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

ENCLOSURE

Report No.: 50-260/92-27

Licensee: Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Docket No.: 50-260 License No.: DPR-52

Facility Name: Browns Ferry Unit 2

Inspection Conducted: July 20 - 31, 1992

Inspector: R. S. Mellen 8/24/92
R. Mellen, Team Leader Date Signed

Team Members:
B. Holbrook
L. King
W. Miller
D. Payne
L. Trocine

Accompanying Personnel:
J. DeBor, SAIC
G. Harris

Approved by: for R. L. Crlenjak 8/25/92
R. L. Crlenjak, Chief Date Signed
Operational Programs Section
Division of Reactor Safety

SUMMARY

Scope:

This was a special announced emergency operating procedure team inspection. Its purpose was to verify the Browns Ferry emergency operating procedures were technically accurate and their specified actions could be accomplished using existing equipment, controls, and instrumentation.

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Results:

The team found the licensee had satisfactorily implemented Revision 4 of the Boiling Water Reactor Owners Group guidelines. The team concluded the emergency operating procedures appropriately covered the broad range of accidents, equipment failures and provided all necessary guidance for safe shutdown of the plant.

The team found the licensee's emergency operating procedure network was clear, concise, and reliable. It was evident from the review of these procedures that the licensee had carefully reviewed other Boiling Water Reactor Owners Group members procedures and the comments from previous NRC inspections; then incorporated the applicable portions into their Emergency Operating Instructions. The flow charts closely followed the Boiling Water Reactor Owners Group guidelines and adequately documented any deviations. The licensee significantly enhanced the Emergency Operating Instructions by converting the format from a multi-sided book to flowcharts. This format allowed easier performance of simultaneous Emergency Operating Instruction flowchart legs and monitoring emergency action status.

While the procedures reviewed were well written, the team had several observations. However, there are areas that the licensee should reevaluate some aspect of its program. None of the observations affect operability or directly affected nuclear safety.

- Information used for establishing Emergency Operating Instruction setpoints should be reevaluated as appropriate since some of this information was based upon 1986 or earlier operating data. (Paragraph 3, Appendix B)

- There were two examples of Emergency Operating Instruction setpoints not matching the Alarm Response Procedure value and several examples of the Abnormal Operating Instruction setpoints not matching the Alarm Response Procedure value. (Paragraph 3, Appendix B)

- While control of equipment necessary to perform Emergency Operating Instruction supplemental procedures was generally adequate, the team identified several areas where the licensee should reevaluate support equipment. (Paragraph 4, Appendix B)

- While the plant labeling was generally adequate, the team identified many examples of labeling that could be improved. Most of these examples should be resolved by the current labeling upgrade program. (Paragraph 4, Appendix D)

- There were no direct transitions into EOI-4 from any other Emergency Operating Instructions or from the Emergency Plan Implementing Procedures. There were several examples of support procedure transitions that could have been more definitive. (Paragraph 5, Appendix B)

The licensee acknowledged the factual content of these comments was correct, committed to evaluate each comment, to take appropriate action, and to document that action. The report or its appendicies contain the details of the specific comments.

## REPORT DETAILS

1. Persons Contacted

Licensee Employees

M. Ash, Shift Support Supervisor
*S. Austin, Compliance Licensing Engineer
B. Baggett, Senior Reactor Operator, Control Room Design Review Project
*P. Barron, Licensing Manager
*M. Bajestani, Technical Support
*C. Beasley, Public Relations
A. Burnette, Shift Operations Supervisor, Emergency Operating Instructions Coordinator
J. Cain, Assistant Shift Operations, Supervisor
T. Chinn, Shift Operations Supervisor, Instructor
R. Davidson, Auxiliary Unit Operator, Operations Procedures Group
W. Dawson, Shift Operations Supervisor, Instructor
M. DeRoche, Operations Training Manager
*C. Dexter, Browns Ferry Training Manager
S. Diaz, Instrument Engineer
J. Dollar, Shift Operations Supervisor, Operations Procedures Group
P. Ebersole, Mechanical Engineer, Operations Procedures Group
T. Elms, Shift Operations Supervisor, Operations Procedures Group
P. Hall, Auxiliary Unit Operator
*M. Herrell, Plant Operations Manager
D. Hill, Shift Operations Supervisor, Instructor
W. Ivey, Regulatory Licensing Engineer
L. Jackson, Reactor Operator, Control Room Design Review Project
G. Little, Operations Program Manager
E. Ridgell, Compliance Licensing Engineer
*P. Salas, Compliance Licensing Manager
J. Scalice, Plant Manager
*K. Schaus, Nuclear Quality Assurance Manager
*S. Smith, Operations Procedures and Support Manager
M. Venters, Lead Specialist, United Energy Services Corporation
P. Walker, Quality Assurance Evaluator
W. Weaver, Jr., Instrument Engineer
B. Williamson, Technical Support/Reactor Engineer (Boiling Water Reactor Owners Group Procedures Subcommittee Chairman)
*O. Zeringue, Vice President Browns Ferry Operations

Other licensee employees contacted included instructors, engineers, mechanics, technicians, operators, and office personnel.

NRC Representatives

W. Beardon, Resident Inspector
E. Christnot, Resident Inspector
P. Kellogg, Projects Section Chief
*J. Munday, Resident Inspector
C. Patterson, Senior Resident Inspector

* Attended Exit Interview

A listing of abbreviations used in this report is contained in Appendix E.

2. EOI/PSTG Comparison

The team compared the index of the BFN EOIs and AOIs against the index of ERGs and the list of emergency procedures recommended in RG-1.33. The team confirmed BFN developed sufficient procedures to encompass the spectrum of accidents and equipment failures addressed by the ERGs, RG-1.33, and the FSAR.

The BFN Program Manual defined the PSTG as the intermediate document between the EPGs and the BFN specific flowcharts. The PSTG was the first document in the conversion process from EPGs to the EOIs. The PSTG was the technical source document for the development of the EOI flowcharts. The process of developing the PSTG for BFN included:

- Substituting BFN plant specific values for generic values.
- Calculating plant specific curves and limits.
- Substituting BFN plant specific nomenclature for generic nomenclature.
- Adding technical steps not required by the EPGs, but required for BFN.
- Deleting EPG steps that do not apply to BFN due to the differing design.

The BFN Deviation Cross Reference Document directly compared the EPG steps to the PSTG steps, and the PSTG steps to the EOI steps. This document contains the justification of any deviations between the EPGs and the PSTGs or EOI flowcharts. The Deviation Cross Reference Document provided the traceability of the EPG source of associated EOI steps, and documented the development of the flowcharted steps from the PSTG steps.

The EOI bases document provided the technical bases for all flowchart entry conditions, steps, cautions, notes, and curves. This document provided an in-depth philosophy and

technical reason for the execution of all parts of the EOI flowchart.

BFN flowcharts were a set of board mounted procedures kept in the MCR. The flow paths were for RPV Control, Primary Containment Control, Secondary Containment Control, and Radioactivity Control. The arrangement of these path procedures provided the accident mitigation strategy and provided a method to transition into the appropriate EOI Appendix or Contingency when necessary. The path procedures also simplified placekeeping. Other documents contained the detailed information. The use of flowcharts procedures was signficantly enhanced.

The procedures reviewed adequately addressed any deviations from the EPGs. A separate cross reference document contained the justification for the step differences between the EPGs and the PSTGs. The team found no instances where the deviations were inadequate.

No violations or deviations were identified in this area.

3. Independent Technical Adequacy Review of the EOIs

The team reviewed the procedures listed in Appendix A to determine their technical adequacy. The procedures either followed the vendor recommended step sequence or deviated from it with acceptable documentation. The team found the EOIs were technically adequate and the priority of accident mitigation strategies in the EOIs was appropriate. BFN significantly enhanced the EOIs by converting the format from a multi-sided book method to a flowchart method. This format allowed easier performance of simultaneous EOI flowchart legs and monitoring emergency action status. The team considered these to be a strength. The AOIs were generally acceptable; however, the preparation, verification, and validation were not equivalent to the EOIs.

During the EOI walkthroughs the team evaluated system drawings and protective system logic prints for accuracy and operator usability. The team found the drawings were accessible, well maintained, readable, and categorized appropriately.

The team reviewed fourteen plant specific calculation worksheets which supported key values in the EOIs for conformance with the ERGs. The team concluded the worksheets were accurate. Adverse containment values and restrictions for level indication which BFN personnel developed in the calculation worksheet were properly applied in the EOIs.

The team found two examples of EOI setpoints not matching the ARP value and several examples of the AOI setpoints not

matching the ARP value. Two examples of this are: 1) EOI-3, Secondary Containment Control Guidelines, had a value of 135 degrees Fahrenheit as a maximum normal value for the RWCU Heat Exchanger Room, however the ARP had a value of 120 degrees Fahrenheit. 2) ARP-9-5 had the APRM downscale setpoint at 3 percent. After further investigation, BFN personnel determined the appropriate value was 5 percent.

The team reviewed several EOI setpoints. Based on the review of these setpoints the team concluded some information used was based upon older operating data. One example was EOI-2, Step DW/T-2, required the operator to determine if DW temperature could be maintained below a setpoint of 160 degrees Fahrenheit. BFN personnel used 1986 BFN specific operating data as the basis for this setpoint. Since 1986, plant modifications were installed that may have affected the cooling characteristics of the drywell. A second example was portions of the hydrogen entry condition setpoint calculation for EOI-2 were based upon plant specific drift data from 1988. The team did not identify specific problems with these calculations; however, it appeared it would be more appropriate to base the setpoints on more current operating data or verify the data was still valid. Prior to the end of this inspection, BFN personnel stated they would review the setpoint assumptions.

No violations of deviations were identified in this area.

4. Review of the EOIs and AOIs by In-plant and MCR Walkthroughs

The team conducted in-plant and/or MCR walkthroughs on all of the EOIs, AOIs, Contingencies, and EOI Appendices listed in Appendix A. The purpose of the walkthroughs was: 1) to verify instruments and controls designated in the procedures were consistent with the installed plant equipment, 2) to ensure the indicators, controls, annunciators referenced in the procedures were available to the operator, and 3) to ensure the tasks could be accomplished.

The team confirmed activities that occur outside the MCR could be performed with available equipment. However, the EOI equipment lockers were not well organized. Designated EOI lockers contained the EOI appendices needed to perform some local actions. The procedures were placed in envelopes and the small equipment required to perform the tasks were placed in plastic bags and attached to the envelope. The envelopes were not well organized and the attached bags did not ensure the tools would remain attached to the procedure. The instrument shop personnel issued some equipment needed to perform tasks. The team determined the equipment located in the instrument shop was not labeled or designated as EOI equipment. Because there were no administrative controls over

this equipment, there was no assurance the equipment would be available if needed for EOI functions. Prior to the end of this inspection, BFN personnel stated they would evaluate this and make appropriate changes.

The team also evaluated the location and availability of the EOIs in the MCR and verified the revisions were current. The design of the new MCR furniture facilitated flowchart use. Additionally, the team found indicators, annunciators and controls referenced in the EOIs were available to the operators. While the results of the EOI walkthroughs were generally acceptable, the team had several comments. Appendix B contains a listing of technical and human factors comments. The resolution of the technical and human factors comments is a portion of IFI 50-260/92-27-01 - Followup on EOI Program.

The team found some minor labeling inconsistencies. However, the BFN labeling group had made progress in assuring appropriate EOI markings were present for key relays, fuses, fuse locations, panels, valves, and other equipment. The team noted the improved EOI marking during the procedure walkthroughs. Appendix D is a listing of the labeling inconsistencies identified by the team. The resolution of labeling inconsistencies is a portion of IFI 50-260/92-27-01 - Followup on EOI Program.

BFN personnel conducted V&V of EOIs according to the EOI Program Manual Sections VII-C, Verifying Emergency Operating Instructions, and VII-D, Validating Emergency Operating Instructions. After their review, the team concluded V&V of locally performed EOI and AOI actions were adequately performed.

Based, in part, on the walkthroughs, the team concluded the emergency operating procedures appropriately covered the broad range of accidents and equipment failures and provided all necessary guidance for safe shutdown of the plant. The team found BFN's emergency operating procedure network was clear, concise, and reliable. While the team had several comments based on the procedure walkthroughs, none either affected operability or directly affected nuclear safety.

No violations or deviations were identified in this area.

5. Simulator Observation

To evaluate the adequacy of the BFN EOIs, the team observed the performance of three different scenarios that required entry into EOIs 1 through 4, and into various EOI contingencies, EOI appendices, and AOIs. The scenarios were Radioactive Material Release, High Drywell Pressure, and Loss of High Pressure Injection that required Alternate Level

Control. These scenarios were written to clarify comments originated during the EOI procedure walkthroughs.

Based upon the team's walkthrough of EOIs, the team concluded there were no direct transitions into EOI-4 from any of the other EOIs or from the EPIPs. The transition into EOI-4 was based primarily on operator knowledge of the entry conditions. The team reviewed entry into and operation in EOI-4 during the Radioactive Material Release scenario. The transition into this EOI was adequate and the procedure network supported the recovery from this evolution. During the scenario, the team observed the isolation of the refueling zone ventilation caused the steam tunnel temperature to rise. Neither the training staff nor the team could postulate the thermodynamic considerations that would cause this phenomena. BFN personnel stated they would investigate the simulator modeling fidelity for isolation of the refueling zone ventilation. The resolution of the simulator fidelity is a portion of IFI 50-260/92-27-01 - Followup on EOI Program.

The team observed two more scenarios, High Drywell Pressure and Loss of High Pressure Injection that required Alternate Level Control. The team noted the EOI flowchart entry conditions, flow paths, and transition requirements for these scenarios were generally clear.

Based on the observation of the three scenarios, procedural reviews, and walkthroughs; the team concluded the guidance provided within the BFN EOIs and supporting procedures, as well as EOI training, aided in the successful completion of the scenarios. The placekeeping methods were effective, and the procedures integrated well and stayed within the accident mitigation strategy. There were no specific procedural weaknesses noted.

No violations or deviations were identified in this area.

6. Management Control of EOIs and AOIs

The team reviewed BFNs' procedures and interviewed personnel to determine if the BFN had established an ongoing evaluation program for the EOIs as recommended in Section 6.2.3 of NUREG-0899. The specific considerations from NUREG-0899 evaluated in this review were:

> "Evaluation of the technical adequacy of the EOPs (EOIs) in light of operational experience and use, training experience, and any simulator experience and MCR walkthroughs,
>
> Evaluation of the organization, format, style, and content and as a result of using the

procedures during operations, training, simulator exercises and walkthroughs,

Evaluation of staffing and staff qualifications relevant to using the EOPs (EOIs)."

Site Standard Practice, SSP-12.16, EOI Control, Revision 0, contained an outline of the formal EOI management program. This procedure included instructions for:

- Developing an EOI Program Manual
- Maintaining EOIs
- Verifying EOIs
- Validating EOIs.

SSP-12.16 Technical Evaluation Criteria Checklists were undergoing an update to assure consistency with the current WG. This update was expected to be completed by the end of 1992. The team discussed the proposed updates and found the technical content and scheduled implementation date were adequate.

The team also gathered information to determine if BFN's QA program was actively monitoring the EOIs and the EOI program as identified in Section 4.4 of NUREG-0899. There was a formalized program, as described in Section 6.2.3, for an ongoing evaluation program for the EOIs.

The team found BFN's site QA organization performed periodic audits of the EOI procedures and program implementation. Annual QA audits were performed in the operations training program and in the overall operations area. These audits included an evaluation of the EOI flow paths, EOI Appendices and AOI procedures and their use during the license operator and AUO training programs. The next QA audit of the operations training program was scheduled for November 1992, and the next QA audit of the operations area was scheduled for January 1993. The QA Evaluator group, which was a separate division in the QA organization, monitored the operations group daily. Many of these evaluations also included a review of the EOI procedures and their implementation. The audits were of sufficient depth and scope to assess the EOI program objectively. The QA program for the monitoring of the EOI program appeared adequate.

No violations or deviations were identified in this area.

7. Auxiliary Unit Operator EOI Training

The team reviewed lesson plan OPN-122R057 Revision 0, which the training staff used to train the AUOs on the changes made

to Revision 4 of the EOIs. The team determined the lesson plan did not fully describe, or define the importance of, actions to be taken when the reactor building floor drain sump levels, located in the Radwaste Control Room, were in alarm. The lesson plan did not state EOI-3 entry conditions were indicated and the MCR operator was to be notified when panel 25-17, windows 16 and 18, or windows 16 and 33, were in alarm simultaneously. The lesson plan also did not contain a learning objective for each EOI appendix.

The AUOs were not formally evaluated on the new EOI appendices during an in-plant (performance) setting. BFN personnel indicated the completion of a new procedure based AUO task list would initiate a revision to the lesson plan and each appendix would have a learning objective. The lesson plan covered all appendices, although there was not an objective for each appendix, in the lesson plan body. Objectives were present for appendices that were more difficult and for those performed outside the MCR. The appendices for Revision 4 of the EOIs were not changed significantly and AUOs were continually trained on various appendices and would be formally evaluated in November or December of 1993.

8. Exit Interview

The inspection scope and findings were summarized on July 31, 1992, with those persons indicated in paragraph 1. The NRC described the areas inspected and discussed in detail the inspection findings. No proprietary material is contained in this report. No dissenting comments were received from the licensee.

| Item Number | Description, Paragraph |
|---|---|
| IFI 50-260/92-27-01 | Followup on EOI Program (Paragraphs 4 and 5). |

## Appendix A

### PROCEDURES REVIEWED

UNIT 2 EOIs

| | | |
|---|---|---|
| EOI-1 | REV. 0 | RPV CONTROL GUIDELINES |
| EOI-2 | REV. 0 | PRIMARY CONTAINMENT CONTROL GUIDELINES |
| EOI-3 | REV. 0 | SECONDARY CONTAINMENT CONTROL GUIDELINES |
| EOI-4 | REV. 0 | RADIOACTIVE RELEASE CONTROL GUIDELINES |
| CONTINGENCY 1 | REV. 0 | ALTERNATE LEVEL CONTROL GUIDELINE |
| CONTINGENCY 2 | REV. 0 | EMERGENCY RPV DEPRESSURIZATION GUIDELINE |
| CONTINGENCY 3 | REV. 0 | STEAM COOLING GUIDELINE |
| CONTINGENCY 4 | REV. 0 | RPV FLOODING GUIDELINE |
| CONTINGENCY 5 | REV. 0 | LEVEL/POWER CONTROL GUIDELINE |
| CONTINGENCY 6 | REV. 0 | PRIMARY CONTAINMENT FLOODING GUIDELINE |

UNIT 2 AOIs

| | | |
|---|---|---|
| AOI-1-1 | REV. 9 | RELIEF VALVE STUCK OPEN |
| AOI-1-3 | REV. 5 | MAIN STEAM ISOLATION VALVE CLOSURE AT POWER |
| AOI-3-1 | REV. 8 | REACTOR WATER LEVEL |
| AOI-30B-1 | REV. 7 | REACTOR BUILDING VENTILATION FAILURE |
| AOI-30B-2 | REV. 1 | REACTOR BUILDING SMOKE REMOVAL |
| AOI-32-2 | REV. 10 | LOSS OF CONTROL AIR |
| AOI-32A-1 | REV. 10 | LOSS OF DRYWELL CONTROL AIR |
| AOI-47-1 | REV. 4 | UNPLANNED TURBINE TRIP BELOW 30% REACTOR POWER (WITHOUT SCRAM) |
| AOI-47-2 | REV. 5 | REACTOR PRESSURE CONTROL UNIT FAILURE |
| AOI-57-4 | REV. 13 | LOSS OF UNIT PREFERRED |
| AOI-57-5A | REV. 16 | LOSS OF I&C BUS A |
| AOI-57-5B | REV. 15 | LOSS OF I&C BUS B |
| AOI-57-9 | REV. 2 | LOSS OF ANNUNCIATOR PANEL(S) SUPPLIED BY PANEL 9-9 CABINET ONE |
| AOI-68-2 | REV. 6 | JET PUMP FAILURE |
| AOI-70-1 | REV. 9 | LOSS OF RBCCW |
| AOI-74-1 | REV. 7 | LOSS OF SHUTDOWN COOLING |
| AOI-79-1 | REV. 6 | FUEL DAMAGE DURING REFUELING |
| AOI-79-2 | REV. 5 | INADVERTENT CRITICALITY DURING INCORE FUEL MOVEMENT |
| AOI-85-1 | REV. 3 | ROD DROP ACCIDENT |
| AOI-85-3 | REV. 7 | CRD SYSTEM FAILURE |
| AOI-85-4 | REV. 5 | LOSS OF RPIS |
| AOI-85-7 | REV. 6 | MISPOSITIONED CONTROL ROD |
| AOI-90-2 | REV. 2 | WIDE RANGE GASEOUS EFFLUENT |

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| | | RADIATION MONITORING SYSTEM ALARMS |
| AOI-99-1 | REV. 8 | LOSS OF POWER TO ONE RPS BUS |
| AOI-100-1 | REV. 17 | REACTOR SCRAM |
| AOI-100-2 | REV. 11 | CONTROL ROOM ABANDONMENT |

UNIT 2 EOI APPENDICES

| | | |
|---|---|---|
| 1A | REV. 1 | REMOVAL AND REPLACEMENT OF RPS SCRAM SOLENOID FUSES |
| 1B | REV. 1 | VENTING AND REPRESSURIZING THE SCRAM PILOT AIR HEADER |
| 1C | REV. 1 | INDIVIDUALLY SCRAM CONTROL RODS |
| 1D | REV. 1 | INSERT CONTROL RODS USING REACTOR MANUAL CONTROL SYSTEM |
| 1E | REV. 1 | MANUAL INSERTION OF CONTROL RODS BY VENTING THE OVER PISTON AREA |
| 1F | REV. 1 | MANUAL SCRAM |
| 1G | REV. 1 | CONTROL ROD INSERTION USING INCREASED COOLING WATER DIFFERENTIAL PRESSURE |
| 2 | REV. 0 | DEFEATING ARI LOGIC TRIPS |
| 3A | REV. 1 | SLC INJECTION |
| 3B | REV. 1 | ALTERNATE SLC INJECTION |
| 4 | REV. 1 | PREVENTION OF INJECTION |
| 5A | REV. 1 | INJECTION SYSTEM LINEUP - CONDENSATE/FEEDWATER |
| 5B | REV. 1 | INJECTION SYSTEM LINEUP - CRD |
| 5C | REV. 1 | INJECTION SYSTEM LINEUP - RCIC |
| 5D | REV. 1 | INJECTION SYSTEM LINEUP - HPCI |
| 6A | REV. 1 | INJECTION SUBSYSTEM LINEUP - CONDENSATE TRANSFER PUMP TO RHR AND CS |
| 6B | REV. 1 | INJECTION SUBSYSTEM LINEUP - RHR SYSTEM I LPCI MODE |
| 6C | REV. 1 | INJECTION SUBSYSTEM LINEUP - RHR SYSTEM II LPCI MODE |
| 6D | REV. 1 | INJECTION SUBSYSTEM LINEUP - CORE SPRAY SYSTEM I |
| 6E | REV. 1 | INJECTION SUBSYSTEM LINEUP - CORE SPRAY SYSTEM II |
| 7A | REV. 1 | ALTERNATE RPV INJECTION SYSTEM LINEUP - CONDENSATE TRANSFER PUMPS TO RHR AND CS |
| 7B | REV. 1 | ALTERNATE RPV INJECTION SYSTEM LINEUP - SLC SYSTEM |
| 7C | REV. 1 | ALTERNATE RPV INJECTION SYSTEM LINEUP - RHR CROSSTIE |
| 7D | REV. 1 | ALTERNATE RPV INJECTION SYSTEM LINEUP - STANDBY COOLANT |
| 7E | REV. 1 | ALTERNATE RPV INJECTION SYSTEM LINEUP - RHR DRAIN PUMP A |
| 7F | REV. 1 | ALTERNATE RPV INJECTION SYSTEM |

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|---|---|---|
| | | LINEUP - RHR DRAIN PUMP B |
| 7G | REV. 1 | ALTERNATE RPV INJECTION SYSTEM LINEUP - PRESSURE SUPPRESSION CHAMBER HEAD TANK PUMPS |
| 7H | REV. 1 | ALTERNATE RPV INJECTION SYSTEM LINEUP - RCIC USING AUXILIARY STEAM |
| 7J | REV. 1 | ALTERNATE RPV INJECTION SYSTEM LINEUP - HPCI USING AUXILIARY STEAM |
| 7K | REV. 1 | ALTERNATE RPV INJECTION SYSTEM LINEUP - FIRE SYSTEM |
| 8A | REV. 1 | BYPASS GROUP 1 RPV LOW LOW LOW LEVEL ISOLATION INTERLOCKS |
| 8B | REV. 1 | REOPENING MSIVs FOLLOWING A GROUP 1 ISOLATION |
| 8C | REV. 0 | BYPASS GROUP 6 ISOLATION INTERLOCK TO DRYWELL CONTROL AIR COMPRESSOR SUCTION VALVE |
| 8D | REV. 0 | RESTORING DRYWELL CONTROL AIR FOLLOWING GROUP 6 ISOLATION |
| 8E | REV. 0 | BYPASSING GROUP 6 LOW LEVEL AND HIGH LEVEL DRYWELL PRESSURE ISOLATION INTERLOCKS |
| 8F | REV. 1 | RESTORING REFUELING ZONE AND REACTOR ZONE VENTILATION FANS FOLLOWING GROUP 6 ISOLATION |
| 8G | REV. 1 | CROSSTIE CAD TO DRYWELL CONTROL AIR |
| 9 | REV. 1 | PRIMARY CONTAINMENT WATER LEVEL MONITORING AND EQUIPMENT CONTROL |
| 10A | REV. 1 | CORE SPRAY SYSTEM I OPERATION WITH SUCTION FROM CST |
| 10B | REV. 1 | CORE SPRAY SYSTEM II OPERATION WITH SUCTION FROM CST |
| 10C | REV. 1 | RHR SYSTEM I OPERATION WITH SUCTION FROM CST |
| 10D | REV. 1 | RHR SYSTEM II OPERATION WITH SUCTION FROM CST |
| 11A | REV. 1 | ALTERNATE RPV PRESSURE CONTROL SYSTEM - MSRVS |
| 11B | REV. 1 | ALTERNATE RPV PRESSURE CONTROL SYSTEM - RCIC TEST MODE |
| 11C | REV. 1 | ALTERNATE RPV PRESSURE CONTROL SYSTEM - HPCI TEST MODE |
| 11D | REV. 1 | ALTERNATE RPV PRESSURE CONTROL SYSTEM - MAIN STEAM LINE DRAINS AND/OR TURBINE AND RFPT DRAIN |
| 11E | REV. 1 | ALTERNATE RPV PRESSURE CONTROL SYSTEM - RWCU SYSTEM BLOWDOWN/RECIRC MODE |
| 11F | REV. 1 | ALTERNATE RPV PRESSURE CONTROL SYSTEM - RFPT ON MINIMUM FLOW |
| 11G | REV. 1 | ALTERNATE RPV PRESSURE CONTROL SYSTEM - STEAM SEALS, SJAES, OFF- |

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|---|---|---|
| | | GAS PREHEATS |
| 11H | REV. 1 | ALTERNATE RPV PRESSURE CONTROL SYSTEM - MAIN CONDENSER |
| 11J | REV. 1 | ALTERNATE RPV PRESSURE CONTROL SYSTEM - HPCI AND RCIC |
| 11K | REV. 0 | ALTERNATE RPV PRESSURE CONTROL SYSTEM - RPV HEAD VENTS |
| 12A | REV. 1 | PRIMARY CONTAINMENT VENTING |
| 12B | REV. 1 | PRIMARY CONTAINMENT VENTING FOR HYDROGEN CONTROL |
| 13 | REV. 1 | EMERGENCY VENTING PRIMARY CONTAINMENT |
| 14A | REV. 1 | N2 MAKEUP TO PRIMARY CONTAINMENT |
| 14B | REV. 1 | CAD OPERATION |
| 14C | REV. 1 | VENTING AND PURGING PRIMARY CONTAINMENT |
| 15 | REV. 1 | RPV VENTING FOR PRIMARY CONTAINMENT FLOODING |
| 16A | REV. 0 | BYPASSING RCIC LOW REACTOR PRESSURE ISOLATION INTERLOCKS |
| 16B | REV. 1 | BYPASSING RCIC TEST MODE ISOLATION INTERLOCKS |
| 16C | REV. 1 | BYPASSING HPCI LOW REACTOR PRESSURE ISOLATION INTERLOCKS |
| 16D | REV. 1 | BYPASSING HPCI TEST MODE ISOLATION INTERLOCKS |
| 16E | REV. 1 | BYPASSING HPCI HIGH SUPPRESSION POOL WATER LEVEL SUCTION TRANSFER INTERLOCK |
| 16F | REV. 1 | BYPASSING RHR SYSTEM I INJECTION VALVE TIMERS |
| 16G | REV. 1 | BYPASSING RHR SYSTEM II INJECTION VALVE TIMERS |
| 16H | REV. 1 | BYPASSING RCIC HIGH RPV LEVEL ISOLATION INTERLOCKS |
| 16J | REV. 1 | BYPASSING HPCI HIGH RPV LEVEL INTERLOCKS |
| 17A | REV. 1 | RHR SYSTEM OPERATION IN SUPPRESSION POOL COOLING MODE |
| 17B | REV. 1 | RHR SYSTEM OPERATION - DRYWELL SPRAYS |
| 17C | REV. 1 | RHR SYSTEM OPERATION - SUPPRESSION CHAMBER SPRAYS |
| 17D | REV. 1 | RHR SYSTEM OPERATION - SHUTDOWN COOLING |
| 18 | REV. 1 | SUPPRESSION POOL WATER INVENTORY REMOVAL AND MAKEUP |
| 100.1 | REV. 1 | DOCUMENTATION AND RESTORATION OF ABNORMAL SYSTEM CONFIGURATION, FUSES, AND INTERLOCKS |

EOI CALCULATIONS, WORKSHEETS AND CURVES

| | | |
|---|---|---|
| WORKSHEET 1 | REV. 0 | BORON INJECTION VARIABLES |
| WORKSHEET 2 | REV. 0 | CONTROL ROD REACTIVITY |
| WORKSHEET 3 | REV. 0 | DRYWELL SPRAY |
| WORKSHEET 4 | REV. 0 | HEAT CAPACITY LIMIT |
| WORKSHEET 5 | REV. 0 | HEAT CAPACITY LIMIT |
| WORKSHEET 6 | REV. 0 | HEAT CAPACITY LIMIT |
| WORKSHEET 8 | REV. 0 | PRRESSURE SUPPRESSION LIMIT |
| WORKSHEET 9 | REV. 0 | PRIMARY CONTAINMENT LIMIT |
| WORKSHEET 10 | REV. 0 | RPV VARIABLES |
| WORKSHEET 11 | REV. 0 | SRV WORKSHEET |
| WORKSHEET 12 | REV. 0 | SUPPRESSION CHAMBER |
| WORKSHEET 13 | REV. 0 | VORTEX WORKSHEET |
| WORKSHEET 13A | REV. 0 | NPSH WORKSHEET |
| WORKSHEET 14 | REV. 0 | WATER LEVEL INSTRUMENT |

ADMINISTRATIVE INSTRUCTIONS

| | | |
|---|---|---|
| 2-EOIPM VII-B | REV. 1 | WRITER'S GUIDE FOR EMERGENCY OPERATING INSTRUCTIONS |
| 2-EOIPM VII-E | REV. 0 | WRITER'S GUIDE FOR EMERGENCY OPERATING INSTRUCTION APPENDICES |
| 2-EOIPM VIII-A | REV. 0 | USER'S GUIDE FOR THE EMERGENCY OPERATING INSTRUCTIONS |
| NEDO 31331 | REV. 4 | BWR OWNERS GROUP EMERGENCY PROCEDURE GUIDELINES |

SITE STANDARD PRACTICE (SSP)

| | | |
|---|---|---|
| SSP-12.16 | REV. 0 | EMERGENCY OPERATING INSTRUCTION CONTROL |

## Appendix B

## TECHNICAL AND HUMAN FACTORS COMMENTS

This Appendix contains technical and human factors comments and observations. Unless specifically stated, these comments were not regulatory requirements. However, the licensee acknowledged the factual content of each of these comments was correct as stated. The licensee further committed to evaluate each comment, to take appropriate action and to document that action. These comments were not to be all inclusive, and the licensee should evaluate the generic applicability of each comment. These items will be reviewed during a future NRC inspection.

I. EOI Flowchart Comments

A. EOI-1, RPV CONTROL

FIGURE 10.1 Entry condition - This entry condition stated "Scram Condition and RX Power Above 5% or Cannot Be Determined." The RC/Q leg of the flowchart required the injection of SLC if the reactor could not be made subcritical before the suppression pool temperature reached 110 degrees Fahrenheit. When the entry conditions are met and then power decreases to below 5 percent, SLC injection was still required. The Boron Injection Initiation Temperature graph, which was derived from the Boron Injection Variables Worksheet 1, was not displayed on the EOI flowchart. This graph could allow the suppression pool temperature to exceed 140 degrees Fahrenheit prior to requiring boron injection. With the reactor between zero and 2.5 percent power, suppression pool temperature could increase to 165 degrees Fahrenheit prior to requiring boron injection.

The team requested that BFN personnel provide a justification for not using available information and electing to use such an extremely conservative SLC injection point. In their response, BFN personnel indicated the procedural steps met the EOI regulatory guidance. However, BFN personnel decided to inject SLC at a suppression pool temperature of 110 degrees Fahrenheit and 5 percent reactor power to avoid having the operators read a value from a graph. BFN personnel stated they would evaluate the potential consequences of boron injection and take appropriate actions.

B. EOI-2, PRIMARY CONTAINMENT CONTROL GUIDELINES

1. General - BFN had a modification proposed for the installation of a hardened pipe vent for release of pressure from the suppression chamber area when primary containment pressure could not be maintained below 55 psig. This proposed vent

primary containment pressure could not be maintained below 55 psig. This proposed vent system would effectively vent the suppression chamber provided the primary containment water level was less than 31 feet. The hardened vent was designed to prevent the release of primary containment atmosphere into secondary containment. This release would make some remote actions in secondary containment difficult. There were no plans for a hardened vent for cases where the primary containment water level exceeded 31 feet. BFN personnel stated they would review this comment and take appropriate actions.

2. Step DW/T-2 - This step required the determination if DW temperature could be maintained below a setpoint of 160 degrees Fahrenheit. The setpoint was based on 1986 BFN specific operating data. Since 1986, plant modifications were installed that affect the cooling characteristics of the drywell. BFN personnel stated they would evaluate the appropriateness of this EOI setpoint and other EOI setpoints to assure the values were still accurate and conservative.

3. Step PC/P-14 - This step stated CAN SUPPR CHMBR PRESS BE MAINTAINED BELOW 55 PSIG. It required containment or drywell venting irrespective of offsite radioactivity release rate if suppression chamber pressure could not be maintained below 55 psig. The structural design limits for the containment is approximately 75 psig at a water level of between zero and 19.5 feet in containment and approximately 95 psig at a water level of between 75 and 107.5 feet. Although BFN's approach met the EOI guidelines, it could result in additional radioactive exposure to personnel outside the plant area. BFN personnel stated the total radioactive release would not be significantly increased if containment was vented at lower pressure. BFN personnel stated they would review this comment and take appropriate actions.

C. EOI-3, SECONDARY CONTAINMENT CONTROL GUIDELINES

1. Table 3 - "Secondary Cntmt Area Temp" had a value of 135 degrees Fahrenheit as a maximum normal value for the RWCU Heat Exchanger Room but the ARP had a value of 120 degrees Fahrenheit.

2. Table 3 - This secondary containment temperature table did not consistently provide support

information for the temperature elements listed. For example, CS Sys I Pumps/RCIC Room were listed as 71-41A while CS Sys II Pumps were listed as (2-XA-55-3E-29) TI-75-69B Panel 9-3.

D. EOI-4, RADIOACTIVE RELEASE CONTROL GUIDELINES

1. General - The objective of this EOI was to provide an interface between the Emergency Plan Implementing Procedures and EOIs 1, 2, and 3. However, there were no cross references from the Emergency Plan Implementing Procedures or EOIs 1, 2, or 3 to EOI-4. EOI-4 could not perform as an interface procedure unless it was connected by references to the rest of the EOI network or Emergency Plan Implementing Procedures. BFN personnel stated they would evaluate the interface and make appropriate procedural revisions.

2. General - The logic was inconsistent with symptomatic EOI operations. The procedural steps dictated the performance of a fault diagnosis prior to taking corrective actions. The procedure required the diagnosis of severe radioactivity release source or waiting until the source was identified before the decision to shutdown and depressurize the reactor. This process was inconsistent with symptomatic EOI operating philosophy that took the plant to a safe condition, then diagnosed the fault.

3. Entry Condition - Table 5, Radioactive Release Rates, required verification of iodine levels. This step was inconsistent with emergency action level RG1 of EPIP-3, Attachment 1, which stated verify Iodine 131. Since these terms were not equivalent, the correct term should be referenced in both places to keep the EPIPs and EOIs consistent.

4. Entry Condition - This EOI was entered when off site release rates reached Alert action levels. The procedure transitioned directly from Alert action levels to General Emergency action levels, bypassing the Site Area Emergency action levels. BFN personnel stated this was an open issue the BWROG was investigating and they would evaluate their actions when the BWROG had reached a resolution.

E. CONTINGENCY 1, ALTERNATE LEVEL CONTROL GUIDELINE

1. Step C1-14 - This step of the flowchart referred to a CRD injection pressure (shutoff discharge pressure) value of 1450 psig; while steps C6-9, C6-12, and C6-17 of Contingency 6 referred to a CRD injection pressure (shutoff discharge pressure) value of 1640 psig. BFN personnel stated it would revise step C1-14 to reflect a CRD injection pressure (shutoff discharge pressure) value of 1640 psig.

2. Caution Number 6 - The first paragraph on page 23 of the bases document for Contingency 1 referred to caution numbers 2, 3, and 6; but the last sentence of this paragraph referred to caution numbers 2, 3, and 4. BFN personnel stated it would revise this paragraph to reflect an appropriate reference to caution number 6.

F. CONTINGENCY 2, EMERGENCY RPV DEPRESSURIZATION GUIDELINE

No comments.

G. CONTINGENCY 3, STEAM COOLING GUIDELINE

No comments.

H. CONTINGENCY 4, RPV FLOODING GUIDELINE

No comments.

I. CONTINGENCY 5, LEVEL/POWER CONTROL GUIDELINE

No comments.

J. CONTINGENCY 6, PRIMARY CONTAINMENT FLOODING GUIDELINE

Step C6-13 - This step referred to a 30-foot primary containment water level, while page 44 of the cross reference document stated this level was 28 feet. Additionally, step C6-10 on the flowchart, page 28 of the cross reference, and page 39 of the bases document all referred to this value as 30 feet. BFN personnel initiated a PCR to revise page 44 of the cross reference document to reflect a value of 30 feet in lieu of 28 feet.

II. EOI Appendices

A. 1A, Removal and Replacement of RPS Scram Solenoid Fuses

1. Steps 4 and 6 - These steps required the removal of RPS scram solenoid fuses that were later restored.

The appendix failed to provide temporary storage instructions for these fuses. Prior to the end of this inspection, BFN personnel initiated an EOI change request form to resolve how the fuses will be controlled once removed.

2. Attachment 1 - This appendix attachment required the operators to obtain tools and equipment from EOI lockers that were locked. The appendix did not indicate the EOI lockers were locked or where the keys could be obtained.

   BFN personnel stated obtaining keys was part of continued operator training. The keys could be obtained from the SOS key locker and the MCR key ring. Additionally, the AUOs carried key rings, with the required keys attached, during their normal rounds. Prior to the end of this inspection, BFN personnel stated if there was any future indication obtaining keys was a problem, an EOI change request would be considered.

B. 1B, VENTING AND REPRESSURIZING THE SCRAM PILOT AIR HEADER

General - This appendix was performed in the reactor building. There were no procedures at the location the procedure was performed. This required the AUO to leave the reactor building and go to a controlled document station to obtain a copy of the appendix causing an unnecessary delay in performing the required actions. BFN personnel stated the only procedures in the field were those that required the use of tools. Prior to the end of this inspection, BFN personnel initiated an EOI change request form to consider placing all appendices in the field for local actions except for simple tasks requiring less than some specified number of manipulations.

C. 1C, INDIVIDUALLY SCRAM CONTROL RODS

No comments.

D. 1D, INSERT CONTROL RODS USING REACTOR MANUAL CONTROL SYSTEM

No comments.

E. 1E, MANUAL INSERTION OF CONTROL RODS BY VENTING THE OVER PISTON AREA

1. Step 4.b - This step directed the operator to place the end of a vent hose from valve 2-85-614,

Withdraw Riser Vent, into a radwaste floor drain. The vent exhaust from the 2-85-614 valve would be approximately equal to reactor pressure. There were no provisions to ensure the vent hose would remain in the drain. Prior to the end of this inspection, BFN personnel stated this item would be reviewed and the appendix revised as necessary.

2. Step 4.c.2 - This step directed the operators to remove the valve stem cap from 2-85-614 for the selected HCU using a crescent wrench. There were no valve caps on any of the 92 HCU 2-85-614 valves that were inspected. Prior to the end of this inspection, BFN personnel stated this item would be reviewed and the appendix revised as necessary.

3. Step 4.c.3 - This step directed the operator to open 2-85-614 to slowly vent the withdraw riser. The design of this vent valve would allow the valve to be completely removed allowing discharged water at approximately reactor pressure. There were no cautions indicating this prior to performing the step. Prior to the end of this inspection, BFN personnel stated this item would be reviewed and the appendix revised as necessary.

4. Step 4.c.3 - This step directed the operator to open valve 2-85-614 using a "T" or "L" shaped wrench. The "T" shaped wrench located in the EOI tool box did not fit the 2-85-614 valves. Prior to the end of this inspection, BFN personnel replaced the "T" shaped wrench that did not fit the 2-85-614 valves with an appropriate "T" shaped wrench.

5. Attachment 1, Item 1 - This attachment appeared to require two keys for the two catwalk areas. Hook 2-11, of the SOS's key cabinet A, contained only one key. Prior to the end of this inspection, BFN personnel stated this item would be reviewed and the appendix revised as necessary.

F. 1F, MANUAL SCRAM

1. Step 1.b.2 - This step indicated that actions were to be taken in bay 1 and 3 of panel 9-15. The following steps, 1.b.2.a and 1.b.2.b, did not indicate in which bay the actions should be performed.

2. Step 1.b.3 - This step indicated that actions were to be taken in bay 1 and 3 of panel 9-17. The following steps, 1.b.3.a and 1.b.3.b, did not

indicate in which bay the actions should be performed.

G. 1G, CONTROL ROD INSERTION USING INCREASED COOLING WATER DIFFERENTIAL PRESSURE

No comments.

H. 2, DEFEATING ARI LOGIC TRIPS

No comments.

I. 3A, SLC INJECTION

No comments.

J. 3B, ALTERNATE SLC INJECTION

1. Step 32 - This step verified closed 2-FCV-85-50, CRD Exhaust Return Line Isolation, and was included in a list of local actions. This step was actually performed from the MCR. Prior to the end of this inspection, BFN personnel initiated an EOI change request form to indicate this step was performed in the MCR.

2. Attachment 1, Item 1 - This item referred to a prefabricated suction strainer cover. This strainer cover had not been fit tested to verify it would perform its intended function. Prior to the end of this inspection, BFN personnel initiated a work request to verify proper fit of the prefabricated suction strainer cover.

3. Attachment 1 - This attachment contained a list of tools and equipment required to perform this appendix. There was a length of plastic hose and a 5 gallon container located in the EOI locker that was not on the equipment list for appendix 3B. BFN personnel investigated the origin of this equipment and determined it was required for completion of appendix 7G. It was not obvious appendix 7G equipment was stored in the same equipment locker with appendix 3B equipment. Additionally, the storage location descriptions for these two appendices were different and the equipment was not clearly identified. Prior to the end of this inspection, BFN personnel took steps to correct this problem.

K. 4, PREVENTION OF INJECTION

No comments.

L. 5A, INJECTION SYSTEM LINEUP - CONDENSATE/FEEDWATER

1. Step 8 - This step did not give the label designation for the Reactor Water Level Trip Channels A, B and C reset push buttons. Prior to the end of this inspection, BFN personnel issued a PCR to correct this problem.

2. Step 10 - This step had the operator verify both the HP and LP stop valves for the RFPs were open. No label designation was given in the procedure to aid the operator in identifying the proper lights to monitor to verify this action. Prior to the end of this inspection, BFN personnel issued a PCR to research and correct this problem.

3. Step 14 - This step had the operator use the MGU to increase RFP speed. There was no step to place the MGU in manual prior to performing step 14. BFN personnel stated the MGU would normally be placed in manual during step 6. Prior to the end of this inspection, BFN personnel issued a PCR to make this action more clear.

M. 5B, INJECTION SYSTEM LINEUP - CRD

No comments.

N. 5C, INJECTION SYSTEM LINEUP - RCIC

No comments.

O. 5D, INJECTION SYSTEM LINEUP - HPCI

No comments.

P. 6A, INJECTION SUBSYSTEM LINEUP - CONDENSATE TRANSFER PUMP TO RHR AND CS

No comments.

Q. 6B, INJECTION SUBSYSTEM LINEUP - RHR SYSTEM I LPCI MODE

No comments.

R. 6C, INJECTION SUBSYSTEM LINEUP - RHR SYSTEM II LPCI MODE

No comments.

S. 6D, INJECTION SUBSYSTEM LINEUP - CORE SPRAY SYSTEM I

Step 4 - This step directed the operator to control the CS injection valve to maintain flow at or below 3125 gpm per pump. Indicator 2-FI-75-21 on Panel 9-3 could not be read to this level of precision. (Instrument reads in gradations of 100 gpm.) Prior to the end of this inspection, BFN personnel issued a PCR to modify the procedure to establish the flow setpoint at the closest conservative readable value that could be measured on the available flow instrumentation.

T. 6E, INJECTION SUBSYSTEM LINEUP - CORE SPRAY SYSTEM II

Step 4 - See similar comment for appendix 6D, INJECTION SUBSYSTEM LINEUP - CORE SPRAY SYSTEM I. This comment was directed toward 2-FI-75-49 on Panel 9-3.

U. 7A, ALTERNATE RPV INJECTION SYSTEM LINEUP - CONDENSATE TRANSFER PUMPS TO RHR AND CS

No comments.

V. 7B, ALTERNATE RPV INJECTION SYSTEM LINEUP - SLC SYSTEM

No comments.

W. 7C, ALTERNATE RPV INJECTION SYSTEM LINEUP - RHR CROSSTIE

1. Step 3.b - Handswitch HS-74-149 was identified in the Appendix as RHR SYS-2 MIN FLOW BYPASS. This handswitch was identified on the MCR control panel as RHR SYSTEM II LOW FLOW BYPASS.

2. Step 3.g - Valve FCV 74-67 was identified in the Appendix as RHR SYS II INBD RECIRC LOOP VALVE. This valve was identified on the MCR control panel as RHR SYS II INBD INJECTION VALVE.

3. Step 3.g - Valve FCV-74-71 was identified in the Appendix as RHR SYS II SUPPRESSION POOL VALVE. This valve was identified on the MCR control panel as RHR SYS II SUPPR POOL SPRAY/TEST ISOL VLV.

X. 7D, ALTERNATE RPV INJECTION SYSTEM LINEUP - STANDBY COOLANT

No comments.

Y. 7E, ALTERNATE RPV INJECTION SYSTEM LINEUP - RHR DRAIN PUMP A

Step 4 - This step required local operation of valve 2-74-624, RHR SYS XTIE DR, which was located off the catwalk on top of the PSC. This area was contaminated, poorly lit and could potentially be a very high radiation area during a LOCA. Additionally, the valve could not be reached or easily seen from the catwalk and the operator had to stand on other pipes or seismic bracing to perform the task. After reviewing this comment, BFN personnel identified an alternate path to inject RHR drain pump flow to the RPV without requiring an operator to climb on top of the PSC. Prior to the end of this inspection, a PCR had been issued to rewrite this appendix for the new flow path.

Z. 7F, ALTERNATE RPV INJECTION SYSTEM LINEUP - RHR DRAIN PUMP B

Step 4 - See similar comment for appendix 7E, ALTERNATE RPV INJECTION SYSTEM LINEUP - RHR DRAIN PUMP A. This comment was directed towards local operation of valve 2-74-622, RHR SYS I HDR DR.

AA. 7G, ALTERNATE RPV INJECTION SYSTEM LINEUP - PRESSURE SUPPRESSION CHAMBER HEAD TANK PUMPS

1. Step 4.b - This step provided for draining the PSC head tank level switch. A fitting was provided in the EOI box to install a tygon tube to the drain line. This piece of equipment was not listed in Attachment 1. Additionally, a tool was not provided to secure the fitting. Prior to the end of this inspection, BFN personnel issued a PCR to correct this discrepancy.

2. Step 4.b - This step provided for draining the PSC head tank level switch. There were no procedural steps to install the equipment listed in Attachment 1 prior to opening the drain valve. Prior to the end of this inspection, BFN personnel issued a PCR to correct this problem.

3. General - While attempting to install the fitting to the drain line per the procedure, the operator was unable to get the fitting to thread into the

line properly. BFN's investigation revealed the maintenance group had failed to remove a special fitting from the valve manifold after completion of a surveillance. The operator was not familiar enough with the valve manifold to recognize this abnormal situation and was unable to install the fitting. BFN personnel took appropriate corrective actions to ensure the maintenance group would properly restore the system to normal configuration following all maintenance activities.

4. Attachment 2 - This attachment provided the operator a schematic of the valves at the PSC head tank. This attachment involved a complicated valve manifold lineup while other appendix drawings more accurately represented the equipment as viewed by the operator. BFN personnel investigated this area and issued a PCR to more accurately represent the valve manifold configuration.

AB. 7H, ALTERNATE RPV INJECTION SYSTEM LINEUP - RCIC USING AUXILIARY STEAM

1. Step 2 - This step stated "Notify Maintenance to install RCIC spool piece." The step did not include a procedural reference or instructions on the installation of the RCIC spool piece. There was no attachment that listed the parts and tools required to install the spool piece.

2. Step 3 - This step stated "Notify personnel to place two auxiliary boilers in service, if available." This step did not include a procedural reference or instruction for placing the auxiliary boilers in service or for what actions are required if two boilers are not available. BFN personnel stated they would evaluate the need for appropriate administrative controls to ensure the number of auxiliary boilers would be commensurate with the requirements of this appendix.

AC. 7J, ALTERNATE RPV INJECTION SYSTEM LINEUP - HPCI USING AUXILIARY STEAM

1. Step 2 - See similar comment for appendix 7H, ALTERNATE RPV INJECTION SYSTEM LINEUP - RCIC USING AUXILIARY STEAM. This comment was directed towards installation of the HPCI spool piece.

2. Step 3 - See identical comment for appendix 7H, ALTERNATE RPV INJECTION SYSTEM LINEUP - RCIC USING

AUXILIARY STEAM. This comment was directed towards auxiliary boiler requirements.

AD. 7K, ALTERNATE RPV INJECTION SYSTEM LINEUP - FIRE SYSTEM

1. General - Several components located outside the MCR, which were required to be locally operated, were not provided with appropriate EOI markings. Three examples were 1-FCV-23-57, 2-FCV-23-53 and 2-FCV-23-57.

2. Step 1 - This step started the diesel-driven fire pump. It did not identify the hand switch (0-HS-26-106A) for starting the fire pump.

3. Steps 4 and 5 - These steps opened valves on RHR system I and II, respectively. These steps did not differentiate those steps to be performed in the MCR from those to be performed locally. Also, Step 4 did not indicate from which MCR panel these actions were to be performed.

AE. 8A, BYPASS GROUP 1 RPV LOW LOW LOW LEVEL ISOLATION INTERLOCKS

No comments.

AF. 8B, REOPENING MSIVS FOLLOWING A GROUP 1 ISOLATION

General - The appendix did not contain the general caution that reminded the operators of the 50 psi differential pressure concern across the MSIVs when reopening. This caution was included in plant OIs and AOIs. Prior to the end of this inspection, BFN personnel initiated an EOI change request form to include the caution in the appendix.

AG. 8C, BYPASS GROUP 6 ISOLATION INTERLOCK TO DRYWELL CONTROL AIR COMPRESSOR SUCTION VALVE

No comments.

AH. 8D, RESTORING DRYWELL CONTROL AIR FOLLOWING GROUP 6 ISOLATION

No comments.

AI. 8E, BYPASSING GROUP 6 LOW LEVEL AND HIGH LEVEL DRYWELL PRESSURE ISOLATION INTERLOCKS

No comments.

AJ. 8F, RESTORING REFUELING ZONE AND REACTOR ZONE VENTILATION FANS FOLLOWING GROUP 6 ISOLATION

No comments.

AK. 8G, CROSSTIE CAD TO DRYWELL CONTROL AIR

1. General - The procedure did not indicate a ladder was required to perform some required steps nor did it provide location information for a ladder. Prior to the end of this inspection, BFN personnel initiated an EOI change request form to consider adding ladder requirements and the location of ladders to perform the task.

2. Step 3 - See identical comment for appendix 1B, VENTING AND REPRESSURIZING THE SCRAM PILOT AIR HEADER. This comment was directed towards actions performed in the reactor building.

AL. 9, PRIMARY CONTAINMENT WATER LEVEL MONITORING AND EQUIPMENT CONTROL

1. Steps 4.a and 6.e.1 - These steps stated "Refer to attachment 1 and obtain keys from the SOS key cabinet." During the walkthrough, these keys were already installed in the switches and thus appeared unnecessary.

2. Step 6.b - This step identified fuse F-3 as 2-FU1-43-13BA. The typed list on the panel door identified this fuse as 2-FU-1-043-0013BB, and the typed label on the orange EOI sticker on the panel door identified this fuse as 2-FU1-043-0013AB.

3. Step 6.d note - This note stated step 6.d was (sic) preferred as soon as possible after primary containment flooding begins instead of performed as soon as possible. Prior to the end of this inspection, BFN personnel issued a PCR to correct this problem.

4. Step 6.e.5 - This step referred to step 6.f.4, but step 6.f.4 did not exist. Prior to the end of this inspection, BFN personnel issued a PCR to change the reference of step 6.f.4 to step 6.e.4.

5. Attachment 1, Item 1 - This attachment referenced two 100 psig instrument test gauges. These gauges were to be obtained from the I&C Section, M&TE Standards Lab in the Service Building. There were no administrative controls to ensure these gauges

would be available exclusively for EOI use. Additionally, the test gauges were not identified with an EOI label.

AM. 10A, CORE SPRAY SYSTEM I OPERATION WITH SUCTION FROM CST

No comments.

AN. 10B, CORE SPRAY SYSTEM II OPERATION WITH SUCTION FROM CST

No comments.

AO. 10C, RHR SYSTEM I OPERATION WITH SUCTION FROM CST

No comments.

AP. 10D, RHR SYSTEM II OPERATION WITH SUCTION FROM CST

Steps 8 and 9 - Step 8 required a dispatched operator to open valves 2-HCV-74-34 and 2-HCV-74-45 locally. Step 9 required the operator to start RHR pumps B(D) when 2-HCV-74-34(35), RHR PUMP B(D) CST SUCTION VALVE, indicated open. There were two inconsistencies in these steps: 1) the steps were not formatted the same, and 2) the valve number labeling was incorrect for step 9. Prior to the end of this inspection, BFN personnel initiated a PCR to change step 9 to refer to 2-HCV-74-34(45).

AQ. 11A, ALTERNATE RPV PRESSURE CONTROL SYSTEM - MSRVS

No comments.

AR. 11B, ALTERNATE RPV PRESSURE CONTROL SYSTEM - RCIC TEST MODE

Step 4.d - This step required the operator to "Start RCIC vacuum pump." This step was not consistent with other procedural steps that stated the specific equipment handswitch number, equipment name, and required action. Prior to the end of this inspection, BFN personnel stated a PCR was initiated to change this step to be consistent with other procedural steps.

AS. 11C, ALTERNATE RPV PRESSURE CONTROL SYSTEM - HPCI TEST MODE

Step 6.d - This step required the operator to "Start the HPCI packing exhauster." This step was not consistent with other procedural steps that stated the specific equipment handswitch number, equipment name, and required

action. Prior to the end of this inspection, BFN personnel stated a PCR was initiated to change this step to be consistent with other procedural steps.

AT. 11D, ALTERNATE RPV PRESSURE CONTROL SYSTEM - MAIN STEAM LINE DRAINS AND/OR TURBINE AND RFPT DRAIN

No comments.

AU. 11E, ALTERNATE RPV PRESSURE CONTROL SYSTEM - RWCU SYSTEM BLOWDOWN/RECIRC MODE

No comments.

AV. 11F, ALTERNATE RPV PRESSURE CONTROL SYSTEM - RFPT ON MINIMUM FLOW

No comments.

AW. 11G, ALTERNATE RPV PRESSURE CONTROL SYSTEM - STEAM SEALS, SJAES, OFF-GAS PREHEATS

Step 2 - This step required the operator to verify "Stack Dilution Fans in service." This step did not specify the number of Stack Dilution Fans required to be in service. The requirements were one of the two Unit 2 and one of the two Unit 3 fans must be in service.

AX. 11H, ALTERNATE RPV PRESSURE CONTROL SYSTEM - MAIN CONDENSER

Steps 3 and 4 - These steps required the verification of both SJAE trains in service. Normally, only one SJAE train was required to be in service.

AY. 11J, ALTERNATE RPV PRESSURE CONTROL SYSTEM - HPCI AND RCIC

Step 2.a.5 - This step required the removal of fuses 23A-F19 and 23A-F20. These fuses were not listed on the instrument panel in the auxiliary instrument room. In response to questions about these and other fuses, BFN personnel indicated they were currently performing a fuse identification labeling program. The safety-related panels were scheduled for completion first followed by nonsafety-related panels. Prior to the end of this inspection, BFN personnel stated the labeling group would evaluate the priority of the fuses associated with EOI performance and make any scheduling adjustments necessary.

AZ. 11K, ALTERNATE RPV PRESSURE CONTROL SYSTEM - RPV HEAD VENTS

No comments.

BA. 12A, PRIMARY CONTAINMENT VENTING

1. Step 4.e - This step directed the operator to monitor stack release rates and adjust vent flow rate to maintain radiation release rates below SI-4.8.B.1.A.1 limits. BFN personnel interviewed had different interpretations of the limits.

2. Four valves used in this appendix have indications on both Panel 9-3 and Panel 9-54. The label nomenclature for these valves was not consistent between panels (though they do match the appendix). The following were the affected valves:

| | | |
|---|---|---|
| 9-3: | 2-FCV-64-34, | SUPPR CHBR TO SGT INBD ISOL VLV |
| | 2-FCV-64-32, | SUPPR CHBR EXH INBD ISOL VLV |
| | 2-FCV-64-31, | DW TO SGT INBD ISOL VLV |
| | 2-FCV-64-29, | DRYWELL EXHAUST INBD ISOL VLV |
| 9-54: | 2-HS-64-34, | SUPPR CHBR TO SGT INBD ISOL VLV |
| | 2-HS-64-32, | SUPPR CHBR EXH INBD ISOL VLV |
| | 2-HS-64-31, | DW TO SGT INBD ISOL VLV |
| | 2-HS-64-29, | DRYWELL EXHAUST INBD ISOL VLV |

Before the end of this inspection, BFN personnel had initiated a PCR to revise the appendix, after the labels have been modified for consistency.

BB. 12B, PRIMARY CONTAINMENT VENTING FOR HYDROGEN CONTROL

No comments.

BC. 13, EMERGENCY VENTING PRIMARY CONTAINMENT

General - Several steps involved verifying positions for valves controlled on Panel 9-3, which have redundant position indication on Panel 9-54. Without specifying which indication should be used, the venting process could be delayed while the operator walked between the two panels. Prior to the end of this inspection, BFN

personnel stated a PCR was initiated to change the procedure.

BD. 14A, N2 MAKEUP TO PRIMARY CONTAINMENT

No comments.

BE. 14B, CAD OPERATION

No comments.

BF. 14C, VENTING AND PURGING PRIMARY CONTAINMENT

1. General - Access to EOI contacts on bus CC in Panel 9-43, in the Unit 2 auxiliary instrument room, was difficult and potentially dangerous. The operator needed to insert his head and upper body inside the cabinet and move aside cable bundles to view and install the necessary jumpers to accomplish the task. Prior to the end of this inspection, BFN personnel issued an EOI change to jumper less hazardous contacts and still meet the intent of the appendix.

2. General - The team noted an orange EOI contact designator attached near contacts on bus BB that seemed to have no function. Upon review, BFN personnel determined it was a designator associated with a previous EOI revision that was no longer applicable. Prior to the end of this inspection, the designator was removed.

BG. 15, RPV VENTING FOR PRIMARY CONTAINMENT FLOODING

1. Step 2.c.5 - This step required a dispatched operator to open turbine seal steam isolation valve 2-12-638 slowly. This valve did not have an appropriate EOI marking. Prior to the end of this inspection, BFN personnel appropriately marked this valve with an EOI label.

2. Step 6.a.3 - This step referenced fuse location CC-1FU in panel 9-39 (rear), but there was no label for this fuse on the fuse block. Two other fuses in this block had labels. However, the labels on the panel door and the orange EOI labels permitted proper identification of the appropriate fuse.

3. Step 7 - This step included a transition from C6, Primary Containment Flooding. However, this

transition was not consistent with other transitions, because it did not include a specific step reference.

BH. 16A, BYPASSING RCIC LOW REACTOR PRESSURE ISOLATION INTERLOCKS

No comments.

BI. 16B, BYPASSING RCIC TEST MODE ISOLATION INTERLOCKS

No comments.

BJ. 16C, BYPASSING HPCI LOW REACTOR PRESSURE ISOLATION INTERLOCKS

No comments.

BK. 16D, BYPASSING HPCI TEST MODE ISOLATION INTERLOCKS

Step 2.a - This step had the operator install boots on several relay contacts on Panel 9-39. These relays were not listed in the order they were installed on the panel. This was not consistent with human factor endeavors to avoid the potential of mistakenly booting the wrong contacts. Prior to the end of this inspection, BFN personnel initiated a PCR to reorder the list of relays in the appendix.

BL. 16E, BYPASSING HPCI HIGH SUPPRESSION POOL WATER LEVEL SUCTION TRANSFER INTERLOCK

No comments.

BM. 16F, BYPASSING RHR SYSTEM I INJECTION VALVE TIMERS

No comments.

BN. 16G, BYPASSING RHR SYSTEM II INJECTION VALVE TIMERS

No comments.

BO. 16H, BYPASSING RCIC HIGH RPV LEVEL ISOLATION INTERLOCKS

Step 1.b - This step required the opening of the RCIC turbine steam supply valve. The step did not contain sufficient information to determine if this should be opened from the breaker compartment or locally at the valve.

BP. 16J, BYPASSING HPCI HIGH RPV LEVEL INTERLOCKS

No comments.

BQ. 17A, RHR SYSTEM OPERATION IN SUPPRESSION POOL COOLING MODE

1. General - Several steps were written that referred to drywell pressure of either 2.45 psig or 2.4 psig. During the inspection BFN personnel stated, if the procedure were referencing the DW scram setpoint, then 2.45 psig should be the value given. Similarly, if the procedure were referencing operator action based on DW instrument readings, then 2.4 psig should be the value given (closest conservative readable value). Before the end of the inspection BFN personnel determined this policy had not been properly followed for this appendix and issued a PCR to resolve the problem.

2. Step 3.f - This step provided five actions for restoring RHR System I (II) logic to normal. Appendices 17B and 17C provide similar guidance but only three actions were specified. The fourth and fifth actions given in appendix 17A were listed as combined steps in appendices 17B and 17C. Discussions with facility staff members indicated appendices 17B and 17C were correct. Before the end of the inspection BFN personnel issued a PCR to correct the differences among these three procedures.

BR. 17B, RHR SYSTEM OPERATION - DRYWELL SPRAYS

General - See identical comment for appendix 17A, RHR SYSTEM OPERATION IN SUPPRESSION POOL COOLING MODE. This comment was directed towards the use of drywell pressure.

BS. 17C, RHR SYSTEM OPERATION - SUPPRESSION CHAMBER SPRAYS

General - See identical comment for appendix 17A, RHR SYSTEM OPERATION IN SUPPRESSION POOL COOLING MODE. This comment was directed towards the use of drywell pressure.

BT. 17D, RHR SYSTEM OPERATION - SHUTDOWN COOLING

No comments.

BU. 18, SUPPRESSION POOL WATER INVENTORY REMOVAL AND MAKEUP

No comments.

BV. 100.1, DOCUMENTATION AND RESTORATION OF ABNORMAL SYSTEM CONFIGURATION, FUSES, AND INTERLOCKS

No comments.

III. Abnormal Operating Instructions

A. AOI-1-1, RELIEF VALVE STUCK OPEN

No comments.

B. AOI-1-3, MAIN STEAM ISOLATION VALVE CLOSURE AT POWER

No comments.

C. AOI-3-1, REACTOR WATER LEVEL

No comments.

D. AOI-30-B1, REACTOR BUILDING VENTILATION FAILURE

No comments.

E. AOI-30-B2, REACTOR BUILDING SMOKE REMOVAL

No comments.

F. AOI-32-2, LOSS OF CONTROL AIR

1. Symptom steps 2.4, 2.5, 2.8, and 2.9 - The setpoints listed for the annunciators in these symptoms do not match the associated ARP value. After further investigation, it was determined in one case the value in this AOI was correct and the setpoint given in the ARP was incorrect. Prior to the end of this inspection, BFN personnel issued a PCR to correct this problem.

2. Step 4.3.2 - This step referred to two valves opened in step 4.2.9. These valves were opened in step 4.2.10.

3. Step 4.3.8 - This step referred to actions taken in steps 4.2.11.1 and 4.2.11.2. These actions were performed in steps 4.2.12.1 and 4.2.12.2.

4. Step 4.3.9 - This step referred to actions taken in step 4.2.11.3. These actions were performed in step 4.2.12.3.

5. Step 4.3.15 - This step referred to actions taken in steps 4.2.7.1 and 4.2.7.3. These actions were performed in steps 4.2.8.1 and 4.2.8.3.

6. Step 4.3.18 - This step referred to actions taken in step 4.2.18. These actions were taken in step 4.2.19.

7. Step 4.3.19 - This step referred to actions taken in step 4.2.19. These actions were taken in step 4.2.20.

8. Step 4.2.6.2 Note - This note stated the RFP turbine turning gear would not remain engaged after manually engaging without control air. Therefore, flow should be established through the RFP minimum flow piping and RFP turbine shaft rotating prior to admitting seal steam. There were no procedural steps referenced for accomplishing these tasks. Procedure 2-OI-3, Reactor Feedwater System, section 5.1 provided the procedural guidance necessary to accomplish these tasks. Prior to the end of this inspection, BFN personnel issued a PCR to correct the procedure.

9. Attachment 1, step 5.16.3 - This step referred to the Fuel Pool Demin Holding Pump discharge valve but did not give the valve number. BFN personnel stated the actual valve number was 2-FCV-78-33. Prior to the end of this inspection, BFN personnel issued a PCR to insert the appropriate valve number.

G. AOI-32A-1, LOSS OF DRYWELL CONTROL AIR

Step 4.2.4.1 _ This step directed the operator to start CAD nitrogen to the Drywell Control Air System in accordance with 2-OI-84, Section 8.6. Performing Section 8.6 would only align CAD to one section of the Drywell Control Air Header. Section 8.7 was also required to align CAD to both sections of the drywell air header. Prior to the end of this inspection, BFN personnel initiated a PCR to correct this deficiency.

H. AOI-47-1, UNPLANNED TURBINE TRIP BELOW 30% REACTOR POWER (WITHOUT SCRAM)

No comments.

I. AOI-47-2, REACTOR PRESSURE CONTROL UNIT FAILURE

No comments.

J. AOI-57-4, LOSS OF UNIT PREFERRED

Step 4.2.4 - This step directed the operator to reenergize the Unit Preferred. There were no procedural steps for accomplishing this task. Prior to the end of this inspection, BFN personnel initiated a PCR to correct this deficiency.

K. AOI-57-5A, LOSS OF I&C BUS A

No comments.

L. AOI-57-5B, LOSS OF I&C BUS B

1. Step 4.2.3 - This step referred to PDIC-64-1 panel 25-219, but the actual panel was labelled 25-215. The Unit 1 and 3 panels were labelled 25-219 and 25-215, respectively.

2. Attachment 1 - Page 1 of this attachment (page 9 of the AOI) began with item (C).

3. Attachment 1 - The format of this attachment was inconsistent with the format of attachment 1 of AOI-57-5A, Loss of I&C Bus A.

4. Attachment 1 - Item (2) on page 2 of this attachment (page 10 of the AOI) referred the user to page 11 of the AOI. After item (2) on page 11 was completed, the user would be required to return to page 10 to complete items (3) and (4). Although item (4) began on page 10, it skipped page 11 and was continued on pages 12 and 13 without referencing where to continue.

M. AOI-57-9, LOSS OF ANNUNCIATOR PANEL(S) SUPPLIED BY PANEL 9-9 CABINET ONE

No comments.

N. AOI-68-2, JET PUMP FAILURE

1. Symptom step 2.6 - This symptom repeated the symptoms evaluated in step 2.1. Prior to the end of this inspection, BFN personnel issued a PCR to delete this symptom step.

2. Step 4.2.2 - This step referred the operator to 2-OI-68, Reactor Recirculation System, Illustration 1 to ensure the operation of the reactor was within the Operating Map while decreasing power. Power reduction would be in accordance with 2-GOI-100-12A, Unit Shutdown From Power Operations To Cold Shutdown and Reductions In Power During Power Operations and this procedure also contained Illustration 1. Prior to the end of this inspection, BFN personnel issued a PCR to modify the AOI.

O. AOI-70-1, LOSS OF RBCCW

1. Symptom step 2.1.3 - This symptom referenced an ARP, 2-XA-55-4C window 7, as a symptom for the loss of RBCCW, but the ARP did not direct the operator to refer to the AOI for the loss of RBCCW. Prior to the end of this inspection, BFN personnel initiated a PCR to delete the reference to the ARP.

2. Symptom steps 2.1.7, 2.1.9, 2.1.10, and 2.1.11 - These symptoms referenced ARPs. The referenced ARPs did not refer the operator to the AOI for the loss of RBCCW. Prior to the end of this inspection, BFN personnel stated they would evaluate the references to the ARPs and make changes as required.

3. Step 4.1.2.1 - This step required the operator to use the Master/Manual controller and run the recirculation pumps to 45 percent speed. The caution, reminding operators core flow decreased to less than 45 percent while rod line is greater than 80 percent may cause power oscillations, followed procedure step 4.2.1. Prior to the end of this inspection, BFN personnel initiated a PCR to place the caution prior to step 4.1.2.1.

4. ARP 2-XA-55-4C - This ARP for the closure of RBCCW 70-48 valve, did not reference the AOI for loss of RBCCW. Prior to the end of this inspection, BFN personnel initiated a PCR for ARP, 2-XA-55-4C, directing the operators to reference the AOI for the loss of RBCCW.

P. AOI-74-1, LOSS OF SHUTDOWN COOLING

1. Step 4.2.3.1 - This step required the operator to place a recirculation pump in service and/or an RHR pump in shutdown cooling in accordance with procedures 2-OI-68 or 2-OI-74, but it did not

reference an applicable OI section or step. Steps 4.2.8, 4.2.9, 4.2.10, 4.2.11, 4.2.13.1.4, 4.2.13.1.6.a, 4.2.13.2.3, and 4.2.13.2.5 of this AOI all referenced applicable OI sections.

2. Step 4.2.3.2.2 - This step required the operator to increase the RWCU flow rate in accordance with procedure 2-OI-69. The AOI transitioned the operator out of the AOI, into the OI, and back to the AOI again to perform only one step (5.1.10) of the OI. In addition, an OI step or section number was not referenced for this transition.

3. Step 4.2.3.2.3 - This step required the operator to reject water with RWCU in accordance with procedure 2-OI-69. There were no OI steps or section numbers referenced for this transition, and the OI table of contents did not reference rejecting water. The OI table of contents did, however, reference blowdown operations in section 6.6.

4. Step 4.2.13.1.6.a - This step required the operator to verify main condenser vacuum or place the main condenser in service and restore vacuum in accordance with section 5.1 of procedure 2-OI-66. Section 5.1 of procedure 2-OI-66 referred to establishing off gas stack air flow, and section 5.2 referred to placing the mechanical vacuum pumps in service.

Q. AOI-79-1, FUEL DAMAGE DURING REFUELING

1. Step 2.1.1 - The instrument number, 2-RA-90-1A, was missing from the window description.

2. Step 4.2.3 - This step referenced EPIP-1. This step was not consistent with the instructions in AOI-79-2 because it did not include subsequent instructions for: 1) Notification of NRC and 2) Notification of Plant Management.

R. AOI-79-2, INADVERTENT CRITICALITY DURING INCORE FUEL MOVEMENT

1. Step 3.1 - This step did not reference instrument numbers and was inconsistent with AOI-79.1.

2. Step 4.2.1 - This step directed the operator to place a fuel assembly in the SFSP if unexpected criticality occurred. This step was not appropriate for incore fuel shuffling since there

was no analyzed location in the SFSP to place the assembly.

3. Step 4.2.3 - This step verified control rods were inserted. It was more appropriate to perform this step prior to stopping the CRD pumps or initiating SLC.

S. AOI-85-1, ROD DROP ACCIDENT

1. Step 2.3 - This step had the operator check whether annunciators on Panel 9-5 were in alarm. However, the annunciator given in step 2.3.7 (NEUTRON MONITORING SYSTEM HALF SCRAM) was located on Panel 9-4. Prior to the end of this inspection, BFN personnel issued a PCR to correct this error.

2. Step 2.3 - None of the annunciator procedures referenced gave dropped rod as a possible cause for the particular alarm nor did they refer the operator to 2-AOI-85-1. Prior to the end of this inspection, BFN personnel stated they would evaluate this discrepancy and take appropriate actions.

3. Step 4.2.7 - This step had the operator shutdown the plant in accordance with "2-GOI-100-12A, Unit Shutdown From Power Operations To Cold Shutdown." The actual title of the referenced procedure was "2-GOI-100-12A, Unit Shutdown From Power Operations To Cold Shutdown and Reductions In Power During Power Operations." Prior to the end of this inspection, BFN personnel issued a PCR to correct this error.

T. AOI-85-3, CRD SYSTEM FAILURE

No comments.

U. AOI-85-4, LOSS OF RPIS

Steps 4.2.5.2.3 and 4.2.5.3.3 - These steps had the operator check the amperage meter reads between 30 and 40 amps. During plant walkthroughs, several meters read 10 amps and were considered normal by the AUO since a note preceding these steps stated the current may fluctuate depending on load but the voltage must be constant. Upon further investigation BFN personnel stated there was no purpose for these steps. Prior to the end of this inspection, BFN personnel stated they would evaluate these steps and take appropriate actions.

V. AOI-85-7, MISPOSITIONED CONTROL ROD

Step 4.2.1 _ This step required the operator to contact the Reactor Engineer, Shift Technical Advisor and the Shift Operations Supervisor to have them verify a control rod was mispositioned. The term verify was defined as "to observe an expected characteristic or condition and, if not as expected, to take action to place in the expected condition." This was clearly not the intent of this step. Prior to the end of this inspection, BFN personnel issued a PCR to correct this error.

W. AOI-90-2, WIDE RANGE GASEOUS EFFLUENT RADIATION MONITORING SYSTEM ALARMS

Step 4.2.1 - This step stated if any EOI entry condition were met, then enter the appropriate EOI(s). There was no direct method for WGERMS to identify entry conditions to any EOI.

X. AOI-99-9, LOSS OF POWER TO ONE RPS BUS

No comments.

Y. AOI-100-1, REACTOR SCRAM

1. Step 4.2.27 - This step required the operators to notify the "cooling towers" in the winter time only. Apparently the step referred to the cooling tower AUO. Prior to the end of this inspection, BFN personnel initiated a PCR to change the wording of the procedure.

2. Attachment 1, Item 6 - This attachment stated the APRM downscale setpoint was 3 percent. The correct value for this setpoint was 5 percent.

3. Attachment 6, Source AOI-70-1, Section 4.2 - This attachment stated a manual scram was required if drywell temperature indicated greater than 160 degrees Fahrenheit. EOI-2 would allow operation until drywell temperature exceeded 200 degrees Fahrenheit. Prior to the end of this inspection, BFN initiated a PCR to change the wording of the procedure.

4. Attachment 6, Source AOI-66-1, Section 4.2 - This attachment stated the operator was to obtain approval prior to a manual reactor scram. This was inconsistent with standard operator training.

Prior to the end of this inspection, BFN personnel initiated a PCR to change the wording of the procedure.

5. Attachment 6, Page 42 - This page contained several conditions that required a manual reactor scram. Some conditions were identified as Immediate Operator Actions and others were not. Several conditions that required immediate scram actions were not consistent with the requirements of the AOIs. Prior to the end of this inspection, BFN personnel initiated a PCR to change the wording of the procedure.

Z. AOI-100-2, CONTROL ROOM ABANDONMENT

1. General - Several attachments did not have personnel specifically assigned to perform the attachments. Prior to the end of this inspection, BFN stated they would evaluate these attachments and take appropriate actions.

2. Unit 2 ASOS Panel Checklist - Switch/Breaker Numbers, 5B and 18C, were located on 480v RMOV Board 2A. The procedure stated they were located on 480v Shutdown Board 2A.

IV. EOI Program Manual

A. Section III-D, EOI-2, Primary Containment Control Cross Reference. Pages 55 and 61 stated the Pressure Suppression Chamber Spray Initiation Pressure was 11.42 psig and 11.25 psig, respectively. After further investigation, BFN personnel stated the proper value was 12.42 psig (as supported by Appendix C calculation worksheet 12). The investigators determined the EOI-2 flowchart contained the proper conservative value of 12 psig but the PSTG, cross reference and basis documents had not been properly updated for the new setpoint. Prior to the end of this inspection, BFN personnel issued a PCR to correct this error.

B. Section VI-J, RPV Variables Worksheet 10. The calculation for the Minimum Core Flooding Interval (used in Contingency 4, RPV Flooding) required a value for the mass of fuel in the vessel. This value has varied with each core loading and the calculation should be reverified as being conservative prior to each start-up following reload. Prior to the end of this inspection, BFN personnel stated they would review this calculation

prior to all future reload start-ups to verify fuel mass changes did not non-conservatively affect Minimum Core Flooding Interval.

V. Generic Comments

A. Several EOI appendices involved removing leads and installing jumpers in the Unit 2 auxiliary instrument room. Most, but not all, of these leads had orange colored electrical tape attached as an operator aid. This marking technique was not permanent and not authorized by plant procedures. While the team concurred this was a useful operator aid and helped clarify which leads were EOI leads, the program should be formal and consistently used.

B. The EOI box in the Unit 2 auxiliary instrument room had so many EOI appendix packages, with attached tools and equipment, that locating a specific appendix package was difficult and the handling of the packages sometimes caused the tools and equipment to become separated from their associated appendix package. Prior to the end of this inspection, BFN personnel stated they would evaluate alternate methods for storing and indexing these appendices.

C. Normal lighting in the Unit 2 torus area and on top of the PSC was poor. Many fixtures had bulbs that needed replacement. Prior to the end of this inspection, BFN personnel issued a work request to correct the problem.

D. Valve lineup checklists were often used by the operators to identify the general location of a valve. Most BFN procedures did not routinely provide valve locations. Valves in these lists were grouped together by plant location and some valve lists were 65 pages long. These lists were poorly organized and did not serve as an effective tool for the operator to identify valve locations. Additionally, there was no cross reference list. Prior to the end of this inspection, BFN personnel stated they would evaluate this condition and take appropriate actions.

VI. ALARM RESPONSE PROCEDURE COMMENTS

| PROCEDURE NO. | COMMENT |
|---|---|
| 2-XA-55-5B | 1. Step 1 of the procedure stated the blown fuse indicators on panel 2-9-47 were amber. The lights were blue. |
| | 2. Step 2 directed the operator to check amber |

| | | |
|---|---|---|
| | | lights on panels 2-9-5, 9-15 or 9-17. These lights were red. |
| 2-ARP-9-5<br>2-XA-55-5A<br>WINDOW 4 | 1. | The ARP had the setpoint for the APRM downscale at 3 percent. The setpoint had been changed to 5 percent. |
| 2-ARP-9-4<br>2-XA-55-4A | 1. | The ARP on a low level scram setpoint and EOI-1 entry condition, referred the operator to procedure 2-AOI-100-1, but it did not refer the operator to EOI-1. |
| 2-ARP-9-8<br>2-XA-55-8C | 1. | Step 1, under automatic actions, was "NONE" while step 2 contained actions to be performed by the operator. |
| 2-ARP-9-3<br>2-XA-55-3D | 1. | Step 2, under operator actions, did not clearly identify which fuse should be checked by the operator. |
| 2-ARP-9-5<br>2-XA-55-5B | 1. | Step 1, under operator actions, referenced 2-GOI-100-3. The correct reference was 2-AOI-79-2. |
| 2-ARP-9-3<br>2-XA-55-3D<br>WINDOW 31 | 1. | Step 2 did not identify which fuse was to be verified by the operators. |

VII. Other Plant Procedures

A. 2-OI-3, REACTOR FEEDWATER SYSTEM

General - A note at the beginning of procedure section 5.1 specified the steps for placing the RFPs on minimum flow. The steps were 5.1.1 to 5.1.6 and 5.1.21 to 5.1.25. There was no step 5.1.25. Prior to the end of this inspection, BFN personnel issued a PCR to correct this error.

B. 2-9-5 ARP for 2-XA-55-5A, Window 8, REACTOR WATER LEVEL ABNORMAL 2-LA-3-53

General - This alarm procedure had the trip setpoints listed as 27 inches and 39 inches. Similar procedures specify whether the trip occurred at less than or greater than the setpoint. Prior to the end of this inspection, BFN personnel issued a PCR to correct this error.

## Appendix C

### WRITER'S GUIDE COMMENTS

This Appendix contains WG comments and observations. Unless specifically stated, these comments were not regulatory requirements. However, the licensee acknowledged the factual content of each of these comments as stated. The licensee agreed to evaluate each comment, to take the appropriate action, and to document that action. These items will be reviewed during a future NRC inspection.

The licensee developed two WGs. EOI Program manual 2-EOIPM Section VII-B WG for Emergency Operating Instructions provided guidance on flowchart format instructions. EOI Program Manual 2-EOIPM Section VII-E WG for Emergency Operating Instruction Appendices provided guidance on creating and revising Appendices in textual format.

The WG for EOIs provided clear guidance for:

- EOI Planning
- EOI Designation and Numbering
- EOI Structure
- Flowchart Preparation
- Step Construction
- Mechanics

No specific concerns were identified with the WG for Emergency Operating Instructions.

The WG for EOI Appendices provided guidance for:

- EOI Appendix Planning
- EOI Appendix Organization
- EOI Appendix Designation and Numbering
- EOI Appendix Format

The WG did not provide guidance on the "level of detail" for step construction of EOI Appendices. Prior to the end of this inspection, BFN personnel initiated a change request using an SSP 12.16, Emergency Operating Instruction Control form. The instructions in the proposed level of detail guidance will produce the same level of detail in the current flowchart WG. Both WGs for flowcharts and appendices were found to be acceptable from a human factors perspective.

In conclusion, the WGs in general included the appropriate topics as specified by NUREG-0899. While there were minor examples of areas where the WGs deviated from or did not thoroughly address the applicable NUREG-0899 topics in a non-restrictive manner, overall the WGs were written so they would produce and maintain high quality procedures, ensured consistency within and between procedures, and would retain that consistency over time and through personnel changes.

## Appendix D

## NOMENCLATURE

This Appendix contains basic plant nomenclature weaknesses. For example, instances where the WG would cause the reader to expect an exact nomenclature match with component nomenclature, yet there was no match. The licensee agreed in each case to evaluate the problem and make the appropriate changes. These items will be reviewed during a future NRC inspection.

| ATTACHMENT /STEP | EOI NOMENCLATURE | COMPONENT NOMENCLATURE |
|---|---|---|
| | **EOI-2** | |
| DW/T-9 | DRYWELL BLOWERS | DRYWELL COOLER FANS |
| | **2-EOI-APPENDIX 1G** | |
| 6 | 2-FCV-85-23 | 2-PCV-85-23 |
| | **2-EOI-APPENDIX 5B** | |
| 2.a | CRD PUMP 2A | CRD PUMP A |
| | **2-EOI-APPENDIX 5D** | |
| 3 | 23A-DS63, HPCI HIGH WATER LVL TRIP | 23A-DS63, HPCI HIGH WATER LEVEL TRIP |
| 7 | 2-HS-73-10A, HPCI Packing Exhauster | 2-HS-73-10A, HPCI PACKING EXHAUSTER |
| | **2-EOI-APPENDIX 7C** | |
| 3.b | RHR SYS-2 MIN FLOW BYPASS | RHR SYSTEM II LOW FLOW BYPASS |
| 3.g | RHR SYS II INBD RECIRC LOOP VALVE | RHR SYS II INBD INJECTION VALVE |
| 3.g | RHR SYS II SUPPRESSION POOL VALVE | RHR SYS II SUPPR POOL SPRAY/TEST ISOL VLV |
| | **2-EOI-APPENDIX 7E** | |
| 1.c | 2-74-529A, RHR DR PUMP A ISOLATION | 2-74-529A, RHR DRAIN PUMP A SHUTOFF VLV |
| | **2-EOI-APPENDIX 7K** | |

**2-EOI-APPENDIX 7K**

| | | |
|---|---|---|
| 4 | STANDBY COOLANT VALVE FROM RHRSW | STANDBY COOLANT VALVE |
| | RHR SYSTEM I U-1 DISCH XTIE | RHR XTX A-C DISCHARGE CROSSTIE VLV |
| 5 | STANDBY COOLANT VLV FROM RHRSW | STANDBY COOLANT VLV |

**2-EOI-APPENDIX 8G**

| | | |
|---|---|---|
| 2.b | 2-PI-84-7 (18) | O-FI-84-7 (18) |

**2-EOI-APPENDIX 10A**

| | | |
|---|---|---|
| 6 | 2-HCV-75-3, CORE SPRAY PUMP A CST SUCTION VLV | 2-HCV-75-3, PUMP A CST SUCTION VLV |
| 6 | 2-HCV-75-12, CORE SPRAY PUMP C CST SUCTION VLV. | 2-HCV-75-12, PUMP C CST SUCTION VLV |
| 13 | 2-HCV-75-3, CORE SPRAY PUMP A CST SUCTION VLV | 2-HCV-75-3, PUMP A CST SUCTION VLV |
| 13 | 2-HCV-75-12, CORE SPRAY PUMP C CST SUCTION VLV. | 2-HCV-75-12, PUMP C CST SUCTION VLV |

**2-EOI-APPENDIX 10B**

| | | |
|---|---|---|
| 6 | 2-HCV-75-31, CORE SPRAY PUMP B CST SUCTION VLV | 2-HCV-75-31, PUMP B CST SUCTION VLV |
| 6 | 2-HCV-75-40, CORE SPRAY PUMP D CST SUCTION VLV. | 2-HCV-75-40, PUMP D CST SUCTION VLV |
| 13 | 2-HCV-75-31, CORE SPRAY PUMP B CST SUCTION VLV | 2-HCV-75-31, PUMP B CST SUCTION VLV |
| 13 | 2-HCV-75-40, CORE SPRAY PUMP D CST SUCTION VLV. | 2-HCV-75-40, PUMP D CST SUCTION VLV |

**2-EOI-APPENDIX 11A**

| | | |
|---|---|---|
| 6.b | 2-PI-84-7 (18) | 0-FI-84-7 (18) |

**2-EOI-APPENDIX 11B**

| | | |
|---|---|---|
| 4.b | RCIC TURB TRIP & THROTTLE VALVE | RCIC TURB TRIP TROT VLV RESET |
| | **2-EOI-APPENDIX 15** | |
| 4.d | 2-FCV-1-55, MAIN STEAM LINE INBD DRAIN ISOL VALVE. | FCV-1-55, MAIN STEAM LINE DRAIN VALVE |
| 4.e | 2-FCV-1-56, MN STM LINE OUTBD DRAIN ISOL VLV | 2-FCV-1-56, MN STEAM LINE WARMING ISOL VLV |
| | **2-EOI-APPENDIX 16H** | |
| 1 | 250V DC Rx MOV Board 2C | 250-V DC REACTOR MOV BOARD 2C DIV-1 |
| 1.b | 2-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV | 2-FCV-71-8, RCIC TURB STEAM SUPPLY VLV |
| 1.c | 2-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV | 2-FCV-71-8, RCIC TURB STEAM SUPPLY VLV |
| | **2-EOI-APPENDIX 17B** | |
| 3 | DRYWELL BLOWERS | DRYWELL COOLER FANS |

| ATTACHMENT /STEP | AOI NOMENCLATURE | COMPONENT NOMENCLATURE |
|---|---|---|
| | **2-AOI-1-1** | |
| 2.1 | ADS BLOWDOWN RELIEF VALVES VALVES OPEN | MAIN STEAM RELIEF OPEN |
| 2.3 | REACTOR PRESS TOTAL STEAM PRESS | TOTAL STM FLOW/RX FLOW |
| 3.1 | RW LEVEL CONTROL | RX WTR LEVEL CONTROL |
| | **2-AOI-32-2** | |
| 2.2 | SERVICE AIR SUPPLY TO CONT AIR (FCV-33-1 OPEN) | SERVICE AIR SUPPLY IN CONT AIR (PCV-33-1 OPEN) |
| | **2-AOI-57-5A** | |
| Page 10 (1) | RE-90-50 | RE-90-50 and 53 |
| Page 15 (7) | 250&251 | 251 |
| Page 33 (26) | Mon RE-90-249 | Mon RM-90-249 |
| Page 35 | Missing | BKR 237 Panel 2-25-14 SRM/IRM Drive Units |
| | **2-AOI-57-5B, ATTACHMENT 1** | |
| (C) | BKR 825 ±24V POWER SUPPLY SYS. BAT. CHGRS B1-2 & B2-2 | BKR NO 825 ±24V POWER SUPPLY SYS BAT CHGRS B1-2 & B2-2. |
| (D) | BKR 828 Pnl. 25-336 (LIQ PROC RAD MON 2-RE-90-132A). | BKR NO 828 PNL. 25-366 LIQ PROC RAD MON 2-RE-90-132A |
| (E) | BKR 829 Pnl. 25-337 (LIQ PROC RAD MON 2-RE-90-133A). | BKR NO 829 PNL. 25-337 (LIQ PROC RAD MON 2-RE-90-133A) |
| (F) | BKR 830 Pnl. 25-338 (LIQ PROC RAD MON 2-RE-90-134A). | BKR NO 830 PNL. 25-338 (LIQ PROC RAD MON 2-RE-90-134A) |
| (G) | BKR 827 PNL. 25-339 (LIQ | BKR NO 827 PNL. 25- |

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| | PROC RAD MON 2-RE-90-131A). | 339 (LIQ PROC RAD MON 2-RE-90-131A) |
| (H) | BKR 826 PSS VHF RADIO. | BKR NO 826 PSS VHF RADIO |
| (I) | BKR 832 ENG SAFEGUARDS DIV II SUPPLY PNL 25-31 & 25-32 | BKR NO 832 ENGR SAFEGUARDS DIV II SUPPLY PNL 25-31 & 25-32 |
| (1) BKR 301 | PANEL 9-92 DRYWELL RAD MON RE-90-273C | PNL 2-9-92 DRYWELL RAD MON 2-RE-90-273C |
| (2) BKR 302 | PANEL 25-3 REACTOR CLEANUP DEMIN VESSEL A | PNL 2-25-3 RWCU DEMIN VESSEL 2A |
| (3) BKR 303 | DRYWELL LEAK DET OUTB ISOL VLV DIV II | DW LEAK DET OUTBD ISOL VLV DIV II |
| (4) BKR 304 | PANEL 9-3 SHTDN COOLING | PANEL 2-9-3 SHUTDOWN COOLING |
| (5) BKR 305 | CAM SYSTEM H2O2 PANEL 25-341 | PANEL 2-25-341 H2/O2 ANALYZER B |
| (6) BKR 306 | PANEL 9-11 AREA RAD MONITORING | PANEL 2-9-11 AREA RAD MON |
| (7) BKR 307 | PANEL 25-22 CRD ACCUM BANKS 3 & 4 | PANEL 2-25-22 CRD ACCUM BANKS 3 & 4 |
| (8) BKR 308 | PANEL 9-52 TURB AUX RELAYS | PANEL 2-2-52 TURB AUX RELAYS |
| (9) BKR 309 | SGT TRAIN C RELAY & INST | SGT TRAIN C RELAY & INSTR |
| (10) BKR 310 | PANEL 9-2 DRYWELL LEAK DET MON RE-90-256 | PANEL 2-9-2 DW LEAK DET MON 2-RM-90-256 |
| (10a) BKR 311 | PNL 25-62 CIT-43-27 RHR FLUSH DR SYS | 2-CIT-43-27 RHR FLUSH DR SYS |
| (11) BKR 312 | PANEL 25-3 REACTOR CLEANUP DEMIN VESSEL B | PANEL 2-25-3 RWCU DEMIN VESSEL B |
| (12) BKR 313 | PANEL 2-9-55 CAD/CAM/P.A.S.S. | PANEL 2-9-55 CAD/CAM/PASS |
| (13) BKR 314 | PANEL 9-25/RBCCW | PANEL 2-9-25/RBCCW |

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| (15) BKR 316 | DRYWELL AIR CONT VLV INST OUT BD | DW AIR CONT VLV INST OUTBOARD |
| (16) BKR 317 | RHR/CSS TEMP - MOISTURE MON SYS | RHR/CS TEMP & MOISTURE MON SYS |
| (18) BKR 319 | PANEL 9-7 SJAE B SOL VALVES | PANEL 2-9-7 SJAE B SOL VALVES |
| (19) BKR 320 | PANEL 9-29 FW. STEAM & CNDS | PANEL 2-9-29 FW STEAM & CNDS |
| (20) BKR 321 | PANEL 9-7 HEATER EXTR BYPASS VALVES | PANEL 2-9-7 HTR EXTR BYPASS VLV |
| (21) BKR 322 | PANEL 9-19 SHUTDOWN COOLING | PANEL 2-9-19 SHUTDOWN COOLING |
| (22) BKR 323 | PANEL 9-43 OUTBOARD ISOLATION | PANEL 2-9-43 OUTBOARD ISOL |
| (23) BKR 324 | PANEL 9-6 FW & CNDS SOL VALVES | PANEL 2-9-6 FW & CNDS SOL VLVS |
| (23a) BKR 325 | TEMP. FDR. FOR CONT. BAY ISOL. SYS MONITOR RM-90-259B | SPARE (CONT BAY MON 0-RM-90-259B) |
| (24) BKR 326 | RCW TO RHR PUMPS B&D ROOMS | RCW TO RHR PUMPS B&D ROOM |
| (25) BKR 327 | PANEL 2-9-94B SPDS. | PANEL 2-9-94B SPDS |
| (27) BKR 336 | TIP DRIVE MOTOR "A" | TIP DRIVE MOTOR A |
| | **2-AOI-85-1** | |
| 4.2.6.2 | OG PRETREATMENT RADIATION, 2-RR-90-160 | OFF-GAS PRETREATMENT RADIATION, 2-RR-90-160 |
| 4.2.6.3 | OG PRETREATMENT RADIATION, 2-RR-90-157 | OFF-GAS PRETREATMENT RADIATION, 2-RR-90-157 |
| | **2-AOI-100-1** | |
| 4.2.24.5.1 | IL-1-20/203 | IL-1-202/203 |
| | **2-AOI-100-2** | |
| 4.2.3.2.2 | SUPP POOL OUTB SUCTION VLV | SUPP POOL OUTB SUCTION XFR |

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| 4.2.12.5 | RHR PUMP 2A | RHR PUMP C |
| Attachment 3 Breaker 3D | RCIC PUMP INJECTION VLV | RCIC PUMP INJECTION TRANSFER |
| Attachment 3 Breaker 8D | COOLING WATER VLV.XFR | COOLING WATER VLV. |
| Attachment 4 Breaker 1C | 2-HS-71-2C | 2-HS-71-2B |
| Attachment 5 Breaker 7C | COOLING VALVE TRANSFER | COOLING SUCTION VALVE TRANSFER |
| Attachment 5 Breaker 18A | DRYWELL BLOWER 2B-3<br>2-HS-70-44C DRYWELL COOLER B3 FAN<br>2-XS-70-44 DRYWELL COOLER B3 FAN TRANSFER | 2A-4<br>2-HS-70-40C DRYWELL COOLER 2A/4 FAN<br>2-XS-70-40 DRYWELL COOLER 2A/4 FAN |

## Appendix E

### ABBREVIATIONS

| | |
|---|---|
| AOI | Abnormal Operating Instruction |
| APRM | Average Power Range Monitor |
| ARP | Alarm Response Procedure |
| AUO | Auxiliary Unit Operator |
| BOP | Balance of Plant |
| BWROG | Boiling Water Reactor Owners Group |
| CRD | Control Rod Drive |
| CST | Condensate Storage Tank |
| DW | Drywell |
| EOI | Emergency Operating Instruction |
| EOP | Emergency Operating Procedure |
| EPG | Emergency Procedure Guidelines |
| EPIP | Emergency Plan Implementing Procedure |
| ERG | Emergency Response Guidelines |
| EQ | Environmental Qualifications |
| FSAR | Final Safety Analysis Report |
| HPCI | High Pressure Coolant Injection |
| LPCI | Low Pressure Coolant Injection |
| MCR | Main Control Room |
| MSIV | Main Steam Isolation Valve |
| MSRV | Main Steam Relief Valve |
| PCR | Procedure Change Request |
| PGP | Procedure Generation Package |
| PSTG | Plant Specific Technical Guidelines |
| RBCCW | Reactor Building Closed Cooling Water |
| RCIC | Reactor Core Isolation Cooling |
| RHR | Residual Heat Removal |
| RPS | Reactor Protection System |
| RPV | Reactor Pressure Vessel |
| RWCU | Reactor Water Cleanup |
| SFSP | Spent Fuel Storage Pool |
| SJAE | Steam Jet Air Ejector |
| SLC | Standby Liquid Control |
| V&V | Verification & Validation |
| WG | Writer's Guide |