UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

May 13, 2011

Mr. R. M. Krich
Vice President, Nuclear Licensing
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT – NRC TEMPORARY INSTRUCTION 2515/183 INSPECTION REPORT 05000259/2011009, 05000260/2011009, 05000296/2011009

Dear Mr. Krich:

On April 29, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Browns Ferry Nuclear Plant using Temporary Instruction 2515/183, "Follow-up to the Fukushima Daiichi Nuclear Station Fuel Damage Event". The enclosed inspection report documents the inspection results which were discussed on May 06, 2011, with Mr. Gannon and other members of your staff.

The objective of this inspection was to assess the adequacy of actions taken at Brown's Ferry Nuclear Plant in response to the Fukushima Daiichi Nuclear Station fuel damage event. The results from this inspection, along with the results from similar inspections at other operating commercial nuclear plants in the United States, will be used to evaluate the U.S. nuclear industry's readiness to respond to a similar event. These results will also help the NRC to determine if additional regulatory actions are warranted.

All of the potential issues and observations identified by this inspection are contained in this report. The NRC's Reactor Oversight Process will further evaluate any issues to determine if they are regulatory findings or violations. Any resulting findings or violations will be documented by the NRC in a separate report. You are not required to respond to this letter

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Eugene Guthrie,
Branch Chief
Division of Reactor Projects

Docket Nos.: 50-259, 50-260, 50-296
License Nos.: DPR-33, DPR-52, DPR-68

Enclosure: Inspection Report 05000259/2011009, 05000260/2011009, 05000296/2011009

cc w/encl: (See page 3)

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ADAMS: ☐ Yes ACCESSION NUMBER: ML111330509 ☐ SUNSI REVIEW COMPLETE ☐ FORM 665 ATTACHED

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NAME	TRoss	CStancil	PNiebaum	LPressley	JHamman	EGuthrie	
DATE	05/13/2011	05/13/2011	05/17/2011	05/13/2011	05/13/2011	05/13/2011	
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OFFICIAL RECORD COPY DOCUMENT NAME: G:\DRPII\RPB6\BROWNS FERRY\REPORTS\2011\BF 009 TI-183\IR 2011-009_BFN(FINAL REV 3).DOCX

cc w/encl:
K. J. Polson
Vice President
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

C.J. Gannon
General Manager
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

J. E. Emens
Manager, Licensing
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

T. C. Matthews
Manager, Corporate Nuclear Licensing - BFN
Tennessee Valley Authority
Electronic Mail Distribution

State Health Officer
Alabama Dept. of Public Health
RSA Tower - Administration
Suite 1552
P.O. Box 30317
Montgomery, AL 36130-3017

E. J. Vigluicci
Assistant General Counsel
Tennessee Valley Authority
Electronic Mail Distribution

Chairman
Limestone County Commission
310 West Washington Street
Athens, AL 35611

James L. McNees, CHP
Director
Office of Radiation Control
Alabama Dept. of Public Health
P. O. Box 303017
Montgomery, AL 36130-3017

Letter to R. M. Krich from Eugene Guthrie dated May 13, 2011

SUBJECT: BROWNS FERRY NUCLEAR PLANT – NRC TEMPORARY INSTRUCTION 2515/183 INSPECTION REPORT 05000259/2011009, 05000260/2011009, 05000296/2011009

Distribution w/encl:
C. Evans, RII
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RIDSNRRDIRS
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RidsNrrPMBrownsFerry Resource

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-259, 50-260, 50-296
License Nos:	DPR-33, DPR-52, DPR-68
Report No:	05000259/2011009, 05000260/2011009, 05000296/2011009
Licensee:	Tennessee Valley Authority (TVA)
Facility:	Browns Ferry Nuclear Plant, Units 1, 2, and 3
Location:	Corner of Shaw and Nuclear Plant Roads Athens, AL 35611
Dates:	April 1, 2011 – April 29, 2011
Inspectors:	T. Ross, Senior Resident Inspector C. Stancil, Resident Inspector P. Niebaum, Resident Inspector L. Pressley, Resident Inspector
Approved by:	Eugene F. Guthrie, Chief Reactor Projects Branch 6 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000259/2011009, 05000260/2011009, 05000296/2011009; 04/01/2011 – 04/29/2011; Browns Ferry Nuclear Plant, Units 1 and 2, Temporary Instruction 2515/183 – Follow-up to the Fukushima Daiichi Nuclear Station Fuel Damage Event

This report covers an announced Temporary Instruction inspection. The inspection was conducted by resident inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

INSPECTION SCOPE

The intent of the TI is to provide a broad overview of the industry's preparedness for events that may exceed the current design basis for a plant. The focus of the TI was on (1) assessing the licensee's capability to mitigate consequences from large fires or explosions on site, (2) assessing the licensee's capability to mitigate station blackout (SBO) conditions, (3) assessing the licensee's capability to mitigate internal and external flooding events accounted for by the station's design, and (4) assessing the thoroughness of the licensee's walk downs and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events possible for the site. If necessary, a more specific follow-up inspection will be performed at a later date.

INSPECTION RESULTS

All of the potential issues and observations identified by this inspection are contained in this report. The NRC's Reactor Oversight Process will further evaluate any issues to determine if they are regulatory findings or violations. Any resulting findings or violations will be documented by the NRC in a separate report.

03.01 Assess the licensee's capability to mitigate conditions that result from beyond design basis events, typically bounded by security threats, committed to as part of NRC Security Order Section B.5.b issued February 25, 2002, and severe accident management guidelines and as required by Title 10 of the Code of Federal Regulations (10 CFR) 50.54(hh). Use Inspection Procedure (IP) 71111.05T, "Fire Protection (Triennial)," Section 02.03 and 03.03 as a guideline. If IP 71111.05T was recently performed at the facility the inspector should review the inspection results and findings to identify any other potential areas of inspection. Particular emphasis should be placed on strategies related to the spent fuel pool. The inspection should include, but not be limited to, an assessment of any licensee actions to:

Licensee Action	Describe what the licensee did to test or inspect equipment.
a. Verify through test or inspection that equipment is available and functional. Active equipment shall be tested and passive equipment shall be walked down and inspected. It is not expected that permanently installed equipment that is tested under an existing regulatory testing program be retested. This review should be done for a reasonable sample of mitigating strategies/equipment.	The licensee identified and verified that active and passive Browns Ferry (BFN) equipment meeting Extensive Damage Mitigating Guidelines (EDMG) and Severe Accident Management Guidelines (SAMG) requirements were available. In addition, the licensee verified other equipment (ground and aerial ladders) useful for, but not required to support EDMG strategies was available. The licensee verified that the required equipment were part of the onsite preventive maintenance (PM) program, or incorporated as necessary. The licensee also reviewed surveillances/tests and performance frequencies for the identified equipment, and reviewed the results of recent tests. Active EDMG and SAMG equipment that did not have recent test results were tested. Passive equipment was walked down and inspected. The licensee initiated PERs for any identified gaps.
	Describe inspector actions taken to confirm equipment readiness (e.g., observed a test, reviewed test results, discussed actions, reviewed records, etc.).
	The licensee's actions as discussed above were completed prior to the issuance of NRC TI 2515/183. The inspectors assessed the licensee's capabilities by conducting a review of the licensee's walkdown activities. In addition, the inspectors independently walked down and verified all major EDMG equipment staged throughout the site. .
	Discuss general results including corrective actions by licensee.

		The EDMG and SAMG equipment on site was determined to be available and functional with two exceptions which were captured by the licensee in their corrective action program (CAP). The portable diesel-driven fire pump and Fire Engine #2 would not draft from the river, but would pump when connected to a low pressure hydrant on the outside fire main. Fire Engine #2 was successfully capacity tested on the outside fire main. Fire Engine #1 successfully drafted from the river and met its required capacity, therefore, supporting all applicable fire fighting strategies. This was captured in the licensee's CAP as Problem Evaluation Report (PER) 342251. The licensee also initiated PER 341654 to ensure PM tasks were established for the hand-held tachometers and portable battery carts used to support three EDMG strategies.
Licensee Action		Describe the licensee's actions to verify that procedures are in place and can be executed (e.g. walkdowns, demonstrations, tests, etc.)
b. Verify through walkdowns or demonstration that procedures to implement the strategies associated with B.5.b and 10 CFR 50.54(hh) are in place and are executable. Licensees may choose not to connect or operate permanently installed equipment during this verification. This review should be done for a reasonable sample of mitigating strategies/equipment.		The licensee reviewed five EDMGs that contain 39 strategies as well as 15 SAMG procedures. Operations staff walked down the EDMGs and SAMGs procedures to ensure all procedures were executable as written. Additionally, the licensee verified two site security procedures and an Abnormal Operating Instruction could be performed as written. The licensee initiated Procedure Change Requests (PCRs) for various procedure enhancements identified during the walkdowns.

	Describe inspector actions and the sample strategies reviewed. Assess whether procedures were in place and could be used as intended.
	The licensee's actions discussed above were completed prior to the issuance of NRC TI 2515/183. The inspectors assessed the licensee's capabilities by conducting a review of the licensee's walkdown activities. In addition, the inspectors independently walked down several EDMG strategies to verify the licensee's conclusions. As discussed in section 03.01(a) above, although two portable fire pumps would not draft from the river, the inspectors determined that sufficient redundant capability remained to support the EDMG strategies that require use of a portable fire pump.
	Discuss general results including corrective actions by licensee.
	The licensee reviewed EDMG and SAMG strategies and did not identify any issues that would prevent execution of the procedures as written. Operations staff walked down the procedures to ensure actions taken in the field could be performed. The licensee initiated PCRs to enhance procedures as necessary. Appropriate issues identified by the licensee were entered into the CAP. Specific PERs are listed in section 03.01(e) below.

Licensee Action	Describe the licensee's actions and conclusions regarding training and qualifications of operators and support staff.
c. Verify the training and qualifications of operators and the support staff needed to implement the procedures and work instructions are current for activities related to Security Order Section B.5.b and severe accident management	The licensee verified that qualifications and training requirements were current for Operations staff that implement the EDMG strategies and SAMG procedures. The licensee also verified that emergency response Technical and Operations Support Center training was conducted and included an overview of the EDMG strategies. Emergency Response Organization (ERO) personnel from the engineering support group received EDMG training that was verified to be current.
	Describe inspector actions and the sample strategies reviewed to assess training and qualifications of operators and support staff

guidelines as required by 10 CFR 50.54 (hh).		The licensee's actions as discussed above were completed prior to the issuance of NRC TI 2515/183. The inspectors independently reviewed and verified the licensee's training and qualification materials and records related to B.5.b and SAMG event response.
		Discuss general results including corrective actions by licensee.
		The training requirements, qualifications, and associated records needed for Operations and Fire Operations personnel for implementation of EDMG and SAMGs were reviewed by the licensee. The training requirements, qualifications, and associated records needed for ERO command and support staff for the implementation of actions needed to mitigate a B.5.b event or implement the EDMG strategies were also reviewed. All ERO command and support staff training requirements were verified as current by the licensee.

Licensee Action		Describe the licensee's actions and conclusions regarding applicable agreements and contracts are in place.
d. Verify that any applicable agreements and contracts are in place and are capable of meeting the conditions needed to mitigate the consequences of these events. This review should be done for a reasonable sample of mitigating strategies/equipment.		The licensee identified all applicable contracts and agreements committed to be in place for the mitigation of a B.5.b related event. The licensee verified that the contracts and agreements were current, and documented the availability of required offsite equipment to support the mitigation strategy.
		For a sample of mitigating strategies involving contracts or agreements with offsite entities, describe inspector actions to confirm agreements and contracts are in place and current (e.g., confirm that offsite fire assistance agreement is in place and current).
		The licensee's actions as discussed above were completed prior to the issuance of NRC TI 2515/183. The inspectors assessed the licensee's capabilities by conducting a review of the licensee's fire protection services agreements with the Clements Volunteer Fire Dept., the City of Athens Fire and Rescue Dept., the City of Decatur, and the City of Huntsville-Madison County Airport Authority. The inspectors verified the agreements were current and adequate for meeting the licensee's mitigation strategy.

		Discuss general results including corrective actions by licensee.
		The licensee verified all current agreements and required offsite equipment were available for interface with the above off site fire departments and/or local government entities. The licensee initiated PER 344210 to verify that the current memorandums of understanding and agreements meet their current standards of excellence.

Licensee Action		Document the corrective action report number and briefly summarize problems noted by the licensee that have significant potential to prevent the success of any existing mitigating strategy.
e. Review any open corrective action documents to assess problems with mitigating strategy implementation identified by the licensee. Assess the impact of the problem on the mitigating capability and the remaining capability that is not impacted.		The following PERs were written during the licensee's review of the EDMG strategies and SAMG procedures: • PER 342251, Engine #2 and the portable diesel-powered fire pump would not draft from the river when tested. • PER 341654, Establish PM tasks for the EDMG battery carts and hand-held tachometers • PER 342310, Perform a functional test of the BFN oscillating monitor nozzles.

03.02 Assess the licensee's capability to mitigate station blackout (SBO) conditions, as required by 10 CFR 50.63, "Loss of All Alternating Current Power," and station design, is functional and valid. Refer to TI 2515/120, "Inspection of Implementation of Station Blackout Rule Multi-Plant Action Item A-22" as a guideline. It is not intended that TI 2515/120 be completely reinspected. The inspection should include, but not be limited to, an assessment of any licensee actions to:

Licensee Action		Describe the licensee's actions to verify the adequacy of equipment needed to mitigate an SBO event.
a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.		The licensee, in their industry response, documented that no gaps were identified, and that no pre-staged equipment nor materials were required by station SBO analysis or procedures. Specifically, the licensee assigned a non-licensed operator to walkdown all SBO response procedure steps outside of the control rooms, but only for the ability to perform the actions concurrent with the site design basis flood of 578' above sea level.
		Describe inspector actions to verify equipment is available and useable.
		The licensee's actions discussed above were completed prior to the issuance of NRC TI 2515/183. The inspectors assessed the licensee's capabilities by conducting a review of the licensee's walkdown activities. In addition, the inspectors walked down the licensee's SBO abnormal operating instruction (AOI), to independently verify the licensee's conclusions.
		Discuss general results including corrective actions by licensee.
		As discussed in section 03.02(a) above, the licensee identified no gaps, and that no pre-staged equipment or materials were required by station SBO analysis or procedures. However, the inspectors identified two longstanding licensee identified issues associated with SBO mitigation capabilities that have not been completely resolved to date. These issues were associated with installed plant equipment invoving safety related Emergency Diesel Generators (EDG) and the non-safety related 4KV Bus-Tie Board. • The EDG parallel function has never been fully tested with two Residual Heat Removal (RHR) pumps loaded onto the same bus supplied from two paralleled

		EDGs. The licensee's design basis LOCA with a concurrent LOOP required the onsite electrical system to be capable of powering two RHR subsystems (two RHR and two RHR Service Water pumps) on each unit, which per the licensee's loss of offsite power and SBO procedure, required paralleling the Unit 1/2 and Unit 3 DGs for long term suppression pool cooling. The EDG parallel function was partially tested once in October 1988, with only one RHR Pump loaded onto the 4KV Shutdown Board. In response to this previously identified issue by the inspectors, the licensee performed a functional evaluation (PER 178142), and based on existing voltage regulator surveillance testing, Based on EDG cross-tie breaker and cable preventive maintenance , and electric governor controller and relay logic and controls testing, the licensee concluded there was reasonable assurance that the EDG system "parallel with unit" function would perform as designed. The inspectors noted that as part of design change DCN 69532 to replace the existing EDG governors, the licensee was developing a post-modification test (PMT) that may include paralleling an EDG with the new governor with an EDG with the old governor. Additionally, the licensee was also considering to use this PMT to fully verify the capability of paralleling two EDGs to the same 4KV Shutdown Board while loaded with two RHR pumps. This issue was already captured in the licensee's CAP. • The non-safety related 4KV Bus-Tie Board remains untested with respect to full energization of the board to prove that the system can carry design current and that all connections are tight with no thermal hot spots which could lead to an adverse condition. The non-safety related 4KV Bus-Tie Board PM was cancelled by the licensee for many years, and then upon discovery of the lapsed PMs in July, 2009, the PMs were re-established. Work orders (WO) were completed for board cleaning and inspection, and breaker refurbishment. The refurbished breakers were sent back to the site, but were not installed in the Tie-Board. Upon discussion with the licensee, PER 359621 was initiated and the breakers reinstalled to restore the capability of the Bus Tie-Board for an SBO event. Additionally, the Bus Tie-Board has not been energized for many years, and the licensee did not intend to energize the Bus Tie-Board as part of PMT following the PMs. In response to inspectors concerns, the licensee initiated PER 339840 to determine if the Bus Tie-Board should be loaded for PMT. The licensee's SBO procedure currently provides

		guidance to use the non-safety related 4KV Bus-Tie Board as an optional method to cross-connect power to mitigate the SBO event. (Three of eight diesels are assumed to remain available during the licensing basis SBO event.) Additional corporate licensing recommendations to be evaluated by the licensee: • Increase capability of DC power for reactor pressure and level instruments (carts or chargers) • Increase capability of DC power for safety relief valves (carts or chargers) • Update simulator modeling for loss of all AC, DC power drainage, core parameters, temperature increase, radiation fields, and reactor core isolation cooling (RCIC) loss due to reduced net positive suction head (NPSH)
Licensee Action		Describe the licensee's actions to verify the capability to mitigate an SBO event.
b. Demonstrate through walkdowns that procedures for response to an SBO are executable.		The licensee, in their industry response, documented that no gaps were identified and that the Abnormal Operating Instruction (AOI) that governs response to an SBO was walked down and demonstrated to be executable. Specifically, the licensee assigned a non-licensed operator to walkdown all SBO response procedure steps outside of the control rooms, but only for the ability to perform the actions concurrent with the site design basis flood of 578' above sea level. Additionally, on March 21, 2011, the licensee performed a Unit 3 simulator scenario with both an onsite and offsite loss of all AC (i.e. no diesel generators available). This was conducted by licensee training personnel with one licensed SRO and corporate representatives observing, including emergency planning.

		Describe inspector actions to assess whether procedures were in place and could be used as intended.
		The licensee's actions discussed above were completed prior to the issuance of NRC TI 2515/183. The inspectors assessed the licensee's capabilities by conducting a review of the licensee's walkdown activities and observing simulator performance. In addition, the inspectors walked down the licensee's SBO abnormal operating instruction (AOI), to independently verify the licensee's conclusions.
		Discuss general results including corrective actions by licensee.
		The inspectors determined that the licensee did not adequately verify the station's capability to mitigate SBO conditions. The AOI that governs response to an SBO was not completely walked down, and therefore, was not demonstrated to be executable. Specifically, control room operator actions were not walked down. Additionally, a non-licensed operator was assigned to walkdown all SBO response procedure steps outside of the control rooms, but only for the ability to perform the actions concurrent with the site design basis flood of 578' above sea level. Discussions with the licensee indicated that this action was assigned preemptively prior to the industry request for information, but was erroneously credited as a licensee response. The licensee initiated PER 361999 for this omission. Subsequently, the licensee completed the walkdown of the SBO procedure by a licensed operator. An independent walkdown by the inspectors of more significant portions of the SBO response procedure (control room actions) verified that the procedure was executable except for the issues identified in 3.02.a above. Additional corporate licensing recommendations to be evaluated by the licensee: • Alternate power source for key primary containment instruments necessary to make EOI decisions • Transfer of non-safety related DC loads, main turbine and reactor feed pumps emergency oil pumps

03.03 Assess the licensee's capability to mitigate internal and external flooding events required by station design. Refer to IP 71111.01, "Adverse Weather Protection," Section 02.04, "Evaluate Readiness to Cope with External Flooding" as a guideline. The inspection should include, but not be limited to, an assessment of any licensee actions to verify through walkdowns and inspections that all required materials and equipment are adequate and properly staged. These walkdowns and inspections shall include verification that accessible doors, barriers, and penetration seals are functional.

Licensee Action	Describe the licensee's actions to verify the capability to mitigate existing design basis flooding events.
a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.	The licensee verified that all existing equipment necessary to mitigate flooding events were capable of performing their function in accordance with existing procedures, including internal and external doors. Additionally, the licensee assigned a licensed operator to walkdown the abnormal operating instructions associated with flooding to verify the capability of the procedures and equipment necessary to mitigate flooding. The licensee also reviewed the PM procedures and work orders for the affected systems and verified the periodicity and last date of completion.
	Describe inspector actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.
	The inspectors reviewed the licensee's walkdown activities and verified the completion of PM work orders. The inspectors also independently walked down and inspected selected risk significant doors and mitigating equipment throughout the site. Furthermore, the inspectors verified the licensee's flood mitigation procedures were executable. .
	Discuss general results including corrective actions by licensee.
	In general, the station appears to be ready to respond to an external flood consistent with the plant design. However, some items of note were discovered by the licensee and are being addressed through the CAP. PM's and abnormal operating instructions (AOI) were determined to be executable with some items requiring enhancement.

		Three external watertight doors for the safety related service water pump rooms were determined to be degraded, but functional, as previously identified by the licensee before the issuance of NRC TI 2515/183. The licensee determined the watertight door leakage would be within the capacity of the individual room sump pumps, therefore allowing the equipment to perform its function during an external flood. Repair of two of the degraded doors were completed on April 2, 2011 per WO# 112108564. The third door was scheduled to be replaced on May 31, 2011, via WO# 08-721887-000. Diesel generator building flood sluice gates (emergency drain valves) did not have a PM program. The licensee initiated PER 345987 to develop PMs for the flood sluice gates. Upon request by the inspectors, the licensee successfully cycled these DG building drain valves. However, service request (SR) 360256 was initiated for these drain valves because of the excessive difficulty cycling these valves manually. This SR was attached to PER 345987. The licensee determined the Probable Maximum Precipitation (PMP) ditch surrounding the plant needed to be dredged, but was functional The licensee initiated PER 294004to dredge the ditch. The licensee initiated PER 344531 to enhance emergency plan implementation procedure (EPIP) classification for internal flooding events. The internal flood strategy was adequately prescribed in the site's emergency operating instructions and annunciator response procedures.

<table>
<tr><td colspan="3">03.04 Assess the thoroughness of the licensee's walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events possible for the site. Assess the licensee's development of any new mitigating strategies for identified vulnerabilities (e.g., entered it in to the corrective action program and any immediate actions taken). As a minimum, the licensee should have performed walkdowns and inspections of important equipment (permanent and temporary) such as storage tanks, plant water intake structures, and fire and flood response equipment; and developed mitigating strategies to cope with the loss of that important function. Use IP 71111.21, "Component Design Basis Inspection," Appendix 3, "Component Walkdown Considerations," as a guideline to assess the thoroughness of the licensee's walkdowns and inspections.</td></tr>
<tr><td>Licensee Action</td><td></td><td>Describe the licensee's actions to assess the potential impact of seismic events on the availability of equipment used in fire and flooding mitigation strategies.</td></tr>
<tr><td rowspan="3">a. Verify through walkdowns that all required materials are adequate and properly staged, tested, and maintained.</td><td rowspan="3"></td><td>Licensee actions included the identification of important equipment required for mitigation of fire and flood events, and to identify the potential for loss of equipment function during seismic events. The licensee convened a multi-disciplined team and created a team charter to conduct table-top type of reviews, including walkdowns and inspections of the equipment, both permanent and temporary. Licensee personnel inspected the material condition of the equipment and surrounding seismic equipment and structures to determine if the equipment was seismically qualified, or assessed whether it would be possible to evaluate the equipment as being seismically rugged. The licensee also assessed the transportability and ruggedness of credited portable equipment. Seismic vulnerabilities, including storage locations, were identified, along with mitigating strategies for equipment that was not seismically qualified.</td></tr>
<tr><td>Describe inspector actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.</td></tr>
<tr><td>The inspectors conducted independent walkdowns of important equipment needed to mitigate fire and flood events to assess the potential that the equipment's function could be lost during a seismic event. This equipment included, but was not limited to:

• Major B.5.b contingency response equipment staged throughout the site
• Installed electric fire pumps and their controls</td></tr>
</table>

		• Watertight doors at the RHRSW/ EECW pumps at the intake structure, EDG buildings and reactor building • External emergency drain isolation valves for EDG buildings The licensee's external flood and earthquake abnormal operating instructions (AOI) were reviewed to verify usability. The results of the inspectors' reviews were consistent with the licensee's conclusions that there were a number of seismic vulnerabilities that potentially needed to be addressed, as described below.
		Discuss general results including corrective actions by licensee. Briefly summarize any new mitigating strategies identified by the licensee as a result of their reviews.
		The licensee determined that non-safety related SSCs, in general, were not considered to be either seismically qualified or seismically rugged. Some flood mitigation equipment (DG building external drain valves, portable water tight doors and reactor building flooding detectors) were not designed to be seismically qualified. Similarly, the vast majority of the fire protection system, including the installed electric fire pumps and the diesel driven channel fire pump, were not seismically qualified. Firefighting equipment staged to respond to B.5.b events were not stowed in seismically qualified buildings and locations, since a seismic event and B.5.b event was not assumed to occur coincidentally. Furthermore, even flood mitigation equipment that was seismically qualified equipment (e.g., RHRSW/EECW water tight doors) were not analyzed for a simultaneous stacked event. The licensee entered the following issues into their CAP: • PER 348491, Evaluate upgrading high pressure fire pumps (HPFP) and piping to seismic class I • PER 348485, Evaluate construction of seismic class I structure to house fire personnel and equipment • PER 348496, Evaluate design to cross-connect emergency equipment cooling water (EECW) piping to HPFP system piping as a possible new strategy • PER 349896, Potential new strategy for EDG buildings if external water tight doors cannot be evaluated for "stacked" events • PER 349897 Potential new strategy for EDG buildings if external drain valves and piping cannot be seismically qualified

		• PER 349898 Potential new strategy for EDG buildings if flooding mitigation equipment cannot be seismically qualified

4OA6 Meetings

.1 Exit Meeting

The inspectors presented the inspection results to Mr. K. Polson and other members of BFN management at the conclusion of the inspection on May 6, 2011. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

B. Baker, Operations Support Superintendent
M. Bryant, Fire Operations
J. Davenport, Site Licensing
T. Feltman, EP Manager
L. Hughes, Operations Manager
T. Marlow, Licensing Manager
M. Rasmussen, Operations Shift Superintendent

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety but rather that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

03.01 Assess the licensee's capability to mitigate conditions that result from beyond design basis events

Number	Description or Title	Date or Revision
0-GOI-300-1/ATT-15.22	Attachment 15.22 EOI Tools and Equipment Inventory Checklist	203
WO# 112068094	Requirement to retest components used in B.5.b events	03/19/11
WO# 09-725306-000	Manually Operate Valves 1-FCV-64—221 & 1-FCV-64-222 Using Hand Wheels to Verify Operability	11/21/10
WO# 08-722400-000	Manually Operate Valves 2-FCV-64—221 & 2-FCV-64-222 Using Hand Wheels to Verify Operability	05/14/09
WO# 09-713650-000	Manually Operate Valves 3-FCV-64—221 & 3-FCV-64-222 Using Hand Wheels to Verify Operability	03/24/10
FP-0-000-INS-005	Quarterly Inspection of Emergency Equipment	29
FP-0-026-INS-034	Portable Fire Pump Functional Test	09
FP-0-026-INS-033	Portable Fire Pump Capability Test	10
EDMG-03	Spent Fuel Pool Response EDMG Flowchart	0
EDMG-04	Support Tables/Drawings for Site Staging	0
EDMG-05	Fire System Management Tables/Drawings for EDMGs	0

EDMG-18	Site Damage Assessment	01
EDMG-21	Radioactive Release Mitigation	01
EDMG-23	Spent Fuel Pool Makeup	06
EDMG-24	Reactor Pressure Vessel Makeup	06
EDMG-25	Containment	02
EDMG-26	Electrical Alignments	02
1,2,3-SAMG Appendix-CFC1	Containment Flooding with Core Spray System I	0
1,2,3-SAMG Appendix-CFC2	Containment Flooding with Core Spray System II	0
1,2,3-SAMG Appendix-CFR1	Containment Flooding with RHR System I	0
1,2,3-SAMG Appendix-CFR2	Containment Flooding with RHR System II	0
1,2,3-SAMG Appendix-CNP	Containment Nitrogen Purge	1

03.02 Assess the licensee's capability to mitigate station blackout (SBO) conditions

Number	Description or Title	Date or Revision
0-AOI-57-1A	Loss of Offsite Power (161 and 500 KV)/Station Blackout	Rev. 78
PER 176376	SBO/4KV Bus Tie-Board (and attached Functional Evaluation)	8/31/09
PER 339840	4KV Bus Tie-Board PM/CM Maintenance-System Now Required for Use with Temporary Diesel Generator	3/17/11
PER 359621	Bus Tie Board Breakers Need to be Reinstalled in Tie-Board	4/25/11
PER 178142	DG Paralleling Design Basis (and attached Functional Evaluation)	11/06/09
OPL171.036	BFN Licensed Operator Training, A.C. Power Distribution	Rev. 6

03.03 Assess the licensee's capability to mitigate internal and external flooding events required by station design

Number	Description or Title	Date or Revision
EDMG-18	Site Damage Assessment	1
0-AOI-100-3	Flood Above Elevation 558'	34
0-AOI-100-7	Severe Weather	31
MPI-0-260-DRS001	Inspection and maintenance of Doors	38
MPI-0-000-INS001	Inspection of Flood Protection Devices	12

PM # 500103473	Inspect Flood Gate per MPI-0-000-INS001	3/8/2011
PM # 500108890	Functional Check of Flood Level Switches	4/19/2011
PM # 500136059	Quarterly Inspection of Inner/Outer Doors	1/25/2011
0-SR-3.6.4.1.3	Combined Zone Secondary Containment Drawdown and Integrity Test	16
WO # 111218606	Combined Zone Secondary Containment Drawdown and Integrity Test	2/8/2011
WO # 112108564	Repair Doors	
WO # 08-721887	Replace Door	
0-TI-237	Secondary Containment Penetration Breach Analysis	13
PER 294004	Dredge Ditch	
PER 341010	Correct Procedure References	
PER 341018	Correct Procedure References	
PER 342361	Details Illegible in Procedure	
PER 344531	Internal Flood Strategy	
PER 345987	Lack of PM's	
SR 360256	Difficulty Cycling Valves	

03.04 Assess the thoroughness of the licensee's walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events

Number	Description or Title	Date or Revision
0-AOI-100-3	Flood Above Elevation 558'	34
0-AOI-100-5	Earthquake	34
Section 4.5.2	Fire Protection Report, Volume 1	9
Section 4.5.1	Fire Protection Report, Volume 1	9

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
AF	Auxiliary Feedwater
ARM	Area Radiation Monitors
CAM	Continuous Air Monitors
CC	Component Cooling Water
CFR	Code of Federal Regulations
NRC	United States Nuclear Regulatory Commission