Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

January 27, 2009

10 CFR 50.12
10 CFR 50, Appendix R

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop OWFN, P1-35
Washington, D.C. 20555-0001

In the Matter of	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-260
		50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 1, 2, AND 3 – PROPOSED REQUEST FOR EXEMPTION FROM 10 CFR 50, APPENDIX R, PARAGRAPH III.G.2, FIRE PROTECTION OF SAFE SHUTDOWN CAPACITY

In accordance with 10 CFR 50.12, Specific Exemptions, as specified in Regulatory Issue Summary (RIS) 2006-10, Regulatory Expectations With Appendix R, Paragraph III.G.2 Operator Manual Actions, BFN is requesting an exemption from the provisions of 10 CFR 50, Appendix R, Paragraph III.G.2, Fire Protection of Safe Shutdown Capability, for the use on operator manual actions (OMAs) on Units 1, 2, and 3 as a means to ensure one redundant safe shutdown train is free of fire damage.

This exemption request is limited to those types of manual actions previously accepted by NRC in a safety evaluation. The OMAs addressed in this proposed exemption request are similar to those that were previously approved by an NRC safety evaluation for BFN Units 2 and 3 Operation.

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Enclosure 1 provides BFN's request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2. Enclosure 2 is TVA Calculation, Appendix R III.G.2 Manual Action Feasibility Evaluation. This calculation, performed using guidance from NUREG 1852, Demonstrating the Feasibility and reliability of Operator manual Actions in Response to Fire, is BFN's basis for the Browns Ferry Plant Exemption Request. The calculation contains bases for the Browns Ferry Nuclear Plant (BFN) Exemption Request for Appendix R III.G.2 Areas Operator Manual Actions (OMA). Attachment number 1 to the calculation is the List of Time Critical Operator Manual Actions, and Attachment number 2 is the Verification and Validation of Appendix R Manual Actions.

TVA has found that the OMAs listed in the exemption are feasible. NRC has previously reviewed the actions and found them acceptable for use in achieving post-fire safe shutdown. Hence, the special circumstances for the issuance of an exemption are satisfied in accordance with the requirements of 10 CFR 50.12(a)(2)(ii) and RIS 2006-10. The application of the rule is not necessary to achieve the underlying purpose of the rule, that is; achieve safe shutdown in the event of a fire. The exemption request is authorized by law and is consistent with the common defense and security. Therefore, the requirements of 10 CFR 50.12 (a)(1) are satisfied.

There are no new regulatory commitments contained within this request. If you have any questions about this request, please telephone me at (256) 729-2636.

I Declare under penalty of perjury that the foregoing is true and correct. Executed on this 27th day of January 2009.

Sincerely,

F. R. Godwin
Manager of Licensing
and Industry Affairs

Enclosures:

1. Request for Exemption from 10 CFR 50 Appendix R, Paragraph III.G.2
2. TVA Calculation, Appendix R III.G.2 Manual Action Feasibility Evaluation Revision 1

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ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS, 1, 2 AND 3

REQUEST FOR EXEMPTION FROM 10 CFR 50 APPENDIX R, PARAGRAPH III.G.2

Pursuant to 10 CFR 50.12, BFN is requesting an exemption from 10 CFR 50, Appendix R, Paragraph III.G.2, Fire Protection of Safe Shutdown Capability for BFN Units 1, 2, and 3. Paragraph III.G.2 of Appendix R does not list operator manual actions (OMAs) as a means of ensuring that one redundant train is free of fire damage.

Contrary to the above, Appendix R, Paragraph III.G.2 areas at BFN rely on OMAs to ensure a train is free from fire damage when the redundant train is in the same fire area.

1.0 Applicable Rule

The applicable rules for this exemption request are 10 CFR 50.48 and 10 CFR 50, Appendix R. Pursuant to 10 CFR 50.48(a), each operating nuclear plant must have a plan to satisfy Criterion 3, Fire Protection, of 10 CFR 50, Appendix A. The fire protection features that BFN must meet to satisfy Criterion 3 of Appendix A are established by 10 CFR 50, Appendix R. Specifically, 10 CFR 50, Appendix R, Paragraph III.G.2 requires, in part, where cable or equipment, including associated non-safety circuits that could prevent operation or cause maloperation as a result of hot shorts, open circuits, or shorts to ground of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, shall be free of fire damage.

2.0 Requested Exemption

TVA is requesting an exemption from 10 CFR 50, Appendix R, Paragraph III.G.2, Fire Protection of Safe Shutdown Capability, for BFN Units 1, 2, and 3 to the extent that OMAs are necessary to achieve and maintain hot shutdown for areas in which both trains of safe shutdown equipment are located.

3.0 Justification and Assessment of Safety Impact

Background

Regulatory Issue Summary, (RIS) 2006-10, Regulatory Expectations With Appendix R, Paragraph III.G.2 Operator Manual Actions, provides NRC's position on OMAs as part of the strategy for compliance with 10 CFR 50, Appendix R, Paragraph III.G.2. NRC requires that plants which credit OMAs for Paragraph III.G.2 compliance to obtain approval for the OMAs via the exemption request in accordance with the requirements of 10 CFR 50.12. As stated below, RIS 2006-10 addresses operator manual actions previously approved outside the exemption process.

> "For pre-1979 licensees, the staff decision in a safety evaluation report that approves the use of operator manual actions, in lieu of one of the means specified in paragraph III.G.2, does not eliminate the need for an exemption. Pre-1979 licensees who have SERs but not a corresponding exemption, which approve manual actions should request an

exemption under 10 CFR part 50.12, citing the special circumstances section of 50.12(a)(2)(ii), using the SER as the safety basis, and confirming that the safety bases established in the SER remains valid. The staff expects to grant the exemption on these without further review."

Basis That The Manual Actions Are Previously Approved

Browns Ferry is unique in their approach to the application of Appendix R. Browns Ferry Units 1, 2, and 3 were shutdown in 1985. As TVA restarted each unit, NRC approved the application of 10 CFR 50, Appendix R to support the operation of that unit. TVA restarted Unit 2 in 1991, Unit 3 in 1995, and Unit 1 in 2007. NRC approved the application of an Appendix R Fire Protection Program for BFN in several safety evaluations (SEs). The following provides a general timeline of the approval process:

By letter dated January 31, 1986 (Reference 1), TVA submitted the 10 CFR 50 Appendix R Fire Protection and Safe Shutdown Systems Analysis Report for Browns Ferry Nuclear Plant. On December 8, 1988 (Reference 2), supplemented by an October 3, 1989 (Reference 3), letter NRC issued the Safety Evaluation (SE) for post safe-shutdown in support of Unit 2 Operation. Section 2.4.3 and Section 2.7 of the respective SEs discuss OMAs.

On January 15, 1992 (Reference 4), TVA issued the BFN Fire Protection Report for NRC review. The report established the BFN Fire Protection Plan in accordance with NRC Generic Letter (GL) 86-10, Implementation of Fire Protection Requirements, and GL 88-12, Removal of the Fire Protection Requirements from Technical Specifications. As part of the evaluation, the NRC reviewed the Fire Protection Plan and Fire Hazard Analysis. On March 31, 1993 (Reference 5), NRC issued a SE that approved the new BFN Fire Protection Report. The Safe Shutdown Analysis, which included use of OMAs and Unit 2 Appendix R Safe Shutdown Program, were previously approved in the above referenced NRC SEs.

In a December 20, 1994 letter (Reference 6), BFN provided the revised FPR for combined Unit 2 and 3 operations. By letter dated November 2, 1995 (Reference 7), NRC approval of a Fire Protection Report for Units 2 and 3 operations with Unit 1 shutdown and defueled. Sections 3.5 and 3.5.1 of the SE summarizes the manual actions for the combined operation of Units 2 and 3. In the SE, the NRC noted that the OMAs involve the same types of actions currently performed on Unit 2. These OMAs include positioning valves, operating switches, and opening breakers. NRC also noted that the time for performing these actions for Unit 3 was consistent with those established for Unit 2.

On April 5, 2006, prior to the restart of Unit 1, TVA met with NRC to discuss the progress of the BFN Fire Protection Program and the reliance on OMAs. During this meeting, TVA discussed maintaining operational fidelity of Unit 1 with Units 2 and 3 by using the same type of OMAs that are currently approved for the Units 2 and 3 Safe Shutdown Program. The Licensing Basis for the proposed Unit 1 Fire protection plan was consistent with the current Unit 2 and 3 Fire Protection Plan. TVA Indicated the Unit 1 Appendix R Safe Shutdown Analysis did not require the addition of any new type OMAs to meet safe shutdown requirements. The OMAs needed for Unit 1 safe shutdown are similar to those approved for Units 2 and 3.

As a result of the April 5, 2006 meeting, as stated in a letter dated April 24, 2006 (Reference 8), BFN committed to perform a Fire Protection Significance Determination Process (SDP) analysis to determine the risk associated with the OMAs approved for Units 2 and 3 operation and the proposed Unit 1 OMAs., and for Units 2 and 3, correct or take

compensatory actions for those OMAs that are risk significant (greater than green). For Unit 1, correct any OMAs that are risk significant prior to Unit 1 entering mode 2 or 3.

BFN performed a risk evaluation of the fire Appendix R, Paragraph III.G.2 area OMAs using NRC Inspection Manual Chapter 609, Significance Determination Process, Appendix F, Fire Protection. The BFN risk analysis found the OMAs used for safe shutdown of Units 1, 2, and 3 to be green (not risk significant). NRC reviewed the analysis and concluded in an April 25, 2007, SE (Reference 9) that BFN has identified the post-fire safe shutdown OMAs performed outside the main control room in Paragraph III.G.2 areas for Units 1, 2, and 3 and placed them in the corrective action program. Furthermore, BFN is treating the OMAs as compensatory measures, which is consistent with RIS 2006-10. NRC found this approach acceptable until full compliance with Paragraph III.G.2 is established.

Feasibility and Dependability Review

Following the guidance provided in NUREG-1852, Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire, BFN performed a feasibility review of the 10 CFR Appendix R, Paragraph III.G.2, OMAs needed to shutdown Units 1, 2, or 3 in the event of a postulated fire. Enclosure 2 provides BFN's Appendix R III.G.2 Manual Action Feasibility Evaluation. Attachment Number 1 to the calculation is the List of Time Critical Operator Manual Actions. Attachment Number 2 is the Verification and Validation of Appendix R Manual Actions.

BFN's evaluation concludes that OMAs required for achieving and maintaining hot shutdown conditions are feasible, reliable, and not affected by environmental conditions associated with fires in Appendix R, Paragraph III.G.2 areas. In addition, the equipment needed to implement OMAs remains available and the areas remain accessible during the event. Plant demonstrations have shown that plant procedures and staffing is adequate and time margin is available to account for uncertainties that may arise during an event. The evaluation found that OMAs are feasible and reliable and using OMAs; therefore, BFN meets the underlying purpose and intent of the Appendix R, Paragraph III.G.2 rule.

4.0 Authorized By Law

NRC has issued TVA's Operating License for BFN under the provisions of Section 104.b of the Atomic Energy Act. Operating licenses issued by the Commission pursuant to Section 104.b are not limited, by stature, to specify the methods for complying with the requirements of 10 CFR 50, Appendix R. As previously stated, 10 CFR 50.12 allows the NRC to grant exemptions from the requirements of 10 CFR 50.48 and Appendix R to 10 CFR 50. Thus, the Commission is authorized by law to exempt BFN from these requirements.

5.0 Presents No Undue Risk to Public Health and Safety

The purpose of this rule is satisfied by the requested exemption since the manual actions previously described provide an equivalent level of protection as required by 10 CFR 50, Appendix R, Paragraph III.G.2. Therefore, the proposed exemption presents no undue risk to the public health and safety.

6.0 Does Not Endanger Common Defense and Security

The Commission's Statement of Considerations in support of the exemption rule noted with approval the explanation of standard as set forth in Long Island Lighting Company (Shoreham Nuclear Power Station, Unit 1) LBP-84-45, 20 NRC 1343, 1400

(October 29, 1984). There, the term "common defense and security" refers principally to safeguarding of special nuclear material, the absence of foreign control over the applicant, the protection of Restricted Data, and the availability of special nuclear material for defense needs. The granting of the requested exemption will not affect any of these matters and, thus, the requested exemption is consistent with the common defense and security.

7.0 Special Circumstances are Present

According to NRC regulations, special circumstances are present if any one of the six cases cited in 10 CFR 50.12 (a)(2) are present. TVA has found that special circumstances found in application of paragraphs (ii) and (iii) exist for this exemption:

(ii) *"Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."*

10 CFR 50, Appendix R, Paragraph III.G.2, specifies methods to ensure that one train of systems necessary to achieve and maintain safe shutdown capability remains free from fire damage. Paragraph III.G.2 does not list manual operator actions as a means of ensuring that one of the redundant trains is free of fire damage. Specifically, Paragraph III.G.2 of Appendix R requires that, where cables and equipment including associated non-safety circuits that could prevent operation of cause maloperation as a result of hot shorts, open circuits, or shorts to ground of redundant trains of systems necessary to achieve and maintain hot shutdown must be protected in accordance with Paragraph III.G.2 of Appendix R.

NRC Regulatory Issue Summary (RIS) 2006-10, Regulatory Expectations With Appendix R Paragraph III.G.2, Operator Manual Actions, allows pre-1979 licensees, who have a staff decision in a Safety Evaluation Report that approves the use of manual operator actions, in lieu of one of the means specified in Paragraph III.G.2 should request an exemption citing special circumstances. NRC approved the use of manual actions for Browns Ferry, Units 2 and 3 in a Safety Evaluation at the time the each Unit was restarted (References 2, 3, and 5). Although not explicitly approved in a NRC Safety Evaluation, the manual operator actions put in place for Unit 1 similar to those approved on Units 2 and 3. That is, positioning valves, operating switches, and opening breakers. In addition, two analyses performed by BFN indicate that the Paragraph III.G.2 manual operator actions for Units 1, 2, and 3 are not risk significant, are feasible, reliable and can be performed under post fire circumstances.

Therefore, the underlying purpose of the rule, to achieve safe shutdown in the event of a postulated Appendix R Fire, is met using operator manual actions. The rule continues to be satisfied by the requested exemption since the existing analyses described provide an equivalent level of safe shutdown capability as required by 10 CFR 50, Appendix R, Paragraph III.G.2.

(iii) *"Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated."*

As previously discussed, the underlying purpose of Paragraph III.G.2 is to ensure that one train of systems necessary to achieve and maintain safe shutdown capability remains free from fire damage. The underlying purpose of the rule continues to be satisfied by the use of operator manual actions. The engineering activities accompanied

by plant physical modifications, procedure revisions and possible extension of planned outages, needed to implement Paragraph III.G.2 of Appendix R will result in a considerable expense to BFN. The cost associated with these activities places an unwarranted burden on BFN with a negligible increase in safety as compared to the alternate means of satisfying the requirements of Paragraph III.G.2 of Appendix R.

Therefore, the special circumstances exist that warrant granting an exemption to 10 CFR 50, Appendix R, Paragraph III.G.2 as described in RIS 2006-10.

8.0 Environmental Impact

TVA has reviewed the proposed exemption and determined implementation of the exemption will not effect the environment. That is there is no construction of operational activities, which could significantly affect the environment. Implementation of the exemption does not result in a significant increase in any adverse environmental impact previously evaluated, result in a significant change in effluents or power levels, or affect any matter not previously reviewed by NRC that may have a significant environmental impact.

The proposed exemption does not alter the land use for the plant, any water uses or impacts on water quality, or ambient air quality. The proposed exemption does not affect the previous analysis of environmental impacts.

References:

1. TVA letter to NRC dated January 31, 1986: In the Matter of the Tennessee Valley Authority – 10 CFR 50 Appendix R Submittal Fire Protection and Safe Shutdown Systems Analysis Report for Browns Ferry Nuclear Plant TVA.

2. NRC letter to TVA dated December 8, 1988: Browns Ferry Nuclear Plant, Units 1, 2, and 3 – Appendix R Safe Shutdown System Analysis. (Tac Nos. 60627, 60628, 60629)

3. NRC letter to TVA dated November 3, 1989: Supplemental Safety Evaluation of Post-Fire Safe Shutdown Systems and Final Review of the Nation Fire Protection Association Code Deviations – Browns Ferry Nuclear Plant, Unit 2 (Tac Nos. 72098 and 00459)

4. TVA letter to NRC dated January 15, 1992: Browns Ferry Nuclear Plant – Fire Protection Report

5. NRC letter to TVA dated March 31, 1993: Fire Protection Program – Browns Ferry Nuclear Plant Units 1, 2, and 3. (Tac Nos. M82687, M82688, and M82689)

6. TVA letter to NRC dated December 20, 1994: Browns Ferry (BFN) – Unit 2 and 3 Browns Ferry Nuclear Plant Fire Protection Report

7. NRC letter to TVA dated November 2, 1995: Safety Evaluation of Post-Fire Safe Shutdown Capability and Issuance of Technical Specification Amendments for the Browns Ferry Nuclear Plant Units 1, 2, and 3. (Tac Nos. M85254, M87900, M87901 and M87902) (TS 337)

8. TVA letter to NRC dated April 24, 2006: Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3 – Fire Protection Program – Post-Fire Operator Manual Actions

9. NRC letter to TVA dated April 25, 2007: Browns Ferry Nuclear Plant, Units 1, 2, and 3 – Issuance of Amendments Regarding Revision to Appendix R License Conditions to Reflect Three Unit Operation (Tac Nos. MD3596, MD3597, and MD3598)(TS-459)

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 1, 2, AND 3

TVA Calculation, Appendix R III.G.2 Manual Action Feasibility Evaluation Revision 1

See Attached:

QA Record

ORIGINAL

NPG CALCULATION COVERSHEET/CCRIS UPDATE

REV 0 EDMS/RIMS NO.	EDMS TYPE:	EDMS ACCESSION NO (N/A for REV. 0)
R14080819105	calculations(nuclear)	R14 090114 101

Calc Title: Appendix R III.G.2 Manual Action Feasibility Evaluation

CALC ID	TYPE	ORG	PLANT	BRANCH	NUMBER	CUR REV	NEW REV	REVISION APPLICABILITY
CURRENT	CN	NUC	BFN	NTB	NDQ099920080007	000		Entire calc ☒
NEW	CN	NUC					001	Selected pages ☐

ACTION						No CCRIS Changes ☐ (For calc revision, CCRIS been reviewed and no CCRIS changes required)
	NEW ☐ REVISION ☒	DELETE ☐ RENAME ☐	SUPERSEDE ☐ DUPLICATE ☐	CCRIS UPDATE ONLY ☐ (Verifier Approval Signatures Not Required)		

UNITS	SYSTEMS	UNIDS
0, 1, 2, 3	999	N/A

DCN,EDC,N/A	APPLICABLE DESIGN DOCUMENT(S)	CLASSIFICATION
N/A	BFN-50-747	D

QUALITY RELATED?	SAFETY RELATED? (If yes, QR = yes)	UNVERIFIED ASSUMPTION	SPECIAL REQUIREMENTS AND/OR LIMITING CONDITIONS?	DESIGN OUTPUT ATTACHMENT?	SAR/TS and/or ISFSI SAR/CoC AFFECTED
Yes ☒ No ☐	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☐ No ☒

PREPARER ID	PREPARER PHONE	PREPARING ORG (BRANCH)	VERIFICATION METHOD	NEW METHOD OF ANALYSIS
ltstafford	NO 729-2563	MEB	Design Review	☐ Yes ☒ No

PREPARER SIGNATURE	DATE	CHECKER SIGNATURE	DATE
L. T. Stafford	1-13-2009	Jon W Gronek	1/13/09
VERIFIER SIGNATURE	**DATE**	**APPROVAL SIGNATURE**	**DATE**
Jon W Gronek	1/13/09	T M Morgan III for KLG	1-13-2009

STATEMENT OF PROBLEM/ABSTRACT

10CFR50 Appendix R Section III.G.2 requires that, where cables or equipment of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located in the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

1. Separation of cables and equipment by a fire barrier having a 3-hour rating
2. Separation of cables and equipment by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards and with fire detection and an automatic fire suppression system in the fire area
3. Enclosure of cables and equipment in a fire barrier having a 1-hour rating and with fire detection and an automatic fire suppression system in the fire area.

According to the NRC's most recent interpretation of Paragraph III.G.2 requirements in Federal Register Volume 71, Number 43 dated March 6, 2006, reliance on operator manual actions is no longer permitted in lieu of the means above to ensure that one of the redundant safe shutdown trains in the same fire area is free of fire damage. Consistent with prior practice within the industry, BFN's Appendix R Program utilize operator manual actions for safe shutdown in Fire Areas 1, 2, 3 and 25. However, based on the interpretation by the NRC, BFN does not have an approved license exemption to allow operator manual actions for III.G.2 fire areas.

This evaluation supports the exemption request to allow the use of operator manual actions in III.G.2 fire areas to ensure safe shutdown can be achieved during an Appendix R event.

Revision 1 makes clarifications to the references and discussion on combustibles in a Fire Area/Zone in Appendix A.

MICROFICHE/EFICHE Yes ☐ No ☒ FICHE NUMBER(S)

☐ LOAD INTO EDMS AND DESTROY

☒ LOAD INTO EDMS AND RETURN CALCULATION TO CALCULATION LIBRARY. ADDRESS:SAB 1C-BFN

☐ LOAD INTO EDMS AND RETURN CALCULATION TO:

NPG CALCULATION COVERSHEET/CCRIS UPDATE

CALC ID	TYPE	ORG	PLANT	BRANCH	NUMBER	REV
	CN	NUC	BFN	NTB	NDQ099920080007	001

ALTERNATE CALCULATION IDENTIFICATION

BLDG	ROOM	ELEV	COORD/AZIM	FIRM	Print Report Yes ☐
NA					

CATEGORIES NA

KEY NOUNS (A-add, D-delete)

ACTION (A/D)	KEY NOUN	A/D	KEY NOUN

CROSS-REFERENCES (A-add, C-change, D-delete)

ACTION (A/C/D)	XREF CODE	XREF TYPE	XREF PLANT	XREF BRANCH	XREF NUMBER	XREF REV
A	P	CN	BFN	MEB	MDN0026910163	

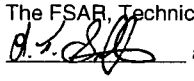
CCRIS ONLY UPDATES:
Following are required only when making keyword/cross reference CCRIS updates and page 1 of form NEDP-2-1 is not included:

PREPARER SIGNATURE	DATE	CHECKER SIGNATURE	DATE
PREPARER PHONE NO.	EDMS ACCESSION NO. R14 090114 101		

NPG CALCULATION RECORD OF REVISION

CALCULATION IDENTIFIER: NDQ099920080007

Title: Appendix R III.G.2 Manual Action Feasibility Evaluation

Revision No.	DESCRIPTION OF REVISION
0	Initial Issue - This evaluation supports the exemption request to allow the use of operator manual actions in 10CFR50 Appendix R III.G.2 Fire Areas to in lieu of the separation requirements in the rule. The FSAR, Technical Specifications, ISFSI SAR and COC and Fire Protection Report have been reviewed by L.T. Stafford and are not impacted by this calculation. Total Pages: 204
1	This revision makes clarifications to the discussion on combustibles in the Fire Area/Zones and adds the Combustible Load Tables as a reference in Appendix A. The FSAR, Technical Specifications, ISFSI SAR and COC and Fire Protection Report have been reviewed by  and are not impacted by this calculation. Pages Revised: iv, Appendix A (sheets A-37, A-60) Pages Added: none Pages Deleted: none Pages Replaced: i, ii, iii, v Total Pages: 204

NPG CALCULATION TABLE OF CONTENTS

Calculation Identifier: NDQ099920080007	Revision:	1

TABLE OF CONTENTS

NPG CALCULATION VERIFICATION FORM

Calculation Identifier NDQ099920080007 Revision 1

Method of verification used:

1. Design Review ☒
2. Alternate Calculation ☐
3. Qualification Test ☐

Verifier Jon W Gronek Date 1/13/09

Comments:

Design verification has been performed by design review in accordance with NEDP-2 and NEDP-5. The methodology used is consistent with good engineering practice and the results were found to be acceptable.

1.0 Purpose

This calculation is being issued to support the 10CFR50 Appendix R III.G.2 exemption request to allow the use of operator manual actions in lieu of separation as described in the rule.

2.0 References

2.1	0-FPR-Volume 1	Fire Protection Report
2.2	ED-Q0999-2003-0048	Units 1, 2, & 3 Appendix R Manual Action Requirements
2.3	0-SSI-001	Safe Shutdown Instructions
2.4	BFN PER 101631	Appendix R Section III.G.2 Operator Manual Actions
2.5	NEI 00-01	Guidance for Post-Fire Safe Shutdown Circuit Analysis
2.6	NUREG-1852	Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire

3.0 Design Input Data

3.1 See Attachment 1 for listing of Time Critical Operator Manual Actions (ref. 2.2).
3.2 See Table 1 of Appendix A for listing of Appendix R III.G.2 Fire Areas/Zones (ref. 2.1).

4.0 Assumptions

4.1 Time Critical Operator Manual Actions are defined as operator manual actions that must be completed within the first 60 minutes of the event and must be completed from outside the Main Control Room.
Verification: Based on industry guidance and past approval by the NRC, after 60 minutes the fire is assumed to be extinguished and the impact to the operators will be substantially reduced.

4.2 Actions performed in the Main Control Room are not included in the evaluation.
Verification: Actions taken in the Main Control Room are not considered operator manual actions since they are being performed from the normal safe shutdown location.

5.0 Special Requirements/Limiting Conditions

None.

6.0 Computations and Analyses

See Appendix A for analysis methodology and basis.

7.0 Supporting Graphics

None.

8.0 Summary of Results

See Appendix A for Summary of the Evaluation Results

9.0 Conclusions

Based on the evaluation performed in Appendix A, the operator manual actions that are performed for post-fire safe shutdown in 10CFR50 Appendix R III.G.2 fire areas/zones are feasible and reliable. The evaluation in Appendix A will be used to support an Appendix R III.G.2 exemption request.

Browns Ferry Nuclear Plant (BFN) Exemption Request for Appendix R III.G.2 Areas Operator Manual Actions (OMA)

Prepared: Rashid Abbas P.E., FPE 8/1/08
Sr. Fire Protection Engineer (SAIC)

Approved: L.T. STAFFORD 8-13-08
Appendix R / Fire Protection Engineer (TVA-BFN)

Exemption from Manual Actions Credit for Appendix R III.G.2 Areas

Paragraph III.G.2 of Appendix R does not list operator manual actions as a means of ensuring that one of the redundant trains is free of fire damage. Specifically, paragraph III.G.2 of Appendix R requires that, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation as a result of hot shorts, open circuits, or shorts to ground of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

> *(a) separation of cables and equipment by a fire barrier having a 3-hour rating,*
> *(b) separation of cables and equipment by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards and with fire detectors and an automatic fire suppression system in the fire area, and*
> *(c) enclosure of cables and equipment in a fire barrier having a 1-hour rating and with fire detectors and an automatic fire suppression system in the fire area.*

Contrary to these requirements, Appendix R III.G.2 areas at BFN rely on operator manual actions in lieu of one of the means specified in paragraph III.G.2 to ensure a train is free of fire damage when redundant trains were in the same fire area.

Justification

Introduction:

The purpose of the analysis presented herein is to show that the operator manual actions (OMA) required to achieve and maintain hot shutdown conditions are not affected by the environmental conditions associated with fires in Appendix R III.G.2 areas, and that the functionality of equipment needed to implement operator actions remains available and the area remains accessible. Realistic plant demonstrations will be provided to show that adequate time margin remains available to account for uncertainties. The analysis follows the guideline of NUREG 1852 and uses a deterministic approach for assessing the feasibility and reliability of operator manual actions. This evaluation will demonstrate that BFN meets the underlying purpose and intent of Appendix R III.G.2 rules.

The information provided within is BFN's basis for the exemption being requested in accordance with the requirements set forth by 10 CFR 50.12(a)(2)(ii) since compliance with the regulation in this instance is not necessary to achieve the underlying purpose of the rule. It should also be noted that the types of actions being evaluated have been previously approved by NRC (Reference 8) and no new type of actions are being introduced.

1. Identification of Appendix R III.G.2 Areas

Following Appendix R III.G.2 areas have been identified in the Fire Protection Report, Volume 1 (FPR) (Reference 1):

Table 1
Appendix R III.G.2 Areas

Fire area/Zone	Description
1-1	Unit 1 Reactor Building, EL 519' through 565' (West side of Rx Bldg.)
1-2	Unit 1 Reactor Building, EL 519' through 565' (East side of Rx Bldg.)
1-3	Unit 1 Reactor Building, EL 593', North Side
1-4	Unit 1 Reactor Building, EL 593', South Side and RHR HX Rooms
1-5	Unit 1 Reactor Building, EL 621' and North Side of 639' Elevations
1-6	Unit 1 Reactor Building, South Side of EL 639`
2-1	Unit 2 Reactor Building, EL 519' through 565' (West side of Torus Area and Main Floor)
2-2	Unit 2 Reactor Building, EL 519' through 565' (East side of Torus Area and Main Floor)
2-3	Unit 2 Reactor Building, EL 593', North Side

2-4	Unit 2 Reactor Building, EL 593', South Side
2-5	Unit 2 Reactor Building, EL 621' and North Side of EL 639'
2-6	Unit 2 Reactor Building, South Side of EL 639`
3-1	Unit 3 Reactor Building, El 565, 519, 639
3-2	Unit 3 Reactor Building, El 565, 519
3-3	Unit 3 Reactor Building, El 593
3-4	Unit 3 Reactor Building, El 621
25	Turbine Building/Intake Pump Station/Pipe Tunnel

2. List of Operator Manual Actions (OMA) by Functions and Their Requirement to Establish Safe Shutdown Path or to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path

The Unit 1, 2 and 3 Appendix R Manual Action Requirement calculation ED-Q0999-2003-0048 R6 (Reference 2) lists all the actions that are necessary for safe shutdown of the plant in the event of an Appendix R fire. This evaluation considers actions performed outside the main control room (MCR) within a period of one hour. Attachment 1 provides a list of all actions required to be performed in the first 60 minutes. It is expected that the fire affects after one hour will be substantially reduced so that manual actions are not impacted. The Operator Manual Actions (OMA) for the above areas will first be categorized according to their functions as follows:

- Reactivity Control
- Reactor Coolant Makeup Control
- Reactor Coolant System Pressure Control
- Decay Heat Removal
- Support Systems (Equipment Cooling)
- Support Systems (Electric Power)

These categories are consistent with the Boiling Water Reactor (BWR) generic Multiple Spurious Operation (MSO) listing as prepared by the BWR Owners Group (Reference 3). The groupings provide the relative order of manual actions for safe shutdown to be performed in a BWR plant. The equipment cooling and electric power supply systems provide the necessary support for safe shutdown functions.

These actions were then further separated in two categories:

Category 1. Manual Operator Actions required to Establish Analyzed Safe Shutdown Path.

This includes actions that are associated with part of the train required to achieve and maintain post fire hot shutdown* such as:

- High pressure injection (HPCI and RCIC)
- Low pressure injection (LPCI)
- Depressurization (ADS & MSRVs)
- Diesel generator loading (loading analysis)
- Diesel generator cooling (EECW)
- Power alignments (4 kV power supplies etc.)

*For BFN, the post-fire hot shutdown systems will include all systems required for high and low pressure injection, depressurization, and associated power supplies and cooling water for these systems. Note that the high pressure injection (HPCI and RCIC) is typically not credited for most III.G.2 areas. Long term decay heat removal is considered a cold shutdown process.

Category 2. Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path.

This includes actions that are not associated with part of the train required to achieve and maintain post-fire hot shutdown, but can impact the ability of credited train to perform its safe shutdown function. Examples of these actions are:

- RPV overfill (spurious HPCI start w/loss of high level trip)
- All flow diversions from credited makeup path (includes single and multiple spurious)
- System trips (recirculation pump trip)
- System isolation (RWCU isolation)
- Preventive actions (open breakers to avoid damage, high impedance faults, preclude spurious operation, preclude dead-head, etc.)

The breakdown of the operator actions is primarily based on the NRC-NEI meeting report (Reference 4) on the deterministic post-fire safe shutdown methodology to address multiple spurious operations. The exemption request will concentrate on OMAs performed in the first category, i.e. OMAs associated with the credited train. OMAs performed in the second category are primarily due to associated circuits (spurious operations) which have an adverse impact on the credited train. These actions are allowed per the guidelines provided in Generic Letter 81-12 (Reference 5). Actions to mitigate the effects of associated circuits have to be pre-planned and feasible.

The following Table 2 provides a review of all OMAs and lists them in their functional grouping along with placing them in one of the two categories as discussed above. HVAC actions are not included in Table 2, and will be addressed separately. The table also highlights actions that are performed in the III.G.2 areas (outside the EBRs).

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	**Location of Action**	**Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path**	**Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path**	**Required Time (Minutes)**	**Comments**
Reactivity Control					
RPS (Scram)	Control Room	NA	NA	NA	Control Room Action
Reactor Coolant Makeup Control					
MSIVs	Control Room	NA	NA	NA	Control Room Action
HPCI	2-BDDD-281-0002A		Yes	10	Spurious operation of the HPCI system could cause overfill of the reactor vessel if the automatic high-level trip is disabled.
HPCI	2-BDDD-281-0002B		Yes	10	Spurious operation of the HPCI system could cause overfill of the reactor vessel if the automatic high-level trip is disabled.
1-FCV-069-0094	1-VTV-032-5103		Yes	30	Open vent valve manually to close FCV-069-0094 (RWCU Isolation)
2-FCV-069-0094	2-VTV-032-5103		Yes	30	Open vent valve manually to close FCV-069-0094 (RWCU Isolation)
3-FCV-069-0094	3-VTV-032-5103		Yes	30	Open vent valve manually to close FCV-069-0094 (RWCU Isolation)
1-FCV-074-0053	1-BDBB-268-0001A	Yes		25	RHR LPCI injection mode
1-FCV-074-0060	1-BDBB-268-0001A (BKR 06B)		Yes	20	Drywell Spray isolation. Prevent flow diversion from LPCI

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
1-FCV-074-0061	1-BDBB-268-0001A (BKR 07B)		Yes	20	Drywell Spray isolation. Prevent flow diversion from LPCI
1-FCV-074-0066	1-BDBB-268-0001B (BKR 03A)		Yes	20	Prevent spurious isolation of LPCI path..
1-FCV-074-0067	1-BDBB-268-0001B	Yes		25	RHR LPCI injection mode
1-FCV-074-0071	1-BDBB-268-0001B (BKR 11C)		Yes	20	Suppression Pool isolation. Prevent flow diversion from LPCI.
1-FCV-074-0074	1-BDBB-268-0001B (BKR 10C)		Yes	20	Drywell Spray isolation. Prevent flow diversion from LPCI.
2-FCV-074-0053	2-BDBB-268-0002D (BKR 02C)	Yes		25	Isolate valve to preclude closure by the Appendix R emergency switch. (RHR LPCI injection)
2-FCV-074-0060	2-BDBB-268-0002A (BKR 13C)		Yes	20	Drywell Spray isolation. Prevent flow diversion from LPCI
2-FCV-074-0061	2-BDBB-268-0002A (BKR 11E)		Yes	20	Drywell Spray isolation. Prevent flow diversion from LPCI
2-FCV-074-0067	2-BDBB-268-0002E (BKR 02C)	Yes		25	Isolate valve to preclude closure by the Appendix R emergency switch. (RHR LPCI injection)

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	**Location of Action**	**Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path**	**Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path**	**Required Time (Minutes)**	**Comments**
2-FCV-074-0074	2-BDBB-268-0002B (BKR 14E)		Yes	20	Drywell Spray isolation. Prevent flow diversion from LPCI.
2-FCV-074-0075	2-BDBB-268-0002B (BKR 10E)		Yes	20	Drywell Spray isolation. Prevent flow diversion from LPCI.
3-FCV-074-0053	3-BDBB-268-0003D	Yes		25	Isolate valve to preclude closure by the Appendix R emergency switch. (RHR LPCI injection)
3-FCV-074-0067	3-BDBB-268-0003E	Yes		25	Isolate valve to preclude closure by the Appendix R emergency switch. (RHR LPCI injection)
1-PMP-074-0005 [1A]	0-BDAA-211-0000A (BKR 0018)		Yes	20	Start RHR pump - Action to prevent dead-head operation
1-PMP-074-0039 [1D]	0-BDAA-211-0000D (BKR 0016)		Yes	20	Start RHR pump - Action to prevent dead-head operation
2-PMP-074-0039 [2D]	0-BDAA-211-0000D (BKR 0017)		Yes	20	Start RHR pump - Action to prevent dead-head operation
3-PMP-074-0016 [3C]	3-BDAA-211-0003EB (BKR 0004)		Yes	20	Start RHR pump - Action to prevent dead-head operation
3-PMP-074-0028 [3B]	3-BDAA-211-0003EC (BKR 0002)		Yes	20	Start RHR pump - Action to prevent dead-head operation

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	**Location of Action**	**Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path**	**Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path**	**Required Time (Minutes)**	**Comments**
2-PMP-068-0060A	2-VFD-068-2002		Yes	20	Stop pump using E-Stop. Action to trip recirculation pump
2-PMP-068-0060A	RPT-2-II (BKR 1452)		Yes	20	Manually trip breaker. Action to trip recirculation pump
2-PMP-068-0060B	2-VFD-068-2112		Yes	20	Stop pump using E-Stop. Action to trip recirculation pump
2-PMP-068-0060B	RPT-2-II (BKR 1552)		Yes	20	Manually trip breaker. Action to trip recirculation pump
3-PMP-068-0060A	RPT BD 3-II		Yes	20	Manually trip breaker. Action to trip recirculation pump
3-PMP-068-0060B	RPT BD 3-II		Yes	20	Manually trip breaker. Action to trip recirculation pump
2-BDDD-281-0002A	2-BDDD-281-0002A (BKR 01B1)		Yes	20	Action to trip recirculation pump. Manually open breaker.
3-BDDD-281-0003A	3-BDDD-281-0003A		Yes	20	Action to trip recirculation pump. Manually open breaker to DC control power for 4160V RPT BD 3-II
Reactor Coolant System Pressure Control					
1-PCV-001-0004	1-LPNL-925-0032	Yes		10	Isolate valve to mitigate opening. Remote shutdown panel action
1-PCV-001-0005	1-LPNL-925-0032	Yes		10	Isolate valve to mitigate opening. Remote shutdown panel action

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
1-PCV-001-0018	1-LPNL-925-0658	Yes		10	Isolate valve to mitigate opening.
1-PCV-001-0019	1-LPNL-925-0658	Yes		10	Isolate valve to mitigate opening.
1-PCV-001-0022	1-LPNL-925-0032	Yes		10	Isolate valve to mitigate opening. Remote shutdown panel action
1-PCV-001-0023	1-LPNL-925-0032	Yes		10	Isolate valve to mitigate opening. Remote shutdown panel action
1-PCV-001-0030	1-LPNL-925-0032	Yes		10	Isolate valve to mitigate opening. Remote shutdown panel action
1-PCV-001-0031	1-LPNL-925-0658	Yes		10	Isolate valve to mitigate opening.
1-PCV-001-0034	1-LPNL-925-0032	Yes		10	Isolate valve to mitigate opening. Remote shutdown panel action
1-PCV-001-0041	1-LPNL-925-0032	Yes		10	Isolate valve to mitigate opening. Remote shutdown panel action
1-PCV-001-0042	1-LPNL-925-0032	Yes		10	Isolate valve to mitigate opening. Remote shutdown panel action
1-PCV-001-0179	1-LPNL-925-0658	Yes		10	Isolate valve to mitigate opening.
1-PCV-001-0180	1-LPNL-925-0032	Yes		10	Isolate valve to mitigate opening. Remote shutdown panel action

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	**Location of Action**	**Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path**	**Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path**	**Required Time (Minutes)**	**Comments**
Decay Heat Removal					
0-PMP-023-0001 [A1]	0-BDAA-211-0000A (BKR 0010)		Yes	30	Open breaker to secure RHRSW pump and avoid minimum flow problems.
0-PMP-023-0008 [C1]	0-BDAA-211-0000B (BKR 0010)		Yes	30	Open breaker to secure RHRSW pump and avoid minimum flow problems.
0-PMP-023-0012 [C2]	0-BDAA-211-0000B (BKR 0015)		Yes	30	Open breaker to secure RHRSW pump and avoid minimum flow problems.
0-PMP-023-0015 [B1]	3-BDAA-211-0003EC (BKR 0008)		Yes	30	Open breaker to secure RHRSW pump and avoid minimum flow problems.
0-PMP-023-0019 [B2]	0-BDAA-211-0000C (BKR 0016)		Yes	30	Open breaker to secure RHRSW pump and avoid minimum flow problems.
0-PMP-023-0027 [D2]	0-BDAA-211-0000D (BKR 0015)		Yes	30	Open breaker to secure RHRSW pump and avoid minimum flow problems.
Support Systems (Equipment Cooling)					
0-PMP-023-0088 [B3]	0-BDAA-211-0000C (BKR 0009)		Yes	10	Prevent spurious trip of required EECW pumps (only FA-25)

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	**Location of Action**	**Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path**	**Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path**	**Required Time (Minutes)**	**Comments**
0-PMP-023-0094 [D3]	0-BDAA-211-0000D (BKR 0010)		Yes	10	Prevent spurious trip of required EECW pumps (only FA-25)
0-PMP-023-0085 [A3]	3-BDAA-211-0003EA (BKR 0005)		Yes	10	Prevent spurious trip of required EECW pumps (only FA-25)
0-PMP-023-0091 [C3]	3-BDAA-211-0003EB (BKR 0010)		Yes	10	Prevent spurious trip of required EECW pumps (only FA-25)
0-FCV-067-0049	0-BDBB-219-0000A (BKR 12C)		Yes	20	Prevent EECW / RHRSW north header intertie valve spurious opening. Open Breaker.
0-FCV-067-0049	0-FCV-067-0049		Yes	20	Prevent EECW / RHRSW south header intertie valve spurious opening. Close valve manually.
Support Systems (Electric Power Supply)					
0-BATA-248-0000C	2-BDBB-268-0002A	Yes		60	Align to the alternate battery charger
0-BATA-248-0001	0-CHGA-248-0002B	Yes		60	Align alternate 250V DC battery charger 2B to Battery bd 1
0-BATA-248-0002	0-CHGA-248-0002B	Yes		60	Align alternate 250V DC battery charger 2B to Battery bd 2
0-BATA-248-0003	0-CHGA-248-0002B	Yes		60	Align alternate 250V DC battery charger 2B to Battery bd 3

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
0-BDAA-211-0000A	0-BDAA-211-0000A	Yes		10	Align alternate DC control power from 0-BDDD-280-0002
0-BDAA-211-0000A (Breakers 1614, 1716, 1818, 1824)	0-BDAA-211-0000A		Yes	20	Isolate breaker to preclude closure. Precludes spurious operation of the breaker for 4 kV SDBD A.
0-BDAA-211-0000B	0-BDAA-211-0000B	Yes		20	Align alternate DC control power from 0-BDDD-280-0002.
0-BDAA-211-0000B	0-BDAA-211-0000B		Yes	20	Verify breaker closed. Load shedding operator actions.
0-BDAA-211-0000B (Breakers 1616, 1714, 1822, 1828,)	0-BDAA-211-0000B		Yes	20	Isolate breaker to preclude closure. Precludes spurious operation of the breaker for 4 kV SDBD B.
0-BDAA-211-0000C	0-BDAA-211-0000C	Yes		20	Align alternate DC control power from 0-BDDD-280-0001
0-BDAA-211-0000C	0-BDAA-211-0000C		Yes	20	Verify breaker closed. Load shedding operator actions.
0-BDAA-211-0000C (Breakers 1624, 1718, 1812, 1814)	0-BDAA-211-0000C		Yes	20	Isolate breaker to preclude closure. Precludes spurious operation of the breaker for 4 kV SDBD C.
0-BDAA-211-0000D	0-BDAA-211-0000D	Yes		20	Align alternate DC control power from 0-BDDD-280-0003

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
0-BDAA-211-0000D (Breakers 1618, 1724, 1816, 1826)	0-BDAA-211-0000D		Yes	20	Isolate breaker to preclude closure. Precludes spurious operation of the breaker for 4 kV SDBD D.
0-BDDD-280-0001 (BKR 609)	0-BDDD-280-0001 (BKR 609)	Yes		20	Align alternate 250V DC battery charger 2B to Battery bd 1
0-BDDD-280-0002	3-BDDD-281-0003A		Yes	20	Trip those loads associated with the Unit 3 HPCI system prior to transferring the 250V RMOV Board 3A to its alternate power supply. 250V DC Unit Battery Load Study
0-BDDD-280-0002 (BKR 607)	0-BDDD-280-0002 (BKR 607)	Yes		20	Align alternate 250V DC battery charger 2B to Battery bd 2
0-BDDD-280-0003	2-BDDD-281-0002A		Yes	20	Trip those loads associated with the Unit 3 HPCI system prior to transferring the 250V RMOV Board 3A to its alternate power supply. 250V DC Unit Battery Load Study
0-BDDD-280-0003 (BKR 609)	0-BDDD-280-0003 (BKR 609)	Yes		20	Align alternate 250V DC battery charger 2B to Battery bd 3
0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)		Yes	20	Trip breaker (710) to the DPO shop to reduce load on unit battery 3.
0-CHGA-248-0001	0-CHGA-248-0001		Yes	60	Reset 250V DC Battery Charger due to load shedding

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
0-CHGA-248-0002A	0-CHGA-248-0002A		Yes	60	Reset 250V DC Battery Charger due to load shedding
0-CHGA-248-0002B	0-CHGA-248-0002B		Yes	60	Reset 250V DC Battery Charger due to load shedding
0-CHGA-248-0003	0-CHGA-248-0003		Yes	60	Reset 250V DC Battery Charger due to load shedding
0-GEN-082-000A	0-BDAA-211-0000A	Yes		10	Isolate and trip breaker 0019 from 0-BDAA-211-0000A. Diesel Loading Analysis.
0-GEN-082-000A	0-BDAA-211-0000A	Yes		20	Isolate and trip breaker 0010, 0011, 0013, 0016, 0017 from 0-BDAA-211-0000A. Diesel Loading Analysis.
0-GEN-082-000B	0-BDAA-211-0000B	Yes		10	Isolate and trip breaker 0006, 0007, 0016, 0017 from 0-BDAA-211-0000B. Diesel Loading Analysis
0-GEN-082-000B	0-BDAA-211-0000B	Yes		20	Isolate and trip breaker 0009, 0010, 0011, 0015, from 0-BDAA-211-0000B. Diesel Loading Analysis
0-GEN-082-000C	0-BDAA-211-0000C	Yes		10	Isolate and trip breaker 0009, 0010, 0016, 0017, 0018 from 0-BDAA-211-0000C. Diesel Loading Analysis
0-GEN-082-000C	0-BDAA-211-0000C	Yes		20	Isolate and trip breaker 0010, 0016 from 0-BDAA-211-0000C. Diesel Loading Analysis
0-GEN-082-000D	0-BDAA-211-0000D	Yes		10	Isolate and trip breaker 0007, 0008, 0010, 0015, 0016, 0017 from 0-BDAA-211-0000D. Diesel Loading Analysis
0-GEN-082-000D	0-BDAA-211-0000D	Yes		20	Isolate and trip breaker 0015 from 0-BDAA-211-0000D. Diesel Loading Analysis

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
3-GEN-082-0003A	3-BDAA-211-0003EA	Yes		10	Isolate and trip breaker 0005, BKR 0006, BKR 11, and BKR 0012 from 3-BDAA-211-0003EA. Diesel loading analysis.
3-GEN-082-0003A	3-BDAA-211-0003EA	Yes		20	Isolate diesel to mitigate failure.
3-GEN-082-0003A	0-BDAA-211-0000A	Yes		20	Trip BKR 0005 and BKR 0021, isolate and trip BKR 0006, BKR 0010, BKR 0013, BKR 0017, BKR 0018, and BKR 0019 from 0-BDAA-211-0000A. Diesel Loading Analysis
3-GEN-082-0003A	0-BDAA-211-0000A	Yes		20	Trip BKR 0021, isolate and trip BKR 0006, BKR 0007, BKR 0010, BKR 0011, BKR 0013, BKR 0016, BKR 0017, BKR 0018, and BKR 0019 from 0-BDAA-211-0000A. Diesel Loading Analysis
3-GEN-082-0003A	0-BDAA-211-0000A	Yes		20	Isolate and trip BKR 0007 and BKR 0010 from 0-BDAA-211-0000A. Diesel loading analysis.
3-GEN-082-0003A	0-BDAA-211-00003EA	Yes		20	Isolate and trip BKR 0005 from 3-BDAA-211-0003EA
3-GEN-082-0003B	3-BDAA-211-0003EB	Yes		10	Isolate and trip BKR 0004, BKR 0005, BKR 0010 from 3-BDAA-211-0003EB
3-GEN-082-0003B	3-BDAA-211-0003EB	Yes		20	Isolate diesel to mitigate failure.
3-GEN-082-0003B	0-BDAA-211-0000B	Yes		20	TRIP BKR 0005, ISOLATE AND TRIP BKR 0006, BKR 0007, BKR 0009, BKR 0010, BKR 0011, BKR 0015, BKR 0016, BKR 0017, AND BKR 0018 FROM 0-BDAA-211-0000B

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
3-GEN-082-0003B	3-BDAA-211-0003EB	Yes		20	ISOLATE AND TRIP BKR 0004, BKR 0005, AND BKR 0010 FROM 3-BDAA-211-0003EB
3-GEN-082-0003C	3-BDAA-211-0003EC	Yes		20	Isolate diesel to mitigate failure.
3-GEN-082-0003C	0-BDAA-211-0000C	Yes		20	ISOLATE AND TRIP BKR 0006 AND BKR 0010 FROM 0-BDAA-211-0000C
3-GEN-082-0003C	3-BDAA-211-0003EC	Yes		20	ISOLATE AND TRIP BKR 0002, BKR 0008, BKR 0009, AND BKR 0013 FROM 3-BDAA-211-0003EC
3-GEN-082-0003C	3-BDAA-211-0003EC	Yes		20	ISOLATE AND TRIP BKR 0008 AND BKR 0009 FROM 3-BDAA-211-0003EC
3-GEN-082-0003D	0-BDAA-211-0000D	Yes		20	TRIP BKR 0013, ISOLATE AND TRIP BKR 0007, BKR 0016, AND BKR 0017 FROM 0-BDAA-211-0000D
3-GEN-082-0003D	3-BDAA-211-0003ED	Yes		20	TRIP BKR 0007 FROM 3-BDAA-211-0003ED
3-GEN-082-0003D	3-BDAA-211-0003ED	Yes		20	ISOLATE AND TRIP BKR 0006 FROM 3-BDAA-211-0003ED
1-BDBB-231-0001A	1-BDBB-231-0001A	Yes		20	Align alternate DC control power from 0-BDDD-280-0002
1-BDBB-231-0001A	1-BDBB-231-0001A	Yes		20	Align to the alternate power from 0-BDAA-211-0000B
1-BDBB-231-0001A	1-BDBB-231-0001A	Yes		20	Isolate, transfer control and locally operate breaker 1C open and 8C closed.

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
1-BDBB-231-0001B	1-BDBB-231-0001B	Yes		20	Align alternate DC control power from 0-BDDD-280-0003
1-BDBB-231-0001B	1-BDBB-231-0001B	Yes		20	Align to the alternate power from 0-BDAA-211-0000B
1-BDBB-231-0001B	1-BDBB-231-0001B	Yes		20	Isolate, transfer control and locally operate breaker 1C closed and 8C open.
1-BDBB-268-0001B	1-BDBB-268-0001B	Yes		20	Align to the alternate power from 0-BDBB-231-0001A
1-BDBB-268-0001B	1-BDBB-231-0001A (BKR 03B)	Yes		20	Close Breaker
1-BDDD-281-0001A	1-BDDD-281-0001A	Yes		20	Align to the alternate power supply 0-BDDD-280-0002
1-BDDD-281-0001B	1-BDDD-281-0001B	Yes		20	Align to the alternate power supply 0-BDDD-280-0001
2-BDDD-281-0002A	2-BDDD-281-0002A	Yes		20	Align to the alternate power supply 0-BDDD-280-0003
2-BDDD-281-0002B	2-BDDD-281-0002B	Yes		20	Align to the alternate power supply 0-BDDD-280-0001
1-BDDD-281-0001C	1-BDDD-281-0001C	Yes		20	Align to the alternate power supply 0-BDDD-280-0001
1-LPNL-925-0032	1-LPNL-925-0032	Yes		20	Align to the alternate power from 0-BDDD-280-0003 (3-MGEN-252-0003)

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
2-BDBB-231-0002A	2-BDBB-231-0002A	Yes		20	Align to the alternate power 0-BDAA-211-0000C
2-BDBB-231-0002A	2-BDBB-231-0002A	Yes		20	Remove non-Appendix R loads to prevent diesel and or 4kV/480V transformer overload.
2-BDBB-231-0002A	2-BDBB-231-0002A	Yes		20	Isolate, transfer control and locally operate breaker 1C closed and 8C open.
2-BDBB-231-0002A	2-BDBB-231-0002A	Yes		20	Align alternate DC control power from 0-BDDD-280-0001
2-BDBB-231-0002A	2-BDBB-231-0002A		Yes	60	Isolate SDBD to mitigate trip of normal feeder breaker.
2-BDBB-231-0002A	0-BDAA-211-0000B (BKR 0005)		Yes	60	Close normal feeder breaker from 0-BDAA-211-0000B
2-BDBB-231-0002A	2-BDBB-231-0002A		Yes	60	Close normal feeder breaker from 0-BDAA-211-0000B
2-BDBB-231-0002A	2-BDBB-231-0002A		Yes	60	Remove non-required loads to assure availability of board.
2-BDBB-231-0002B	2-BDBB-231-0002B	Yes		20	Align to the alternate power 0-BDAA-211-0000C
2-BDBB-231-0002B	0-BDDD-280-0003 (BKR 708)		Yes	20	Open the alternate DC control power to assure availability of normal control power.
2-BDBB-231-0002B	2-BDBB-231-0002B		Yes	20	Remove non-required loads to assure availability of board.

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
2-BDBB-231-0002B	2-BDBB-231-0002B		Yes	20	Remove non-Appendix R loads to prevent diesel and or 4kV/480V transformer overload.
2-BDBB-231-0002B	2-BDBB-231-0002B	Yes		20	Isolate, transfer control and locally operate breaker 1C closed and 8C open.
2-BDBB-231-0002B	2-BDBB-231-0002B	Yes		20	Isolate, transfer control and locally operate breaker 1C open and 8C closed.
2-BDBB-268-0002A	2-BDBB-268-0002A		Yes	20	Remove non-required loads to prevent multiple high impedance faults.
2-BDBB-268-0002A	2-BDBB-231-0002A	Yes		60	Power alignment. Close normal feeder breaker
2-BDBB-268-0002A	2-BDBB-231-0002A		Yes	20	Remove non-required loads to assure availability of board.
2-BDBB-268-0002A	2-BDBB-268-0002A		Yes	60	Remove non-Appendix R loads to prevent diesel and or 4kV/480V transformer overload.
2-BDBB-268-0002A	2-BDBB-268-0002A	Yes		60	Align to alternate power supply from 2-BDBB-231-002B
2-BDBB-268-0002A	2-BDBB-268-0002B	Yes		60	Close Breaker
2-BDBB-268-0002B	2-BDBB-268-0002B		Yes	60	Remove non-required loads to prevent multiple high impedance faults.
2-BDBB-268-0002B	2-BDBB-268-0002B	Yes		60	Power alignment. Close normal feeder breaker

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
2-BDBB-268-0002B	2-BDBB-268-0002B		Yes	20	Remove non-required loads to assure availability of board.
2-BDBB-268-0002B	2-BDBB-268-0002B		Yes	60	Remove non-Appendix R loads to prevent diesel and or 4kV/480V transformer overload.
2-BDBB-268-0002C	2-BDBB-268-0002C		Yes	60	Remove non-Appendix R loads to prevent diesel and or 4kV/480V transformer overload.
2-BDBB-268-0002D	2-BDBB-268-0002C	Yes		20	Align to alternate power
2-BDBB-268-0002D	2-BDBB-268-0002D	Yes		20	Align to alternate power
3-BDBB-268-0003A	3-BDBB-268-0003A	Yes		60	Power alignment – Close normal feeder breaker from 3-BDBB-231-0003A
3-BDBB-268-0003A	3-BDBB-268-0003A		Yes	60	Remove non-required loads to assure availability of board.
3-BDBB-268-0003A	3-BDBB-268-0003A		Yes	60	Remove non-Appendix R loads to prevent diesel and or 4kV/480V transformer overload.
3-BDBB-268-0003B	3-BDBB-268-0003B	Yes		20	Power alignment - Close normal feeder breaker from 3-BDBB-231-0003B
3-BDBB-268-0003B	3-BDBB-268-0003B		Yes	20	Remove non-required loads to assure availability of board.
3-BDBB-268-0003B	3-BDBB-268-0003B		Yes	20	Remove non-Appendix R loads to prevent diesel and or 4kV/480V transformer overload.

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
3-BDAA-211-0003EA	3-BDAA-211-0003EA	Yes		10	Align alternate DC control power from 0-BDDD-280-0002
3-BDAA-211-0003EA	3-BDAA-211-0003EA		Yes	20	Isolate breaker to mitigate closure.
3-BDAA-211-0003EB	3-BDAA-211-0003EB (BKR 0009)		Yes	20	Verify breaker closed or close breaker.
3-BDAA-211-0003EB	3-BDAA-211-0003EB		Yes	20	Isolate breaker to mitigate closure.
3-BDAA-211-0003EC	3-BDAA-211-0003EC		Yes	20	Isolate breaker to mitigate closure.
3-BDAA-211-0003ED	3-BDAA-211-0003ED	Yes		20	Align alternate DC control power from 0-BDDD-280-0003
3-BDAA-211-0003ED	3-BDAA-211-0003ED		Yes	20	Isolate breaker to mitigate closure.
3-BDBB-219-0003EA	3-BDBB-219-0003EA	Yes		20	Align to the alternate power 3-BDBB-231-0003B
3-BDBB-231-0003A	3-BDBB-231-0003A	Yes		20	Align to the alternate power 3-BDAA-211-0003EB
3-BDBB-231-0003A	3-BDBB-231-0003A		Yes	20	Remove non-Appendix R loads to prevent diesel and or 4kV/480V transformer overload.
3-BDBB-231-0003A	3-BDBB-231-0003A	Yes		20	Align alternate DC control power from 0-BDDD-280-0002

Table 2 – Operator Manual Actions Functional and Category Review (Shaded areas are outside EBRs)					
Component Requiring Manual Action	Location of Action	Category 1 - Manual Operator Actions Required to Establish Analyzed Safe Shutdown Path	Category 2 - Manual Operator Actions Required to Mitigate Adverse Consequences to the Analyzed Safe Shutdown Path	Required Time (Minutes)	Comments
3-BDBB-231-0003A	3-BDBB-231-0003A		Yes	60	Remove non-required loads to assure availability of board.
3-BDBB-231-0003A	3-BDBB-231-0003A	Yes		60	Isolate, transfer control and locally operate breaker 1C closed and 8C open.
3-BDBB-231-0003B	3-BDBB-231-0003B	Yes		20	Align to the alternate power 3-BDAA-211-0003EB
3-BDBB-231-0003B	3-BDBB-231-0003B		Yes	20	Remove non-required loads to assure availability of board.
3-BDBB-231-0003B	3-BDBB-231-0003B		Yes	60	Remove non-required loads to assure availability of board.
3-BDBB-231-0003B	3-BDBB-231-0003B	Yes		20	Isolate, transfer control and locally operate breaker 1C closed and 8C open.
3-BDBB-231-0003B	3-BDBB-231-0003B		Yes	60	Remove non-Appendix R loads to prevent diesel and or 4kV/480V transformer overload.
3-BDDD-281-0003A	3-BDDD-281-0003A	Yes		20	Align to alternate power supply 0-BDDD-280-0002
3-BDDD-281-0003B	3-BDDD-281-0003B	Yes		20	Align to alternate power supply 0-BDDD-280-0003
3-BDDD-281-0003C	3-BDDD-281-0003C	Yes		20	Align to alternate power supply 0-BDDD-280-0003

3. Feasibility and Reliability Review of Operator Manual Actions (OMA)

The following review of manual actions is based on NUREG-1852 guidance.

Review of Table 2 shows that majority of the actions are performed in the electrical board room (switchgear rooms). The remaining actions are performed in the reactor building, diesel generator building and intake pump station. Following is a breakdown of these actions in areas other than the electrical board rooms:

- Trip Recirculation Pumps (using mechanical trip or E-Stop) – reactor building
- Isolate RWCU System (open vent valve) – reactor building
- LPCI Injection (isolate and open using Appendix R switch) – reactor building
- Power alignment – diesel generator building (diesel aux. board room) and reactor building
- Remove non-Appendix R loads – reactor building
- Close EECW valve 0-FCV-067-0049 (prevent cooling flow diversion) – diesel generator building (diesel aux. board room) and intake pump station

3.1 Environmental Factors Feasibility

Fires in III.G.2 areas have the possibility of affecting OMAs being performed in electrical board rooms, reactor building, diesel generator building (diesel aux. board room) and intake pump station. The OMAs vis-à-vis the fire location evaluation will consider impacts due to temperature, smoke, toxic gasses, noise, etc. and will review mitigating fire protection features such as fire barriers, separation, compartmentation, and HVAC. The following feasibility assessment is based on these environmental factors:

a) OMAs in Electrical Board Rooms:
The Electrical Board Rooms (EBR) are located within the control building habitability zone which includes the main control room and remote shutdown panel location. EBRs are separated from III.G. 2 areas in the reactor building by three hour fire barriers. Fires in the reactor building should have very little impact on EBR temperatures due to substantial fire barriers (12" or more thick concrete) and independent ventilation systems. The boundary between EBRs and reactor building are also secondary containment boundary. The boundaries are sealed to prevent the affects of fire, heat and smoke. Due to the short travel distance from the control room, adequate temperature control, non- contaminated Zone and non-radiation area, the EBRs can be considered as pseudo control room. The electrical board rooms (EBR) are served by redundant HVAC units. However, fires in certain areas can damage both trains of HVAC resulting in loss of cooling in these areas. Engineering analyses (Reference 6) have shown that the temperature in EBR remains well below the limit (104 ^{0}F) for several hours. Some manual actions (shut lights, open doors, provide portable ventilation, etc) may be required later (10 hours or more) to limit the rise in EBR temperatures. Based on the above discussion,

actions can be performed in the EBRs under the expected environmental conditions that will be encountered.

b) OMAs in Reactor Building:
The reactor building areas consists of large open spaces and the fire zones are not separated by fire rated barriers across its entire boundary (i.e. equipment hatches) or depend on spatial separation (i.e. 20 ft. separation). A review of the relative proximity of the fire area and the location of action is required to assess the feasibility of the action. Table 3 lists the actions that are performed in the reactor building fire zones; the fire effects assessment and the category of OMA. As stated above, the exemption request is specifically for OMAs in category 1. However, category 2 actions are also evaluated for completeness. Diesel generator building (DGB) and intake pump station (IPS) OMAs are also addressed in the table.

Table 3 – Feasibility of Operator Manual Actions (OMA) in Reactor Buildings						
No.	Location of Action (Fire Zone)	Manual Action description	Actions Required for Fire Zones	Reqd. Time (Min)	Exemption Required (Category)	Feasibility Assessment for Fire Affects (temperature, humidity, smoke, toxic gasses and noise)
1	1-VTV-032-5103 (1-5, El 621)	Open vent valve to manually close FCV-069-0094 (RWCU Isolation)	1-3, El 593	30	No (2)	Fire Zone 1-5 is on EL 621 and is connected to Fire Zone 1-3 through EL 621 floor slab. To prevent a fire on the EL 593 elevation from propagating up to EL 621, all penetrations are sealed to at least a one hour or equivalent rating and 3 hour rated fire dampers are installed in duct penetrations. The OMA on El 621 will not be affected by fire on El 593. Operators can reach El 621 without traversing the fire location.
2	2-VTV-032-5103 (2-5, El 621)	Open vent valve to manually close FCV-069-0094 (RWCU Isolation)	2-4, El 593	30	No (2)	Fire Zone 2-5 is on EL 621 and is connected to Fire Zone 2-4 through EL 593 floor slab. To prevent a fire on the EL 593 elevation from propagating up to EL 621, all penetrations are sealed to at least a one hour or equivalent rating and 3 hour rated fire dampers are installed in duct penetrations. The OMA on El 621 will not be affected by fire on El 593. Operators can reach El 621 without traversing the fire location.
3	3-VTV-032-5103 (3-4, El 621)	Open vent valve to manually close FCV-069-0094 (RWCU Isolation)	3-3, El 593	30	No (2)	Fire Zone 3-4 is on EL 621, and north of fuel pool wall on EL 639. It connects with Fire Zone 3-3 through the EL 621 floor slab, having equipment hatch at R16-U and stairway at R2l-U. To prevent a fire on the EL 593 elevation from propagating up to EL 621, equipment hatch and stairway are protected by water curtains and all penetrations are sealed to at least a one hour or equivalent rating and 3 hour rated fire dampers are installed in duct penetrations. The OMA on El 621 will not be affected by fire on El 593. Operators can reach El 621 without traversing the fire location.

Table 3 – Feasibility of Operator Manual Actions (OMA) in Reactor Buildings						
No.	**Location of Action (Fire Zone)**	**Manual Action description**	**Actions Required for Fire Zones**	**Reqd. Time (Min)**	**Exemption Required (Category)**	**Feasibility Assessment for Fire Affects (temperature, humidity, smoke, toxic gasses and noise)**
4	2-BDBB-268-0002D (BKR 02C) (2-4, El 593)	Isolate valve to preclude closure by the Appendix R emergency switch. (RHR LPCI injection 2-FCV-074-0053)	2-2, El 565, El 519 2-5, El 621	25	Yes (1)	Fire Zone 2-4 is on EL 593 south of column line Q and is connected to Fire Zone 2-2 through the RHR heat exchanger room enclosure at column R14-T/S, and EL 593 floor slab. Penetrations are sealed to at least a one hour or equivalent rating and 3 hour fire rated dampers are installed in duct penetrations. The OMAs on El 593 will not be affected by fires on El 565. Fire Zone 2-4 is connected to Fire Zone 2-5 through an open equipment hatch at R9-U, another hatch at R13-U, and EL 621 floor slab. Water curtains are provided at both equipment hatches to prevent a fire from EL 593 propagating up to EL 621. Penetrations are sealed to at least a one hour or equivalent rating and 3 hour fire dampers are installed in duct penetrations. The fire affects on EL 621 are not likely to impact OMAs on El 593 below. Operators can reach El 593 without traversing the fire locations.
5	2-BDBB-268-0002E (BKR 02C) (2-5, El 621)	Isolate valve to preclude closure by the Appendix R emergency switch. (RHR LPCI injection 2-FCV-074-0067)	2-1, El 565, 519 2-3, El 593 2-4, El 593	25	Yes (1)	Fire Zone 2-5 is on EL 621 and is not connected to Fire Zone 2-1 on El 565. Fire Zone 2-5 is connected to Fire Zone 2-3 through EL 593 floor slab. To prevent a fire on the EL 593 from propagating up to EL 621, all penetrations are sealed to at least a one hour or equivalent rating and 3 hour fire dampers are installed in duct penetrations. Fire Zone 2-5 is connected to Fire Zone 2-4 through an open equipment hatch at R9-U, another hatch at R13-U, and EL 621 floor slab. Water curtains are provided at both equipment hatches to prevent a fire from EL 593 propagating up to EL 621. Penetrations are sealed to at least a one hour or equivalent rating and 3 hour fire dampers are installed in duct penetrations.

Table 3 – Feasibility of Operator Manual Actions (OMA) in Reactor Buildings						
No.	**Location of Action (Fire Zone)**	**Manual Action description**	**Actions Required for Fire Zones**	**Reqd. Time (Min)**	**Exemption Required (Category)**	**Feasibility Assessment for Fire Affects (temperature, humidity, smoke, toxic gasses and noise)**
						The OMA on El 621 will not be affected by fire on El 593 and El 565. Operators can reach El 621 without traversing the fire location.
6	3-BDBB-268-0003D (3-3, El 593)	Isolate valve to preclude closure by the Appendix R emergency switch. (RHR LPCI injection 3-FCV-074-0053)	3-2, El 565, 519	25	Yes (1)	Fire zone 3-3 connects to fire zone 3-2 through the EL 593 floor slab and 1 hour fire rated barrier of RHR heat exchanger room on EL 565. To prevent a fire on the EL 565 elevation from propagating up to EL 593, penetrations are sealed to at least a one hour or equivalent rating. The door of heat exchanger room on EL 565 is protected by a water curtain. To prevent a fire from the RHR pump room from propagating to the RHR heat exchanger enclosure a water curtain is installed at the ceiling of the RHR pump rooms (EL. 541). The OMA on El 593 will not be affected by fire on El 593 and El 565. Operators can reach El 621 without traversing the fire location.
7	3-BDBB-268-0003E (3-4, El 621)	Isolate valve to preclude closure by the Appendix R emergency switch. (RHR LPCI injection 3-FCV-074-0067)	3-1, El 565, 519, 639 3-3, El 593	25	Yes (1)	Fire Zone 3-4 is on EL 621, and north of fuel pool wall on EL 639. It connects to Fire Zone 3-1 through an open equipment hatch at R16-U, and at R21-U, the EL 639 floor slab and the fuel pool wall on the EL 639. Water curtains are provided at equipment hatch and stairway to prevent a fire from EL 621 propagating up to 639. The fuel pool wall provides separation on EL 639 between Fire Zones 3-1 and 3-4. To prevent fire propagating from EL 621 to EL 639, penetrations are sealed to at least a one hour or equivalent rating and duct penetrations are provided with 3 hour fire dampers. Fire Zone 3-4 connects with Fire Zone 3-3 through the EL 621 floor slab, having equipment hatch at R16-U and stairway at R2l-U. To prevent a fire on the EL 593 elevation from propagating up to EL 621, equipment hatch and stairway are protected by water curtains and all penetrations are sealed to at least a one hour or equivalent rating and 3 hour rated fire dampers are installed in duct penetrations.

Table 3 – Feasibility of Operator Manual Actions (OMA) in Reactor Buildings						
No.	**Location of Action (Fire Zone)**	**Manual Action description**	**Actions Required for Fire Zones**	**Reqd. Time (Min)**	**Exemption Required (Category)**	**Feasibility Assessment for Fire Affects (temperature, humidity, smoke, toxic gasses and noise)**
						The OMA on El 621 will not be affected by fire on El 593, El 565 or El 639. Operators can reach El 621 without traversing the fire location.
8	2-VFD-068-2002 (2-6, El 639)	Stop pump using E-Stop. Action to trip recirculation pump, 2-PMP-068-0060A	2-5, El 621	20	No (2)	Fire Zone 2-6 is located on EL 639 south of the fuel pool wall. The adjacent Fire Zone is 2-5. Fire Zone 2-5 is on EL 621 and north of the fuel pool wall on EL 639 and connects to Fire Zone 2-6 through an open equipment hatch at R9-U, another hatch at R13-U, the EL 639 floor slab and the fuel pool wall on EL 639. Water curtains are provided at both equipment hatches to prevent a fire from EL 621 propagating up to EL 639. The OMA on El 639 will not be affected by fire on El 621. Operators can reach El 639 without traversing the fire location.
9	RPT-2-II (BKR 1452), 2-5, El 621	Manually trip breaker. Action to trip recirculation pump, 2-PMP-068-0060A	2-1, El 565, 519 2-2, El 565, El 519 2-3, El 593 North Side 2-4, El 593, South Side 2-6, El 639	20	No (2)	Fire Zone 2-5 is on EL 621 and is not connected to Fire Zone 2-1 on El 565. Fire Zone 2-5 is on EL 621 and is not connected to Fire Zone 2-2 on El 565. Fire Zone 2-5 is connected to Fire Zone 2-3 through EL 593 floor slab. To prevent a fire on the EL 593 from propagating up to EL 621, all penetrations are sealed to at least a one hour or equivalent rating and 3 hour fire dampers are installed in duct penetrations. Fire Zone 2-5 is connected to Fire Zone 2-4 through an open equipment hatch at R9-U, another hatch at R13-U, and EL 621 floor slab. Water curtains are provided at both equipment hatches to prevent a fire from EL 593 propagating up to EL 621. Penetrations are sealed to at least a one hour or equivalent rating and 3 hour fire dampers are installed in duct penetrations. Fire Zone 2-5 is connected to Fire Zone 2-6 through an open equipment hatch at R9-U, and at R13-U, the EL 639 floor slab and the

Table 3 – Feasibility of Operator Manual Actions (OMA) in Reactor Buildings						
No.	**Location of Action (Fire Zone)**	**Manual Action description**	**Actions Required for Fire Zones**	**Reqd. Time (Min)**	**Exemption Required (Category)**	**Feasibility Assessment for Fire Affects (temperature, humidity, smoke, toxic gasses and noise)**
						fuel pool wall on the EL 639. Water curtains are provided at both equipment hatches to prevent a fire from EL 621 propagating up to EL 639. The fuel pool wall separates Fire Zones 2-5 and 2-6. To prevent fire propagating from EL 621 to EL 639 penetrations are sealed to at least a one hour or equivalent rating and 3 hour fire dampers are installed in duct penetrations. The OMA on El 621 will not be affected by fire on El 593 and El 565. Operators can reach El 621 without traversing the fire location.
10	2-VFD-068-2112, (2-6, El 639)	Stop pump using E-Stop. Action to trip recirculation pump, 2-PMP-068-0060B	2-5, El 621	20	No (2)	Fire Zone 2-6 is located on EL 639 south of the fuel pool wall. The adjacent Fire Zone is 2-5. Fire Zone 2-5 is on EL 621 and north of the fuel pool wall on EL 639 and connects to Fire Zone 2-6 through an open equipment hatch at R9-U, another hatch at R13-U, the EL 639 floor slab and the fuel pool wall on EL 639. Water curtains are provided at both equipment hatches to prevent a fire from EL 621 propagating up to EL 639. The OMA on El 639 will not be affected by fire on El 621. Operators can reach El 639 without traversing the fire location.
11	RPT-2-II (BKR 1552), 2-5, El 621	Manually trip breaker. Action to trip recirculation pump, 2-PMP-068-0060B	2-1, El 565, 519 2-2, El 565, El 519 2-3, El 593 North Side 2-4, El 593, South Side 2-6, El 639	20	No (2)	Fire Zone 2-5 is on EL 621 and is not connected to Fire Zone 2-1 on El 565. Fire Zone 2-5 is on EL 621 and is not connected to Fire Zone 2-2 on El 565. Fire Zone 2-5 is connected to Fire Zone 2-3 through EL 593 floor slab. To prevent a fire on the EL 593 from propagating up to EL 621, all penetrations are sealed to at least a one hour or equivalent rating and 3 hour fire dampers are installed in duct penetrations. Fire Zone 2-5 is connected to Fire Zone 2-4 through an open equipment hatch at R9-U, another hatch at R13-U, and EL 621 floor

Table 3 – Feasibility of Operator Manual Actions (OMA) in Reactor Buildings						
No.	Location of Action (Fire Zone)	Manual Action description	Actions Required for Fire Zones	Reqd. Time (Min)	Exemption Required (Category)	Feasibility Assessment for Fire Affects (temperature, humidity, smoke, toxic gasses and noise)
						slab. Water curtains are provided at both equipment hatches to prevent a fire from EL 593 propagating up to EL 621. Penetrations are sealed to at least a one hour or equivalent rating and 3 hour fire dampers are installed in duct penetrations. Fire Zone 2-5 is connected to Fire Zone 2-6 through an open equipment hatch at R9-U, and at R13-U, the EL 639 floor slab and the fuel pool wall on the EL 639. Water curtains are provided at both equipment hatches to prevent a fire from EL 621 propagating up to EL 639. The fuel pool wall separates Fire Zones 2-5 and 2-6. To prevent fire propagating from EL 621 to EL 639 penetrations are sealed to at least a one hour or equivalent rating and 3 hour fire dampers are installed in duct penetrations. The OMA on El 621 will not be affected by fire on El 565, 593 or El 639. Operators can reach El 621 without traversing any of these fire locations.
12	RPT BD 3-II (3-4, El 621)	Manually trip breaker. Action to trip recirculation pump, 3-PMP-068-0060A	3-1, El 565, 519, 639 3-2, El 565, 519 3-3, El 593	20	No (2)	Fire Zone 3-4 is on EL 621 and north of the fuel pool wall on EL 639. Fire Zone 3-4 communicates with Fire Zone 3-1 through 1 hour fire rated barrier around elevator and stairway at R16-U on EL 621. Fire Zone 3-4 is separated from Fire Zone 3-1 by the fuel pool wall and 20 ft. separation on EL 639. Automatic fire suppression (preaction systems) is installed in Fire Zone 3-1 on EL 639. The stairways and equipment hatches separating fire zones above and below are protected by water curtains. Three hour fire dampers are installed in duct penetrations through floor slab at EL 639. Piping, conduit, and cable tray penetrations are sealed to at least a one hour or equivalent rating.

Table 3 – Feasibility of Operator Manual Actions (OMA) in Reactor Buildings						
No.	**Location of Action (Fire Zone)**	**Manual Action description**	**Actions Required for Fire Zones**	**Reqd. Time (Min)**	**Exemption Required (Category)**	**Feasibility Assessment for Fire Affects (temperature, humidity, smoke, toxic gasses and noise)**
						Fire Zone 3-4 is on EL 621 and is not connected to Fire Zone 3-2 on El 565. Fire Zone 3-3 is on EL 593 and RHR heat exchanger rooms on EL 565. It connects with Fire Zone 3-4 through the EL 621 floor slab, open hatch at R1-U and stairs at R21-U. Water curtains are provided at both equipment hatch and stair case to prevent propagation of fire from EL 593 to EL 621. To prevent a fire on the EL 593 from propagating up to EL 621, all penetrations are sealed to at least a one hour or equivalent rating and duct penetrations are provided with 3 hour fire dampers. Fire on EL 593 is prevented from spreading to EL 565 by 1 hour fire rated walls of RHR heat exchanger room and a water curtain for door opening at EL 565. The OMA on El 621 will not be affected by fire on El 565, 593 or El 639. Operators can reach El 621 without traversing any of these fire locations.
13	RPT BD 3-II (3-4, El 621)	Manually trip breaker. Action to trip recirculation pump, 3-PMP-068-0060B	3-1, El 565, 519, 639 3-2, El 565, 519 3-3, El 593	20	No (2)	Fire Zone 3-4 is on EL 621 and north of the fuel pool wall on EL 639. Fire Zone 3-4 communicates with Fire Zone 3-1 through 1 hour fire rated barrier around elevator and stairway at R16-U on EL 621. Fire Zone 3-4 is separated from Fire Zone 3-1 by the fuel pool wall and 20 ft. separation on EL 639. Automatic fire suppression (preaction systems) is installed in Fire Zone 3-1 on EL 639. The stairways and equipment hatches separating fire zones above and below are protected by water curtains. Three hour fire dampers are installed in duct penetrations through floor slab at EL 639. Piping, conduit, and cable tray penetrations are sealed to at least a one hour or equivalent rating. Fire Zone 3-4 is on EL 621 and is not connected to Fire Zone 3-2 on El

Table 3 – Feasibility of Operator Manual Actions (OMA) in Reactor Buildings						
No.	**Location of Action (Fire Zone)**	**Manual Action description**	**Actions Required for Fire Zones**	**Reqd. Time (Min)**	**Exemption Required (Category)**	**Feasibility Assessment for Fire Affects (temperature, humidity, smoke, toxic gasses and noise)**
						565. Fire Zone 3-3 is on EL 593 and RHR heat exchanger rooms on EL 565. It connects with Fire Zone 3-4 through the EL 621 floor slab, open hatch at R1-U and stairs at R21-U. Water curtains are provided at both equipment hatch and stair case to prevent propagation of fire from EL 593 to EL 621. To prevent a fire on the EL 593 from propagating up to EL 621, all penetrations are sealed to at least a one hour or equivalent rating and duct penetrations are provided with 3 hour fire dampers. Fire on EL 593 is prevented from spreading to EL 565 by 1 hour fire rated walls of RHR heat exchanger room and a water curtain for door opening at EL 565. The OMA on El 621 will not be affected by fire on El 565, 593 or El 639. Operators can reach El 621 without traversing any of these fire locations.
14	0-BDBB-219-0000A (BKR 12C) Diesel Aux. Bd A (unit 1 & 2 DGB, Fire area 20, EL 583)	Prevent EECW / RHRSW south header intertie valve 0-FCV-067-0049 spurious opening. Open breaker.	1-1, El 565 1-2, El 565 1-3, El 593	20	No (2)	Fire area 20 is in the diesel generator building and is separated from fire Area 1 by 3 hour fire rated barriers. Penetrations and openings through the fire barriers are protected with fire rated seals, fire dampers, and fire doors. Exceptions such as SBGT duct penetrations and building gaps have been evaluated to provide equivalent protection. The OMA in the unit 1 and 2 DGB will not be affected by fire in unit 1 reactor building. Operators can reach the unit 1 and 2 DGB without traversing the fire location in unit 1 reactor building.
15	0-FCV-067-0049 (Intake Pump station Pump compt. C, Fire area 25, EL	Prevent EECW / RHRSW south header intertie valve spurious opening. Close	1-1, El 565 1-2, El 565 1-3, El 593	20	No (2)	Intake Pump station Pump compt. C, Fire area 25 is a separate building located at significant distance from the reactor building. There is no possibility of fire in unit 1 reactor building affecting OMA in the intake pump station. Operators can reach the intake pump

Table 3 – Feasibility of Operator Manual Actions (OMA) in Reactor Buildings						
No.	**Location of Action (Fire Zone)**	**Manual Action description**	**Actions Required for Fire Zones**	**Reqd. Time (Min)**	**Exemption Required (Category)**	**Feasibility Assessment for Fire Affects (temperature, humidity, smoke, toxic gasses and noise)**
	565)	valve manually.				station without traversing the fire location in unit 1 reactor building. The path from the reactor building to intake pump is well lighted with Appendix R emergency lighting.
16	1-BDDD-281-0001C, 250V DC RMOV Board 1C (Fire zone 1-1)	Align to the alternate power supply 0-BDDD-280-0001, DC Battery board 1.	1-2, El 565, 519 2-1, El 565, 519 2-3, El 593	20	Yes (1)	Fire Zone 1-1 is that portion of the Unit 1 Reactor Building from column line R1 to 10 ft east of column line R4 from EL 519 through EL 565 and is adjacent to Fire Zone 1-2. The 250V DC RMOV Bd. 1C is located on El 565. Fire Zone 1-2 is from column line R7 to 10 ft west of column line R4 on EL 519 through EL 565 and is separated by a 20 ft. zone of separation. On EL 565, an addressable smoke detection system providing area wide coverage and a preaction sprinkler system is installed on the ceiling and under obstructions in order to provide adequate coverage. Since the fire zone 1-2 is located on the same floor as the 250V DC RMOV Bd. 1C without any physical barriers, it is possible that the OMA can be affected by temperature, smoke, water on the floor and fire brigade presence. Operators are required to don SCBAs for entering this area. This action is further reviewed in the Section 3.1.1 below and in Table 5 for feasibility and reliability. Fire zones 2-1 and 2-3 are located in unit 2 reactor building which is separated from unit 1 by 3 hour fire barriers. Fire in these areas will have no impact on the OMA in unit 1 reactor building.
17	3-BDDD-281-0003C, 250V DC RMOV Board 3C (Fire zone 3-1)	Align to the alternate power supply 0-BDDD-280-0003, DC Battery board 3.	2-2, El 565, El 519 2-3, El 593 North Side 2-4, El 593, South Side	20	Yes (1)	Fire zones 2-2, 2-3 and 2-4 are located in unit 2 reactor building which is separated from unit 3 by 3 hour fire barriers. Fire in these areas will have no impact on the OMA in unit 3 reactor building.
18	2-BDBB-268-0002C, 480V	Remove non-Appendix R loads	1-3, El 593	60	No (2)	Fire zones 1-3 is located in unit 1 reactor building which is separated from unit 2 by 3 hour fire barriers. Fire in this area will have no impact

Table 3 – Feasibility of Operator Manual Actions (OMA) in Reactor Buildings						
No.	**Location of Action (Fire Zone)**	**Manual Action description**	**Actions Required for Fire Zones**	**Reqd. Time (Min)**	**Exemption Required (Category)**	**Feasibility Assessment for Fire Affects (temperature, humidity, smoke, toxic gasses and noise)**
	RMOV Bd. 2C (Fire zone 2-2, EL 565)	to prevent diesel and or 4kV/480V transformer overload.				on the OMA in unit 2 reactor building.
19	2-BDBB-268-0002D (Fire zone 2-4, EL 593)	Align to alternate power 2-BDBB-268-0002C (BKR R7B)	2-5 El 621	20	Yes (1)	Fire Zone 2-5 is connected to Fire Zone 2-4 through an open equipment hatch at R9-U, another hatch at R13-U, and EL 621 floor slab. Water curtains are provided at both equipment hatches to prevent a fire from EL 593 propagating up to EL 621. Penetrations are sealed to at least a one hour or equivalent rating and 3 hour fire dampers are installed in duct penetrations. Fire and products of combustion are not likely to propagate from El 621 down to El 593. The OMA on El 593 will not be affected by fire on El 621. Operators can reach El 593 without traversing any of the fire location.

3.1.1 Conclusions of Environmental Factors Feasibility Based on Relative Location of OMA and Fire Zone

The analysis in Section 3.1 addressed the environmental factors that could be encountered during the performance of a manual action. The OMAs can be summarized to fit in one of the following categories:

- The OMA location and III.G.2 fire zones are separated by 3 hour fire rated boundaries (i.e. they are located in different fire areas) such as the reactor buildings separation from the electrical board rooms and diesel generator building or are separated by significant distances such as the intake pump station. Majority of the OMAs are in this category. There are no environmental factors concerns for these OMAs.
- The OMA location and III.G.2 fire zones are separated by 1 hour fire rated boundaries with stairwell and equipment hatch openings protected with water curtains. The reactor building floors provide the vertical separation. This is typical of reactor building fire zones. Table 3 mostly depicts this category of OMAs. Where fire zones are located above the OMA floor, fire propagation to the floor below is not considered likely. Where fire zones are located below the OMA floor, smoke and products of combustion are possible to migrate to the floor above. However, due to large open spaces, high ceiling, area wide sprinklers, draft stops and water curtains around equipment hatches and stairwell openings, the products of combustion are likely to be contained within the confines of the fire zone. The fixed fire sources and their combustible loading in the reactor building are contained and tracked in the Combustible Load Table calculation (Reference 7). Based on conservative assumptions, the only fire sources that can develop hot gas layers are the oil filled transformers (4kV-480V Emergency Transformers) located on El 639 of the reactor building. Adverse environmental conditions at this level will have no impact on OMAs in other parts of the reactor building fire zones. R1
- The OMA location and III.G.2 fire zones are separated by 20 ft. zone of separation and no physical barriers exist between them. Only one OMA falls in this category. Item 16 in Table 3 – OMA is required in fire zone 1-1 for a fire in zone 1-2. The only significant fixed fire sources in fire zone 1-2 are the CS, RHR and CRD pumps. However, these pumps are located on elevation 519, whereas the OMA is on El 565. Therefore no environmental impacts are expected. Review of the potential targets that can be affected by transient fire sources (Reference 6, Attachment 3) shows that there were no potential transient combustible fire scenarios in fire zone 1-2. Therefore, the OMA in fire zone 1-1 is feasible.

3.1.2 Feasibility of OMAs Based on Other Environmental Factors (Radiation, Lighting)

Other environmental factors that can negatively impact the ability to perform manual actions are lighting and radiation. At BFN emergency lighting is provided as required by Appendix R, Section III.J for paths to and from locations requiring

any actions and in areas where actions are performed. Therefore, lighting availability is considered adequate.

Access and egress paths and locations in the reactor building where manual actions are performed are typically categorized as "radiation areas" (>5mrem/hr and <100 mrem/hr). These are considered accessible areas with normal precautions. No actions are required in "high radiation"(>100 mrem/hr) areas. Other areas where manual actions are performed are non-radiation areas. Radiation and lighting levels are also discussed in detail in Attachment 2.

3.2 Equipment Functionality and Accessibility

The analysis in Section 3.1 (a) shows that majority of the actions are performed on electrical boards located in the electrical board rooms. The functionality of equipment and cables, needed to implement operator actions in these areas, will remain un-affected by the fire environment in the III.G.2 areas. All areas in the electrical board rooms are readily accessible.

The analysis in Section 3.1 (b) Table 3 shows that based on floor to floor fire zone separations and large distances within fire zones, the functionality of equipment and cables, needed to implement operator actions in these areas, will remain un-affected by the fire environment in the III.G.2 areas.

Adequacy of diagnostic instrumentation, communications, portable equipment and personnel protective equipment (PPE) is detailed in Attachment 2.

3.3 Feasibility and Reliability of Manual Actions and Time Margins

The feasibility and reliability of the OMAs are evaluated based on demonstrations, i.e. the actions can be performed in the analyzed time available and are feasible. The demonstration is performed by a randomly selected established crew. Table 4 lists all the OMAs in the Electrical Board Rooms and Table 5 lists all the OMAs in the Reactor Building, their required time and demonstrated time and the technical basis of the required time.

A detailed validation and verification (V&V) of manual actions listed in the Safe Shutdown Instructions (SSIs) was performed. See Attachment 2 for details. The V&V demonstrated the feasibility and reliability of manual actions based on the adequacy of diagnostic instrumentation, communications, special tools, accessibility, procedures, staffing and training. The timing validation demonstrated that the actions are feasible and operators can perform the actions reliably. Sufficient time margin is available to account for uncertainties.

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)					
Component Requiring Manual Action	**Location of Action**	**Actions required for Fire Zones**	**Demonstrated Time (m:s)[1]**	**Required Time (Min)**	**Technical Basis, Feasibility and Reliability Assessment**
HPCI	2-BDDD-281-0002A	2-3	3:10	10	Spurious operation of the HPCI system could cause overfill of the reactor vessel if the automatic high-level trip is disabled and no manual operator action is performed. The time at which the spuriously operated HPCI pump would fill the reactor vessel up to the MSL using the SAFER code is approximately 6 minutes without a high water level (level 8) trip. For Fire Zone 02-03, an additional (confirmatory) manual operator action to trip both HPCI logic buses (from either Battery Board 2 or the 250V RMOV Boards 2A and 2B) will be taken to assure HPCI isolation. Adequate time is available for the operator to perform the required action.
HPCI	2-BDDD-281-0002B	2-3	3:34	10	Same as HPCI (2-BDDD-281-0002A)
1-FCV-074-0053	1-BDBB-268-0001A	1-2, 1-4	12:16	25	The 25 minute required time for opening of the LPCI injection valve is an approximation based on the analysis presented in Calculation MD-N0999-980113, Rev. 1, "Appendix R Fire Protection Evaluation". Adequate time is available for the operator to perform the required action.
1-FCV-074-0060	1-BDBB-268-0001A (BKR 06B)	1-4	9:15	20	Mitigate flow diversion prior to establishing LPCI injection (25 minutes). Adequate time is available for the operator to perform the required action. Additional margin of 5 minutes is available prior to LPCI start.
1-FCV-074-0061	1-BDBB-268-0001A (BKR 07B)	1-4	14	20	Same as 1-FCV-074-0060
1-FCV-074-0066	1-BDBB-268-0001B (BKR 03A)	1-5	14	20	Prevent spurious isolation of the LPCI injection path. Additional margin of 5 minutes is available prior to LPCI start.
1-FCV-074-0067	1-BDBB-268-0001B	1-1, 1-3, 1-5	15:38	25	The 25 minute required time for opening of the LPCI injection valve is an approximation based on the analysis presented in Calculation MD-N0999-980113, Rev. 1, "Appendix R Fire Protection Evaluation". Adequate time is available for the operator to perform the required action.

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)

Component Requiring Manual Action	Location of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
1-FCV-074-0071	1-BDBB-268-0001B (BKR 11C)	1-3, 1-5	16	20	Same as 1-FCV-074-0060
1-FCV-074-0074	1-BDBB-268-0001B (BKR 10C)	1-3, 1-5	16	20	Same as 1-FCV-074-0060
2-FCV-074-0060	2-BDBB-268-0002A (BKR 13C)	2-1, 2-3, 2-4	14	20	Same as 1-FCV-074-0060
2-FCV-074-0061	2-BDBB-268-0002A (BKR 11E)	2-1, 2-3, 2-4	14	20	Same as 1-FCV-074-0060
2-FCV-074-0074	2-BDBB-268-0002B (BKR 14E)	2-4	14	20	Same as 1-FCV-074-0060
2-FCV-074-0075	2-BDBB-268-0002B (BKR 10E)	2-4	14	20	Same as 1-FCV-074-0060
1-PMP-074-0005 [1A]	0-BDAA-211-0000A (BKR 0018)	1-4	10:22	20	Due to concerns relating to the potential dead-head operation of the RHR pumps, which could be induced by a spurious RHR min-flow valve closure signal during an Appendix R event, the RHR pumps shall be started at the same time blow-down is initiated (or immediately prior to). This will minimize the potential for dead-head pump operation of greater than 7 and ½ minutes, which had been established as a maximum time limit per General Electric Calculation GE-NE E12-00171-00, Rev. 0, "RHR Pump Dead-head Evaluation". Adequate time is available for the operator to perform the required action.
1-PMP-074-0039 [1D]	0-BDAA-211-0000D (BKR 0016)	1-3	5:25	20	Same as 1-PMP-074-0005 [1A]
2-PMP-074-0039 [2D]	0-BDAA-211-0000D (BKR 0017)	2-1, 2-3, 2-4	5:25	20	Same as 1-PMP-074-0005 [1A]
3-PMP-074-0016 [3C]	3-BDAA-211-0003EB (BKR 0004)	3-2	9:30	20	Same as 1-PMP-074-0005 [1A]
3-PMP-074-0028 [3B]	3-BDAA-211-0003EC (BKR 0002)	3-3	13:27	20	Same as 1-PMP-074-0005 [1A]
2-BDDD-281-	2-BDDD-281-0002A	2-1, 2-2, 2-3, 2-	14	20	The Reactor Recirculation Pumps are tripped for two reasons: (1) to

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)					
Component Requiring Manual Action	**Location of Action**	**Actions required for Fire Zones**	**Demonstrated Time (m:s)[1]**	**Required Time (Min)**	**Technical Basis, Feasibility and Reliability Assessment**
0002A	(BKR 01B1)	4, 2-6			assure the RHR pump being used can inject into the reactor vessels and (2) to assure core flow imbalances do not result. Pumps are tripped prior to LPCI start. Adequate time is available for the operator to perform the required action.
3-BDDD-281-0003A	3-BDDD-281-0003A	3-1, 3-2, 3-3	8:30	20	Same as 2-BDDD-281-0002A
1-PCV-001-0004	1-LPNL-925-0032	1-3, 1-5	6:51	10	One MSRV is assumed to open immediately due to a spurious opening signal generated as a result of the fire. The MSRV is reclosed at 10 minutes into the event due to the operator action. The operator initiates ADS (3 MSRVs at 20 minutes into the event). A minimum of three (3) main steam relief valves (MSRVs) are required for depressurization, while only one (1) MSRV is required to maintain the alternate shutdown cooling path. Once the reactor vessel has been depressurized, reactor pressure should be maintained greater than 100 psig to assure the alternate shutdown cooling path remains open and equal to or less than 215 psig to ensure continued LPCI system injection. Adequate time is available for the operator to perform the required action.
1-PCV-001-0005	1-LPNL-925-0032	1-3, 1-5	6:51	10	Same as 1-PCV-001-0004
1-PCV-001-0018	1-LPNL-925-0658	1-3, 1-5	6:51	10	Same as 1-PCV-001-0004
1-PCV-001-0019	1-LPNL-925-0658	1-3, 1-5	6:51	10	Same as 1-PCV-001-0004
1-PCV-001-0022	1-LPNL-925-0032	1-3, 1-5, 1-4	6:51	10	Same as 1-PCV-001-0004
1-PCV-001-0023	1-LPNL-925-0032	1-5	6:51	10	Same as 1-PCV-001-0004
1-PCV-001-0030	1-LPNL-925-0032	1-3, 1-5	6:51	10	Same as 1-PCV-001-0004
1-PCV-001-0031	1-LPNL-925-0658	1-3, 1-5	6:51	10	Same as 1-PCV-001-0004
1-PCV-001-0034	1-LPNL-925-0032	1-3, 1-5, 1-4	6:51	10	Same as 1-PCV-001-0004
1-PCV-001-0041	1-LPNL-925-0032	1-3, 1-5	6:51	10	Same as 1-PCV-001-0004
1-PCV-001-0042	1-LPNL-925-0032	1-5	6:51	10	Same as 1-PCV-001-0004
1-PCV-001-0179	1-LPNL-925-0658	1-3, 1-5	6:51	10	Same as 1-PCV-001-0004

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)					
Component Requiring Manual Action	**Location of Action**	**Actions required for Fire Zones**	**Demonstrated Time (m:s)[1]**	**Required Time (Min)**	**Technical Basis, Feasibility and Reliability Assessment**
1-PCV-001-0180	1-LPNL-925-0032	1-5	6:51	10	Same as 1-PCV-001-0004
0-PMP-023-0001 [A1]	0-BDAA-211-0000A (BKR 0010)	1-4	8	30	On the 4kV shutdown board supplying power to the required RHRSW pump (e.g. 4kV Shutdown Board D supplying RHRSW Pump D2), when the initial board alignment occurs for the RHR pump, the required RHRSW pump will be tripped off. Then, within 2 hours, the required RHRSW pump will be started. This will help to assure that minimum flow problems on the RHRSW pumps are avoided (reference Calculation MD-Q0023-880125, Rev. 4, "RHRSW Pump Minimum Flowrate Analysis"). Adequate time is available for the operator to perform the required action.
0-PMP-023-0008 [C1]	0-BDAA-211-0000B (BKR 0010)	1-3, 25-1	8	30	Same as 0-PMP-023-0001 [A1]
0-PMP-023-0012 [C2]	0-BDAA-211-0000B (BKR 0015)	25-1	3	30	Same as 0-PMP-023-0001 [A1]
0-PMP-023-0015 [B1]	3-BDAA-211-0003EC (BKR 0008)	25-11	3	30	Same as 0-PMP-023-0001 [A1]
0-PMP-023-0019 [B2]	0-BDAA-211-0000C (BKR 0016)	25-11	3	30	Same as 0-PMP-023-0001 [A1]
0-PMP-023-0027 [D2]	0-BDAA-211-0000D (BKR 0015)	2-3, 25-11	8	30	Same as 0-PMP-023-0001 [A1]
0-PMP-023-0085 [A3]	3-BDAA-211-0003EA (BKR 0005)	25-1	3	10	All four EECW pumps will be started from the MCR for Fire Area 25 except for fires on EL 550 of the intake pumping station. If pumps B3 / D3 start, Division II is available and no fire will cause pumps B3 / D3 to trip off. If B3 / D3 do not start, Division I pumps A3 / C3 are available and must be started using their backup control circuitry. Using the backup control circuitry, spurious trip of the pumps is isolated. For a fire on EL 550 of the intake pumping station, pumps B3 / D3 may initially start, but their long-term operation cannot be assured. Thus, for fires on EL 550 of the intake pumping station, pumps A3 / C3 are

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)

Component Requiring Manual Action	Location of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
					available and will be started using their backup control circuitry as described above. Adequate time is available for the operator to perform the required action.
0-PMP-023-0088 [B3]	0-BDAA-211-0000C (BKR 0009)	25-11	3	10	Same as 0-PMP-023-0085 [A3]
0-PMP-023-0091 [C3]	3-BDAA-211-0003EB (BKR 0010)	25-1	3	10	Same as 0-PMP-023-0085 [A3]
0-PMP-023-0094 [D3]	0-BDAA-211-0000D (BKR 0010)	25-11	3	10	Same as 0-PMP-023-0085 [A3]
0-FCV-067-0049	0-BDBB-219-0000A (BKR 12C)	1-1, 1-2, 1-3	16	20	Cooling to the diesel generators is established via EECW pumps start within 10 minutes (see above). Any flow diversion possibilities are corrected within 20 minutes prior to diesel loading with RHR pumps. Adequate time is available for the operator to perform the required action.
0-BATA-248-0000C	2-BDBB-268-0002A	1-3	21:45	60	Align to alternate battery charger feed. See detailed discussion below.
0-BATA-248-0001	0-CHGA-248-0002B	1-1	11	60	The 250V DC battery chargers are required to support long-term battery requirements. These battery chargers are normally aligned to their respective battery board with Battery Charger 2B (0-CHGA-248-0002B) being an alternate. These chargers receive an automatic trip which must be reset at the charger with the emergency on / off switch. In addition, when Battery Charger 2B is to be used it must be properly aligned to the respective battery board. This alignment is accomplished by placing the output transfer switch (located at Battery Charger 2B) to the selected battery board and then positioning the associated breakers at the selected battery board. Adequate time is available for the operator to perform the required action.
0-BATA-248-0002	0-CHGA-248-0002B	1-2, 1-3, 1-4, 1-5	11	60	Same as 0-BATA-248-0001

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)					
Component Requiring Manual Action	Location of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
0-BATA-248-0003	0-CHGA-248-0002B	3-3	11	60	Same as 0-BATA-248-0001
0-BDAA-211-0000A	0-BDAA-211-0000A	1-1	3	10	Align alternate DC control power. Adequate time is available for the operator to perform the required action.
0-BDAA-211-0000A (Breakers 1614, 1716, 1818, 1824)	0-BDAA-211-0000A	1-1, 1-4, 2-3, 3-1, 3-2, 3-3	15	20	Precludes spurious actuations. Adequate time is available for the operator to perform the required action.
0-BDAA-211-0000B	0-BDAA-211-0000B	1-5, 2-5	3:45	20	Align alternate DC control power. Adequate time is available for the operator to perform the required action.
0-BDAA-211-0000B	0-BDAA-211-0000B	1-5	6:37	20	Board alignment and load shedding operation. Only credited Appendix R loads are connected to the 4kV Shutdown Boards and only at the timeframe specified. Non-Appendix R loads and non-credited Appendix R loads must be verified tripped or manually tripped during the initial alignment to the credited power supply (i.e., diesel generator) to maintain the basis for the APS calculation. Alignment of the electrical system to the credited diesel generators will be performed within t=20 minutes of a reactor trip.
0-BDAA-211-0000B (Breakers 1616, 1714, 1822, 1828,)	0-BDAA-211-0000B	1-3, 2-3, 2-4, 3-3	12	20	Precludes spurious actuations. Adequate time is available for the operator to perform the required action.
0-BDAA-211-0000C	0-BDAA-211-0000C	1-5, 2-5, 2-6	6:39	20	Align alternate DC control power. Adequate time is available for the operator to perform the required action.
0-BDAA-211-0000C	0-BDAA-211-0000C	2-4	13:45	20	Board alignment and load shedding operation. Same as 0-BDAA-211-0000B.
0-BDAA-211-0000C (Breakers 1624, 1718, 1812, 1814)	0-BDAA-211-0000C	1-1, 1-3, 2-4, 3-2, 3-3	7	20	Precludes spurious actuations. Adequate time is available for the operator to perform the required action.
0-BDAA-211-	0-BDAA-211-0000D	2-3, 2-4	11:40	20	Align alternate DC control power. Adequate time is available for the

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)

Component Requiring Manual Action	Location of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
0000D					operator to perform the required action.
0-BDAA-211-0000D (Breakers 1618, 1724, 1816, 1826)	0-BDAA-211-0000D	1-1, 1-2, 1-3, 1-4, 2-1, 2-2, 2-3, 2-4, 3-2, 3-3	5:25	20	Precludes spurious actuations. Adequate time is available for the operator to perform the required action.
0-BDDD-280-0001 (BKR 609)	0-BDDD-280-0001 (BKR 609)	1-1	9:26	20	Align alternate DC control power. Adequate time is available for the operator to perform the required action.
0-BDDD-280-0002	3-BDDD-281-0003A	3-2	8:30	20	Trip those loads associated with the Unit 3 HPCI system prior to transferring the 250V RMOV Board 3A to its alternate power supply. The basis for this action comes from Calculation ED-Q0248-2002-0042, Revision 5, "250V DC Unit Battery Load Study, VD, SC, and Battery Capacity for LOCA / LOOP, Station Blackout and Appendix R Analysis for Unit / Shutdown Board Batteries".
0-BDDD-280-0002 (BKR 607)	0-BDDD-280-0002 (BKR 607)	1-2, 1-3, 1-4, 1-5	16	20	Align alternate DC control power. Adequate time is available for the operator to perform the required action.
0-BDDD-280-0003	2-BDDD-281-0002A	2-4	13:45	20	Same as 0-BDDD-280-0002.
0-BDDD-280-0003 (BKR 609)	0-BDDD-280-0003 (BKR 609)	3-3	13:27	20	Align alternate DC control power. Adequate time is available for the operator to perform the required action.
0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 3-1, 3-3, 3-4, 25-1, 25-11	16	20	The basis for this action comes from Calculation ED-Q0248-2002-0042, Revision 5, "250V DC Unit Battery Load Study, VD, SC, and Battery Capacity for LOCA / LOOP, Station Blackout and Appendix R Analysis for Unit / Shutdown Board Batteries". Adequate time is available for the operator to perform the required action.
0-CHGA-248-0001	0-CHGA-248-0001	1-2, 1-5, 1-6, 2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 3-1, 3-3, 3-4, 25-1,	16	20	The Station Battery Chargers 1, 2A, 2B, and 3 receive an automatic trip on initiation of the load shed logic and must be reset with the Emergency On / Off Switch. Component may require resetting due to being load-shed on a loss of offsite power, not as a direct result of the

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)

Component Requiring Manual Action	Location of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
		25-11			fire. The requirements of Appendix R dictate that safe shutdown capability be demonstrated with and without offsite power available. Adequate time is available for the operator to perform the required action.
0-CHGA-248-0002A	0-CHGA-248-0002A	1-1, 1-6, 2-1, 2-2, 2-5, 2-6, 3-1, 3-2, 3-3, 3-4, 25-1, 25-11	16	60	Same as 0-CHGA-248-0001
0-CHGA-248-0002B	0-CHGA-248-0002B	1-1, 1-2, 1-3, 1-4, 1-5, 3-3	16	60	Same as 0-CHGA-248-0001
0-CHGA-248-0003	0-CHGA-248-0003	1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 3-1, 3-4, 25-1, 25-11	16	60	Same as 0-CHGA-248-0001
0-GEN-082-000A	0-BDAA-211-0000A	2-1	4:04	10	Isolate and trip breakers. The basis for this manual action is in Calculation ED-Q0999-2003-0055, Rev. 2, "Unit 1,2,3 Appendix R - Auxiliary Power System Alignments and Diesel Generator Loading". Adequate time is available for the operator to perform the required action.
0-GEN-082-000A	0-BDAA-211-0000A	1-2, 2-4, 3-3, 25-1, 25-11	12	20	Same as 0-GEN-082-000A.
0-GEN-082-000B	0-BDAA-211-0000B	1-5, 2-1, 2-3,	6:51	10	Same as 0-GEN-082-000A.
0-GEN-082-000B	0-BDAA-211-0000B	2-4, 3-3, 25-1, 25-11	12:06	20	Same as 0-GEN-082-000A.
0-GEN-082-000C	0-BDAA-211-0000C	2-4	6	10	Same as 0-GEN-082-000A.
0-GEN-082-000C	0-BDAA-211-0000C	25-11	5:20	20	Same as 0-GEN-082-000A.
0-GEN-082-000D	0-BDAA-211-0000D	2-3, 2-4	4:58	10	Same as 0-GEN-082-000A.
0-GEN-082-000D	0-BDAA-211-0000D	25-11	5:20	20	Same as 0-GEN-082-000A.
3-GEN-082-	3-BDAA-211-	3-1, 3-2	5:42	10	Same as 0-GEN-082-000A.

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)					
Component Requiring Manual Action	Location of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
0003A	0003EA				
3-GEN-082-0003A	3-BDAA-211-0003EA	3-1, 3-2	17:22	20	Same as 0-GEN-082-000A.
3-GEN-082-0003A	0-BDAA-211-0000A	1-1	4:27	20	Same as 0-GEN-082-000A.
3-GEN-082-0003A	0-BDAA-211-0000A	1-4	4:16	20	Same as 0-GEN-082-000A.
3-GEN-082-0003A	0-BDAA-211-0000A	2-3	7:15	20	Same as 0-GEN-082-000A.
3-GEN-082-0003A	0-BDAA-211-00003EA	25-11	7:36	20	Same as 0-GEN-082-000A.
3-GEN-082-0003B	3-BDAA-211-0003EB	3-3	2:56	10	Same as 0-GEN-082-000A.
3-GEN-082-0003B	3-BDAA-211-0003EB	3-2, 3-3	8:45	20	Same as 0-GEN-082-000A.
3-GEN-082-0003B	0-BDAA-211-0000B	1-3	16	20	Same as 0-GEN-082-000A.
3-GEN-082-0003B	3-BDAA-211-0003EB	3-2	8:45	20	Same as 0-GEN-082-000A.
3-GEN-082-0003C	3-BDAA-211-0003EC	3-3	8:45	20	Same as 0-GEN-082-000A.
3-GEN-082-0003C	0-BDAA-211-0000C	1-3	16	20	Same as 0-GEN-082-000A.
3-GEN-082-0003C	3-BDAA-211-0003EC	3-3	8:45	20	Same as 0-GEN-082-000A.
3-GEN-082-0003C	3-BDAA-211-0003EC	25-1, 25-11	7:36	20	Same as 0-GEN-082-000A.
3-GEN-082-0003D	0-BDAA-211-0000D	1-1, 1-2, 1-3, 1-4, 2-1,	16	20	Same as 0-GEN-082-000A.
3-GEN-082-	3-BDAA-211-	1-1, 1-2, 1-3, 1-	16	20	Same as 0-GEN-082-000A.

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)

Component Requiring Manual Action	Location of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
0003D	0003ED	4, 2-1,			
3-GEN-082-0003D	3-BDAA-211-0003ED	25-1, 25-11	7:36	20	Same as 0-GEN-082-000A.
1-BDBB-231-0001A	1-BDBB-231-0001A	1-5	9:11	20	Power alignments for 480V SDBDs. The basis for this manual action is in Calculation ED-Q0999-2003-0055, Rev. 2, "Unit 1,2,3 Appendix R - Auxiliary Power System Alignments and Diesel Generator Loading". Adequate time is available for the operator to perform the required action
1-BDBB-231-0001A	1-BDBB-231-0001A	1-5	13:48	20	Same as 1-BDBB-231-0001A
1-BDBB-231-0001B	1-BDBB-231-0001B	1-3, 2-5, 2-6	16	20	Same as 1-BDBB-231-0001A
1-BDBB-231-0001B	1-BDBB-231-0001B	2-5	16:15	20	Same as 1-BDBB-231-0001A
1-BDBB-231-0001B	1-BDBB-231-0001B	1-3	16	20	Same as 1-BDBB-231-0001A
1-BDBB-268-0001B	1-BDBB-268-0001B	1-5	13:48	20	Same as 1-BDBB-231-0001A
1-BDBB-268-0001B	1-BDBB-231-0001A (BKR 03B)	1-5	13:48	20	Same as 1-BDBB-231-0001A
1-BDDD-281-0001A	1-BDDD-281-0001A	1-4	9:15	20	Power alignments for 250V RMOV Boards. The basis for this manual action is in Calculation ED-Q0999-2003-0055, Rev. 2, "Unit 1,2,3 Appendix R - Auxiliary Power System Alignments and Diesel Generator Loading". Adequate time is available for the operator to perform the required action
1-BDDD-281-0001B	1-BDDD-281-0001B	1-1, 1-2, 2-1, 2-2, 25-1, 25-11	16	20	Same as 1-BDDD-281-0001A
2-BDDD-281-0002A	2-BDDD-281-0002A	2-4	13:45	20	Same as 1-BDDD-281-0001A
2-BDDD-281-	2-BDDD-281-0002B	3-2, 3-3	8:45	20	Same as 1-BDDD-281-0001A

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)					
Component Requiring Manual Action	**Location of Action**	**Actions required for Fire Zones**	**Demonstrated Time (m:s)[1]**	**Required Time (Min)**	**Technical Basis, Feasibility and Reliability Assessment**
0002B					
1-LPNL-925-0032	1-LPNL-925-0032	1-3	16	20	Align to alternate power supply. The basis for this manual action is in Calculation ED-Q0999-2003-0055, Rev. 2, "Unit 1,2,3 Appendix R - Auxiliary Power System Alignments and Diesel Generator Loading". Check calc.
2-BDBB-231-0002A	2-BDBB-231-0002A	2-5	16:15	20	Power alignments for 480V SDBDs. The basis for this manual action is in Calculation ED-Q0999-2003-0055, Rev. 2, "Unit 1,2,3 Appendix R - Auxiliary Power System Alignments and Diesel Generator Loading". Check calc. Adequate time is available for the operator to perform the required action
2-BDBB-231-0002A	2-BDBB-231-0002A	2-4, 2-5	16	20	Same as 2-BDBB-231-0002A
2-BDBB-231-0002A	2-BDBB-231-0002A	2-4	13:45	20	Same as 2-BDBB-231-0002A
2-BDBB-231-0002A	2-BDBB-231-0002A	2-5	16:15	20	Same as 2-BDBB-231-0002A
2-BDBB-231-0002A	2-BDBB-231-0002A	2-3	21:58	60	Same as 2-BDBB-231-0002A
2-BDBB-231-0002A	0-BDAA-211-0000B (BKR 0005)	2-4	31:15	60	Close normal feeder breaker from 0-BDAA-211-0000B. These actions have been identified as an additional level of assurance to preclude the occurrence of multiple high impedance faults on the subject boards (reference Calculation ED-Q2999-880574, Rev. 8, "Class 1E Electrical Boards Margin Study for 4kV, 480V, 120VAC, &250V, 125V, 24VDC Systems" and Calculation ED-Q3999-920253 Rev. 4, "Appendix R – Margin Study for Required AC & DC Power Distribution Boards/Panels"). Adequate time is available for the operator to perform the required action
2-BDBB-231-0002A	2-BDBB-231-0002A	2-4	31:15	60	Same as 2-BDBB-231-0002A
2-BDBB-231-0002A	2-BDBB-231-0002A	2-4	31:15	60	Remove non required loads. Same as 2-BDBB-231-0002A

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)

Component Requiring Manual Action	Location of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
2-BDBB-231-0002B	2-BDBB-231-0002B	2-4	13:45	20	Power alignments for 480V SDBDs. The basis for this manual action is in Calculation ED-Q0999-2003-0055, Rev. 2, "Unit 1,2,3 Appendix R - Auxiliary Power System Alignments and Diesel Generator Loading". Adequate time is available for the operator to perform the required action
2-BDBB-231-0002B	0-BDDD-280-0003 (BKR 708)	2-3, 2-4	13:45	20	This action is required due to the possibility of a spurious operation of the DC control power transfer switch followed by the subsequent loss of the alternate DC power feed. By opening the alternate DC power feeder breaker, the potential spurious operation of the transfer switch is defeated since the transfer will occur only when the alternate power source is available. Adequate time is available for the operator to perform the required action
2-BDBB-231-0002B	2-BDBB-231-0002B	2-4	13:45	20	Power alignments for 480V SDBDs. The basis for this manual action is in Calculation ED-Q0999-2003-0055, Rev. 2, Adequate time is available for the operator to perform the required action
2-BDBB-231-0002B	2-BDBB-231-0002B	2-5	16:15	20	Same as 2-BDBB-231-0002B for Power alignments for 480V SDBDs.
2-BDBB-231-0002B	2-BDBB-231-0002B	2-3	13:10	20	Same as 2-BDBB-231-0002B for Power alignments for 480V SDBDs.
2-BDBB-231-0002B	2-BDBB-231-0002B	2-4	13:45	20	Same as 2-BDBB-231-0002B for Power alignments for 480V SDBDs.
2-BDBB-268-0002A	2-BDBB-268-0002A	2-5	11:30	20	480V RMOV Bd. Power alignments. Remove non-required loads, high impedance faults, etc. Adequate time is available for the operator to perform the required action
2-BDBB-268-0002A	2-BDBB-231-0002A	2-1, 2-2, 2-3, 2-4, 2-5, 2-6	16	20	Loads removed from the 480V RMOV Boards. These actions have been identified as an additional level of assurance to preclude the occurrence of multiple high impedance faults on the subject boards (reference Calculation ED-Q2999-880574, Rev. 8, "Class 1E Electrical Boards Margin Study for 4kV, 480V, 120VAC, & 250V, 125V, 24VDC Systems" and Calculation ED-Q3999-920253 Rev. 4,

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)					
Component Requiring Manual Action	Location of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
					"Appendix R – Margin Study for Required AC & DC Power Distribution Boards/Panels".)
2-BDBB-268-0002A	2-BDBB-231-0002A	2-1, 2-2, 2-4, 2-6,	16	20	480V RMOV Bd. Power alignments. Remove non-required loads, high impedance faults, etc. Adequate time is available for the operator to perform the required action.
2-BDBB-268-0002A	2-BDBB-231-0002B	1-3	21:45	60	480V RMOV Bd. Power alignments. Remove non-required loads, high impedance faults, etc. Adequate time is available for the operator to perform the required action.
2-BDBB-268-0002A	2-BDBB-268-0002A	1-3	21:45	60	480V RMOV Bd. Power alignments. Remove non-required loads, high impedance faults, etc. Adequate time is available for the operator to perform the required action.
2-BDBB-268-0002A	2-BDBB-268-0002A	1-3	21:45	60	480V RMOV Bd. Power alignments. Remove non-required loads, high impedance faults, etc. Adequate time is available for the operator to perform the required action.
2-BDBB-268-0002B	2-BDBB-268-0002B	2-1	15:43	60	480V RMOV Bd. Power alignments. Remove non-required loads, high impedance faults, etc. Adequate time is available for the operator to perform the required action.
2-BDBB-268-0002B	2-BDBB-268-0002B	2-1, 2-3, 2-5, 2-6	16	20	480V RMOV Bd. Power alignments. Remove non-required loads, high impedance faults, etc. Adequate time is available for the operator to perform the required action.
2-BDBB-268-0002B	2-BDBB-268-0002B	2-1, 2-3, 2-4, 2-6	16	20	480V RMOV Bd. Power alignments. Remove non-required loads, high impedance faults, etc. Adequate time is available for the operator to perform the required action.
2-BDBB-268-0002B	2-BDBB-268-0002B	2-3	13:10	60	480V RMOV Bd. Power alignments. Remove non-required loads, high impedance faults, etc. Adequate time is available for the operator to perform the required action.
3-BDBB-268-0003A	3-BDBB-268-0003A	3-2, 3-3, 3-4	16:15	20	Manually shed non-Appendix R loads.
3-BDBB-268-0003A	3-BDBB-268-0003A	3-2, 3-3, 3-4	16:30	60	480V RMOV Bd. Power alignments. Remove non-required loads, high impedance faults, etc. Adequate time is available for the operator to

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)					
Component Requiring Manual Action	**Location of Action**	**Actions required for Fire Zones**	**Demonstrated Time (m:s)[1]**	**Required Time (Min)**	**Technical Basis, Feasibility and Reliability Assessment**
					perform the required action.
3-BDBB-268-0003A	3-BDBB-268-0003A	3-3, 3-4	16:15	20	Manually shed non-Appendix R loads.
3-BDBB-268-0003B	3-BDBB-268-0003B	3-1, 3-3, 3-4	16:30	60	480V RMOV Bd. Power alignments. Remove non-required loads, high impedance faults, etc. Adequate time is available for the operator to perform the required action.
3-BDBB-268-0003B	3-BDBB-268-0003B	3-1, 3-3	16:15	20	Manually shed non-Appendix R loads.
3-BDBB-268-0003B	3-BDBB-268-0003B	3-3, 3-4	16:15	20	Manually shed non-Appendix R loads.
3-BDAA-211-0003EA	3-BDAA-211-0003EA	1-3, 1-4	4:30	10	Align to alternate control power DC. Adequate time is available for the operator to perform the required action.
3-BDAA-211-0003EA	3-BDAA-211-0003EA	3-1, 3-2, 25-1, 25-11	7:36	20	Isolate breaker to mitigate closure. 4kV Bd. 3EA power alignments. Adequate time is available for the operator to perform the required action.
3-BDAA-211-0003EB	3-BDAA-211-0003EB (BKR 0009)	3-3	8:45	20	Isolate breaker to mitigate closure. 4kV Bd. 3EB power alignments. Adequate time is available for the operator to perform the required action.
3-BDAA-211-0003EB	3-BDAA-211-0003EB	3-2, 3-3, 25-1, 25-11	8:45	20	Isolate breaker to mitigate closure. 4kV Bd. 3EB power alignments. Adequate time is available for the operator to perform the required action.
3-BDAA-211-0003EC	3-BDAA-211-0003EC	3-1, 3-3, 25-1, 25-11	7:36	20	Isolate breaker to mitigate closure. 4kV Bd. 3EC power alignments. Adequate time is available for the operator to perform the required action.
3-BDAA-211-0003ED	3-BDAA-211-0003ED	2-3, 2-4, 3-1	7:36	20	Isolate breaker to mitigate closure. 4kV Bd. 3ED power alignments. Adequate time is available for the operator to perform the required action.
3-BDAA-211-0003ED	3-BDAA-211-0003ED	3-1, 25-1, 25-11	7:36	20	Isolate breaker to mitigate closure. 4kV Bd. 3ED power alignments. Adequate time is available for the operator to perform the required action.

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)					
Component Requiring Manual Action	Location of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
3-BDBB-219-0003EA	3-BDBB-219-0003EA	3-3	13.27	20	480V Diesel Aux. Board. Align to the alternate power supply. Adequate time is available for the operator to perform the required action.
3-BDBB-231-0003A	3-BDBB-231-0003A	3-3, 3-4	4:47	20	480V SDBD 3A alternate power alignments and removing non-required loads. Adequate time is available for the operator to perform the required action.
3-BDBB-231-0003A	3-BDBB-231-0003A	3-3, 3-4	4:47	20	480V SDBD 3A alternate power alignments and removing non-required loads. Adequate time is available for the operator to perform the required action.
3-BDBB-231-0003A	3-BDBB-231-0003A	1-3, 1-4	4:47	20	480V SDBD 3A alternate power alignments and removing non-required loads. Adequate time is available for the operator to perform the required action.
3-BDBB-231-0003A	3-BDBB-231-0003A	3-3, 3-4	5:32	60	480V SDBD 3A. Remove non-required Appendix R loads. Adequate time is available for the operator to perform the required action.
3-BDBB-231-0003A	3-BDBB-231-0003A	3-3	5:32	60	480V SDBD 3A. Isolate, transfer control and locally operate breaker 1C and 8C. Adequate time is available for the operator to perform the required action.
3-BDBB-231-0003B	3-BDBB-231-0003B	3-3, 3-4	16:15	20	480V SDBD 3B, power alignments. Adequate time is available for the operator to perform the required action.
3-BDBB-231-0003B	3-BDBB-231-0003B	3-4	16:30	60	480V SDBD 3B, loads. Remove non- required loads. Adequate time is available for the operator to perform the required action.
3-BDBB-231-0003B	3-BDBB-231-0003B	3-3	16:15	20	480V SDBD 3B, remove non-required. Adequate time is available for the operator to perform the required action.
3-BDBB-231-0003B	3-BDBB-231-0003B	3-3	16:15	20	480V SDBD 3B, isolate, transfer control and locally operate breaker 1C, 8C. Adequate time is available for the operator to perform the required action.
3-BDBB-231-0003B	3-BDBB-231-0003B	2-2	12:11	60	480V SDBD 3B, manually shed non-Appendix R loads. Adequate time is available for the operator to perform the required action.
3-BDDD-281-0003A	3-BDDD-281-0003A	3-2	8:30	20	250V RMOV Bd. 3A, power alignment. Adequate time is available for the operator to perform the required action.

Table 4 – Adequacy of Time Available to Perform the Manual Actions (Electrical Bd. Room Actions)					
Component Requiring Manual Action	Location of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
3-BDDD-281-0003B	3-BDDD-281-0003B	1-3, 1-4, 1-5, 2-5, 3-3, 3-4	16:15	20	250V RMOV Bd. 3B, power alignment. Adequate time is available for the operator to perform the required action.

1. Demonstrated time is based on area specific SSIs. However, maximum demonstrated time from Attachment 2 may have been used instead. The listed action was always completed by the listed demonstrated time.

Table 5 – Adequacy of Time Available to Perform the Manual Actions (Reactor Building Actions)					
Location of Action (Fire Zone)	Description of Action	Actions required for Fire Zones	Demonstrated Time (m:s)[1]	Required Time (Min)	Technical Basis, Feasibility and Reliability Assessment
1-VTV-032-5103 (1-5, El 621)	Open vent valve to manually close FCV-069-0094 (RWCU Isolation)	1-3, El 593	21:45	30	In each Fire Area / Fire Zone, except 01-03, 01-05, 04, and 16, valve 1-FCV-069-0002 will be closed from the main control room in 30 minutes. For Fire Zone / Fire Area 01-03, 01-05, and 16, neither valve 1-FCV-069-0002 or -0001 can be assured available to isolate the RWCU system. Manual operator action to close 1-FCV-069-0094 by opening the valve actuator vent valve, 1-VTV-032-5103 in 30 minutes will ensure RWCU isolation. Adequate time is available for the operator to perform the required action.
2-VTV-032-5103 (2-5, El 621)	Open vent valve to manually close FCV-069-0094 (RWCU Isolation)	2-4, El 593	22:15	30	For Fire Zones 02-04 and 16, neither valve 2-FCV-069-0001 or -0002 can be assured to be available to isolate the RWCU system. Manual operator action to close 2-FCV-069-0094 by opening the valve actuator vent valve, 2-VTV-032-5103, will ensure RWCU isolation within 30 minutes. Adequate time is available for the operator to perform the required action.

Table 5 – Adequacy of Time Available to Perform the Manual Actions (Reactor Building Actions)					
Location of Action (Fire Zone)	**Description of Action**	**Actions required for Fire Zones**	**Demonstrated Time (m:s)[1]**	**Required Time (Min)**	**Technical Basis, Feasibility and Reliability Assessment**
3-VTV-032-5103 (3-4, El 621)	Open vent valve to manually close FCV-069-0094 (RWCU Isolation)	3-3, El 593	16:06	30	For Fire Zone / Fire Area 03-03 and 16, neither valve 3-FCV-069-0002 or -0001 can be assured available to isolate the RWCU system. Manual operator action to close 3-FCV-069-0094 by opening the valve actuator vent valve, 3-VTV-032-5103, will ensure RWCU isolation within 30 minutes. Adequate time is available for the operator to perform the required action.
2-BDBB-268-0002D (BKR 02C) (2-4, El 593)	Isolate valve to preclude closure by the Appendix R emergency switch. (RHR LPCI injection 2-FCV-074-0053)	2-2, El 565, El 519 2-5, El 621	15:58 18:45	25	Where manual operator action is required for LPCI injection valve FCV-074-0053 or FCV-074-0067, the emergency switches (located at 480V RMOV Boards D and E respectively for Units 2 and 3, and located at 480V RMOV Boards A and B respectively for Unit 1) are to be used to open the valve locally. The 25 minute required time for opening of the LPCI injection valve is an approximation based on the analysis presented in Calculation MD-N0999-980113, Rev. 1, "Appendix R Fire Protection Evaluation". The actual time requirement is the time at which the pressure permissive is reached for opening of the LPCI injection valve based on initiating reactor depressurization with three (3) MSRVs by 20 minutes. Adequate time is available for the operator to perform the required action.
2-BDBB-268-0002E (BKR 02C) (2-5, El 621)	Isolate valve to preclude closure by the Appendix R emergency switch. (RHR LPCI injection 2-FCV-074-0067)	2-1, El 565, 519 2-3, El 593 2-4, El 593	15:39 15:40 15:50	25	Same as 2-FCV-074-0053
3-BDBB-268-0003D (3-3, El 593)	Isolate valve to preclude closure by the Appendix R emergency switch. (RHR LPCI injection 3-FCV-074-0053)	3-2, El 565, 519	15	25	Same as 2-FCV-074-0053
3-BDBB-268-0003E	Isolate valve to	3-1, El 565, 519,	11:15	25	Same as 2-FCV-074-0053

Table 5 – Adequacy of Time Available to Perform the Manual Actions (Reactor Building Actions)					
Location of Action (Fire Zone)	**Description of Action**	**Actions required for Fire Zones**	**Demonstrated Time (m:s)[1]**	**Required Time (Min)**	**Technical Basis, Feasibility and Reliability Assessment**
(3-4, El 621)	preclude closure by the Appendix R emergency switch. (RHR LPCI injection 3-FCV-074-0067)	639 3-3, El 593	14:32		
2-VFD-068-2002 (2-6, El 639)	Stop pump using E-Stop. Action to trip recirculation pump, 2-PMP-068-0060A	2-5, El 621	8	20	The Reactor Recirculation Pumps are tripped for two reasons: (1) to assure the RHR pump being used can inject into the reactor vessels and (2) to assure core flow imbalances do not result. These pumps are required to be tripped by manual operation action at the VFD E-Stop or the supply breaker(s) (e.g., the RPT Boards), or from the Main Control Room (for Unit 1 only, for remote trip and lockout of the Unit 1 RR Boards). The RPT Board DC control power must be removed from the manually tripped supply breaker(s) in order to preclude spurious closure. If the RPT Board breakers are tripped prior to the removal of DC control power, the RPT Board breakers must be re-verified open to ensure they did not spuriously recluse. When stopping the Recirc Pump using the VFD E-Stop, the RPT DC control power need not be removed. Adequate time is available for the operator to perform the required action.
RPT-2-II (BKR 1452), 2-5, El 621	Manually trip breaker. Action to trip recirculation pump, 2-PMP-068-0060A	2-1, El 565, 519 2-2, El 565, El 519 2-3, El 593 North Side 2-4, El 593, South Side 2-6, El 639	7:15 7:15 13:10 13:45 9:09	20	Same as 2-PMP-068-0060A
2-VFD-068-2112, (2-6, El 639)	Stop pump using E-Stop. Action to trip recirculation pump, 2-PMP-068-0060B	2-5, El 621	8	20	Same as 2-PMP-068-0060A

Table 5 – Adequacy of Time Available to Perform the Manual Actions (Reactor Building Actions)					
Location of Action (Fire Zone)	**Description of Action**	**Actions required for Fire Zones**	**Demonstrated Time (m:s)[1]**	**Required Time (Min)**	**Technical Basis, Feasibility and Reliability Assessment**
RPT-2-II (BKR 1552), 2-5, El 621	Manually trip breaker. Action to trip recirculation pump, 2-PMP-068-0060B	2-1, El 565, 519 2-2, El 565, El 519 2-3, El 593 North Side 2-4, El 593, South Side 2-6, El 639	7:15 7:15 13:10 13:45 9:09	20	Same as 2-PMP-068-0060A
RPT BD 3-II (3-4, El 621)	Manually trip breaker. Action to trip recirculation pump, 3-PMP-068-0060A	3-1, El 565, 519, 639 3-2, El 565, 519 3-3, El 593	9:15 11:00 12:42	20	Same as 2-PMP-068-0060A
RPT BD 3-II (3-4, El 621)	Manually trip breaker. Action to trip recirculation pump, 3-PMP-068-0060B	3-1, El 565, 519, 639 3-2, El 565, 519 3-3, El 593	9:15 11:00 12:42	20	Same as 2-PMP-068-0060A
0-BDBB-219-0000A (BKR 12C) Diesel Aux. Bd A (unit 1 & 2 DGB, Fire area 20, EL 583)	Prevent EECW / RHRSW south header intertie valve 0-FCV-067-0049 spurious opening. Open breaker.	1-1, El 565 1-2, El 565 1-3, El 593	16	20	This action is to prevent flow diversion of cooling water from one to the other header. Adequate time is available for the operator to perform the required action.
0-FCV-067-0049 (Intake Pump station Pump compt. C, Fire area 25, EL 565)	Prevent EECW / RHRSW south header intertie valve spurious opening. Close valve manually.	1-1, El 565 1-2, El 565 1-3, El 593	17	20	This action is to prevent flow diversion of EECW cooling water from one to the other header. Adequate time is available for the operator to perform the required action.
1-BDDD-281-0001C, 250V DC	Align to the alternate power supply 0-	1-2, El 565, 519 2-1, El 565, 519	7:55	20	Alternate power supply alignment. Adequate time is available for the operator to perform the required action.

Table 5 – Adequacy of Time Available to Perform the Manual Actions (Reactor Building Actions)					
Location of Action (Fire Zone)	**Description of Action**	**Actions required for Fire Zones**	**Demonstrated Time (m:s)[1]**	**Required Time (Min)**	**Technical Basis, Feasibility and Reliability Assessment**
RMOV Board 1C (Fire zone 1-1)	BDDD-280-0001, DC Battery board 1.	2-3, El 593			
3-BDDD-281-0003C, 250V DC RMOV Board 3C (Fire zone 3-1)	Align to the alternate power supply 0-BDDD-280-0003, DC Battery board 3.	2-2, El 565, El 519 2-3, El 593 North Side 2-4, El 593, South Side	14	20	Alternate power supply alignment. Adequate time is available for the operator to perform the required action.
2-BDBB-268-0002C, 480V RMOV Bd. 2C (Fire zone 2-2, EL 565)	Remove non-Appendix R loads to prevent diesel and or 4kV/480V transformer overload.	1-3, El 593	19:30	60	The basis for this manual action is in Calculation ED-Q0999-2003-0055, Rev. 2, "Unit 1,2,3 Appendix R - Auxiliary Power System Alignments and Diesel Generator Loading". This is the APS Electrical Loading Calculation in support of the combined Unit 1, 2, and 3 2003 baseline Appendix R computer separation analysis, Calculation ED-Q0999-2003-0037, Rev. 3, "Appendix R Computerized Separation Analysis" (Units 1, 2, and 3). Adequate time is available for the operator to perform the required action.
2-BDBB-268-0002D (Fire zone 2-4, EL 593)	Align to alternate power 2-BDBB-268-0002C (BKR R7B)	2-5 El 621	16	20	Alternate power supply alignment. Adequate time is available for the operator to perform the required action.

2. Demonstrated time is based on area specific SSIs. However, maximum demonstrated time from Attachment 2 may have been used instead. The listed action was always completed by the listed demonstrated time.

3.4 Plant Procedures

Detailed post-fire safe shutdown procedures have been developed. These procedures, referred to as Safe Shutdown Instructions (SSI), provide instructions to the operator with the equipment and actions necessary to shutdown the plant in the event of a fire in any area of the plant. All operators are periodically trained to perform the SSIs with special emphasis on procedures involving complex actions and time critical steps (e.g. the main control room fire). The process involves a walkthrough from the control room (or other locations) to where the action is being performed. The operator remains in constant communication with the main control room during this period. Performance of the action has to be clearly demonstrated in a timely manner. Any required tools or replacement parts (e.g. breaker racking tool) are made available locally. Breathing apparatus, if necessary are donned during this exercise. Each shift is fully staffed to perform the required post-fire safe shutdown actions per the SSI. The procedures are reviewed by Independent Qualified Reviewers (IQR) to ensure each required action was incorporated into the procedures and reviewed by procedure sponsors, with comments incorporated at each process phase, if required.

3.5 Staffing

The staffing levels are adequate to implement the three units Safe Shutdown Instructions (SSI). Staff needed to implement Appendix R manual actions is within that specified by BFN Tech Specs. The staffing level consists of 1 Shift Manager, 3 Unit SROs, 6UOs, 8AUOs, with the incident commander position filled by another qualified individual. The staffing level designates an SRO for each unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

4.0 HVAC Actions

HVAC actions are performed to ensure that adequate cooling is available in the electrical board rooms (EBR) and the main control building (MCB) including the main control rooms. BFN has two redundant trains of HVAC system. One train of HVAC (chillers, chilled water pumps and AHUs) are normally aligned to cool the MCB and EBRs. For fires in Appendix R III.G.2 areas (primarily the reactor building), one train of HVAC remains free of fire damage to provide cooling to the MCB and EBRs. The only exception is for fires in Fire Zones1-3 & 1-4, 2-3 & 2-4, and 3-3, where both HVAC trains to EBRs 1A & 1B, 2A & 2B, 3A & 3B could be lost. Analyses have shown that on loss of HVAC to the EBRs, (Reference 6) the temperatures in EBRs remain below the design limit for at least 10 hours. For fires in other fire zones, the normally aligned train may be damaged due to fire,

therefore, the redundant train is aligned from the MCB to provide the necessary cooling to the EBRs and MCB. For EBRs, the timing of the re-alignment is not significant, since on loss of HVAC, the temperatures remain acceptable for several hours. As a prudent measure, the Appendix R analysis requires that damaged train be isolated and the un-affected train aligned in 60 minutes to provide cooling to EBRs. Where fires in III.G.2 areas affect one train of HVAC system to MCB, the redundant train of HVAC system remains available and is aligned in 60 minutes to provide cooling. Since all actions are performed in the MCB/chiller enclosure, or EBRs, which are not affected by the fire, the operator actions remain feasible and reliable. HVAC actions can also be considered as cold shutdown actions since they are only required during the cold shutdown (decay heat removal) phase.

Therefore, the HVAC actions will be considered feasible and reliable based on the fact that all actions are performed in MCB/EBRs unaffected by the affects of fire, fire has been extinguished and sufficient time margin is available to account for uncertainties.

5.0 Conclusion

The above analysis shows that operator manual actions required to achieve and maintain hot shutdown conditions are not affected by environmental factors associated with fires in Appendix R III.G.2 areas. The functionality of equipment and cables needed to implement operator actions are not affected by fire environment and the equipment remains accessible. Adequate plant procedures and staffing is provided to implement operator actions. Realistic plant demonstrations and adequate time margin shows that operator manual actions are feasible and reliable. The evaluation demonstrates that BFN meets the underlying purpose and intent of Appendix R III.G.2 rules.

6.0 References

1. Browns Ferry Nuclear Plant, Fire Protection Report, Volume 1 | R1
2. Calculation ED-Q0999-2003-0048 R6, Unit 1, 2 and 3 Appendix R manual Action Requirement
3. BWR Generic Multiple Spurious Operation (MSO) list (Prepared by BWROG)
4. NRC-NEI Meeting on Deterministic Post-Fire Safe Shutdown Methodology, May 7, 2008, (SECY-08-0093)
5. NRC Generic Letter 81-12
6. Calculation ND-Q0999-2008-0001 "Appendix R TMG Analysis for Loss of HVAC", Loss of HVAC to EBR and MCB
7. Calculation MD-N0026-9100163 "Combustible Load Table" | R1
8. SER dated November 2, 1995, Subject: Safety Evaluation of Post-fire Safe Shutdown capability and issuance of Technical Specification Amendments for Browns Ferry Nuclear Plant Units 1, 2, and 3 (ML020040025).

Attachment 1

List of Time Critical Operator Manual Actions

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-02	-031-	0-AHU-031-0081	0-AHU-031-0081	START AHU	0060	0008, 0019
COMMON	02-03	-031-	0-AHU-031-0081	0-AHU-031-0081	START AHU	0060	0008, 0019
COMMON	02-04	-031-	0-AHU-031-0081	0-AHU-031-0081	START AHU	0060	0008, 0019
COMMON	03-01	-031-	0-AHU-031-0081	0-AHU-031-0081	START AHU	0060	0008, 0019
COMMON	03-02	-031-	0-AHU-031-0081	0-AHU-031-0081	START AHU	0060	0008, 0019
COMMON	03-03	-031-	0-AHU-031-0081	0-AHU-031-0081	START AHU	0060	0008, 0019
COMMON	03-04	-031-	0-AHU-031-0081	0-AHU-031-0081	START AHU	0060	0008, 0019
COMMON	AREA 25-I	-031-	0-AHU-031-0081	0-AHU-031-0081	START AHU	0060	0008, 0019
COMMON	AREA 25-II	-031-	0-AHU-031-0081	0-AHU-031-0081	START AHU	0060	0008, 0019
COMMON	01-01	-031-	0-AHU-031-0081	0-AHU-031-0081	TURN OFF AHU	0060	NONE
COMMON	01-02	-031-	0-AHU-031-0081	0-AHU-031-0081	TURN OFF AHU	0060	NONE
COMMON	01-03	-031-	0-AHU-031-0081	0-AHU-031-0081	TURN OFF AHU	0060	NONE
COMMON	01-04	-031-	0-AHU-031-0081	0-AHU-031-0081	TURN OFF AHU	0060	NONE
COMMON	01-05	-031-	0-AHU-031-0081	0-AHU-031-0081	TURN OFF AHU	0060	NONE
COMMON	01-06	-031-	0-AHU-031-0081	0-AHU-031-0081	TURN OFF AHU	0060	NONE
COMMON	02-01	-031-	0-AHU-031-0081	0-AHU-031-0081	TURN OFF AHU	0060	NONE
COMMON	02-05	-031-	0-AHU-031-0081	0-AHU-031-0081	TURN OFF AHU	0060	NONE
COMMON	02-06	-031-	0-AHU-031-0081	0-AHU-031-0081	TURN OFF AHU	0060	NONE
COMMON	01-01	-031-	0-AHU-031-0082	0-AHU-031-0082	START AHU	0060	0008, 0019
COMMON	01-02	-031-	0-AHU-031-0082	0-AHU-031-0082	START AHU	0060	0008, 0019
COMMON	01-03	-031-	0-AHU-031-0082	0-AHU-031-0082	START AHU	0060	0008, 0019
COMMON	01-04	-031-	0-AHU-031-0082	0-AHU-031-0082	START AHU	0060	0008, 0019
COMMON	01-05	-031-	0-AHU-031-0082	0-AHU-031-0082	START AHU	0060	0008, 0019
COMMON	01-06	-031-	0-AHU-031-0082	0-AHU-031-0082	START AHU	0060	0008, 0019

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-01	-031-	0-AHU-031-0082	0-AHU-031-0082	START AHU	0060	0008, 0019
COMMON	02-05	-031-	0-AHU-031-0082	0-AHU-031-0082	START AHU	0060	0008, 0019
COMMON	02-06	-031-	0-AHU-031-0082	0-AHU-031-0082	START AHU	0060	0008, 0019
COMMON	02-02	-031-	0-AHU-031-0082	0-AHU-031-0082	TURN OFF AHU	0060	NONE
COMMON	02-03	-031-	0-AHU-031-0082	0-AHU-031-0082	TURN OFF AHU	0060	NONE
COMMON	02-04	-031-	0-AHU-031-0082	0-AHU-031-0082	TURN OFF AHU	0060	NONE
COMMON	03-01	-031-	0-AHU-031-0082	0-AHU-031-0082	TURN OFF AHU	0060	NONE
COMMON	03-02	-031-	0-AHU-031-0082	0-AHU-031-0082	TURN OFF AHU	0060	NONE
COMMON	03-03	-031-	0-AHU-031-0082	0-AHU-031-0082	TURN OFF AHU	0060	NONE
COMMON	03-04	-031-	0-AHU-031-0082	0-AHU-031-0082	TURN OFF AHU	0060	NONE
COMMON	AREA 25-I	-031-	0-AHU-031-0082	0-AHU-031-0082	TURN OFF AHU	0060	NONE
COMMON	AREA 25-II	-031-	0-AHU-031-0082	0-AHU-031-0082	TURN OFF AHU	0060	NONE
COMMON	02-02	-031-	0-AHU-031-0088	0-AHU-031-0088	START AHU	0060	0008, 0019
COMMON	02-03	-031-	0-AHU-031-0088	0-AHU-031-0088	START AHU	0060	0008, 0019
COMMON	02-04	-031-	0-AHU-031-0088	0-AHU-031-0088	START AHU	0060	0008, 0019
COMMON	03-01	-031-	0-AHU-031-0088	0-AHU-031-0088	START AHU	0060	0008, 0019
COMMON	03-02	-031-	0-AHU-031-0088	0-AHU-031-0088	START AHU	0060	0008, 0019
COMMON	03-03	-031-	0-AHU-031-0088	0-AHU-031-0088	START AHU	0060	0008, 0019
COMMON	03-04	-031-	0-AHU-031-0088	0-AHU-031-0088	START AHU	0060	0008, 0019
COMMON	AREA 25-I	-031-	0-AHU-031-0088	0-AHU-031-0088	START AHU	0060	0008, 0019
COMMON	AREA 25-II	-031-	0-AHU-031-0088	0-AHU-031-0088	START AHU	0060	0008, 0019
COMMON	01-01	-031-	0-AHU-031-0088	0-AHU-031-0088	TURN OFF AHU	0060	NONE
COMMON	01-02	-031-	0-AHU-031-0088	0-AHU-031-0088	TURN OFF AHU	0060	NONE
COMMON	01-03	-031-	0-AHU-031-0088	0-AHU-031-0088	TURN OFF AHU	0060	NONE
COMMON	01-04	-031-	0-AHU-031-0088	0-AHU-031-0088	TURN OFF AHU	0060	NONE
COMMON	01-05	-031-	0-AHU-031-0088	0-AHU-031-0088	TURN OFF AHU	0060	NONE

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	01-06	-031-	0-AHU-031-0088	0-AHU-031-0088	TURN OFF AHU	0060	NONE
COMMON	02-01	-031-	0-AHU-031-0088	0-AHU-031-0088	TURN OFF AHU	0060	NONE
COMMON	02-05	-031-	0-AHU-031-0088	0-AHU-031-0088	TURN OFF AHU	0060	NONE
COMMON	02-06	-031-	0-AHU-031-0088	0-AHU-031-0088	TURN OFF AHU	0060	NONE
COMMON	01-01	-031-	0-AHU-031-0089	0-AHU-031-0089	START AHU	0060	0008, 0019
COMMON	01-02	-031-	0-AHU-031-0089	0-AHU-031-0089	START AHU	0060	0008, 0019
COMMON	01-03	-031-	0-AHU-031-0089	0-AHU-031-0089	START AHU	0060	0008, 0019
COMMON	01-04	-031-	0-AHU-031-0089	0-AHU-031-0089	START AHU	0060	0008, 0019
COMMON	01-05	-031-	0-AHU-031-0089	0-AHU-031-0089	START AHU	0060	0008, 0019
COMMON	01-06	-031-	0-AHU-031-0089	0-AHU-031-0089	START AHU	0060	0008, 0019
COMMON	02-01	-031-	0-AHU-031-0089	0-AHU-031-0089	START AHU	0060	0008, 0019
COMMON	02-05	-031-	0-AHU-031-0089	0-AHU-031-0089	START AHU	0060	0008, 0019
COMMON	02-06	-031-	0-AHU-031-0089	0-AHU-031-0089	START AHU	0060	0008, 0019
COMMON	02-02	-031-	0-AHU-031-0089	0-AHU-031-0089	TURN OFF AHU	0060	NONE
COMMON	02-03	-031-	0-AHU-031-0089	0-AHU-031-0089	TURN OFF AHU	0060	NONE
COMMON	02-04	-031-	0-AHU-031-0089	0-AHU-031-0089	TURN OFF AHU	0060	NONE
COMMON	03-01	-031-	0-AHU-031-0089	0-AHU-031-0089	TURN OFF AHU	0060	NONE
COMMON	03-02	-031-	0-AHU-031-0089	0-AHU-031-0089	TURN OFF AHU	0060	NONE
COMMON	03-03	-031-	0-AHU-031-0089	0-AHU-031-0089	TURN OFF AHU	0060	NONE
COMMON	03-04	-031-	0-AHU-031-0089	0-AHU-031-0089	TURN OFF AHU	0060	NONE
COMMON	AREA 25-I	-031-	0-AHU-031-0089	0-AHU-031-0089	TURN OFF AHU	0060	NONE
COMMON	AREA 25-II	-031-	0-AHU-031-0089	0-AHU-031-0089	TURN OFF AHU	0060	NONE
COMMON	AREA 25-I	-067-	3-SHV-067-0769	0-AHU-031-0089	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	AREA 25-II	-067-	3-SHV-067-0769	0-AHU-031-0089	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	AREA 25-I	-067-	3-SHV-067-0779	0-AHU-031-0089	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	AREA 25-II	-067-	3-SHV-067-0779	0-AHU-031-0089	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-01	-211-	0-BDAA-211-0000A	0-BDAA-211-0000A	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0002	0010	NONE
COMMON	01-01	-211-	0-BDAA-211-0000A (BKR 1614)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	01-04	-211-	0-BDAA-211-0000A (BKR 1614)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	02-03	-211-	0-BDAA-211-0000A (BKR 1614)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	01-01	-211-	0-BDAA-211-0000A (BKR 1716)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042
COMMON	01-04	-211-	0-BDAA-211-0000A (BKR 1716)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE, USE MECHANICAL TRIP LATCH TO OPEN BREAKER	0020	0006, 0042
COMMON	02-03	-211-	0-BDAA-211-0000A (BKR 1716)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE, USE OF MECHANICAL TRIP LATCH MAY BE NECESSARY	0020	0006, 0042
COMMON	01-01	-211-	0-BDAA-211-0000A (BKR 1818)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	01-04	-211-	0-BDAA-211-0000A (BKR 1818)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	02-03	-211-	0-BDAA-211-0000A (BKR 1818)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	01-01	-211-	0-BDAA-211-0000A (BKR 1824)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042
COMMON	01-04	-211-	0-BDAA-211-0000A (BKR 1824)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042
COMMON	02-03	-211-	0-BDAA-211-0000A (BKR 1824)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042
COMMON	03-01	-211-	0-BDAA-211-0000A (BKR 1824)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	03-02	-211-	0-BDAA-211-0000A (BKR 1824)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-03	-211-	0-BDAA-211-0000A (BKR 1824)	0-BDAA-211-0000A	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	02-01	-211-	0-GEN-082-000A	0-BDAA-211-0000A	ISOLATE AND TRIP BKR 0007 AND BKR 0019 FROM 0-BDAA-211-0000A	0010	0084
COMMON	01-02	-211-	0-GEN-082-000A	0-BDAA-211-0000A	ISOLATE AND TRIP BKR 0013 FROM 0-BDAA-211-0000A	0020	0084
COMMON	02-04	-211-	0-GEN-082-000A	0-BDAA-211-0000A	ISOLATE AND TRIP BKR 0010 FROM 0-BDAA-211-0000A	0020	0084
COMMON	03-03	-211-	0-GEN-082-000A	0-BDAA-211-0000A	ISOLATE AND TRIP BKR 0010 FROM 0-BDAA-211-0000A	0020	0084
COMMON	AREA 25-I	-211-	0-GEN-082-000A	0-BDAA-211-0000A	ISOLATE AND TRIP BKR 0010, BKR 0011, BKR 0016, AND BKR 0017 FROM 0-BDAA-211-0000A	0020	0084
COMMON	AREA 25-II	-211-	0-GEN-082-000A	0-BDAA-211-0000A	ISOLATE AND TRIP BKR 0010, BKR 0011, BKR 0016, AND BKR 0017 FROM 0-BDAA-211-0000A	0020	0084
COMMON	01-01	-211-	3-GEN-082-0003A	0-BDAA-211-0000A	TRIP BKR 0005 AND BKR 0021, ISOLATE AND TRIP BKR 0006, BKR 0010, BKR 0013, BKR 0017, BKR 0018, AND BKR 0019 FROM 0-BDAA-211-0000A	0020	0084
COMMON	01-04	-211-	3-GEN-082-0003A	0-BDAA-211-0000A	TRIP BKR 0021, ISOLATE AND TRIP BKR 0006, BKR 0007, BKR 0010, BKR 0011, BKR 0013, BKR 0016, BKR 0017, BKR 0018, AND BKR 0019 FROM 0-BDAA-211-0000A	0020	0084
COMMON	02-03	-211-	3-GEN-082-0003A	0-BDAA-211-0000A	ISOLATE AND TRIP BKR 0007 AND BKR 0010 FROM 0-BDAA-211-0000A	0020	0084
UNIT 1	01-04	-023- (RHR SW)	0-PMP-023-0001 [A1]	0-BDAA-211-0000A (BKR 0010)	OPEN BKR TO SECURE PUMP	0030	0005
UNIT 1	01-04	-074-	1-PMP-074-0005 [1A]	0-BDAA-211-0000A (BKR 0018)	ISOLATE PUMP TO MITIGATE FAILURE	0020	0043, 0078
COMMON	01-05	-211-	0-BDAA-211-0000B	0-BDAA-211-0000B	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0002	0020	NONE
COMMON	02-05	-211-	0-BDAA-211-0000B	0-BDAA-211-0000B	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0002	0020	NONE
COMMON	01-03	-211-	0-BDAA-211-0000B (BKR 1616)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-03	-211-	0-BDAA-211-0000B (BKR 1616)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	02-04	-211-	0-BDAA-211-0000B (BKR 1616)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	01-03	-211-	0-BDAA-211-0000B (BKR 1714)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	02-03	-211-	0-BDAA-211-0000B (BKR 1714)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	02-04	-211-	0-BDAA-211-0000B (BKR 1714)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	01-03	-211-	0-BDAA-211-0000B (BKR 1822)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	02-03	-211-	0-BDAA-211-0000B (BKR 1822)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	02-04	-211-	0-BDAA-211-0000B (BKR 1822)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	01-03	-211-	0-BDAA-211-0000B (BKR 1828)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0042
COMMON	02-03	-211-	0-BDAA-211-0000B (BKR 1828)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	02-04	-211-	0-BDAA-211-0000B (BKR 1828)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	03-03	-211-	0-BDAA-211-0000B (BKR 1828)	0-BDAA-211-0000B	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	01-05	-211-	0-GEN-082-000B	0-BDAA-211-0000B	ISOLATE AND TRIP BKR 0006 AND BKR 0016 FROM 0-BDAA-211-0000B	0010	0084

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-01	-211-	0-GEN-082-000B	0-BDAA-211-0000B	ISOLATE AND TRIP BKR 0007 AND BKR 0017 FROM 0-BDAA-211-0000B	0010	0084
COMMON	02-03	-211-	0-GEN-082-000B	0-BDAA-211-0000B	ISOLATE AND TRIP BKR 0007 AND BKR 0017 FROM 0-BDAA-211-0000B	0010	0084
COMMON	02-04	-211-	0-GEN-082-000B	0-BDAA-211-0000B	ISOLATE AND TRIP BKR 0010 FROM 0-BDAA-211-0000B	0020	0084
COMMON	03-03	-211-	0-GEN-082-000B	0-BDAA-211-0000B	ISOLATE AND TRIP BKR 0010 FROM 0-BDAA-211-0000B	0020	0084
COMMON	AREA 25-I	-211-	0-GEN-082-000B	0-BDAA-211-0000B	ISOLATE AND TRIP BKR 0009, BKR 0010, BKR 0011, AND BKR 0015 FROM 0-BDAA-211-0000B	0020	0084
COMMON	AREA 25-II	-211-	0-GEN-082-000B	0-BDAA-211-0000B	ISOLATE AND TRIP BKR 0009, BKR 0010, BKR 0011, AND BKR 0015 FROM 0-BDAA-211-0000B	0020	0084
COMMON	01-03	-211-	3-GEN-082-0003B	0-BDAA-211-0000B	TRIP BKR 0005, ISOLATE AND TRIP BKR 0006, BKR 0007, BKR 0009, BKR 0010, BKR 0011, BKR 0015, BKR 0016, BKR 0017, AND BKR 0018 FROM 0-BDAA-211-0000B	0020	0084
COMMON	02-04	-211-	2-BDBB-231-0002A	0-BDAA-211-0000B (BKR 0005)	CLOSE NORMAL FEEDER BKR FROM 0-BDAA-211-0000B	0060	0076
UNIT 3	01-03	-023- (RHR SW)	0-PMP-023-0008 [C1]	0-BDAA-211-0000B (BKR 0010)	OPEN BKR TO SECURE PUMP	0030	0005
UNIT 2	AREA 25-I	-023- (RHR SW)	0-PMP-023-0008 [C1]	0-BDAA-211-0000B (BKR 0010)	OPEN BKR TO SECURE PUMP	0030	0005
COMMON	01-05	-211-	0-BDAA-211-0000B	0-BDAA-211-0000B (BKR 0014)	VERIFY BREAKER CLOSED OR CLOSE BREAKER	0020	0084
UNIT 2	AREA 25-I	-023- (RHR SW)	0-PMP-023-0012 [C2]	0-BDAA-211-0000B (BKR 0015)	OPEN BKR TO SECURE PUMP	0030	0005, 0082
COMMON	01-01	-031-	0-CHR-031-2100	0-BDAA-211-0000B (BKR 0018)	TURN OFF CHILLER	0060	0079
COMMON	01-02	-031-	0-CHR-031-2100	0-BDAA-211-0000B (BKR 0018)	TURN OFF CHILLER	0060	0079
COMMON	01-03	-031-	0-CHR-031-2100	0-BDAA-211-0000B (BKR 0018)	TURN OFF CHILLER	0060	0079
COMMON	01-04	-031-	0-CHR-031-2100	0-BDAA-211-0000B (BKR 0018)	TURN OFF CHILLER	0060	0079
COMMON	01-05	-031-	0-CHR-031-2100	0-BDAA-211-0000B (BKR 0018)	TURN OFF CHILLER	0060	0079

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	01-06	-031-	0-CHR-031-2100	0-BDAA-211-0000B (BKR 0018)	TURN OFF CHILLER	0060	0079
COMMON	02-01	-031-	0-CHR-031-2100	0-BDAA-211-0000B (BKR 0018)	TURN OFF CHILLER	0060	0079
COMMON	02-05	-031-	0-CHR-031-2100	0-BDAA-211-0000B (BKR 0018)	TURN OFF CHILLER	0060	0079
COMMON	02-06	-031-	0-CHR-031-2100	0-BDAA-211-0000B (BKR 0018)	TURN OFF CHILLER	0060	0079
COMMON	01-05	-211-	0-BDAA-211-0000C	0-BDAA-211-0000C	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0001	0020	NONE
COMMON	02-05	-211-	0-BDAA-211-0000C	0-BDAA-211-0000C	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0001	0020	NONE
COMMON	02-06	-211-	0-BDAA-211-0000C	0-BDAA-211-0000C	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0001	0020	NONE
COMMON	01-01	-211-	0-BDAA-211-0000C (BKR 1624)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	01-03	-211-	0-BDAA-211-0000C (BKR 1624)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	02-04	-211-	0-BDAA-211-0000C (BKR 1624)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	01-01	-211-	0-BDAA-211-0000C (BKR 1718)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	01-03	-211-	0-BDAA-211-0000C (BKR 1718)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	02-04	-211-	0-BDAA-211-0000C (BKR 1718)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	01-01	-211-	0-BDAA-211-0000C (BKR 1812)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	01-03	-211-	0-BDAA-211-0000C (BKR 1812)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042
COMMON	01-01	-211-	0-BDAA-211-0000C (BKR 1814)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	01-03	-211-	0-BDAA-211-0000C (BKR 1814)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042
COMMON	02-04	-211-	0-BDAA-211-0000C (BKR 1814)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-02	-211-	0-BDAA-211-0000C (BKR 1814)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-03	-211-	0-BDAA-211-0000C (BKR 1814)	0-BDAA-211-0000C	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	02-04	-211-	0-GEN-082-000C	0-BDAA-211-0000C	ISOLATE AND TRIP BKR 0009, BKR 0010, BKR 0016, BKR 0017, AND BKR 0018 FROM 0-BDAA-211-0000C	0010	0084
COMMON	AREA 25-II	-211-	0-GEN-082-000C	0-BDAA-211-0000C	ISOLATE AND TRIP BKR 0010 AND BKR 0016 FROM 0-BDAA-211-0000C	0020	0084
COMMON	01-03	-211-	3-GEN-082-0003C	0-BDAA-211-0000C	ISOLATE AND TRIP BKR 0006 AND BKR 0010 FROM 0-BDAA-211-0000C	0020	0084
COMMON	02-04	-211-	0-BDAA-211-0000C	0-BDAA-211-0000C (BKR 0005)	VERIFY BREAKER CLOSED OR CLOSE BREAKER	0020	0084
COMMON	AREA 25-II	-023- (EECW)	0-PMP-023-0088 [B3]	0-BDAA-211-0000C (BKR 0009)	ISOLATE PUMP TO MITIGATE FAILURE	0010	0028, 0043
UNIT 1	AREA 25-II	-023- (RHR SW)	0-PMP-023-0019 [B2]	0-BDAA-211-0000C (BKR 0016)	OPEN BKR TO SECURE PUMP	0030	0005
COMMON	02-03	-211-	0-BDAA-211-0000D	0-BDAA-211-0000D	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0003	0020	NONE
COMMON	02-04	-211-	0-BDAA-211-0000D	0-BDAA-211-0000D	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0003	0020	NONE
COMMON	01-01	-211-	0-BDAA-211-0000D (BKR 1618)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	01-02	-211-	0-BDAA-211-0000D (BKR 1618)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	01-03	-211-	0-BDAA-211-0000D (BKR 1618)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	01-04	-211-	0-BDAA-211-0000D (BKR 1618)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	02-01	-211-	0-BDAA-211-0000D (BKR 1618)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	02-03	-211-	0-BDAA-211-0000D (BKR 1618)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	02-04	-211-	0-BDAA-211-0000D (BKR 1618)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	01-01	-211-	0-BDAA-211-0000D (BKR 1724)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	01-02	-211-	0-BDAA-211-0000D (BKR 1724)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	01-03	-211-	0-BDAA-211-0000D (BKR 1724)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	01-04	-211-	0-BDAA-211-0000D (BKR 1724)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	02-01	-211-	0-BDAA-211-0000D (BKR 1724)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	02-03	-211-	0-BDAA-211-0000D (BKR 1724)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	02-04	-211-	0-BDAA-211-0000D (BKR 1724)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	01-01	-211-	0-BDAA-211-0000D (BKR 1816)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	01-02	-211-	0-BDAA-211-0000D (BKR 1816)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	01-03	-211-	0-BDAA-211-0000D (BKR 1816)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	01-04	-211-	0-BDAA-211-0000D (BKR 1816)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	02-01	-211-	0-BDAA-211-0000D (BKR 1816)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	02-03	-211-	0-BDAA-211-0000D (BKR 1816)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	02-04	-211-	0-BDAA-211-0000D (BKR 1816)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	01-01	-211-	0-BDAA-211-0000D (BKR 1826)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	01-02	-211-	0-BDAA-211-0000D (BKR 1826)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	01-03	-211-	0-BDAA-211-0000D (BKR 1826)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	01-04	-211-	0-BDAA-211-0000D (BKR 1826)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	02-01	-211-	0-BDAA-211-0000D (BKR 1826)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	02-03	-211-	0-BDAA-211-0000D (BKR 1826)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	02-04	-211-	0-BDAA-211-0000D (BKR 1826)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-02	-211-	0-BDAA-211-0000D (BKR 1826)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-03	-211-	0-BDAA-211-0000D (BKR 1826)	0-BDAA-211-0000D	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	02-03	-211-	0-GEN-082-000D	0-BDAA-211-0000D	ISOLATE AND TRIP BKR 0007, BKR 0008, BKR 0010, BKR 0015, BKR 0016, AND BKR 0017 FROM 0-BDAA-211-0000D	0010	0084
COMMON	02-04	-211-	0-GEN-082-000D	0-BDAA-211-0000D	ISOLATE AND TRIP BKR 0008, BKR 0010, BKR 0015, BKR 0016, AND BKR 0017 FROM 0-BDAA-211-0000D	0010	0084
COMMON	AREA 25-II	-211-	0-GEN-082-000D	0-BDAA-211-0000D	ISOLATE AND TRIP BKR 0015 FROM 0-BDAA-211-0000D	0020	0084
COMMON	01-01	-211-	3-GEN-082-0003D	0-BDAA-211-0000D	TRIP BKR 0013 FROM 0-BDAA-211-0000D	0020	0084
COMMON	01-02	-211-	3-GEN-082-0003D	0-BDAA-211-0000D	TRIP BKR 0013, ISOLATE AND TRIP BKR 0007, BKR 0016, AND BKR 0017 FROM 0-BDAA-211-0000D	0020	0084
COMMON	01-03	-211-	3-GEN-082-0003D	0-BDAA-211-0000D	TRIP BKR 0013, ISOLATE AND TRIP BKR 0007 AND BKR 0016 FROM 0-BDAA-211-0000D	0020	0084
COMMON	01-04	-211-	3-GEN-082-0003D	0-BDAA-211-0000D	TRIP BKR 0013, ISOLATE AND TRIP BKR 0007 AND BKR 0017 FROM 0-BDAA-211-0000D	0020	0084
COMMON	02-01	-211-	3-GEN-082-0003D	0-BDAA-211-0000D	TRIP BKR 0013, ISOLATE AND TRIP BKR 0016 AND BKR 0017 FROM 0-BDAA-211-0000D	0020	0084

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	AREA 25-II	-023- (EECW)	0-PMP-023-0094 [D3]	0-BDAA-211-0000D (BKR 0010)	ISOLATE PUMP TO MITIGATE FAILURE	0010	0028, 0043
COMMON	02-02	-031-	0-CHR-031-2200	0-BDAA-211-0000D (BKR 0012)	TURN OFF CHILLER	0060	0079
COMMON	02-03	-031-	0-CHR-031-2200	0-BDAA-211-0000D (BKR 0012)	TURN OFF CHILLER	0060	0079
COMMON	02-04	-031-	0-CHR-031-2200	0-BDAA-211-0000D (BKR 0012)	TURN OFF CHILLER	0060	0079
COMMON	03-01	-031-	0-CHR-031-2200	0-BDAA-211-0000D (BKR 0012)	TURN OFF CHILLER	0060	0079
COMMON	03-02	-031-	0-CHR-031-2200	0-BDAA-211-0000D (BKR 0012)	TURN OFF CHILLER	0060	0079
COMMON	03-03	-031-	0-CHR-031-2200	0-BDAA-211-0000D (BKR 0012)	TURN OFF CHILLER	0060	0079
COMMON	03-04	-031-	0-CHR-031-2200	0-BDAA-211-0000D (BKR 0012)	TURN OFF CHILLER	0060	0079
COMMON	AREA 25-I	-031-	0-CHR-031-2200	0-BDAA-211-0000D (BKR 0012)	TURN OFF CHILLER	0060	0079
COMMON	AREA 25-II	-031-	0-CHR-031-2200	0-BDAA-211-0000D (BKR 0012)	TURN OFF CHILLER	0060	0079
UNIT 2	02-03	-023- (RHR SW)	0-PMP-023-0027 [D2]	0-BDAA-211-0000D (BKR 0015)	OPEN BKR TO SECURE PUMP	0030	0005
UNIT 2	AREA 25-II	-023- (RHR SW)	0-PMP-023-0027 [D2]	0-BDAA-211-0000D (BKR 0015)	OPEN BKR TO SECURE PUMP	0030	0005
UNIT 1	01-03	-074-	1-PMP-074-0039 [1D]	0-BDAA-211-0000D (BKR 0016)	ISOLATE PUMP TO MITIGATE FAILURE	0020	0043, 0078
UNIT 2	02-01	-074-	2-PMP-074-0039 [2D]	0-BDAA-211-0000D (BKR 0017)	ISOLATE PUMP TO MITIGATE FAILURE	0020	0043, 0078
UNIT 2	02-03	-074-	2-PMP-074-0039 [2D]	0-BDAA-211-0000D (BKR 0017)	ISOLATE PUMP TO MITIGATE FAILURE	0020	0043, 0078
UNIT 2	02-04	-074-	2-PMP-074-0039 [2D]	0-BDAA-211-0000D (BKR 0017)	ISOLATE PUMP TO MITIGATE FAILURE	0020	0043, 0078
COMMON	01-01	-067-	0-FCV-067-0049	0-BDBB-219-0000A (BKR 12C)	OPEN BKR	0020	0002
COMMON	01-02	-067-	0-FCV-067-0049	0-BDBB-219-0000A (BKR 12C)	OPEN BKR	0020	0002
COMMON	01-03	-067-	0-FCV-067-0049	0-BDBB-219-0000A (BKR 12C)	OPEN BKR	0020	0002

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-02	-266-	0-BDBB-266-OHVB	0-BDBB-266-OHVB	TRANSFER TO ALTERNATE POWER SUPPLY 3-BDBB-231-0003B	0060	NONE
COMMON	01-01	-280-	0-BDDD-280-0001 (BKR 609)	0-BDDD-280-0001 (BKR 609)	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 1	0060	0045
COMMON	01-02	-280-	0-BDDD-280-0002 (BKR 607)	0-BDDD-280-0002 (BKR 607)	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 2	0060	0045
COMMON	01-03	-280-	0-BDDD-280-0002 (BKR 607)	0-BDDD-280-0002 (BKR 607)	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 2	0060	0045
COMMON	01-04	-280-	0-BDDD-280-0002 (BKR 607)	0-BDDD-280-0002 (BKR 607)	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 2	0060	0045
COMMON	01-05	-280-	0-BDDD-280-0002 (BKR 607)	0-BDDD-280-0002 (BKR 607)	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 2	0060	0045
COMMON	03-03	-280-	0-BDDD-280-0003 (BKR 609)	0-BDDD-280-0003 (BKR 609)	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 3	0060	0045
COMMON	02-03	-280-	2-BDBB-231-0002B	0-BDDD-280-0003 (BKR 708)	OPEN THE ALTERNATE DC CONTROL POWER BKR (708) TO ASSURE AVAILABILITY OF NORMAL CONTROL POWER	0020	0060
COMMON	02-04	-280-	2-BDBB-231-0002B	0-BDDD-280-0003 (BKR 708)	OPEN THE ALTERNATE DC CONTROL POWER BKR (708) TO ASSURE AVAILABILITY OF NORMAL CONTROL POWER	0020	0060
COMMON	01-01	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	01-02	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	01-03	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	01-04	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	01-05	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	01-06	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	02-01	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	02-02	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	02-03	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	02-04	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	02-05	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-06	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	03-01	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	03-03	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	03-04	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	AREA 25-I	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	AREA 25-II	-280-	0-BDDD-280-0003 (BKR 710)	0-BDDD-280-0003 (BKR 710)	TRIP BKR (710) TO THE DPO SHOP TO REDUCE LOAD ON UNIT BATTERY 3	0020	0097
COMMON	01-02	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-05	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-06	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-01	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-02	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-03	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-04	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-05	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-06	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	03-01	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	03-02	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	03-03	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	03-04	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	AREA 25-I	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	AREA 25-II	-248-	0-CHGA-248-0001	0-CHGA-248-0001	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-01	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-06	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-01	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-02	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-05	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-06	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	03-01	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	03-02	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	03-03	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	03-04	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	AREA 25-I	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	AREA 25-II	-248-	0-CHGA-248-0002A	0-CHGA-248-0002A	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-01	-248-	0-BATA-248-0001	0-CHGA-248-0002B	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 1	0060	0045
COMMON	01-02	-248-	0-BATA-248-0002	0-CHGA-248-0002B	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 2	0060	0045
COMMON	01-03	-248-	0-BATA-248-0002	0-CHGA-248-0002B	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 2	0060	0045
COMMON	01-04	-248-	0-BATA-248-0002	0-CHGA-248-0002B	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 2	0060	0045
COMMON	01-05	-248-	0-BATA-248-0002	0-CHGA-248-0002B	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 2	0060	0045
COMMON	03-03	-248-	0-BATA-248-0003	0-CHGA-248-0002B	ALIGN TO THE ALTERNATE BATTERY CHARGER 2B TO BATTERY BD 3	0060	0045
COMMON	01-01	-248-	0-CHGA-248-0002B	0-CHGA-248-0002B	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-02	-248-	0-CHGA-248-0002B	0-CHGA-248-0002B	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-03	-248-	0-CHGA-248-0002B	0-CHGA-248-0002B	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-04	-248-	0-CHGA-248-0002B	0-CHGA-248-0002B	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-05	-248-	0-CHGA-248-0002B	0-CHGA-248-0002B	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	03-03	-248-	0-CHGA-248-0002B	0-CHGA-248-0002B	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-01	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-02	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-03	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-04	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-05	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-06	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-01	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-02	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-03	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-04	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-05	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	02-06	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	03-01	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	03-04	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	AREA 25-I	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	AREA 25-II	-248-	0-CHGA-248-0003	0-CHGA-248-0003	RESET 250V DC BATTERY CHARGER	0060	0008
COMMON	01-01	-067-	0-FCV-067-0049	0-FCV-067-0049	CLOSE VALVE MANUALLY	0020	NONE
COMMON	01-02	-067-	0-FCV-067-0049	0-FCV-067-0049	CLOSE VALVE MANUALLY	0020	NONE
COMMON	01-03	-067-	0-FCV-067-0049	0-FCV-067-0049	CLOSE VALVE MANUALLY	0020	NONE
COMMON	02-02	-031-	0-FAN-031-0074	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	02-03	-031-	0-FAN-031-0074	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	02-04	-031-	0-FAN-031-0074	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	03-01	-031-	0-FAN-031-0074	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	03-02	-031-	0-FAN-031-0074	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	03-03	-031-	0-FAN-031-0074	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	03-04	-031-	0-FAN-031-0074	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	AREA 25-I	-031-	0-FAN-031-0074	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	AREA 25-II	-031-	0-FAN-031-0074	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	01-01	-031-	0-FAN-031-0075	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	01-02	-031-	0-FAN-031-0075	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	01-03	-031-	0-FAN-031-0075	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	01-04	-031-	0-FAN-031-0075	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	01-05	-031-	0-FAN-031-0075	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	01-06	-031-	0-FAN-031-0075	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	02-01	-031-	0-FAN-031-0075	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	02-05	-031-	0-FAN-031-0075	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-06	-031-	0-FAN-031-0075	0-LPNL-925-0165	START EXHAUST FAN	0060	0019, 0025
COMMON	03-03	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	START PUMP	0060	0008, 0020, 0079
COMMON	03-04	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	START PUMP	0060	0008, 0020, 0079
COMMON	AREA 25-I	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	START PUMP	0060	0008, 0020, 0079
COMMON	AREA 25-II	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	START PUMP	0060	0008, 0020, 0079
COMMON	01-01	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	01-02	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	01-03	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	01-04	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	01-05	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	01-06	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	02-01	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	02-02	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	02-03	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	02-04	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	02-05	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	02-06	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	03-01	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	03-02	-031-	0-PMP-031-2101	0-LPNL-925-2100 / 0-LPNL-925-0165	START PUMP	0060	0079

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	AREA 25-I	-031-	0-CHR-031-2100	0-LPNL-925-2110 / 0-LPNL-925-0165	START CHILLER	0060	0008, 0019, 0079
COMMON	AREA 25-II	-031-	0-CHR-031-2100	0-LPNL-925-2110 / 0-LPNL-925-0165	START CHILLER	0060	0008, 0019, 0079
COMMON	02-02	-031-	0-CHR-031-2100	0-LPNL-925-2110 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	02-03	-031-	0-CHR-031-2100	0-LPNL-925-2110 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	02-04	-031-	0-CHR-031-2100	0-LPNL-925-2110 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	03-01	-031-	0-CHR-031-2100	0-LPNL-925-2110 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	03-02	-031-	0-CHR-031-2100	0-LPNL-925-2110 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	03-03	-031-	0-CHR-031-2100	0-LPNL-925-2110 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	03-04	-031-	0-CHR-031-2100	0-LPNL-925-2110 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	02-05	-031-	0-CHR-031-2200	0-LPNL-925-2110 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	02-06	-031-	0-CHR-031-2200	0-LPNL-925-2110 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	02-01	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	START PUMP	0060	0008, 0020, 0079
COMMON	01-01	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	01-02	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	01-03	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	01-04	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	01-05	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	01-06	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	02-02	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	02-03	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-04	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	02-05	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	02-06	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	START PUMP	0060	0079
COMMON	03-01	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	03-02	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	03-03	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	03-04	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	AREA 25-I	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	AREA 25-II	-031-	0-PMP-031-2201	0-LPNL-925-2200 / 0-LPNL-925-0165	TURN OFF PUMP	0060	0079
COMMON	01-01	-031-	0-CHR-031-2200	0-LPNL-925-2210 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	01-02	-031-	0-CHR-031-2200	0-LPNL-925-2210 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	01-03	-031-	0-CHR-031-2200	0-LPNL-925-2210 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	01-04	-031-	0-CHR-031-2200	0-LPNL-925-2210 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	01-05	-031-	0-CHR-031-2200	0-LPNL-925-2210 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	01-06	-031-	0-CHR-031-2200	0-LPNL-925-2210 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	02-01	-031-	0-CHR-031-2200	0-LPNL-925-2210 / 0-LPNL-925-0165	START CHILLER	0060	0079
COMMON	01-02	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	01-05	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	01-06	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-01	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	02-02	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	02-03	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	02-04	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	02-05	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	02-06	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	03-01	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	03-02	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	03-03	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	03-04	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	AREA 25-I	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	AREA 25-II	-231-	0-BDBB-266-0000A	1-BDBB-231-0001A	ISOLATE CONTROL BAY VENT BD TO MITIGATE TRIP	0060	0008, 0043, 0058
COMMON	01-05	-231-	1-BDBB-231-0001A	1-BDBB-231-0001A	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0002	0020	NONE
COMMON	01-05	-231-	1-BDBB-231-0001A	1-BDBB-231-0001A	ISOLATE, TRANSFER CONTROL, AND LOCALLY OPERATE BKR 1C OPEN AND 8C CLOSED	0020	NONE
COMMON	01-05	-231-	1-BDBB-231-0001A	1-BDBB-231-0001A	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDAA-211-0000B	0020	NONE

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	01-05	-231-	1-BDBB-268-0001B	1-BDBB-231-0001A (BKR 03B)	CLOSE BREAKER	0020	NONE
COMMON	01-03	-231-	1-BDBB-231-0001B	1-BDBB-231-0001B	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0003	0020	NONE
COMMON	01-03	-231-	1-BDBB-231-0001B	1-BDBB-231-0001B	ISOLATE, TRANSFER CONTROL, AND LOCALLY OPERATE BKR 1C CLOSED AND 8C OPEN	0020	NONE
COMMON	02-05	-231-	1-BDBB-231-0001B	1-BDBB-231-0001B	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0003	0020	NONE
COMMON	02-05	-231-	1-BDBB-231-0001B	1-BDBB-231-0001B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDAA-211-0000B	0020	NONE
COMMON	02-06	-231-	1-BDBB-231-0001B	1-BDBB-231-0001B	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0003	0020	NONE
UNIT 1	01-02	-074-	1-FCV-074-0053	1-BDBB-268-0001A	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 480V RMOV BD 1A (POST-MODIFICATION)	0025	0003, 0011
UNIT 1	01-04	-074-	1-FCV-074-0053	1-BDBB-268-0001A	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 480V RMOV BD 1A (POST-MODIFICATION)	0025	0003, 0011
UNIT 1	01-04	-074-	1-FCV-074-0060	1-BDBB-268-0001A (BKR 06B)	OPEN BKR	0020	0087, 0088
UNIT 1	01-04	-074-	1-FCV-074-0061	1-BDBB-268-0001A (BKR 07B)	OPEN BKR	0020	0087, 0088
COMMON	01-05	-268-	1-BDBB-268-0001B	1-BDBB-268-0001B	ALIGN TO THE ALTERNATE POWER SUPPLY 1-BDBB-231-0001A	0020	NONE
UNIT 1	01-01	-074-	1-FCV-074-0067	1-BDBB-268-0001B	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 480V RMOV BD 1B (POST-MODIFICATION)	0025	0003, 0011
UNIT 1	01-03	-074-	1-FCV-074-0067	1-BDBB-268-0001B	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 480V RMOV BD 1B (POST-MODIFICATION)	0025	0003, 0011
UNIT 1	01-05	-074-	1-FCV-074-0067	1-BDBB-268-0001B	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 480V RMOV BD 1B (POST-MODIFICATION)	0025	0003, 0011
UNIT 1	01-05	-074-	1-FCV-074-0066	1-BDBB-268-0001B (BKR 03A)	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 480V RMOV BD 1B	0020	NONE
UNIT 1	01-03	-074-	1-FCV-074-0074	1-BDBB-268-0001B (BKR 10C)	ISOLATE, TRANSFER CONTROL, AND CLOSE VALVE FROM 480V RMOV BD 1B	0020	0087
UNIT 1	01-05	-074-	1-FCV-074-0074	1-BDBB-268-0001B (BKR 10C)	ISOLATE, TRANSFER CONTROL, AND CLOSE VALVE FROM 480V RMOV BD 1B	0020	0087
UNIT 1	01-03	-074-	1-FCV-074-0071	1-BDBB-268-0001B (BKR 11C)	ISOLATE, TRANSFER CONTROL, AND CLOSE VALVE FROM 480V RMOV BD 1B	0020	0087
UNIT 1	01-05	-074-	1-FCV-074-0071	1-BDBB-268-0001B (BKR 11C)	ISOLATE, TRANSFER CONTROL, AND CLOSE VALVE FROM 480V RMOV BD 1B	0020	0087

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
UNIT 1	01-04	-281-	1-BDDD-281-0001A	1-BDDD-281-0001A	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0002	0020	NONE
~~UNIT 1~~	~~01-01~~	~~-281-~~	~~1-BDDD-281-0001A~~	~~1-BDDD-281-0001A (BKR 01B1)~~	~~MANUALLY OPEN BKR~~	~~0020~~	~~0017~~
~~UNIT 1~~	~~01-02~~	~~-281-~~	~~1-BDDD-281-0001A~~	~~1-BDDD-281-0001A (BKR 01B1)~~	~~MANUALLY OPEN BKR~~	~~0020~~	~~0017~~
~~UNIT 1~~	~~01-03~~	~~-281-~~	~~1-BDDD-281-0001A~~	~~1-BDDD-281-0001A (BKR 01B1)~~	~~MANUALLY OPEN BKR~~	~~0020~~	~~0017~~
~~UNIT 1~~	~~01-04~~	~~-281-~~	~~1-BDDD-281-0001A~~	~~1-BDDD-281-0001A (BKR 01B1)~~	~~MANUALLY OPEN BKR~~	~~0020~~	~~0017~~
UNIT 1	01-01	-281-	1-BDDD-281-0001B	1-BDDD-281-0001B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 1	01-02	-281-	1-BDDD-281-0001B	1-BDDD-281-0001B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 1	02-01	-281-	1-BDDD-281-0001B	1-BDDD-281-0001B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 1	02-02	-281-	1-BDDD-281-0001B	1-BDDD-281-0001B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 1	03-01	-281-	1-BDDD-281-0001B	1-BDDD-281-0001B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 1	03-02	-281-	1-BDDD-281-0001B	1-BDDD-281-0001B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 1	AREA 25-I	-281-	1-BDDD-281-0001B	1-BDDD-281-0001B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 1	AREA 25-II	-281-	1-BDDD-281-0001B	1-BDDD-281-0001B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 1	01-02	-281-	1-BDDD-281-0001C	1-BDDD-281-0001C	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 1	02-01	-281-	1-BDDD-281-0001C	1-BDDD-281-0001C	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 1	02-03	-281-	1-BDDD-281-0001C	1-BDDD-281-0001C	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
COMMON	01-01	-031-	0-TCV-031-0019	1-BYV-031-0526	OPEN BYPASS VALVE MANUALLY	0060	0022
COMMON	01-03	-031-	0-TCV-031-0019	1-BYV-031-0526	OPEN BYPASS VALVE MANUALLY	0060	0022
COMMON	01-04	-031-	0-TCV-031-0019	1-BYV-031-0526	OPEN BYPASS VALVE MANUALLY	0060	0022
COMMON	01-01	-031-	0-TCV-031-0022	1-BYV-031-0530	OPEN BYPASS VALVE MANUALLY	0060	0022
COMMON	01-03	-031-	0-TCV-031-0022	1-BYV-031-0530	OPEN BYPASS VALVE MANUALLY	0060	0022
COMMON	01-04	-031-	0-TCV-031-0022	1-BYV-031-0530	OPEN BYPASS VALVE MANUALLY	0060	0022
UNIT 1	01-03	-925-	1-LPNL-925-0032	1-LPNL-925-0032	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0003 (3-MGEN-252-0003)	0020	NONE
UNIT 1	01-03	-001-	1-PCV-001-0004	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
UNIT 1	01-05	-001-	1-PCV-001-0004	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-03	-001-	1-PCV-001-0005	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-05	-001-	1-PCV-001-0005	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-04	-001-	1-PCV-001-0005	1-LPNL-925-0032	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 1-25-32	0020	0062
UNIT 1	01-03	-001-	1-PCV-001-0022	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-05	-001-	1-PCV-001-0022	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-04	-001-	1-PCV-001-0022	1-LPNL-925-0032	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 1-25-32	0020	0062
UNIT 1	01-05	-001-	1-PCV-001-0023	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-03	-001-	1-PCV-001-0030	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-05	-001-	1-PCV-001-0030	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-04	-001-	1-PCV-001-0030	1-LPNL-925-0032	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 1-25-32	0020	0062
UNIT 1	01-03	-001-	1-PCV-001-0034	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-05	-001-	1-PCV-001-0034	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-04	-001-	1-PCV-001-0034	1-LPNL-925-0032	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 1-25-32	0020	0062
UNIT 1	01-03	-001-	1-PCV-001-0041	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-05	-001-	1-PCV-001-0041	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-05	-001-	1-PCV-001-0042	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-05	-001-	1-PCV-001-0180	1-LPNL-925-0032	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-05	-001-	1-PCV-001-0018	1-LPNL-925-0658	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-03	-001-	1-PCV-001-0018	1-LPNL-925-0658	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 1-25-658 (POST-MODIFICATION)	0020	0062
UNIT 1	01-05	-001-	1-PCV-001-0018	1-LPNL-925-0658	OPEN VALVE	0020	0062
UNIT 1	01-05	-001-	1-PCV-001-0019	1-LPNL-925-0658	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-03	-001-	1-PCV-001-0019	1-LPNL-925-0658	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 1-25-658 (POST-MODIFICATION)	0020	0062
UNIT 1	01-05	-001-	1-PCV-001-0019	1-LPNL-925-0658	OPEN VALVE	0020	0062
UNIT 1	01-05	-001-	1-PCV-001-0031	1-LPNL-925-0658	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-03	-001-	1-PCV-001-0031	1-LPNL-925-0658	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 1-25-658 (POST-MODIFICATION)	0020	0062
UNIT 1	01-05	-001-	1-PCV-001-0031	1-LPNL-925-0658	OPEN VALVE	0020	0062
UNIT 1	01-05	-001-	1-PCV-001-0179	1-LPNL-925-0658	ISOLATE VALVE TO MITIGATE OPENING	0010	0062
UNIT 1	01-03	-001-	1-PCV-001-0179	1-LPNL-925-0658	ISOLATE, TRANSFER CONTROL, AND OPEN VALVE FROM 1-25-658 (POST-MODIFICATION)	0020	0062

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
UNIT 1	01-05	-001-	1-PCV-001-0179	1-LPNL-925-0658	OPEN VALVE	0020	0062
UNIT 1	01-03	-069-	1-FCV-069-0094	1-VTV-032-5103	OPEN VENT VALVE MANUALLY TO CLOSE FCV-069-0094	0030	0034
COMMON	02-05	-231-	2-BDBB-231-0002A	2-BDBB-231-0002A	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDAA-211-0000C	0020	0055
COMMON	02-04	-231-	2-BDBB-231-0002A	2-BDBB-231-0002A	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0020	0084
COMMON	02-05	-231-	2-BDBB-231-0002A	2-BDBB-231-0002A	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0020	0084
COMMON	02-04	-231-	2-BDBB-231-0002A	2-BDBB-231-0002A	ISOLATE, TRANSFER CONTROL, AND LOCALLY OPERATE BKR 1C CLOSED AND 8C OPEN	0020	NONE
COMMON	02-05	-231-	2-BDBB-231-0002A	2-BDBB-231-0002A	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0001	0020	NONE
COMMON	02-03	-231-	2-BDBB-231-0002A	2-BDBB-231-0002A	ISOLATE SHUTDOWN BD TO MITIGATE TRIP OF NORMAL FEEDER BKR	0060	0043, 0055
COMMON	02-04	-231-	2-BDBB-231-0002A	2-BDBB-231-0002A	CLOSE NORMAL FEEDER BKR FROM 0-BDAA-211-0000B	0060	0076
COMMON	02-04	-231-	2-BDBB-231-0002A	2-BDBB-231-0002A	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0076
COMMON	02-01	-231-	2-BDBB-268-0002A	2-BDBB-231-0002A (BKR 03A)	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-02	-231-	2-BDBB-268-0002A	2-BDBB-231-0002A (BKR 03A)	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-03	-231-	2-BDBB-268-0002A	2-BDBB-231-0002A (BKR 03A)	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-04	-231-	2-BDBB-268-0002A	2-BDBB-231-0002A (BKR 03A)	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-05	-231-	2-BDBB-268-0002A	2-BDBB-231-0002A (BKR 03A)	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-06	-231-	2-BDBB-268-0002A	2-BDBB-231-0002A (BKR 03A)	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-04	-231-	2-BDBB-268-0002B	2-BDBB-231-0002A (BKR 03B)	CLOSE ALTERNATE FEEDER BKR TO 2-BDBB-268-0002B	0060	0077
COMMON	02-04	-231-	2-BDBB-231-0002B	2-BDBB-231-0002B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDAA-211-0000C	0020	0055
COMMON	02-04	-231-	2-BDBB-231-0002B	2-BDBB-231-0002B	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0020	0076
COMMON	02-05	-231-	2-BDBB-231-0002B	2-BDBB-231-0002B	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0020	0084

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-03	-231-	2-BDBB-231-0002B	2-BDBB-231-0002B	ISOLATE, TRANSFER CONTROL, AND LOCALLY OPERATE BKR 1C CLOSED AND 8C OPEN	0020	NONE
COMMON	02-04	-231-	2-BDBB-231-0002B	2-BDBB-231-0002B	ISOLATE, TRANSFER CONTROL, AND LOCALLY OPERATE BKR 1C OPEN AND 8C CLOSED	0020	NONE
COMMON	01-03	-231-	2-BDBB-268-0002A	2-BDBB-231-0002B (BKR 03A)	CLOSE BREAKER	0060	NONE
COMMON	02-01	-231-	2-BDBB-268-0002B	2-BDBB-231-0002B (BKR 03B)	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002B	0060	0077
COMMON	02-03	-231-	2-BDBB-268-0002B	2-BDBB-231-0002B (BKR 03B)	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002B	0060	0077
COMMON	02-05	-231-	2-BDBB-268-0002B	2-BDBB-231-0002B (BKR 03B)	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002B	0060	0077
COMMON	02-06	-231-	2-BDBB-268-0002B	2-BDBB-231-0002B (BKR 03B)	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002B	0060	0077
COMMON	01-03	-268-	0-BATA-248-0000C	2-BDBB-268-0002A	ALIGN TO THE ALTERNATE BATTERY CHARGER FEED FROM 2-BDBB-268-0002A TO 0-CHGA-248-0000C (POST-MODIFICATION)	0060	NONE
COMMON	02-05	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0020	0084
COMMON	02-01	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	02-01	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-02	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	02-02	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-03	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-04	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	02-04	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-05	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-06	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	02-06	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	01-03	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0060	0084

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	01-03	-268-	2-BDBB-268-0002A	2-BDBB-268-0002A	ALIGN TO THE ALTERNATE POWER SUPPLY 2-BDBB-231-0002B	0060	NONE
UNIT 2	02-01	-074-	2-FCV-074-0061	2-BDBB-268-0002A (BKR 11E)	OPEN BKR	0020	0087, 0088
UNIT 2	02-03	-074-	2-FCV-074-0061	2-BDBB-268-0002A (BKR 11E)	OPEN BKR	0020	0087, 0088
UNIT 2	02-04	-074-	2-FCV-074-0061	2-BDBB-268-0002A (BKR 11E)	OPEN BKR	0020	0087, 0088
UNIT 2	02-01	-074-	2-FCV-074-0060	2-BDBB-268-0002A (BKR 13C)	OPEN BKR	0020	0087, 0088
UNIT 2	02-03	-074-	2-FCV-074-0060	2-BDBB-268-0002A (BKR 13C)	OPEN BKR	0020	0087, 0088
UNIT 2	02-04	-074-	2-FCV-074-0060	2-BDBB-268-0002A (BKR 13C)	OPEN BKR	0020	0087, 0088
COMMON	02-05	-268-	2-BDBB-268-0002B	2-BDBB-268-0002B	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0020	0084
COMMON	02-01	-268-	2-BDBB-268-0002B	2-BDBB-268-0002B	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	02-01	-268-	2-BDBB-268-0002B	2-BDBB-268-0002B	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002B	0060	0077
COMMON	02-03	-268-	2-BDBB-268-0002B	2-BDBB-268-0002B	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	02-04	-268-	2-BDBB-268-0002B	2-BDBB-268-0002B	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	02-04	-268-	2-BDBB-268-0002B	2-BDBB-268-0002B	CLOSE ALTERNATE FEEDER BKR FROM 2-BDBB-231-0002A	0060	0077
COMMON	02-05	-268-	2-BDBB-268-0002B	2-BDBB-268-0002B	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002B	0060	0077
COMMON	02-06	-268-	2-BDBB-268-0002B	2-BDBB-268-0002B	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	02-06	-268-	2-BDBB-268-0002B	2-BDBB-268-0002B	CLOSE NORMAL FEEDER BKR FROM 2-BDBB-231-0002B	0060	0077
UNIT 2	02-04	-074-	2-FCV-074-0075	2-BDBB-268-0002B (BKR 10E)	OPEN BKR	0020	0087, 0088
UNIT 2	02-04	-074-	2-FCV-074-0074	2-BDBB-268-0002B (BKR 14E)	OPEN BKR	0020	0087, 0088
COMMON	01-03	-268-	2-BDBB-268-0002C	2-BDBB-268-0002C	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0060	0084
UNIT 2	02-05	-268-	2-BDBB-268-0002D	2-BDBB-268-0002C (BKR R7B)	ALIGN TO THE ALTERNATE POWER SUPPLY 2-BDBB-268-0002C	0020	NONE
UNIT 2	02-05	-268-	2-BDBB-268-0002D (BKR 05A)	2-BDBB-268-0002D	ALIGN TO THE ALTERNATE POWER SUPPLY 2-BDBB-268-0002C	0020	NONE

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
UNIT 2	02-02	-074-	2-FCV-074-0053	2-BDBB-268-0002D (BKR 02C)	ISOLATE VALVE TO MITIGATE FAILURE BY USE OF THE APPENDIX R EMERGENCY SWITCH	0025	0003, 0011, 0043
UNIT 2	02-05	-074-	2-FCV-074-0053	2-BDBB-268-0002D (BKR 02C)	ISOLATE VALVE TO MITIGATE FAILURE BY USE OF THE APPENDIX R EMERGENCY SWITCH	0025	0003, 0011, 0043
UNIT 2	02-01	-074-	2-FCV-074-0067	2-BDBB-268-0002E (BKR 02C)	OPEN VALVE LOCALLY BY USE OF APPENDIX R EMERGENCY SWITCH	0025	0003, 0011, 0043
UNIT 2	02-03	-074-	2-FCV-074-0067	2-BDBB-268-0002E (BKR 02C)	OPEN VALVE LOCALLY BY USE OF APPENDIX R EMERGENCY SWITCH	0025	0003, 0011, 0043
UNIT 2	02-04	-074-	2-FCV-074-0067	2-BDBB-268-0002E (BKR 02C)	OPEN VALVE LOCALLY BY USE OF APPENDIX R EMERGENCY SWITCH	0025	0003, 0011, 0043
COMMON	02-04	-281-	0-BDDD-280-0003	2-BDDD-281-0002A	TRIP HPCI LOADS ON 2-BDDD-281-0002A PRIOR TO TRANSFERRING THE BD TO THE ALTERNATE POWER SUPPLY	0020	0069
UNIT 2	02-03	-281-	2-BDDD-281-0002A	2-BDDD-281-0002A	OPEN BKR TO HPCI LOGIC BUS	0010	0036
UNIT 2	02-04	-281-	2-BDDD-281-0002A	2-BDDD-281-0002A	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0003	0020	NONE
UNIT 2	02-01	-281-	2-BDDD-281-0002A	2-BDDD-281-0002A (BKR 01B1)	MANUALLY OPEN BKR	0020	0017
UNIT 2	02-02	-281-	2-BDDD-281-0002A	2-BDDD-281-0002A (BKR 01B1)	MANUALLY OPEN BKR	0020	0017
UNIT 2	02-03	-281-	2-BDDD-281-0002A	2-BDDD-281-0002A (BKR 01B1)	MANUALLY OPEN BKR	0020	0017
UNIT 2	02-04	-281-	2-BDDD-281-0002A	2-BDDD-281-0002A (BKR 01B1)	MANUALLY OPEN BKR	0020	0017
UNIT 2	02-06	-281-	2-BDDD-281-0002A	2-BDDD-281-0002A (BKR 01B1)	MANUALLY OPEN BKR	0020	0017
UNIT 2	02-03	-281-	2-BDDD-281-0002B	2-BDDD-281-0002B	OPEN BKR TO HPCI LOGIC BUS	0010	0036
UNIT 2	03-02	-281-	2-BDDD-281-0002B	2-BDDD-281-0002B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 2	03-03	-281-	2-BDDD-281-0002B	2-BDDD-281-0002B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0001	0020	NONE
UNIT 2	02-05	-068-	2-PMP-068-0060A	2-VFD-068-2002	STOP PUMP USING 2-HS-068-2002A, E-STOP PB4	0020	0017
UNIT 2	02-05	-068-	2-PMP-068-0060B	2-VFD-068-2112	STOP PUMP USING 2-HS-068-2112A, E-STOP PB4	0020	0017
UNIT 2	02-04	-069-	2-FCV-069-0094	2-VTV-032-5103	OPEN VENT VALVE MANUALLY TO CLOSE FCV-069-0094	0030	0034
COMMON	03-01	-031-	3-AHU-031-0104	3-AHU-031-0104	START AHU	0060	0008, 0019

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	03-02	-031-	3-AHU-031-0104	3-AHU-031-0104	START AHU	0060	0008, 0019
COMMON	03-03	-031-	3-AHU-031-0104	3-AHU-031-0104	START AHU	0060	0008, 0019
COMMON	03-04	-031-	3-AHU-031-0104	3-AHU-031-0104	START AHU	0060	0008, 0019
COMMON	AREA 25-I	-031-	3-AHU-031-0104	3-AHU-031-0104	START AHU	0060	0008, 0019
COMMON	AREA 25-II	-031-	3-AHU-031-0104	3-AHU-031-0104	START AHU	0060	0008, 0019
COMMON	01-01	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	01-02	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	01-03	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	01-04	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	01-05	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	01-06	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	02-01	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	02-02	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	02-03	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	02-04	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	02-05	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	02-06	-031-	3-AHU-031-0104	3-AHU-031-0104	TURN OFF AHU	0060	NONE
COMMON	01-01	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019
COMMON	01-02	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019
COMMON	01-03	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019
COMMON	01-04	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019
COMMON	01-05	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019
COMMON	01-06	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019
COMMON	02-01	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019
COMMON	02-02	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019
COMMON	02-03	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-04	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019
COMMON	02-05	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019
COMMON	02-06	-031-	3-AHU-031-0105	3-AHU-031-0105	START AHU	0060	0008, 0019
COMMON	03-01	-031-	3-AHU-031-0105	3-AHU-031-0105	TURN OFF AHU	0060	NONE
COMMON	03-02	-031-	3-AHU-031-0105	3-AHU-031-0105	TURN OFF AHU	0060	NONE
COMMON	03-03	-031-	3-AHU-031-0105	3-AHU-031-0105	TURN OFF AHU	0060	NONE
COMMON	03-04	-031-	3-AHU-031-0105	3-AHU-031-0105	TURN OFF AHU	0060	NONE
COMMON	AREA 25-I	-031-	3-AHU-031-0105	3-AHU-031-0105	TURN OFF AHU	0060	NONE
COMMON	AREA 25-II	-031-	3-AHU-031-0105	3-AHU-031-0105	TURN OFF AHU	0060	NONE
COMMON	03-01	-031-	3-AHU-031-0107	3-AHU-031-0107	START AHU	0060	0008, 0019
COMMON	03-02	-031-	3-AHU-031-0107	3-AHU-031-0107	START AHU	0060	0008, 0019
COMMON	03-03	-031-	3-AHU-031-0107	3-AHU-031-0107	START AHU	0060	0008, 0019
COMMON	03-04	-031-	3-AHU-031-0107	3-AHU-031-0107	START AHU	0060	0008, 0019
COMMON	AREA 25-I	-031-	3-AHU-031-0107	3-AHU-031-0107	START AHU	0060	0008, 0019
COMMON	AREA 25-II	-031-	3-AHU-031-0107	3-AHU-031-0107	START AHU	0060	0008, 0019
COMMON	01-01	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE
COMMON	01-02	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE
COMMON	01-03	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE
COMMON	01-04	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE
COMMON	01-05	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE
COMMON	01-06	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE
COMMON	02-01	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE
COMMON	02-02	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE
COMMON	02-03	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE
COMMON	02-04	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE
COMMON	02-05	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE
COMMON	02-06	-031-	3-AHU-031-0107	3-AHU-031-0107	TURN OFF AHU	0060	NONE

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	01-01	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	01-02	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	01-03	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	01-04	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	01-05	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	01-06	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	02-01	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	02-02	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	02-03	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	02-04	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	02-05	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	02-06	-031-	3-AHU-031-0108	3-AHU-031-0108	START AHU	0060	0008, 0019
COMMON	03-01	-031-	3-AHU-031-0108	3-AHU-031-0108	TURN OFF AHU	0060	NONE
COMMON	03-02	-031-	3-AHU-031-0108	3-AHU-031-0108	TURN OFF AHU	0060	NONE
COMMON	03-03	-031-	3-AHU-031-0108	3-AHU-031-0108	TURN OFF AHU	0060	NONE
COMMON	03-04	-031-	3-AHU-031-0108	3-AHU-031-0108	TURN OFF AHU	0060	NONE
COMMON	AREA 25-I	-031-	3-AHU-031-0108	3-AHU-031-0108	TURN OFF AHU	0060	NONE
COMMON	AREA 25-II	-031-	3-AHU-031-0108	3-AHU-031-0108	TURN OFF AHU	0060	NONE
COMMON	01-03	-211-	3-BDAA-211-0003EA	3-BDAA-211-0003EA	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0002	0010	NONE
COMMON	01-04	-211-	3-BDAA-211-0003EA	3-BDAA-211-0003EA	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0002	0010	NONE
COMMON	03-01	-211-	3-BDAA-211-0003EA (BKR 1334)	3-BDAA-211-0003EA	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	03-02	-211-	3-BDAA-211-0003EA (BKR 1334)	3-BDAA-211-0003EA	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	AREA 25-I	-211-	3-BDAA-211-0003EA (BKR 1334)	3-BDAA-211-0003EA	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	AREA 25-II	-211-	3-BDAA-211-0003EA (BKR 1334)	3-BDAA-211-0003EA	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-01	-211-	3-BDAA-211-0003EA (BKR 1726)	3-BDAA-211-0003EA	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	03-02	-211-	3-BDAA-211-0003EA (BKR 1726)	3-BDAA-211-0003EA	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	03-01	-211-	3-BDAA-211-0003EA (BKR 1838)	3-BDAA-211-0003EA	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	03-02	-211-	3-BDAA-211-0003EA (BKR 1838)	3-BDAA-211-0003EA	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	03-01	-211-	3-BDAA-211-0003EA (BKR 1844)	3-BDAA-211-0003EA	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-02	-211-	3-BDAA-211-0003EA (BKR 1844)	3-BDAA-211-0003EA	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-01	-211-	3-GEN-082-0003A	3-BDAA-211-0003EA	ISOLATE AND TRIP BKR 0005, BKR 0006, AND BKR 0012 FROM 3-BDAA-211-0003EA	0010	0084
COMMON	03-02	-211-	3-GEN-082-0003A	3-BDAA-211-0003EA	ISOLATE AND TRIP BKR 0005, BKR 0006, BKR 0011, AND BKR 0012 FROM 3-BDAA-211-0003EA	0010	0084
COMMON	03-01	-082-	3-GEN-082-0003A	3-BDAA-211-0003EA	ISOLATE DIESEL TO MITIGATE FAILURE	0020	0006
COMMON	03-02	-082-	3-GEN-082-0003A	3-BDAA-211-0003EA	ISOLATE DIESEL TO MITIGATE FAILURE	0020	0006
COMMON	AREA 25-II	-211-	3-GEN-082-0003A	3-BDAA-211-0003EA	ISOLATE AND TRIP BKR 0005 FROM 3-BDAA-211-0003EA	0020	0084

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	AREA 25-I	-023- (EECW)	0-PMP-023-0085 [A3]	3-BDAA-211-0003EA (BKR 0005)	ISOLATE PUMP TO MITIGATE FAILURE	0010	0028, 0043
COMMON	03-02	-211-	3-BDAA-211-0003EB (BKR 1336)	3-BDAA-211-0003EB	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-03	-211-	3-BDAA-211-0003EB (BKR 1336)	3-BDAA-211-0003EB	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	AREA 25-I	-211-	3-BDAA-211-0003EB (BKR 1336)	3-BDAA-211-0003EB	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-02	-211-	3-BDAA-211-0003EB (BKR 1728)	3-BDAA-211-0003EB	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	03-03	-211-	3-BDAA-211-0003EB (BKR 1728)	3-BDAA-211-0003EB	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	03-02	-211-	3-BDAA-211-0003EB (BKR 1842)	3-BDAA-211-0003EB	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	03-03	-211-	3-BDAA-211-0003EB (BKR 1842)	3-BDAA-211-0003EB	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	03-02	-211-	3-BDAA-211-0003EB (BKR 1848)	3-BDAA-211-0003EB	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	03-03	-211-	3-BDAA-211-0003EB (BKR 1848)	3-BDAA-211-0003EB	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	03-03	-211-	3-GEN-082-0003B	3-BDAA-211-0003EB	ISOLATE AND TRIP BKR 0004, BKR 0005, AND BKR 0010 FROM 3-BDAA-211-0003EB	0010	0084
COMMON	03-02	-082-	3-GEN-082-0003B	3-BDAA-211-0003EB	ISOLATE DIESEL TO MITIGATE FAILURE	0020	0006
COMMON	03-03	-082-	3-GEN-082-0003B	3-BDAA-211-0003EB	ISOLATE DIESEL TO MITIGATE FAILURE	0020	0006
COMMON	03-02	-211-	3-GEN-082-0003B	3-BDAA-211-0003EB	ISOLATE AND TRIP BKR 0004, BKR 0005, AND BKR 0010 FROM 3-BDAA-211-0003EB	0020	0084

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
UNIT 3	03-02	-074-	3-PMP-074-0016 [3C]	3-BDAA-211-0003EB (BKR 0004)	ISOLATE PUMP TO MITIGATE FAILURE	0020	0043, 0078
COMMON	03-03	-211-	3-BDAA-211-0003EB	3-BDAA-211-0003EB (BKR 0009)	VERIFY BREAKER CLOSED OR CLOSE BREAKER	0020	0084
COMMON	AREA 25-I	-023- (EEC W)	0-PMP-023-0091 [C3]	3-BDAA-211-0003EB (BKR 0010)	ISOLATE PUMP TO MITIGATE FAILURE	0010	0028, 0043
COMMON	03-03	-211-	3-BDAA-211-0003EC (BKR 1338)	3-BDAA-211-0003EC	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	AREA 25-I	-211-	3-BDAA-211-0003EC (BKR 1338)	3-BDAA-211-0003EC	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	AREA 25-II	-211-	3-BDAA-211-0003EC (BKR 1338)	3-BDAA-211-0003EC	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-03	-211-	3-BDAA-211-0003EC (BKR 1626)	3-BDAA-211-0003EC	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	03-01	-211-	3-BDAA-211-0003EC (BKR 1832)	3-BDAA-211-0003EC	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	03-03	-211-	3-BDAA-211-0003EC (BKR 1832)	3-BDAA-211-0003EC	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	03-03	-211-	3-BDAA-211-0003EC (BKR 1834)	3-BDAA-211-0003EC	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	03-03	-082-	3-GEN-082-0003C	3-BDAA-211-0003EC	ISOLATE DIESEL TO MITIGATE FAILURE	0020	0006
COMMON	03-03	-211-	3-GEN-082-0003C	3-BDAA-211-0003EC	ISOLATE AND TRIP BKR 0002, BKR 0008, BKR 0009, AND BKR 0013 FROM 3-BDAA-211-0003EC	0020	0084
COMMON	AREA 25-I	-211-	3-GEN-082-0003C	3-BDAA-211-0003EC	ISOLATE AND TRIP BKR 0008 AND BKR 0009 FROM 3-BDAA-211-0003EC	0020	0084
COMMON	AREA 25-II	-211-	3-GEN-082-0003C	3-BDAA-211-0003EC	ISOLATE AND TRIP BKR 0008 AND BKR 0009 FROM 3-BDAA-211-0003EC	0020	0084
UNIT 3	03-03	-074-	3-PMP-074-0028 [3B]	3-BDAA-211-0003EC (BKR 0002)	ISOLATE PUMP TO MITIGATE FAILURE	0020	0043, 0078

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
UNIT 3	AREA 25-II	-023- (RHR SW)	0-PMP-023-0015 [B1]	3-BDAA-211-0003EC (BKR 0008)	OPEN BKR TO SECURE PUMP	0030	0005
COMMON	02-03	-211-	3-BDAA-211-0003ED	3-BDAA-211-0003ED	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0003	0020	NONE
COMMON	02-04	-211-	3-BDAA-211-0003ED	3-BDAA-211-0003ED	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0003	0020	NONE
COMMON	03-01	-211-	3-BDAA-211-0003ED	3-BDAA-211-0003ED	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0003	0020	NONE
COMMON	03-01	-211-	3-BDAA-211-0003ED (BKR 1342)	3-BDAA-211-0003ED	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	AREA 25-I	-211-	3-BDAA-211-0003ED (BKR 1342)	3-BDAA-211-0003ED	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	AREA 25-II	-211-	3-BDAA-211-0003ED (BKR 1342)	3-BDAA-211-0003ED	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0007, 0042, 0043
COMMON	03-01	-211-	3-BDAA-211-0003ED (BKR 1628)	3-BDAA-211-0003ED	ISOLATE BKR TO MITIGATE CLOSURE	0020	0006, 0042, 0043
COMMON	03-01	-211-	3-BDAA-211-0003ED (BKR 1836)	3-BDAA-211-0003ED	ISOLATE BKR TO MITIGATE TRIP	0020	0006, 0007, 0042, 0043
COMMON	01-01	-211-	3-GEN-082-0003D	3-BDAA-211-0003ED	TRIP BKR 0007 FROM 3-BDAA-211-0003ED	0020	0084
COMMON	01-02	-211-	3-GEN-082-0003D	3-BDAA-211-0003ED	TRIP BKR 0007 FROM 3-BDAA-211-0003ED	0020	0084
COMMON	01-03	-211-	3-GEN-082-0003D	3-BDAA-211-0003ED	TRIP BKR 0007 FROM 3-BDAA-211-0003ED	0020	0084
COMMON	01-04	-211-	3-GEN-082-0003D	3-BDAA-211-0003ED	TRIP BKR 0007 FROM 3-BDAA-211-0003ED	0020	0084
COMMON	02-01	-211-	3-GEN-082-0003D	3-BDAA-211-0003ED	TRIP BKR 0007 FROM 3-BDAA-211-0003ED	0020	0084
COMMON	AREA 25-I	-211-	3-GEN-082-0003D	3-BDAA-211-0003ED	ISOLATE AND TRIP BKR 0006 FROM 3-BDAA-211-0003ED	0020	0084
COMMON	AREA 25-II	-211-	3-GEN-082-0003D	3-BDAA-211-0003ED	ISOLATE AND TRIP BKR 0006 FROM 3-BDAA-211-0003ED	0020	0084
COMMON	03-03	-219-	3-BDBB-219-0003EA	3-BDBB-219-0003EA	ALIGN TO THE ALTERNATE POWER SUPPLY 3-BDBB-231-0003B	0020	0001

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	03-03	-231-	3-BDBB-231-0003A	3-BDBB-231-0003A	ALIGN TO THE ALTERNATE POWER SUPPLY 3-BDAA-211-0003EB	0020	0055, 0076
COMMON	03-04	-231-	3-BDBB-231-0003A	3-BDBB-231-0003A	ALIGN TO THE ALTERNATE POWER SUPPLY 3-BDAA-211-0003EB	0020	0055, 0076
COMMON	03-03	-231-	3-BDBB-231-0003A	3-BDBB-231-0003A	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0020	0084
COMMON	03-04	-231-	3-BDBB-231-0003A	3-BDBB-231-0003A	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0020	0084
COMMON	01-03	-231-	3-BDBB-231-0003A	3-BDBB-231-0003A	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0002	0020	NONE
COMMON	01-04	-231-	3-BDBB-231-0003A	3-BDBB-231-0003A	ALIGN TO THE ALTERNATE DC CONTROL POWER SUPPLY 0-BDDD-280-0002	0020	NONE
COMMON	03-03	-231-	3-BDBB-231-0003A	3-BDBB-231-0003A	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0076
COMMON	03-04	-231-	3-BDBB-231-0003A	3-BDBB-231-0003A	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0076
COMMON	03-03	-231-	3-BDBB-231-0003A	3-BDBB-231-0003A	ISOLATE, TRANSFER CONTROL, AND LOCALLY OPERATE BKR 1C OPEN AND 8C CLOSED	0060	NONE
COMMON	03-02	-231-	3-BDBB-268-0003A	3-BDBB-231-0003A (BKR 03A)	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003A	0060	0077
COMMON	03-03	-231-	3-BDBB-268-0003A	3-BDBB-231-0003A (BKR 03A)	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003A	0060	0077
COMMON	03-04	-231-	3-BDBB-268-0003A	3-BDBB-231-0003A (BKR 03A)	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003A	0060	0077
COMMON	03-03	-231-	3-BDBB-231-0003B	3-BDBB-231-0003B	ALIGN TO THE ALTERNATE POWER SUPPLY 3-BDAA-211-0003EB	0020	0055
COMMON	03-04	-231-	3-BDBB-231-0003B	3-BDBB-231-0003B	ALIGN TO THE ALTERNATE POWER SUPPLY 3-BDAA-211-0003EB	0020	0055, 0076
COMMON	03-03	-231-	3-BDBB-231-0003B	3-BDBB-231-0003B	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0020	0076, 0084
COMMON	03-04	-231-	3-BDBB-231-0003B	3-BDBB-231-0003B	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0020	0084
COMMON	03-03	-231-	3-BDBB-231-0003B	3-BDBB-231-0003B	ISOLATE, TRANSFER CONTROL, AND LOCALLY OPERATE BKR 1C OPEN AND 8C CLOSED	0020	NONE
COMMON	03-04	-231-	3-BDBB-231-0003B	3-BDBB-231-0003B	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0055, 0076
COMMON	02-02	-231-	3-BDBB-231-0003B	3-BDBB-231-0003B	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0060	0084

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	03-01	-231-	3-BDBB-268-0003B	3-BDBB-231-0003B (BKR 03B)	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003B	0060	0077
COMMON	03-03	-231-	3-BDBB-268-0003B	3-BDBB-231-0003B (BKR 03B)	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003B	0060	0077
COMMON	03-04	-231-	3-BDBB-268-0003B	3-BDBB-231-0003B (BKR 03B)	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003B	0060	0077
COMMON	02-02	-231-	0-BDBB-266-OHVB	3-BDBB-231-0003B (BKR 07D)	CLOSE ALTERNATE FEEDER BKR TO 0-BDBB-266-0HVB	0060	NONE
COMMON	03-03	-268-	3-BDBB-268-0003A	3-BDBB-268-0003A	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0020	0084
COMMON	03-04	-268-	3-BDBB-268-0003A	3-BDBB-268-0003A	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0020	0084
COMMON	03-02	-268-	3-BDBB-268-0003A	3-BDBB-268-0003A	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	03-02	-268-	3-BDBB-268-0003A	3-BDBB-268-0003A	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003A	0060	0077
COMMON	03-03	-268-	3-BDBB-268-0003A	3-BDBB-268-0003A	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	03-03	-268-	3-BDBB-268-0003A	3-BDBB-268-0003A	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003A	0060	0077
COMMON	03-04	-268-	3-BDBB-268-0003A	3-BDBB-268-0003A	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	03-04	-268-	3-BDBB-268-0003A	3-BDBB-268-0003A	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003A	0060	0077
COMMON	03-03	-268-	3-BDBB-268-0003B	3-BDBB-268-0003B	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0020	0084
COMMON	03-04	-268-	3-BDBB-268-0003B	3-BDBB-268-0003B	MANUALLY SHED NON-APP. R AND NON-CREDITED APP. R LOADS TO PREVENT DIESEL AND/OR 4KV/480V TRANSFORMER OVERLOAD	0020	0084
COMMON	03-01	-268-	3-BDBB-268-0003B	3-BDBB-268-0003B	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	03-01	-268-	3-BDBB-268-0003B	3-BDBB-268-0003B	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003B	0060	0077
COMMON	03-03	-268-	3-BDBB-268-0003B	3-BDBB-268-0003B	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077
COMMON	03-03	-268-	3-BDBB-268-0003B	3-BDBB-268-0003B	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003B	0060	0077
COMMON	03-04	-268-	3-BDBB-268-0003B	3-BDBB-268-0003B	REMOVE NON REQUIRED LOADS TO ASSURE AVAILABILITY OF BD	0060	0077

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	03-04	-268-	3-BDBB-268-0003B	3-BDBB-268-0003B	CLOSE NORMAL FEEDER BKR FROM 3-BDBB-231-0003B	0060	0077
UNIT 3	03-02	-074-	3-FCV-074-0053	3-BDBB-268-0003D	ISOLATE VALVE TO MITIGATE FAILURE BY USE OF THE APPENDIX R EMERGENCY SWITCH	0025	0003, 0011, 0043
UNIT 3	03-01	-074-	3-FCV-074-0067	3-BDBB-268-0003E	ISOLATE VALVE TO MITIGATE FAILURE BY USE OF THE APPENDIX R EMERGENCY SWITCH	0025	0003, 0011, 0043
UNIT 3	03-03	-074-	3-FCV-074-0067	3-BDBB-268-0003E	ISOLATE VALVE TO MITIGATE FAILURE BY USE OF THE APPENDIX R EMERGENCY SWITCH	0025	0003, 0011, 0043
COMMON	03-02	-281-	0-BDDD-280-0002	3-BDDD-281-0003A	TRIP HPCI LOADS ON 3-BDDD-281-0003A PRIOR TO TRANSFERRING TO THE ALTERNATE POWER SUPPLY	0020	0070
UNIT 3	03-02	-281-	3-BDDD-281-0003A	3-BDDD-281-0003A	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0002	0020	NONE
UNIT 3	03-01	-281-	3-BDDD-281-0003A (BKR 01B1)	3-BDDD-281-0003A	OPEN BKR TO DC CONTROL POWER FOR 4160V RPT BD 3-II	0020	0017
UNIT 3	03-02	-281-	3-BDDD-281-0003A (BKR 01B1)	3-BDDD-281-0003A	OPEN BKR TO DC CONTROL POWER FOR 4160V RPT BD 3-II	0020	0017
UNIT 3	03-03	-281-	3-BDDD-281-0003A (BKR 01B1)	3-BDDD-281-0003A	OPEN BKR TO DC CONTROL POWER FOR 4160V RPT BD 3-II	0020	0017
UNIT 3	01-03	-281-	3-BDDD-281-0003B	3-BDDD-281-0003B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0003	0020	NONE
UNIT 3	01-04	-281-	3-BDDD-281-0003B	3-BDDD-281-0003B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0003	0020	NONE
UNIT 3	01-05	-281-	3-BDDD-281-0003B	3-BDDD-281-0003B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0003	0020	NONE
UNIT 3	02-05	-281-	3-BDDD-281-0003B	3-BDDD-281-0003B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0003	0020	NONE
UNIT 3	03-03	-281-	3-BDDD-281-0003B	3-BDDD-281-0003B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0003	0020	NONE
UNIT 3	03-04	-281-	3-BDDD-281-0003B	3-BDDD-281-0003B	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0003	0020	NONE
UNIT 3	02-02	-281-	3-BDDD-281-0003C	3-BDDD-281-0003C	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0003	0020	NONE
UNIT 3	02-03	-281-	3-BDDD-281-0003C	3-BDDD-281-0003C	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0003	0020	NONE
UNIT 3	02-04	-281-	3-BDDD-281-0003C	3-BDDD-281-0003C	ALIGN TO THE ALTERNATE POWER SUPPLY 0-BDDD-280-0003	0020	NONE
COMMON	03-01	-031-	3-CHR-031-1943	3-CHR-031-1943	START CHILLER	0060	0008
COMMON	03-02	-031-	3-CHR-031-1943	3-CHR-031-1943	START CHILLER	0060	0008

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	03-03	-031-	3-CHR-031-1943	3-CHR-031-1943	START CHILLER	0060	0008
COMMON	03-04	-031-	3-CHR-031-1943	3-CHR-031-1943	START CHILLER	0060	0008
COMMON	AREA 25-I	-031-	3-CHR-031-1943	3-CHR-031-1943	START CHILLER	0060	0008
COMMON	AREA 25-II	-031-	3-CHR-031-1943	3-CHR-031-1943	START CHILLER	0060	0008
COMMON	01-01	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	01-02	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	01-03	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	01-04	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	01-05	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	01-06	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	02-01	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	02-02	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	02-03	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	02-04	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	02-05	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	02-06	-031-	3-CHR-031-1951	3-CHR-031-1951	START CHILLER	0060	NONE
COMMON	01-01	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-02	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-03	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-04	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-05	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-06	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	02-01	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	02-02	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	02-03	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	02-04	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-05	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	02-06	-067-	3-SHV-067-0769	3-SHV-067-0769	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	03-01	-067-	3-SHV-067-0769	3-SHV-067-0769	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	03-02	-067-	3-SHV-067-0769	3-SHV-067-0769	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	03-03	-067-	3-SHV-067-0769	3-SHV-067-0769	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	03-04	-067-	3-SHV-067-0769	3-SHV-067-0769	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-01	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-02	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-03	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-04	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-05	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	01-06	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	02-01	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	02-02	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	02-03	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	02-04	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	02-05	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	02-06	-067-	3-SHV-067-0779	3-SHV-067-0779	OPEN VALVE TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	03-01	-067-	3-SHV-067-0779	3-SHV-067-0779	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	03-02	-067-	3-SHV-067-0779	3-SHV-067-0779	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
COMMON	03-03	-067-	3-SHV-067-0779	3-SHV-067-0779	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	03-04	-067-	3-SHV-067-0779	3-SHV-067-0779	CLOSE VALVE MANUALLY TO ASSURE COOLING WATER TO CHILLER	0060	0020
UNIT 3	03-03	-069-	3-FCV-069-0094	3-VTV-032-5103	OPEN VENT VALVE MANUALLY TO CLOSE FCV-069-0094	0030	0034
UNIT 3	03-01	-068-	3-PMP-068-0060A	4160V RPT BD 3-II	STOP PUMP USING MECHANICAL TRIP	0020	0017
UNIT 3	03-02	-068-	3-PMP-068-0060A	4160V RPT BD 3-II	STOP PUMP USING MECHANICAL TRIP	0020	0017
UNIT 3	03-03	-068-	3-PMP-068-0060A	4160V RPT BD 3-II	STOP PUMP USING MECHANICAL TRIP	0020	0017
UNIT 3	03-01	-068-	3-PMP-068-0060B	4160V RPT BD 3-II	STOP PUMP USING MECHANICAL TRIP	0020	0017
UNIT 3	03-02	-068-	3-PMP-068-0060B	4160V RPT BD 3-II	STOP PUMP USING MECHANICAL TRIP	0020	0017
UNIT 3	03-03	-068-	3-PMP-068-0060B	4160V RPT BD 3-II	STOP PUMP USING MECHANICAL TRIP	0020	0017
UNIT 2	02-01	-068-	2-PMP-068-0060A	RPT-2-II (BKR 1452)	MANUALLY TRIP BKR	0020	0017
UNIT 2	02-02	-068-	2-PMP-068-0060A	RPT-2-II (BKR 1452)	MANUALLY TRIP BKR	0020	0017
UNIT 2	02-03	-068-	2-PMP-068-0060A	RPT-2-II (BKR 1452)	MANUALLY TRIP BKR	0020	0017
UNIT 2	02-04	-068-	2-PMP-068-0060A	RPT-2-II (BKR 1452)	MANUALLY TRIP BKR	0020	0017
UNIT 2	02-06	-068-	2-PMP-068-0060A	RPT-2-II (BKR 1452)	MANUALLY TRIP BKR	0020	0017
UNIT 2	02-01	-068-	2-PMP-068-0060B	RPT-2-II (BKR 1552)	MANUALLY TRIP BKR	0020	0017
UNIT 2	02-02	-068-	2-PMP-068-0060B	RPT-2-II (BKR 1552)	MANUALLY TRIP BKR	0020	0017
UNIT 2	02-03	-068-	2-PMP-068-0060B	RPT-2-II (BKR 1552)	MANUALLY TRIP BKR	0020	0017
UNIT 2	02-04	-068-	2-PMP-068-0060B	RPT-2-II (BKR 1552)	MANUALLY TRIP BKR	0020	0017
UNIT 2	02-06	-068-	2-PMP-068-0060B	RPT-2-II (BKR 1552)	MANUALLY TRIP BKR	0020	0017
COMMON	01-01	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	01-02	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	01-03	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	01-04	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	01-05	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	01-06	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	02-01	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	02-02	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	02-03	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	02-04	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	02-05	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	02-06	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	03-01	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	03-02	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	03-03	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	03-04	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	AREA 25-I	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	AREA 25-II	-031-	0-PMP-031-0141A	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	01-01	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	01-02	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	01-03	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	01-04	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	01-05	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	01-06	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	02-01	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	02-02	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	02-03	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	02-04	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	02-05	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	02-06	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024

UNIT	AREA	SYS.	COMPONENT REQUIRING MANUAL ACTION	LOCATION OF ACTION	MANUAL OPERATOR ACTION REQUIRED	REQD. TIME (min.)	NOTES *
COMMON	03-01	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	03-02	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	03-03	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	03-04	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	AREA 25-I	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024
COMMON	AREA 25-II	-031-	0-PMP-031-0141B	U1 MECH EQUIP RM	TRIP PUMP USING THE HAND SWITCH LOCATED ON THE WEST (R1) WALL	0060	0024

*See Calculation ED-Q0999-2003-0048 Appendix B for Notes.

Attachment 2

Verification and Validation of Appendix R Manual Actions

178 070327 002

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-1-1

Verification & Validation Team Members: (Name/Organization)
Steve J.Stinchcomb, Stephen. D. Montgomery , Ashley Fann, Ron Stowe - Operations
Trey Reddick - System Engineering
Brett C. Williams - Fire Operations

Criteria:
Diagnostic Instrumentation:
(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58B, Reactor Level; 1-PI-3-74B, Reactor Pressure; 1-TI-64-162, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-PI-64-67B, Drywell Pressure; 2-TI-64-52AB, Drywell Temp; 2-TI-64-162, Suppression Pool Bulk Temp; 2-LI-64-66, Suppression Pool Water Level; 2-LI-2-161A, Condensate Storage Tank Level.

Unit 3 credited instrumentation: 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-TI-64-52AB, Drywell Temp; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165A, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 1 reactor building with smoke ejected to refuel floor thru Unit 1 stairwell. Additionally temperature, humidity, smoke and toxic gas do not present a problem with the manual actions in this fire area since the operators do not enter into this area à any adjacent area, including stairwell to refuel floor, until the120 minute time frame for valve alignment verification performance at which time the operator can access Unit 1 El. 565 from Unit 2 reactor building. For entry into or adjacent to the fire area at times of 60 minutes or greater, the operator is directed to check with the Fire Captain/Incident Commander to determine if SCBA is still required prior to entry. The 60 minute time is generally justified on a case by case basis. Our assumptions are based on the Fire Ops response time, the combustible loading of the area, the potential fire severity (45 minutes for FA 1-1) fire detection and fire suppression. The general assumption is based on fixed fire sources in the reactor building or electrical boards. The fire is postulated to start in one vertical section of an electrical cabinet. Based on fire tests, it takes approximately 15 minutes for the fire to spread from one section to an adjacent section. Due to area wide detection, the fire is detected within 5 minutes and the fire brigade response time is between 10 & 15 minutes. Therefore, the fire can be extinguished and the area will be accessible at the 120 minute time frame.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)

The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available.
No PPE other than normal PPE is required for fire area 1-1 since no actions less than 2 hours require entry into or adjacent to the Unit 1 reactor building

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	1.0	20	7:55
	2.0	90	14:26
	3.0	180	23:49
2	1.0	20	9:26
	2.0	120	11:45
	3.0	60/120	51:43
	4.0	90	59:44
3	1.0	10 20	1:35 4:25
	2.0	25	7:18
	3.0	90	12:30
	4.0	120	22:55
4	1.0	20/120	14:40
	2.0	60	29:22
5	1.0	20	4:44
	2.0	60	17:58
	3.0	120	27:54
	4.0	180	31:56
	5.0	180	39:37
6	1.0	20/60	4:27
	2.0	120	20:46
	3.0	90	34:02
	4.0	90	38:32
7	1.0	20	3:50
		600/720	18:50
8	N/A		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: [signature]

Approved: [signature]

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-1-2
Verification & Validation Team Members: (Name/Organization)
Steve J.Stinchcomb , Wesley R. Clark , Ron Stowe - Operations
Trey Reddick - System Engineering
Brett C. Williams - Fire Operations

Criteria:
Diagnostic Instrumentation:
(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-159A, Suppression Pool Water Level

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-PI-64-67B, Drywell Pressure; 2-TI-64-52AB, Drywell Temp; 2-TI-64-162, Suppression Pool Bulk Temp; 2-LI-64-66, Suppression Pool Water Level; 2-LI-2-161A, Condensate Storage Tank Level.

Unit 3 credited instrumentation: 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-TI-64-52AB, Drywell Temp; 3-PI-64-160A, Drywell Pressure; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165A, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 1 reactor building with smoke ejected to refuel floor thru Unit 1 stairwell. An action to align 250v RMOV Board 1C in FA 1-1 at 20 minutes requires the operator to access Unit 1 El. 565 from Unit 2 reactor building with SCBA. Additional temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into this area until the120 minute time frame for valve alignment verification performance at which time the operator can access Unit 1 El. 565 from Unit 2 reactor building. For entry into or adjacent to the fire area at times of less than 60 minutes SCBA is directed to be worn and the Fire Captain/Incident Commander is contacted prior to entry. For entry into or adjacent to the fire area at times of 60 minutes or greater, the operator is directed to check with the Fire Captain/Incident Commander to determine if SCBA is still required prior to entry. The 60 minute time is generally justified on a case by case basis. Our assumptions are based on the Fire Ops response time, the combustible loading of the area, the potential fire severity (45 minutes for FA 1-2) fire detection and fire suppression. The general assumption is based on fixed fire sources in the reactor building or electrical boards. The fire is postulated to start in one vertical section of an electrical cabinet. Based on fire tests, it takes approximately 15 minutes for the fire to spread from one section to an adjacent section. Due to area wide detection, the fire is detected within 5 minutes and the fire brigade response time is between 10 & 15 minutes. Therefore, the fire can be extinguished and the area will be accessible at the 120 minute time frame.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available.
SCBA is required for fire area 1-2 since entry is required to adjacent FA 1-1 for an action at 20 minutes for electrical board alignment.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number		
1	1.0	20	8:25
	2.0	60/90/120	28:35
	3.0	90	36:30
2	1.0	20	6:35
	2.0	120	25:25
	3.0	120	49:30
3	1.0	20	4:20
	2.0	25	5:24
	3.0	90	11:21
4	1.0	20/120	15:17
	2.0	60	25:23
5	1.0	20 120	4:44 21:34
	2.0	60 180	29:12 34:46
6	1.0	20/600/180	10
7	1.0	600/720	12
8	N/A		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: [signature]
Approved: [signature]

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-1-3

Verification & Validation Team Members: (Name/Organization)

Wesley R. Clark - Operations

Trey Reddick - System Engineering

Theron C. Dawson - Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-54A, Suppression Pool Water Level

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-PI-64-67B, Drywell Pressure; 2-TI-64-52AB, Drywell Temp; 2-TI-64-162, Suppression Pool Bulk Temp; 2-LI-64-66, Suppression Pool Water Level; 2-LI-2-161A, Condensate Storage Tank Level.

Unit 3 credited instrumentation: 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-TI-64-52AB, Drywell Temp; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165A, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 1 reactor building with smoke ejected to refuel floor thru Unit 1 stairwell. An action to align a RWCU valve in FA 1-5 (elevation above the fire area) at 30 minutes requires the operator to access Unit 1 El. 621 from Electric Board Room 1A with SCBA. Additional temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the adjacent areas, below the fire, until the120 minute time frame for valve alignment verification performance at which time the operator can access Unit 1 El. 565 from Unit 2 reactor building. For entry into or adjacent to the fire area at times of less than 60 minutes SCBA is directed to be worn and the Fire Captain/Incident Commander is contacted prior to entry.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)

The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available. AUO keys can be used to open tamper resistant cover of local control switch for Unit 2 LPCI injection valve at RMOV board.
SCBA is required for fire area 1-3 since entry is required to adjacent FA 1-5 for an action at 30 minutes for a valve alignment.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	**1.0**	**20**	**5:15**
	2.0	**60**	**11**
	3.0	**90**	**18**
2	**1.0**	**20** **60**	**7:00** **8**
	2.0	**60** **120**	**26**
	3.0	**120**	**43**
3	**1.0**	**20**	**16**
	2.0	**25**	**17**
	3.0	**No Time Limit Required**	**Steps Performed As Necessary (15)**
	4.0	**120**	**34**
4	**1.0**	**10** **20** **25**	**4:30** **7** **14:15**
	2.0	**60**	**21:45**
	3.0	**120**	**28:45**
	4.0	**120**	**33:45**
5	**1.0**	**10** **20** **120**	**2** **6:30** **9:30**
	2.0	**60**	**19:30**
	3.0	**120**	**27:30**
	4.0	**120**	**32:30**
	5.0	**180**	**40:30**
6	**1.0**	**20**	**8**
	2.0	**120**	**11**
	3.0	**90**	**14**
	4.0	**180**	**21**
7	**1.0**	**540/600/720**	**13**
8	**N/A**		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: T. O. McCamy

Approved: Ronald H Stafford

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-1-4

Verification & Validation Team Members: (Name/Organization)

Steve J.Stinchcomb - Operations

Trey Reddick - System Engineering

Theron C. Dawson - Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58B, Reactor Level; 1-PI-3-74B, Reactor Pressure; 1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-PI-64-67B, Drywell Pressure; 2-TI-64-52AB, Drywell Temp; 2-TI-64-162, Suppression Pool Bulk Temp; 2-LI-64-66, Suppression Pool Water Level; 2-LI-2-161A, Condensate Storage Tank Level.

Unit 3 credited instrumentation: 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-TI-64-52AB, Drywell Temp; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165A, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 1 reactor building with smoke ejected to refuel floor thru Unit 1 stairwell. Temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent areas, below the fire, until the120 minute time frame for valve alignment verification performance at which time the operator can access Unit 1 El. 565 from Unit 2 reactor building.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)

The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available. AUO keys can be used to open tamper resistant cover of local control switch for Unit 2 LPCI injection valve at RMOV board.
No special PPE is required for fire area 1-4 since no entry is required to adjacent areas FA 1-1 & 1-2 (below the fire area) for actions until the 120 minute time frame for valve alignment verifications.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	1.0	20	1:45
	2.0	60	8:00
	3.0	90	20:10
	4.0	120	31:22
2	1.0	20	4:21
	2.0	60/120/600	22:55
	3.0	120	29:09
	4.0	120	31:44
3	1.0	20	9:15
	2.0	25	10:22
	3.0	25	12:16
	4.0	60	15:52
	5.0	120	19:16
	6.0	120	23:37
4	1.0	20	9
	2.0	No time limit	n/a
5	1.0	10 20 600	3:12 5:22 6:22
	2.0	120	13:43
	3.0	180	17:50
6	1.0	20	4:16
	2.0	60	12:20
	3.0	120 180	13:57 23:20
7	1.0	600 720	7:35 20:15
8	N/A		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: [signature]
Approved: [signature]

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-1-5

Verification & Validation Team Members: (Name/Organization)

Bradley s. Sager - Operations

Larry E.St. Mary - System Engineering

Terry W. Richter - Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A & B, Reactor Level; 1-PI-3-74A & B, Reactor Pressure; 1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-PI-64-67B, Drywell Pressure; 2-TI-64-52AB, Drywell Temp; 2-TI-64-162, Suppression Pool Bulk Temp; 2-LI-64-66, Suppression Pool Water Level; 2-LI-2-161A, Condensate Storage Tank Level.

Unit 3 credited instrumentation: 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-PI-64-160A, Drywell Pressure; 3-TI-64-52AB, Drywell Temp; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165A, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 1 reactor building with smoke ejected to refuel floor thru Unit 1 north stairwell. Temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent areas, including the north stairwell.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)

The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)

The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available.

No special PPE is required for fire area 1-5 since no entry is required to adjacent areas.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	1.0	20	2:45
	2.0	60/120	19:33
	3.0	120	44:23
	4.0	180	54:20
2	1.0	20	6:37
	2.0	60/180	23:08
	3.0	60/180	23:08
3	1.0	10 20	6:51 9:11
	2.0	20	13:48
	3.0	25	15:38
	4.0	No Time Required	
4	1.0	60	10
	2.0	120/600	14
	3.0	180	21:22
5	1.0	20	2:43
	2.0	120	6:27
	3.0	180	15:18
6	1.0	120	6:19
7	1.0	600/720	13:55
8	N/A		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: J. A. McCrary

Approved: Ronald W Stone

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-1-6
Verification & Validation Team Members: (Name/Organization)
SSI Walkdown Team Members
Bradley S. Sager, Operations
Larry E. St. Mary, System Engineering
Terry W. Richter, Fire Operations

Criteria:
Diagnostic Instrumentation:
(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-PI-64-160A, Drywell Pressure; 1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level; 1-LI-2-169, Condensate Storage Tank Level. **Unit 2 credited instrumentation:** 2-LI-3-58A, Reactor Level; 2-PI-3-74A, Reactor Pressure; 2-PI-64-67B, Drywell Pressure; 2-TI-64-52AB, Drywell Temp; 2-TI-64-162, Suppression Pool Bulk Temp; 2-LI-64-66, Suppression Pool Water Level; 2-LI-2-161, Condensate Storage Tank Level. **Unit 3 credited instrumentation:** 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & -74B, Reactor Pressure; 3-PI-64-160A, Drywell Pressure; 3-TI-64-52AB, Drywell Temp; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 1 reactor building with smoke ejected to refuel floor thru north Unit 1 stairwell. Additionally temperature, humidity, smoke and toxic gas do not present a problem with the manual actions in this fire area since the operators do not enter into this area or any adjacent area, including stairwell from El 639 to refuel floor, during the manual action performance.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)

The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)

The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available.

No PPE other than normal PPE is required for fire area 1-6 since no actions less than 2 hours require entry adjacent to the Unit 1 reactor building (FA 1-2 actions which are not adjacent to 1-6).

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	**1.0**	**20** **60**	**2:45** **10:12**
	2.0	**60/120**	**36:09**
2	**1.0**	**120**	**5:40**
3	**1.0**	**120**	**2:56**
	2.0	**120**	**7:01**
	3.0	**180**	**13:14**
4	**1.0**	**60**	**10**
	2.0	**120/600**	**14**
	3.0	**180**	**21:22**
5	**1.0**	**120**	**3:37**
	2.0	**180**	**12:28**
6	**N/A**		
7	**1.0**	**600/720**	**14:10**
8	**N/A**		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: [signature]

Approved: [signature]

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-2-1
Verification & Validation Team Members: (Name/Organization)
SSI Walkdown Team Members
Bradley S. Sager, Operations
Larry E. St. Mary, System Engineering
Terry D. Shelton, Fire Operations

Criteria:
Diagnostic Instrumentation:
(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-PI-64-160A, Drywell Pressure; 1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level; 1-LI-2-169, Condensate Storage Tank Level.
Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-TI-64-162, Suppression Pool Bulk Temp; 2-LI-64-66, Suppression Pool Water Level.
Unit 3 credited instrumentation: 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-PI-64-160A, Drywell Pressure; 3-TI-64-52AB, Drywell Temp; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A, 3-LI-64-159A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165A, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)
Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 2 reactor building with smoke ejected to refuel floor thru Unit 2 stairwell. An action to trip the RPT breakers in FA 2-5 (elevation above the fire area) at 20 minutes and open the LPCI injection valve at 480V RMOV Board 2D requires the operator to access Unit 2 El. 621 from Electric Board Room 2A with SCBA. Additional temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent areas, until the120 minute time frame for valve alignment verification performance at which time the operator can access Unit 2 El. 565 from Unit 1 reactor building. For entry into or adjacent to the fire area at times of 60 minutes or greater, the operator is directed to check with the Fire Captain/Incident Commander to determine if SCBA is still required prior to entry. The 60 minute time is generally justified on a case by case basis. Our assumptions are based on the Fire Ops response time, the combustible loading of the area, the potential fire severity, fire detection and fire suppression. The general assumption is based on fixed fire sources in the reactor building or electrical boards. The fire is postulated to start in one vertical section of an electrical cabinet. Based on fire tests, it takes approximately 15 minutes for the fire to spread from one section to an adjacent section. Due to area wide detection, the fire is detected within 5 minutes and the fire brigade response time is between 10 & 15 minutes. Therefore, the fire can be extinguished and the area will be accessible at the 120 minute time frame.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available. AUO keys can be used to open tamper resistant cover of local control switch for Unit 2 LPCI injection valve at RMOV board. SCBA is required for Unit 2 Reactor Building entry @ 20 minutes to trip RPT breakers and align LPCI injection valve on El. 621 (FA 2-5). SCBAs are staged for Appendix R use in Electrical Board rooms 1A, 2A & 3A.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	1.0	10 20	4:04 5:41
	2.0	60	17:17
	3.0	60/120	43;24
	4.0	120	52:39
	5.0	120	55:28
2	1.0	20	6:30
	2.0	20	7:06
	3.0	120	13:27
3	1.0	20	7:15
	2.0	20 25	8:20 15:39 (SCBA)
	3.0	120	22:07 (SCBA)
	4.0	180	27:33 (SCBA)
4	1.0	20 600	3:28 3:42
	2.0	60	15:43
	3.0	120	17:13
5	1.0	20 60	2:45 7:09
	2.0	120	11:03
6	1.0	180	4:35
	2.0	180	13:26
7	1.0	600/720	14:10
8	N/A		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: [signature]
Approved: [signature]

78 070327 009

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-2-2
Verification & Validation Team Members: (Name/Organization)
SSI Walkdown Team Members
Bradley S. Sager, Operations
Larry E. St. Mary, System Engineering
Gary W. Brock, Fire Operations

Criteria:
Diagnostic Instrumentation:
(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-PI-64-160A, Drywell Pressure; 1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level; 1-LI-2-169, Condensate Storage Tank Level.
Unit 2 credited instrumentation: 2-LI-3-58A, Reactor Level; 2-PI-3-74A, Reactor Pressure; 2-TI-64-161, Suppression Pool Bulk Temp; 2-LI-64-66 & 2-LI-64-159A, Suppression Pool Water Level.
Unit 3 credited instrumentation: 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-PI-64-160A, Drywell Pressure; 3-TI-64-52AB, Drywell Temp; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A, 3-LI-64-159A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165A, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 2 reactor building with smoke ejected to refuel floor thru Unit 2 stairwell. An action to trip the RPT breakers in FA 2-5 (elevation above the fire area) at 20 minutes and open the LPCI injection valve (25 mins) at 480V RMOV Board 2D requires the operator to access Unit 2 El. 621 from Electric Board Room 2A with SCBA. Additional temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent areas, until the120 minute time frame for valve alignment verification performance at which time the operator can access Unit 2 El. 565 from Unit 1 reactor building. For entry into or adjacent to the fire area at times of 60 minutes or greater, the operator is directed to check with the Fire Captain/Incident Commander to determine if SCBA is still required prior to entry. The 60 minute time is generally justified on a case by case basis. Our assumptions are based on the Fire Ops response time, the combustible loading of the area, the potential fire severity, fire detection and fire suppression. The general assumption is based on fixed fire sources in the reactor building or electrical boards. The fire is postulated to start in one vertical section of an electrical cabinet. Based on fire tests, it takes approximately 15 minutes for the fire to spread from one section to an adjacent section. Due to area wide detection, the fire is detected within 5 minutes and the fire brigade response time is between 10 & 15 minutes. Therefore, the fire can be extinguished and the area will be accessible at the 120 minute time frame.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available. AUO keys can be used to open tamper resistant cover of local control switch for Unit 2 LPCI injection valve at RMOV board.
SCBA is required for Unit 2 Reactor Building entry @ 20 minutes to trip RPT breakers and align LPCI injection valve on El. 621 (FA 2-5 & 2-4). SCBAs are staged for Appendix R use in Electrical Board rooms 1A, 2A & 3A.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures

and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	**1.0**	**20**	**2:45**
	2.0	**20**	**5:26**
	3.0	**60**	**10:37**
	4.0	**60**	**32:20**
2	**1.0**	**60**	**3:44**
	2.0	**60**	**8:37**
	3.0	**120**	**10:22**
3	**1.0**	**20**	**7:15**
	2.0	**25**	**15:58**
	3.0	**90**	**19**
	4.0	**120**	**37:17**
4	**1.0**	**20**	**2:32**
	2.0	**60** **600**	**12:11** **14:41**
5	**1.0**	**120**	**2:56**
	2.0	**180**	**7:31**
	3.0	**180**	**15:22**
6	**1.0**	**180**	**4:52**
7	**1.0**	**540/600/720**	**16:39**
8	**N/A**		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: [signature]
Approved: [signature]

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Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-2-3

Verification & Validation Team Members: (Name/Organization)

SSI Walkdown Team Members

Nicholas Wiginton, Operations

Larry E. St. Mary, System Engineering

Lawrence E. Fuqua, Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-PI-64-160A, Drywell Pressure; 1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level; 1-LI-2-169, Condensate Storage Tank Level.

Unit 2 credited instrumentation: 2-LI-3-58A, Reactor Level; 2-PI-3-74A, Reactor Pressure; 2-TI-64-161, Suppression Pool Bulk Temp; 2-LI-64-54A & 2-LI-64-159A, Suppression Pool Water Level.

Unit 3 credited instrumentation: 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-PI-64-160A, Drywell Pressure; 3-TI-64-52AB, Drywell Temp; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A, 3-LI-64-159A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165A, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 2 reactor building with smoke ejected to refuel floor thru Unit 2 stairwell. An action to trip the RPT breakers in FA 2-5 (elevation above the fire area) at 20 minutes and open the LPCI injection valve (25 mins) at 480V RMOV Board 2E requires the operator to access Unit 2 El. 621 from Electric Board Room 2A with SCBA. Additional temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent areas, until the120 minute time frame for valve alignment verification performance at which time the operator can access Unit 2 El. 565 from Unit 1 reactor building. For entry into or adjacent to the fire area at times of 60 minutes or greater, the operator is directed to check with the Fire Captain/Incident Commander to determine if SCBA is still required prior to entry. The 60 minute time is generally justified on a case by case basis. Our assumptions are based on the Fire Ops response time, the combustible loading of the area, the potential fire severity, fire detection and fire suppression. The general assumption is based on fixed fire sources in the reactor building or electrical boards. The fire is postulated to start in one vertical section of an electrical cabinet. Based on fire tests, it takes approximately 15 minutes for the fire to spread from one section to an adjacent section. Due to area wide detection, the fire is detected within 5 minutes and the fire brigade response time is between 10 & 15 minutes. Therefore, the fire can be extinguished and the area will be accessible at the 120 minute time frame.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available. AUO keys can be used to open tamper resistant cover of local control switch for Unit 2 LPCI injection valve at RMOV board. SCBA is required for Unit 2 Reactor Building entry @ 20 minutes to trip RPT breakers and align LPCI injection valve on El. 621 (FA 2-5). SCBAs are staged and available for Appendix R use in Electrical Board rooms 1A, 2A & 3A.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures

and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	**1.0**	**10** **20** **60**	**6:11** **9:11** **10:53**
	2.0	**60**	**21:58**
	3.0	**90**	**38:43**
	4.0	**110**	**41:42**
2	**1.0**	**10** **20**	**3:34** **11:30**
	2.0	**60**	**15**
	3.0	**90**	**21:40**
	4.0	**120**	**29:40**
3	**1.0**	**10** **20**	**3:10** **13:10**
	2.0	**25**	**15:40**
	3.0	**120**	**37:55**
4	**1.0**	**20**	**11:30**
	2.0	**90**	**15:30**
	3.0	**120**	**19:30**
5	**1.0**	**20**	**2:30**
	2.0	**60**	**14:45**
	3.0	**120**	**19:05**
	4.0	**180**	**28:35**
6	**1.0**	**20**	**4**
	2.0	**120**	**13:30**
	3.0	**120**	**NTL 3.0 + 4.0**
	4.0	**120**	**28:30**
	5.0	**180**	**35:20**
7	**1.0**	**600/720**	**12:15**
8	**N/A**		

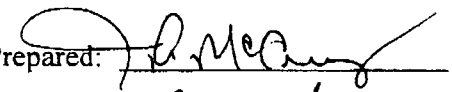
Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: 

Approved: 

070327 011

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-2-4

Verification & Validation Team Members: (Name/Organization)

SSI Walkdown Team Members

Stephen B. Sulcer, Wesley R. Clark, Ashley Fann, Ron Stowe - Operations

Larry E. St. Mary, System Engineering

Bobby J. Atkins, Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-PI-64-160A, Drywell Pressure;1 -TI-64-52AB, Drywell Temp;1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level; 1-LI-2-169, Condensate Storage Tank Level.

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-TI-64-161, Suppression Pool Bulk Temp; 2-LI-64-66, Suppression Pool Water Level.

Unit 3 credited instrumentation: 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-PI-64-160A, Drywell Pressure; 3-TI-64-52AB, Drywell Temp; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A, 3-LI-64-159A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165A, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)
Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 2 reactor building with smoke ejected to refuel floor thru Unit 2 stairwell. An action to trip the RPT breakers in FA 2-5 (elevation above the fire area) at 20 minutes, open the LPCI injection valve (25 mins) at 480V RMOV Board 2E and to isolate the RWCU 2-FCV-69-94 valve requires the operator to access Unit 2 El. 621 from Electric Board Room 2A with SCBA. Additional temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent areas, until the120 minute time frame for valve alignment verification performance at which time the operator can access Unit 2 El. 565 from Unit 1 reactor building. For entry into or adjacent to the fire area at times of 60 minutes or greater, the operator is directed to check with the Fire Captain/Incident Commander to determine if SCBA is still required prior to entry. The 60 minute time is generally justified on a case by case basis. Our assumptions are based on the Fire Ops response time, the combustible loading of the area, the potential fire severity, fire detection and fire suppression. The general assumption is based on fixed fire sources in the reactor building or electrical boards. The fire is postulated to start in one vertical section of an electrical cabinet. Based on fire tests, it takes approximately 15 minutes for the fire to spread from one section to an adjacent section. Due to area wide detection, the fire is detected within 5 minutes and the fire brigade response time is between 10 & 15 minutes. Therefore, the fire can be extinguished and the area will be accessible at the 120 minute time frame.

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available. AUO keys can be used to open tamper resistant cover of local control switch for Unit 2 LPCI injection valve at RMOV board.
SCBA is required for Unit 2 Reactor Building entry @ 20 minutes to trip RPT breakers, align LPCI injection valve and RWCU valve on El. 621 (FA 2-5). SCBAs are staged and available for Appendix R use in Electrical Board rooms 1A, 2A & 3A.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	1.0	20	12:06
	2.0	60	14:30
	3.0	60/120	30:50
	4.0	120	35:50
2	1.0	10 20 60	6 11:40 12:05
	2.0	20	12:40
	3.0	120	13:05
	4.0	180	16:50
3	1.0	20	14
	2.0	25	15:50
	3.0	30	22:15
	4.0	120	26
	5.0	120	30:35
4	1.0	10 20	4:00 13:45
	2.0	60	26:06
	3.0	60	31:15
	4.0	120	37:50
	5.0	180	53:20
5	1.0	20/600	3/5
	2.0	60	10:40
	3.0	120	12:50
	4.0	180	16:50
6	1.0	20	5:00
	2.0	120	15:00
	3.0	120	22
	4.0	180	29:15
7	1.0	20	7:30
	2.0	600/720	19:00
8	N/A		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: J. A. McCann

Approved: [signature]

178 070327 012

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-2-5

Verification & Validation Team Members: (Name/Organization)

SSI Walkdown Team Members

Bradley S. Sager, Operations

Trey Riddick, System Engineering

Thomas B. Stephens, Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-PI-64-160A, Drywell Pressure;1 -TI-64-52AB, Drywell Temp;1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level; 1-LI-2-169, Condensate Storage Tank Level.

Unit 2 credited instrumentation: 2-LI-3-58A & B, Reactor Level; 2-PI-3-74A & B, Reactor Pressure; 2-TI-64-161, Suppression Pool Bulk Temp; 2-LI-64-66, Suppression Pool Water Level.

Unit 3 credited instrumentation: 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-PI-64-160A & 3-XR-64-159, Drywell Pressure; 3-TI-64-52AB, Drywell Temp; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A, 3-LI-64-159A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165A, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 2 reactor building with smoke ejected to refuel floor thru Unit 2 north stairwell. An action to stop the VFDs in FA 2- (elevation above the fire area) at 20 minutes and access is from Unit1 Rx Bldg., and to align breakers at 480v RMOV Board 2D (adjacent FA 2-4 elevation below fire) both require SCBA. Additional temperature,humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent areas again.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)

The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available. AUO keys can be used to open tamper resistant cover of local control switch for Unit 2 LPCI injection valve at RMOV board.
SCBA is required for Unit 2 Reactor Building entry @ 20 minutes to stop VFDs (FA 2-6) and align breakers at 480V RMOV Board 2D on El. 593 (FA 2-4). SCBAs are staged and available for Appendix R use in Electrical Board rooms 1A, 2A & 3A.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	**1.0**	**20** **60**	**3:45** **4:10**
	2.0	**60**	**8**
	3.0	**60**	**31:28**
2	**1.0**	**20**	**2**
	2.0	**20**	**16**
	3.0	**60**	**25**
3	**1.0**	**20**	**16:15**
	2.0	**25**	**18:45**
	3.0	**120**	**28**
	4.0	**120**	**28**
4	**1.0**	**20**	**3**
	2.0	**60**	**12**
	3.0	**120**	**15:30**
	4.0	**180**	**20:00**
5	**1.0**	**20**	**3:30**
	2.0	**120**	**7**
	3.0	**180**	**14**
6	**1.0**	**20**	**8**
7	**1.0**	**600/720**	**14:10**
8	**N/A**		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: [signature]
Approved: [signature]

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-2-6

Verification & Validation Team Members: (Name/Organization)

SSI Walkdown Team Members

Eric Young, Operations

W. R. McNamee, System Engineering

Bobby J. Atkins, Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-PI-64-160A, Drywell Pressure;1 -TI-64-52AB, Drywell Temp;1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level; 1-LI-2-169, Condensate Storage Tank Level.

Unit 2 credited instrumentation: 2-LI-3-58A, Reactor Level; 2-PI-3-74A, Reactor Pressure; 2-TI-64-161, Suppression Pool Bulk Temp; 2-LI-64-159A, Suppression Pool Water Level.

Unit 3 credited instrumentation: 3-LI-3-58A & -58B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-PI-64-160A & 3-XR-64-159, Drywell Pressure; 3-TI-64-52AB, Drywell Temp; 3-TI-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-54A, 3-LI-64-159A & 3-LI-64-66, Suppression Pool Water Level; 3-LI-2-165A, CST Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)
Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 2 reactor building with smoke ejected to refuel floor thru Unit 2 stairwell. An action to trip the RPT breakers in FA 2- 5 (elevation below the fire area) at 20 minutes requires entry from Electrical Board Room 2A with the Operator in SCBA. Additional temperature,humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent area again.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available.
SCBA is required for Unit 2 Reactor Building entry @ 20 minutes to trip RPTs (FA 2-5). SCBAs are staged and available for Appendix R use in Electrical Board rooms 1A, 2A & 3A.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	**1.0**	**20** **60**	**3:02** **11:57**
	2.0	**60**	**25:46**
	3.0	**60**	**49:54**
	4.0	**120**	**56:04**
2	**1.0**	**20**	**6:39**
	2.0	**20**	**8:26**
	3.0	**120**	**10:03**
3	**1.0**	**20**	**9:09**
	2.0	**180**	**13:52**
4	**1.0**	**60**	**12:30**
	2.0	**120/600**	**23:15**
	3.0	**180**	**29:45**
5	**1.0**	**120**	**9:19**
	2.0	**180**	**17:10**
6	**N/A**		
7	**1.0**	**600/720**	**19:23**
8	**N/A**		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: [signature]
Approved: [signature]

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-3-1

Verification & Validation Team Members: (Name/Organization)

SSI Walkdown Team Members

C. R. Scott, Wesley R. Clark, Ron Stowe - Operations

W. R. McNamee, System Engineering

Bobby J. Atkins, Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-PI-64-160A, Drywell Pressure; 1-TI-64-52AB, Drywell Temp;1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level; 1-LI-2-169, Condensate Storage Tank Level.

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-TI-64-162, Suppression Pool Bulk Temp; 2-LI-64-67B & 2-LI-64-159A, Suppression Pool Water Level; 2-TI-64-52AB, Drywell Temperature; 2-LI-2-161, Condensate Storage Tank Level.

Unit 3 credited instrumentation: 3-LI-3-58B, Reactor Level; 3-PI-3-74B, Reactor Pressure; 3-XR-64-162, Suppression Pool Bulk Temp; 3-LI-64-66, Suppression Pool Water Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 3 reactor building with smoke ejected to refuel floor thru Unit 3 stairwell. An action to trip the RPT breakers in FA 3-4 (elevation above the fire area) at 20 minutes and open the LPCI injection valve at 480V RMOV Board 3E requires the operator to access Unit 3 El. 621 from Electric Board Room 3A with SCBA. Additional temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent areas, until the120 minute time frame for valve alignment verification (FA 3-2) performance at which time the operator can access Unit 3 El. 565 from Unit 2 reactor building. For entry into or adjacent to the fire area at times of 60 minutes or greater, the operator is directed to check with the Fire Captain/Incident Commander to determine if SCBA is still required prior to entry. The 60 minute time is generally justified on a case by case basis. Our assumptions are based on the Fire Ops response time, the combustible loading of the area, the potential fire severity, fire detection and fire suppression. The general assumption is based on fixed fire sources in the reactor building or electrical boards. The fire is postulated to start in one vertical section of an electrical cabinet. Based on fire tests, it takes approximately 15 minutes for the fire to spread from one section to an adjacent section. Due to area wide detection, the fire is detected within 5 minutes and the fire brigade response time is between 10 & 15 minutes. Therefore, the fire can be extinguished and the area will be accessible at the 120 minute time frame.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available. AUO keys can be used to open tamper resistant cover of local control switch for Unit 3 LPCI injection valve at RMOV board.
SCBA is required for Unit 3 Reactor Building entry @ 20 minutes to trip RPT breakers and align LPCI injection valve on El. 621 (FA 3-4). SCBAs are staged for Appendix R use in Electrical Board rooms 1A, 2A & 3A.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number		
1	1.0	20	9:39
	2.0	60/120	33:11
2	1.0	10	4:58
	2.0	90	10:23
	3.0	120	12:23
	4.0	180	17:44
3	1.0	120	1:29
	2.0	120	6:54
4	1.0	20	3
	2.0	120	6:32
5	1.0	20	9:15
	2.0	25	11:15
	3.0	120	17:15
	4.0	180	38:15
6	1.0	10 20 600	5:42 17:22 18:37
	2.0	60	25:37
	3.0	60	33:52
	4.0	120	35:52
7	1.0	60/720	20
8	N/A		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: J. D. McCamy

Approved: [signature]

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-3-2

Verification & Validation Team Members: (Name/Organization)

SSI Walkdown Team Members

C. R. Scott, Tim Patterson, Wesley R. Clark, Ronald W. Stowe - Operations

W. R. McNamee, Frederick W. Krenke, System Engineering

Thomas B. Stephens, Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-PI-64-160A, Drywell Pressure; 1-TI-64-52AB, Drywell Temp;1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level; 1-LI-2-169, Condensate Storage Tank Level.

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-TI-64-162, Suppression Pool Bulk Temp; 2-LI-64-159A, Suppression Pool Water Level; 2-TI-64-52AB, Drywell Temperature; 2-LI-64-67B, Drywell Pressure; 2-LI-2-161, Condensate Storage Tank Level.

Unit 3 credited instrumentation: 3-LI-3-58B, Reactor Level; 3-PI-3-74B, Reactor Pressure; 3-TR-64-161, Suppression Pool Bulk Temp; 3-LI-64-54A, Suppression Pool Water Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 3 reactor building with smoke ejected to refuel floor thru Unit 3 stairwell. An action to trip the RPT breakers in FA 3-4 (elevation above the fire area) at 20 minutes and ensure the LPCI injection valve is open using local APP R switch at 480V RMOV Board 3D (FA-3-3) requires the operator to access Unit 3 El. 621 from Electric Board Room 3A with SCBA. Additional temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent areas, until the120 minute time frame for valve alignment verification (FAs 3-1 & 3-2) performance at which time the operator can access Unit 3 El. 565 from Unit 2 reactor building. For entry into or adjacent to the fire area at times of 60 minutes or greater, the operator is directed to check with the Fire Captain/Incident Commander to determine if SCBA is still required prior to entry. The 60 minute time is generally justified on a case by case basis. Our assumptions are based on the Fire Ops response time, the combustible loading of the area, the potential fire severity (FA 3-2 34 minutes), fire detection and fire suppression. The general assumption is based on fixed fire sources in the reactor building or electrical boards. The fire is postulated to start in one vertical section of an electrical cabinet. Based on fire tests, it takes approximately 15 minutes for the fire to spread from one section to an adjacent section. Due to area wide detection, the fire is detected within 5 minutes and the fire brigade response time is between 10 & 15 minutes. Therefore, the fire can be extinguished and the area will be accessible at the 120 minute time frame.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available. AUO keys can be used to open tamper resistant cover of local control switch for Unit 3 LPCI injection valve at RMOV board.
SCBA is required for Unit 3 Reactor Building entry @ 20 minutes to trip RPT breakers and align LPCI injection valve on El. 593 (FA 3-3 & 3-4). SCBAs are staged for Appendix R use in Electrical Board rooms 1A, 2A & 3A.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	1.0	20/60/120	14:10
	2.0	60/120	34:30
	3.0	180	43:30
2	1.0	20	6:30
	2.0	60	14:00
	3.0	120	17:30
3	1.0	20 120	13:50 19:50
	2.0	90	26:30
	3.0	120	34:30
	4.0	120	40:30
	5.0	120	50:30
4	1.0	10 20	4:50 8:45
	2.0	60	15:00
	3.0	60	16:30
	4.0	120	26:30
5	1.0	20	8:30
	2.0	120	12:30
	3.0	180	21:30
6	1.0	20	11
	2.0	25	15
	3.0	120	27
7	1.0	20	8:15
	2.0	20 600/720	9:30 25
8	N/A		

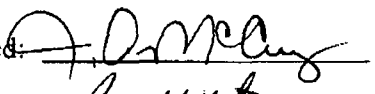
Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

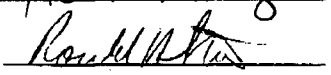
Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: 

Approved: 

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-3-3

Verification & Validation Team Members: (Name/Organization)

SSI Walkdown Team Members

Bradley S Sager - Operations

Frederick W. Krenke, System Engineering

Lawrence W. Fuqua, Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-PI-64-160A, Drywell Pressure; 1-TI-64-52AB, Drywell Temp;1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level; 1-LI-2-169, Condensate Storage Tank Level.

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-TI-64-162, Suppression Pool Bulk Temp; 2-LI-64-159A, Suppression Pool Water Level; 2-TI-64-52AB, Drywell Temperature; 2-LI-64-67B, Drywell Pressure; 2-LI-2-161A, Condensate Storage Tank Level.

Unit 3 credited instrumentation: 3-LI-3-58A&B, Reactor Level; 3-PI-3-74A&B, Reactor Pressure; 3-TR-64-161, Suppression Pool Bulk Temp; 3-LI-64-66, Suppression Pool Water Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 3 reactor building with smoke ejected to refuel floor thru Unit 3 stairwell. An action to trip the RPT breakers in FA 3-4 (elevation above the fire area) at 20 minutes, Aat 25 minutes ensure the LPCI injection valve is open using local APP R switch at 480V RMOV Board 3E, and at 30 minutes ensure RWCU FCV69-94 is closed, requires the operator to access Unit 3 El. 621 from Electric Board Room 3A with SCBA. Additional temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent areas, until the120 minute time frame for valve alignment verification (FAs 3-1, 3-2 & 3-4) performance at which time the operator can access Unit 3 El. 565 from Unit 2 reactor building. For entry into or adjacent to the fire area at times of 60 minutes or greater, the operator is directed to check with the Fire Captain/Incident Commander to determine if SCBA is still required prior to entry. The 60 minute time is generally justified on a case by case basis. Our assumptions are based on the Fire Ops response time, the combustible loading of the area, the potential fire severity (FA 3-3 38 minutes), fire detection and fire suppression. The general assumption is based on fixed fire sources in the reactor building or electrical boards. The fire is postulated to start in one vertical section of an electrical cabinet. Based on fire tests, it takes approximately 15 minutes for the fire to spread from one section to an adjacent section. Due to area wide detection, the fire is detected within 5 minutes and the fire brigade response time is between 10 & 15 minutes. Therefore, the fire can be extinguished and the area will be accessible at the 120 minute time frame.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available. AUO keys can be used to open tamper resistant cover of local control switch for Unit 3 LPCI injection valve at RMOV board.
SCBA is required for Unit 3 Reactor Building entry @ 20 minutes to trip RPT breakers and align LPCI injection valve & isolate RWCU, on El. 621 (FA 3-4). SCBAs are staged for Appendix R use in Electrical Board rooms 1A, 2A & 3A.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures

and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number		
1	1.0	20 60	11:39 12:13
	2.0	120	15:18
	3.0	60/120	31:22
	4.0	120	37:56
2	1.0	10 20 600 20	2:56 6:09 6:54 13:27
	2.0	60	24:25
	3.0	90	29:13
	4.0	180	32:02
3	1.0	20	12:42
	2.0	120	15:46
	3.0	120	20:07
	4.0	120	29:47
4	1.0	20 60	4:47 5:32
	2.0	60	10:34
	3.0	540	20:34
5	1.0	20	9:33
	2.0	60	12:33
	3.0	120	19:33
6	1.0	20	8:09
	2.0	25 30	14:32 16:06
	3.0	120	21:11
	4.0	180/540	22:41
7	1.0	720 1200	14:40 25:40
8	N/A		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: _____

Approved: _____

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-3-4

Verification & Validation Team Members: (Name/Organization)

SSI Walkdown Team Members

Bradley S Sager - Operations

Frederick W. Krenke, System Engineering

Lawrence W. Fuqua, Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58A, Reactor Level; 1-PI-3-74A, Reactor Pressure; 1-PI-64-160A, Drywell Pressure; 1-TI-64-52AB, Drywell Temp;1-TI-64-161, Suppression Pool Bulk Temp; 1-LI-64-66, Suppression Pool Water Level; 1-LI-2-169, Condensate Storage Tank Level.

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-TI-64-162, Suppression Pool Bulk Temp; 2-LI-64-159A, Suppression Pool Water Level; 2-TI-64-52AB, Drywell Temperature; 2-LI-64-67B, Drywell Pressure; 2-LI-2-161A, Condensate Storage Tank Level.

Unit 3 credited instrumentation: 3-LI-3-58A&B, Reactor Level; 3-PI-3-74A&B, Reactor Pressure; 3-TR-64-161 & -162, Suppression Pool Bulk Temp; 3-LI-64-66, Suppression Pool Water Level, 3-LI-2-165A, Condensate Storage Tank Level.

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)

Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting:** The emergency lighting calculation ND-Q0999-92-0115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/TEMP/SMOKE/FUMEs**: A fire in this zone is contained by the fire barriers and water curtains. Fire dampers isolate the HVAC ducts from other fire areas and zones within the Unit 3 reactor building with smoke ejected to refuel floor thru Unit 3 north stairwell. Additionally, temperature, humidity, smoke and toxic gases do not present a problem with the manual actions in this fire area since the operators do not enter into the fire area or adjacent areas, until the120 minute time frame for RPT breaker trip and valve alignment verification (FAs 3-3 & 3-4) performance at which time the operator can access Unit 3 El. 565 from Unit 2 reactor building. For entry into or adjacent to the fire area at times of 60 minutes or greater, the operator is directed to check with the Fire Captain/Incident Commander to determine if SCBA is still required prior to entry. The 60 minute time is generally justified on a case by case basis. Our assumptions are based on the Fire Ops response time, the combustible loading of the area, the potential fire severity (FA 3-4 16 minutes), fire detection and fire suppression. The general assumption is based on fixed fire sources in the reactor building or electrical boards. The fire is postulated to start in one vertical section of an electrical cabinet. Based on fire tests, it takes approximately 15 minutes for the fire to spread from one section to an adjacent section. Due to area wide detection, the fire is detected within 5 minutes and the fire brigade response time is between 10 & 15 minutes. Therefore, the fire can be extinguished and the area will be accessible at the 120 minute time frame.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. These communications were verified and documented adequate communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available.
The Fire Captain/Incident Commander are contacted prior to reactor building entry @ 120 minutes to ensure no SCBA is required. SCBAs are staged for Appendix R use in Electrical Board rooms 1A, 2A & 3A.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-2003-0048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	1.0	60	2
	2.0	120	5:15
	3.0	60	21:50
2	1.0	20	16:15
	2.0	60	21:37
	3.0	90	26:24
3	1.0	20	5:46
	2.0	120	9:01
	3.0	180	13:03
4	1.0	20	7:07
	2.0	60	12:09
	3.0	120/600	14:52
5	1.0	20 60 120	8:12 8:28 9:08
	2.0	60	11:38
6	1.0	20	8:40
	2.0	120	16:40
	3.0	120	22:01
7	1.0	720	3
8	N/A		

Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: T. A. McA
Approved: Ronald W. Hs

078 070327 039

Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-25I

Verification & Validation Team Members: (Name/Organization)

Bradley Sager, Operations

Darren Sloas, Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58B, Reactor Level; 1-PI-3-74B, Reactor Pressure; 1-TI-64-162, Suppression Pool Bulk Temp; 1-LI-64-66 , Suppression Pool Water Level; 1-PI-64-160A, Drywell Pressure

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-TI-64-162, Suppression Pool Temp; 2-LI-64-159A, Suppression Pool Water Level; 2-PI-64-160A, Drywell Pressure

Unit 3 credited instrumentation: 3-LI-3-58A& B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-LI-64-54A, 3-LI-64-159A & 3-LI-64-66, Suppression Pool Water; Level, 3-TI-64-161 & -162, Suppression Pool Temp; 2-TI-64-52AB, Drywell Temp; 3-XR-64-159 & 3-PI-64-160A, Drywell Pressure

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)
Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting**: The emergency lighting calculation ND-Q0999-920115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/Temp/Smoke/Fumes:** A fire in this zone is contained by the installed fire barriers with fire dampers isolating the HVAC ducts from the adjacent fire areas. Procedures are in place to initiate HVAC zone isolation as required with smoke ejected outside the building with portable ejectors through the Turbine building railroad bay, the radwaste outside door or intake pumping station outside door. An operator does not enter the fire area during SSI performance and the adjacent fire areas are separated by three hour fire barriers.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. The PMTI also verifies and documents as adequate the communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R use have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

Special Tools:
(Evaluate the need for special tools or PPE and verify such items are dedicated and readily available)
The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available.
No PPE other than normal PPE is required for this fire area since there are no manual actions in the fire area itself within the first two hours.

Accessibility:
(If special access equipment such as ladders or keys is needed, verify their availability)
Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

Procedures:
(Review procedural guidance to ensure that it is adequate to perform the required action)
The procedures were developed to implement the requirements of ED-Q0999-20030048 Revision 6, Appendix R Manual Action Requirements, desktop reviewed by operators, walked down several times by numerous field operators, reviewed by Independent Qualified Reviewers to ensure each required action was incorporated into the procedures and reviewed by procedure Sponsors, with comments incorporated at each process phase, if required.

Timing Validation:
(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

Attachment number	Section Number	Time Action Required (min)	Time Action Completed (Min)
1	1.0	20	6
	2.0	60/90/120	22:33
	3.0	120	29:54
2	1.0	20	3
	2.0	60	8:30
	3.0	120	13:15
3	1.0	20	2:45
	2.0	90	7:30
	3.0	120	11:21
	4.0	120	20:21
4	1.0	60	5:30
	2.0	120/600	9
	3.0	180	13:30
5	1.0	120	2:45
	2.0	180	9:15
6	1.0	10 20	3:10 9:05
	2.0	120	13:40
7	1.0	2880/720	6:15
8	N/A		

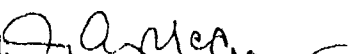
Staffing:
(Evaluate if shift staffing is adequate to perform the required manual actions and safely operate the plant)
OPDP-1, CONDUCT OF OPERATIONS, has been revised to address increased staffing levels for implementing the three unit Safe Shutdown Instructions. The new staffing level consists of 1 Shift Manager, 3 Unit SROs, 6 UOs, 8 AUOs, with the Incident Commander position filled by another qualified individual. The increased staffing level designates an SRO for each Unit, two UOs per unit to accommodate the additional MCR board actions for load shed/diesel generator operation, and eight AUOs allows for implementation of the field manual actions as well as any ventilation system alignments that may be required by 0-AOI-26-1, as requested by Fire Captain or Incident Commander to facilitate smoke/gas removal, prior to entering the SSIs.

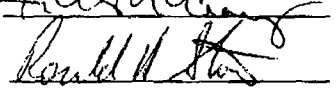
Training:
(Evaluate if frequency of operator training on the manual actions and associated procedures are adequate)
The Safe Shutdown Instruction training is conducted biennially and consists of classroom and JPM training. SSI training was conducted in 2006 Requal Cycle 2 for existing 2/3-SSIs and during Cycles 4 & 6 for the three unit SSIs. Three unit SSI training is continuing in 2007 Requal Cycle 1 and is currently scheduled for an additional cycle during 2007.

References:

Fire Protection Report, BFN Units 1, 2, 3, Rev. 0 (Version B)
ED-Q0999-20030048, Rev. 6, Unit 1, 2, and 3 Appendix R Manual Action Requirements
ED-N0244-890050, Rev. 8, Appendix R Analysis Intraplant Communications System
ND-Q0999-920115, Rev. 22, APPENDIX R - Location of Emergency Lighting

Based on the assessment of the above criteria, this SSI is considered verified and validated for use at BFN.

Prepared: 

Approved: 

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Verification and Validation
Appendix R Manual Actions

SSI Number: 0-SSI-25II

Verification & Validation Team Members: (Name/Organization)

Bradley Sager, Operations

Darren Sloas, Fire Operations

Criteria:

Diagnostic Instrumentation:

(Instrumentation should be available to verify that the manual action accomplished the intended objective)

Evaluation of Instrumentation

Reactor pressure indication from 0 to 1,200 psig and reactor water level from -155 inches to +60 inches (instrument zero at 528 inches above vessel bottom) are provided. The reactor pressure indication provides a full range of possible reactor pressure. This gives the operator the necessary information to depressurize and to operate the LPCI pump in providing makeup inventory. The reactor water level indication provides a range of conditions where the operator may have to initiate depressurization for LPCI injection or to trip any high pressure systems which have spuriously operated. Suppression pool level and temperature indications are provided to confirm the availability of the suppression pool as a heat sink during the post fire shutdown process. Drywell pressure and/or temperature indication will be used with reactor vessel pressure and level to provide the operators with additional monitoring to initiate manual blowdown if necessary for areas where HPCI and/or RCIC are available. This depressurization action is currently called out in the existing safe shutdown instructions (SSIs) see Section 3.7.3.8 of the Safe Shutdown Analysis for further details. In addition to the reactor pressure and water level, suppression pool level and temperature indications and drywell pressure and temperature, information on equipment status, such as breaker position and valve position, is available for the operator. The post fire shutdown procedures are based on the availability of the identified instrumentation. Therefore, the minimum SSDS instrumentation capability is sufficient for safe shutdown.

Unit 1 credited instrumentation: 1-LI-3-58B, Reactor Level; 1-PI-3-74B, Reactor Pressure; 1-TI-64-162, Suppression Pool Bulk Temp; 1-LI-64-66 , Suppression Pool Water Level; 1-PI-64-160A, Drywell Pressure; 1-TI-64-52AB, Drywell Temp

Unit 2 credited instrumentation: 2-LI-3-58B, Reactor Level; 2-PI-3-74B, Reactor Pressure; 2-TI-64-162, Suppression Pool Temp; 2-LI-64-159A, Suppression Pool Water Level; 2-PI-64-160A & 2-PI-64-67B, Drywell Pressure, 2-TI-64-52AB, Drywell Temp

Unit 3 credited instrumentation: 3-LI-3-58A& B, Reactor Level; 3-PI-3-74A & B, Reactor Pressure; 3-LI-64-54A, 3-LI-64-159A & 3-LI-64-66, Suppression Pool Water; Level, 3-TI-64-161 & -162, Suppression Pool Temp; 2-TI-64-52AB, Drywell Temp; 3-XR-64-159 & 3-PI-64-160A, Drywell Pressure

Environmental Considerations:
(Radiation Levels, Emergency lighting, Temperature and Humidity, Fire effects such as smoke and toxic gases)
Radiation Levels: With the reactors scrammed, MSIVs closed, and MSRVs open to suppression pool, radiation levels in the reactor buildings are acceptable for equipment operation. No actions are required in the first 8 hours below El. 565 in the reactor building, in the area of the RHR pumps or suppression pool, and no actions are required at any time in the RHR heat exchanger rooms. **Emergency Lighting**: The emergency lighting calculation ND-Q0999-920115, identified all required Appendix R lighting, and DCN 51092-03 PMTI functional testing confirmed that the emergency battery pack lights operate as designed and provide the required minimum illumination levels for the ingress/egress path and adequate lighting at the essential equipment requiring manual actions. Each battery pack had normal AC power interrupted and illumination levels measured. **HVAC/Temp/Smoke/Fumes:** A fire in this zone is contained by the installed fire barriers with fire dampers isolating the HVAC ducts from the adjacent fire areas. Procedures are in place to initiate HVAC zone isolation as required with smoke ejected outside the building with portable ejectors through the Turbine building railroad bay, the radwaste outside door or intake pumping station outside door. An operator does not enter the fire area during SSI performance during the first 48 hours and the adjacent fire areas are separated by three hour fire barriers.

Communications:
(Verify coordination between AUOs and MCR can be accomplished free from fire damage)
The communications calculation ED-N0244-890050, identified credited Appendix R radio communication channels for each fire area. DCN 51092 Test Scoping Document and resulting PMTI established the minimum testing required for radio system coverage utilizing the credited systems from the referenced calculation. The PMTI also verifies and documents as adequate the communications between operators at the field components and the Main Control Room or Backup Control Panel, as appropriate. The F2/F4 radio repeaters designated for Appendix R use have a 3-hour UPS system to ensure radio availability during the first 3 hours of an Appendix R event.

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The only special tool identified for use in the SSIs is the racking tool for the actions to rack 480V Shutdown Board breakers to TEST position in certain fire areas (1-3, 1-4, 2-3, 2-4, 2-5, 3-3, 3-4, 10, 11, 14, 16, 25II). There are racking tools affixed to the wall in each 480V Shutdown Board Room, and if one racking tool was missing then the adjacent board room would have one available.
No PPE other than normal PPE is required for this fire area since there are no manual actions in the fire area itself within the first 48 hours.

Accessibility:
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Ladders are required on El 565 in each reactor building, to access the CAD valves (120 min action), in the following: 0-SSI-1-1, 1-2, 1-3, 1-5, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3, and 16. Operators utilize the ladders staged for EOI use on El. 565, these ladders are secured in place with EOI orange locking tabs, chains and padlocks (GGMKA keys issued to AUO). The integrity of the orange locking tabs and padlocks are monitored daily by on shift Operations personnel and logged in NOMS or the associated 0-GOI-300-1 operator round sheets. Where access to areas which have Security padlocks, such as Electric Board Rooms 1B, 2B, 3B access doors to the Reactor building and U-3 Cardox tank room from outside, Security is notified at time zero to have Security personnel unlock these padlocks to allow access where the Operator has actions @ 20 minutes or greater (0-SSI-12, 0-SSI-13 and 0-SSI-16).

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(Evaluated the capability of operators to perform the manual actions in the time available before the plant will be placed in unrecoverable condition)

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1	**1.0**	**10** **20**	**4:30** **5:20**
	2.0	**60/120**	**20:40**
	3.0	**90**	**23:55**
	4.0	**120**	**29:55**
2	**1.0**	**10** **20**	**3:00** **3:45**
	2.0	**60**	**7:15**
	3.0	**120**	**9:15**
	4.0	**180**	**11:45**
3	**1.0**	**20**	**6:30**
	2.0	**120**	**9:50**
	3.0	**180**	**13:35**
4	**1.0**	**60**	**5:30**
	2.0	**120/600**	**9**
	3.0	**180**	**13:30**
5	**1.0**	**120**	**2:45**
	2.0	**120**	**6**
	3.0	**180**	**12:30**
6	**1.0**	**20**	**7:36**
	2.0	**120**	**11:36**
7	**Long Term**	**720/2880**	***6:15 same as 25I actions**
8	**N/A**		

Staffing:
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Prepared: [signature]
Approved: [signature]