN W19260.

TEST REQUIREMENT	BASIS	TEST PROCEDURE	COMPLETION DATE	COMMENTS
DESIGN BASELINE VERIFICATION PROGRAM				
1) Relief valves 3-RFV-063-0512 and 3-RFV-063-513 lift at 1425 ± 75 psig and reseat properly at reduced pressure.	BFN-TSD-063-A (B.6)	3-SI-3.2.9	_____	Valves may be removed from system and bench tested i.a.w. standard valve test procedures. Tolerance is ± 42.7 psig due to ASME Section XI requirements.
5) The solution is circulated from the storage tank through the required suction path and returns back to the storage tank upon operation of the pump	BFN-TSD-063-A (C.6.1)	3-SI-4.4.A.2	_____	
6) The pump flow rate exceeds 39 gpm at a pump discharge pressure head of at least 1275 psig.	BFN-TSD-063-A (C.6.2)	3-SI-4.4.A.2	_____	The flow rate and pressure requirement does not apply for the solution recirculation.
7) Verify that demineralized water is injected into the reactor vessel.	BFN-TSD-063-A (D.6.1)	3-SI-4.4.A.2	_____	
8) Only one pump and one injection valve are required to be activated at each testing cycle but the control circuit of the disconnected injection valve must be verified to receive an ignition signal upon initiation of the SLCS.	BFN-TSD-063-A (D.6.2)	3-SI-4.4.A.2	_____	

TEST REQUIREMENT		BASIS	TEST PROCEDURE	COMPLETION DATE	COMMENTS
9)	Verify that RWCU isolation valves 3-FCV-069-0001 and 3-FCV-069-0002 have received a signal for closure upon initiation of the SLC system.	BFN-TSD-063-A (D.6.3)	3-SI-4.4.A.2	_____	SI also verifies 3-FCV -069-0012 will close upon SLC initiation but not required by the SSA.
10)	Verify that the pump for the loop being tested shall start irrespective of the position of the local test switches.	BFN-TSD-063-A (D.6.4)	3-SI-4.4.A.2	_____	
11)	The pump flow rate exceeds 39 gpm a pump discharge pressure head of at least 1275 psig.	BFN-TSD-063-A (D.6.5)	3-SI-4.4.A.2	_____	Same requirement as item # 6.
II.	PLANT MODIFICATIONS				
1)	Calibrate indicators.	DCN W17133A, S05	3-PMTP-BF-063.0001A (LCI-3-L-63-1) (LCI-3-P-63-7)	_____	CRDR. Instr. loop test.
2)	Verify ESPB chemistry.	DCN W19260A	PMTP-BF-63.006 (CCI-0-PS-00-33) (LCI-3-L-63-1) (LCI-3-T-63-3) (CCI-0-TIS-0048) (LCI-3-P-63-7) (3-SI-4.4.A.2) (3-SI-4.4.C.2) (3-SI-4.4.D)	_____	Also a BTRD requirement.
3)	Calibrate indicators.	DCN W15367, S16	PMT-229 (LCI-3-L-63-1)	_____	Integrated computer mod.

TEST REQUIREMENT	BASIS	TEST PROCEDURE	COMPLETION DATE	COMMENTS
III. UNIT 2 TEST PROGRAM				
1) 2-BFN-STS-063 Mode Number 063-01-M-2 described "Verify pump suction heat trace operability". This was tested under Section 5.2 of 2-RTP-063. DCN W19260 removes SLC heat tracing from Unit 3. This Unit 2 test requirement is not required for Unit 3.				
IV. SMPL/TROI PUNCHLIST				
1) Verify and readjust spring cans	WO 93-09462-01	0-TI-252	_____	
2) Remove pump 3B packing, plungers, and drain crankcase.	WO 89-08048-77	MCI-0-063-PMP001	_____	Requires a 40 minute pump operation.
3) Remove pump 3A packing, plungers, and drain crankcase.	WO 89-07265-48	MCI-0-063-PMP001	_____	Requires a 40 minute pump operation.
4) LLRT	App. J	3-SI-4.7.A.2.g-3/63	_____	3-63-525 and 3-63-526.
5) Hydro Pressure Test	Hydro Prgm	3-SI-3.3.4	_____	Performed during 3-SI-4 .2 functional test of SLC.
6) Implement requirements of the ATWS rule.	NCO 850447003	DCN W19260	_____	Implemented by DCN W19260.
7) The sodium pentaborate will be replaced with enriched Boron-10 prior to startup.	NCO 850458004	DCN W19260	_____	Implemented by DCN W19260.

TEST REQUIREMENT	BASIS	TEST PROCEDURE	COMPLETION DATE	COMMENTS

V MPAC DATA BASE

No test requirements generated from the MPAC review.

VI ADDITIONAL TEST REQUIREMENTS

No additional test requirements have been identified

FORM SSP-215
(Page 1 of 2)

BROWNS FERRY NUCLEAR PLANT
RESTART TEST PROGRAM TEST REQUIREMENTS
COVER SHEET

Page 1 of 5

BTRD Number: 3-BFN-BTRD-0063

Revision: 0

Title: STANDBY LIQUID CONTROL SYSTEM

Prepared by:	KEVIN GRAY Technical Support Engineer	8/26/93 Date
Reviewed by:	Independent Qualified Reviewer	8/30/93 Date
Reviewed by:	Systems Supervisor	12/3/93 Date
Ready for JTG Review	RTP Manager	12-3-93 Date
JTG Review	JTG Chairman	12-9-93 Date
Approval	Technical Support Manager	12-9-93 Date

Retention period: Lifetime
Responsible organization: RM

68(237)

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TEST REQUIREMENT	ACCEPTANCE CRITERIA	PLANT INSTRUCTION	REVISION REQUIRED	SATISFACTORILY COMPLETED SIGNATURE/DATE
1) MANUAL INJECTION CAPABILITY OF SLCS:				
A. Verify concentration of ESPB in the SLC Storage Tank is maintained within limits	ESPB concentration shall be greater than or equal to the value listed in Attachment 1 for its associated minimum pump flow rate. (The concentration requirement need only be demonstrated for one SLC pump)	3-SI-4.4.C.2	NO	_____ / _____
	The ESPB concentration shall not exceed 9.2 weight percent.	3-SI-4.4.C.2	NO	_____ / _____
	The total volume of the ESPB in the SLC Storage Tank shall be greater than or equal to the lower process limit associated with the concentration and pump flow rate demonstrated above.	3-SI-4.4.C.2	NO	_____ / _____
B. Verify Boron-10 quantity is maintained within limits	Total calculated quantity of Boron-10 stored in the SLC Storage Tank shall be greater than or equal to 186 pounds.	3-SI-4.4.C.3	NO	_____ / _____
C. Verify pressure relief valves prevent system overpressurization.	Relief valves 3-RFV-063-0512 and 3-RFV-063-0513 lift at 1425 +/- 75 psig and reseat properly at reduced pressure.	3-SI-3.2.9	NO	_____ / _____

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Retention Period: Lifetime

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TEST REQUIREMENT	ACCEPTANCE CRITERIA	PLANT INSTRUCTION	REVISION REQUIRED	SATISFACTORILY COMPLETED SIGNATURE/DATE
1) MANUAL INJECTION CAPABILITY OF SLCS (cont'd)				
D. Verify SLC pump recirculation capability	SLC pumps 3A and 3B are capable of pumping ESPB when recirculating back to the SLC Storage Tank.	3-SI-4.4.A.2	NO	_____/_____
E. Verify SLC pumps are capable of providing minimum required flow rates at simulated injection pressure.	SLC pumps 3A and 3B flow rates exceed 39 gpm at a pump discharge head of at least 1275 psig during flow rate testing with demineralized water.	3-SI-4.4.A.2	NO	_____/_____
2) DEMONSTRATE SLCS CAPABILITY FOR VESSEL INJECTION AND RWCU SYSTEM ISOLATION:				
A. SLCS is capable of injecting ESPB solution (simulated with demineralized water) into the reactor vessel. This includes operation of associated control circuits and explosive valves.	Verify demineralized water is injected into the reactor vessel.	3-SI-4.4.A.2	NO	_____/_____
	One SLC pump operates and one injection valve activates upon receipt of a SLCS initiation signal.	3-SI-4.4.A.2	NO	_____/_____

Responsible Organization: RM Retention Period: Lifetime

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TEST REQUIREMENT	ACCEPTANCE CRITERIA	PLANT INSTRUCTION	REVISION REQUIRED	SATISFACTORILY COMPLETED SIGNATURE/DATE
2) DEMONSTRATE SLCS CAPABILITY FOR VESSEL INJECTION AND RWCU SYSTEM ISOLATION:				
A. SLCS is capable of injecting ESPB solution (simulated with demineralized water) into the reactor vessel. This includes operation of associated control circuits and explosive valves. (cont'd)	The control circuit of the disconnected injection valve must be verified to receive an ignition signal upon manual initiation of the SLCS.	3-SI-4.4.A.2	YES	_____/_____
	Verify SLC Pump 3A starts irrespective of the position on 3-TSW-063-0006A.	3-SI-4.4.A.2	YES	_____/_____
	Verify SLC Pump 3B starts irrespective of the position on 3-TSW-063-0006B.	3-SI-4.4.A.2	YES	_____/_____
	Verify pump flow rate exceeds 39 gpm at a pump discharge head of at least 1275 psig while injecting demineralized water into the reactor vessel.	3-SI-4.4.A.2	YES	_____/_____
B. Upon initiation of the SLC system a closure signal will be sent to the Reactor Water Cleanup System isolation valves.	Verify that valve 3-FCV-69-001 closes upon receipt of a manual SLCS initiation signal.	3-SI-4.4.A.2	YES	_____/_____
	Verify that valve 3-FCV-69-002 closes upon receipt of a manual SLCS initiation signal.	3-SI-4.4.A.2	YES	_____/_____

Responsible Organization: RM Retention Period: Lifetime

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ATTACHMENT 1

BTRD No. 3 BFN BTRD 0063 Rev. 0

Solution Weight Percent	Minimum Pump Flow Rate Per TS	Boration Volume (injectable gallons)	Tank Unavailable Volume (gallons)	Lower Process Limit (total gallons)
7.00%	51 gpm	2869	237	3106
8.00%	44 gpm	2499	237	2736
9.00%	39 gpm	2209	237	2446
9.20%	39 gpm	2161	237	2398

3-SI-4.4.A.2

ACCEPTANCE CRITERIA

5.0 SPECIAL TOOLS AND EQUIPMENT RECOMMENDED

5.1 Calibrated stopwatch (required).

5.2 35-foot minimum length drain hose with quick disconnect fitting.

5.3 Calculator.

5.4 Ladder to extend up to valve 3-VTV-063-0521 (12 feet).

5.5 Hose and fitting tagged "for use in 2-SI-4.4.A.1 and 2-SI-4.4.A.2" in the tool room for use at the discretion of Test Director.

5.6 Vibration meter.

5.7 Key from CHEMISTRY to unlock the SLC Storage Tank Hatch.

6.0 ACCEPTANCE CRITERIA

6.1 Responses which fail to meet the acceptance criteria stated in Section 6.0 shall constitute unsatisfactory surveillance instruction results and require immediate notification of the Shift Operations Supervisor at the time of failure.

6.1.1 SLC Pumps 3A and 3B are capable of pumping boron solution when on recirculation to the SLC Solution Tank.

6.1.2 SLC Pumps 3A and 3B are capable of pumping a minimum of 39 gpm at an average discharge pressure of at least 1275 psig.

Date _____

INITIALS

7.0 PROCEDURE STEPS (Continued)

NOTES:

(1) To obtain a good discharge pressure reading it may be necessary to throttle 3-RTV-063-0007,SLC PUMP DISCH PRESS ROOT VALVE, or the gauge shutoff at Panel 25-19 to dampen the discharge oscillations.

(2) The valve used in Note 1 should be opened and closed several times to verify unobstructed pressure communication while observing the instrument reading.

****

CAUTION

Pump discharge pressure should not be allowed to exceed 1500 psig.

****

7.8.21 Slowly THROTTLE CLOSED 3-THV-063-0518, SLC TEST LINE THROTTLE VALVE, to obtain an average discharge pressure of at least 1280 psig as read on 3-PI-063-0007B, SLC PUMP DISCH PRESS INDR (Panel 25-19).

_____

****

CAUTION

Do not drop any objects into the SLC STORAGE TANK. Notify the SOS immediately if any object(s) is dropped into the tank.

****

7.8.22 OPEN the hatch on top of the SLC Storage Tank.

_____

7.8.23 Visually observe flow into the SLC Storage Tank.

_____ AC)

Date _____

INITIALS

7.0 PROCEDURE STEPS (Continued)

NOTES:

(1) The Test Tank should be monitored to ensure the level remains stable.

(2) To obtain a good SLC pump discharge pressure reading, it may be necessary to throttle 3-RTV-063-0007, SLC PUMP DISCH PRESS ROOT VALVE, or the gauge shutoff at Panel 25-19 to dampen the discharge oscillations.

(3) The valve used in Note 2 shall be opened and closed several times to verify unobstructed pressure communication while observing the instrument reading.

****

CAUTION

During SLC pump operation, hearing protection is required.

****

7.11.7 START SLC Pump 3A using 3-HS-0[illegible]00AA, 3A SLC PUMP HAND SWITCH, on Panel 25-1

_____

****

CAUTION

Pump discharge pressure shall not be allowed to exceed 1500 psig.

****

7.11.8 THROTTLE CLOSED 3-THV-063-0518, SLC TEST LINE THROTTLE VALVE, to obtain an average discharge pressure of at least 1280 psig as read on 3-PI-063-0007B, SLC PUMP DISCH PRESS INDR (Panel 25-19).

_____(AC)

Date _____

INITIALS

7.0 PROCEDURE STEPS (Continued)

7.11.10.12 CALCULATE the 3A SLC pump flowrate:

$$\frac{\text{(Level Decrease)} \times (4.4 \text{ gallons/inch})}{2 \text{ minutes}} = \_\_\_\_\_ \text{ gpm}$$

$$\frac{(\quad \text{inches}) \times (4.4 \text{ gallons/inch})}{2 \text{ minutes}} = \_\_\_\_\_ \text{ gpm}$$

SLC Pump 3A FLOWRATE		
Minimum	Measured	Maximum
39 gpm	_____ gpm	N/A

_____(AC)

7.11.10.13 VERIFY sufficient volume in the portable SLC drain tank exists for an additional 100 gallons of demin water. OTHERWISE, pump out the portable SLC drain tank into the plastic 55-gallon drums.

_____

7.11.10.14 CLOSE 3-VTV-063-0521, SLC SYSTEM VENT VALVE.

_____

7.11.10.15 OPEN 3-SHV-063-0519, SLC TEST TANK RECIRC SHUTOFF VALVE.

_____

7.11.10.16 Using 3-SHV-063-0532, SLC TEST TANK DEMIN WATER SHUTOFF VALVE, FILL the SLC Test Tank to the 48 inch level as measured with the ruler.

_____

APPENDIX A
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DESIGN BASELINE VERIFICATION PROGRAM/BASELINE TEST REQUIREMENTS DOCUMENT LIST

SYSTEM NO	DESCRIPTION	BTRD NUMBER
01	MAIN STEAM	3–BFN–BTRD–001
02	CONDENSATE/DEMINERALIZERS	3–BFN–BTRD–002/005
03	REACTOR FEEDWATER	3–BFN–BTRD–003/046
05	EXTRACTION STEAM	3–BFN–BTRD–002/005
10	BOILER DRAINS AND VENTS	2/3–BFN–BTRD–010
18	FUEL OIL	3–BFN–BTRD–018
23	RHR SERVICE WATER	2/3–BFN–BTRD–023
24	RAW COOLING WATER	2/3–BFN–BTRD–024
25	RAW SERVICE WATER	2/3–BFN–BTRD–025/026
26	HIGH PRESSURE FIRE PROTECTION	2/3–BFN–BTRD–025/026
27	CONDENSER CIRCULATING WATER	2/3–BFN–BTRD–027
30	DIESEL/REACTOR BUILDING VENTILATION	2/3–BFN–BTRD–030
31	CONTROL BAY VENTILATION	2/3–BFN–BTRD–031
32	CONTROL AIR	3–BFN–BTRD–032
43	SAMPLING AND WATER QUALITY	3–BFN–BTRD–043
46	FEEDWATER CONTROL	3–BFN–BTRD–003/046
47	TURBINE/GENERATOR CONTROL (EHC)	3–BFN–BTRD–047
50	SODIUM HYPOCHLORITE	2/3–BFN–BTRD–067/050
57–1	DIESEL 125V DC	2/3–BFN–BTRD–57–1
57–2	120V AC INST. AND CONTROL POWER	2/3–BFN–BTRD–57–2
57–3	250V DC DISTRIBUTION	2/3–BFN–BTRD–57–3
57–4	480V AC DISTRIBUTION	2/3–BFN–BTRD–57–4
57–5	4KV DISTRIBUTION	2/3–BFN–BTRD–57–5
57–6	500KV/161KV OFFSITE & MISC DISTR.	2/3–BFN–BTRD–57–6

APPENDIX A
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SYSTEM NO	DESCRIPTION	BTRD NUMBER
63	STANDBY/LIQUID CONTROL	3-BFN-BTRD-063
64A	PRIMARY CONTAINMENT	3-BFN-BTRD-064A
64B	CONTAINMENT VENTILATION	2/3-BFN-BTRD-064B
64C	SECONDARY CONTAINMENT	2/3-BFN-BTRD-064C
65	STANDBY GAS TREATMENT	3-BFN-BTRD-065/066
66	OFFGAS/RECOMBINER/CHARCOAL	3-BFN-BTRD-065/066
67	EMERGENCY EQUIPMENT COOLING WATER	2/3-BFN-BTRD-067/050
68	REACTOR WATER RECIRCULATION	3-BFN-BTRD-068
69	REACTOR WATER CLEANUP	3-BFN-BTRD-069
70	REACTOR BLDG CLOSED COOLING WATER	3-BFN-BTRD-070
71	REACTOR CORE ISOLATION COOLING	3-BFN-BTRD-071
73	HIGH PRESSURE COOLANT INJECTION	3-BFN-BTRD-073
74	RESIDUAL HEAT REMOVAL	3-BFN-BTRD-074
75	CORE SPRAY COOLING	3-BFN-BTRD-075
76	CONTAINMENT INERTING	3-BFN-BTRD-076
77	RADWASTE	3-BFN-BTRD-077
78	FUEL POOL COOLING & CLEANUP	3-BFN-BTRD-078
79	FUEL HANDLING	3-BFN-BTRD-079
82	STANDBY DIESEL GENERATOR	2/3-BFN-BTRD-082
84	CONTAINMENT AIR DILUTION	3-BFN-BTRD-084
85	CONTROL ROD DRIVE	3-BFN-BTRD-085
86	DIESEL STARTING AIR	3-BFN-BTRD-086
90	RADIATION MONITORING	3-BFN-BTRD-090
92	NEUTRON MONITORING	3-BFN-BTRD-092

APPENDIX A
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SYSTEM NO	DESCRIPTION	BTRD NUMBER
94	TRAVERSING INCORE PROBE	3–BFN–BTRD–094
96	REACTOR RECIRC. FLOW CONTROL	3–BFN–BTRD–096
99	REACTOR PROTECTION	3–BFN–BTRD–099
244	COMMUNICATIONS	2/3–BFN–BTRD–244