



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PA 19406-1415

May 13, 2011

Mr. Paul Freeman  
Site Vice President, North Region  
Seabrook Nuclear Power Plant  
NextEra Energy Seabrook, LLC  
c/o Mr. Michael O'Keefe  
P.O. Box 300  
Seabrook, NH 03874

SUBJECT: SEABROOK STATION UNIT NO. 1 – NRC TEMPORARY INSTRUCTION  
2515/183 INSPECTION REPORT 05000443/2011009

Dear Mr. Freeman:

On April 22, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Seabrook Station, Unit No. 1 using Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event." The enclosed inspection report documents the inspection results which were discussed on April 22, 2011, with you and other members of your staff.

The objective of this inspection was to promptly assess the capabilities of Seabrook Station to respond to extraordinary consequences similar to those that have recently occurred at the Japanese Fukushima Daiichi Nuclear Station. The results from this inspection, along with the results from this inspection performed at other operating commercial nuclear plants in the United States will be used to evaluate the United States nuclear industry's readiness to safely respond to similar events. These results will also help the NRC to determine if additional regulatory actions are warranted.

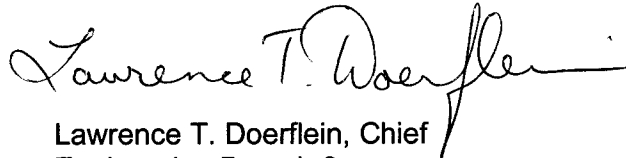
All of the potential issues and observations identified by this inspection are contained in this report. The NRC's Reactor Oversight Process will further evaluate any issues to determine if they are regulatory findings or violations. Any resulting findings or violations will be documented by the NRC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

P. Freeman

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Sincerely,

A handwritten signature in cursive script that reads "Lawrence T. Doerflein". The signature is written in black ink and is positioned above the typed name and title.

Lawrence T. Doerflein, Chief  
Engineering Branch 2  
Division of Reactor Safety

Docket No.: 50-443  
License No.: NPF-86

Enclosure: Inspection Report No. 05000443/2011009

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Sincerely,

*/RA/*

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No: 50-443

License No: NPF-86

Report No: 05000443/2011009

Licensee: NextEra Energy Seabrook, LLC

Facility: Seabrook Station, Unit No. 1

Location: Seabrook, New Hampshire 03874

Dates: April 18, 2011 - April 22, 2011

Inspector: F. Arner, Senior Reactor Inspector, Division of Reactor Safety

Approved by: Lawrence T. Doerflein, Chief  
Engineering Branch 2  
Division of Reactor Safety

## **SUMMARY OF FINDINGS**

IR 05000443/2011009; 04/18/2011 – 04/22/2011; Seabrook Station, Unit No. 1; Temporary Instruction 2515/183 - Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event.

This report covers an announced Temporary Instruction (TI) inspection. The inspection was conducted by a region based inspector. 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 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. If necessary, a more specific followup 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.
<p>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.</p> <p>This review should be done for a reasonable</p>	<p>NextEra identified procedures and equipment associated with implementation of Severe Accident Management Guidelines (SAMG) and B.5.b strategies (Extreme Damage Mitigating Guidelines). NextEra reviewed the B.5.b equipment inspection and testing preventive maintenance tasks to ensure that the tasks were up to date and the equipment was available and functional. This included performing surveillance tests for the B.5.b portable diesel driven pump (PDDP) and cooling tower makeup pump to verify their functionality. Support equipment such as hoses, fittings, fasteners and trucks associated with operation of the PDDP were inspected to ensure they were functional as well. Additionally, the B.5.b hoses were pressure tested to their applicable required pressure. The portable SAMG equipment that was identified to support PDDP implementation and SAMG strategies was inspected and verified to be staged in the required locations. SAMG plant equipment such as valves were walked down to ensure they were accessible and in adequate condition to implement the strategies.</p> <p>Describe inspector actions taken to confirm equipment readiness (e.g., observed a test, reviewed test results, discussed actions, reviewed records, etc.).</p>

<p>sample of mitigating strategies/equipment.</p>	<p>The inspector assessed NextEra's capabilities of implementing the strategies by conducting a review of their walkdown activities. The inspector walked down and inspected key B.5.b response equipment including accessory equipment in the B.5.b building that was required for various mitigating strategies. The inspector sampled a review of completed inventory checks by NextEra and compared them with the results of field observations to ensure the proper equipment was staged and functional for the applicable strategy. The types of equipment examined included: interior fire water supply piping and hose stations; portable pump and associated suction and discharge hoses, adapters, and tools. The inspector reviewed the most recent test results for the B.5.b pump performance to ensure the pump was capable of supporting all associated strategies. This review included a review of the associated calculation to ensure the expected flowrate for various strategies would be achieved considering head losses, friction losses and the actual pump performance capability.</p>
	<p>Discuss general results including corrective actions by licensee.</p>
	<p>There were no issues identified that would have prevented the implementation of the strategies reviewed. The inspector concluded that the required materials and equipment were available and functional. NextEra identified some enhancement type issues such as the need for additional equipment labeling, the need to purchase additional B.5.b hose for margin and enhancements to the work control process to expedite repairs of B.5.b components when identified. The inspectors noted that the B.5.b storage areas may benefit from increased availability of backup lighting sources if normal lighting was not available, including consideration for the implementation of the strategies in the field. NextEra entered this issue into their corrective action program (CAP) including the items they identified for evaluation.</p>



<p>Licensee Action</p>	<p>Describe the licensee's actions to verify that procedures are in place and can be executed (e.g., walkdowns, demonstrations, tests, etc.).</p>
<p>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.</p> <p>This review should be done for a reasonable sample of mitigating strategies/equipment.</p>	<p>NextEra reviewed those procedures/guidelines utilized to mitigate the consequences of B.5.b related events and severe accidents. NextEra identified procedure tasks to target and determine which tasks would be demonstrated or walked down. This review was based on the most limiting strategies identified with respect to equipment required, the probability of required implementation, and the importance of the strategy. NextEra set up validation teams of at least two operators with at least one licensed operator per team to perform the demonstrations and walkdowns. The abnormal procedure, OS1215.07, "Loss of Spent Fuel Pool Cooling or Level," was walked down in the field to verify the procedure could accomplish its objectives. The Extreme Damage Mitigating Guideline procedures, EDMG-1, "Response to Large Area Fire or Explosion," and EDMG-2, "Major Loss of Plant Control Systems," were validated through walkdowns. Several of the most limiting and key Severe Accident Guideline procedures were validated including the actual deployment of the PDDP and hose trailer, SAG-9, "PDDP and Hose Trailer Deployment." Procedures which were not validated through demonstration were validated through walkdowns to ensure they could be implemented and accomplish the intent of their mitigation strategies.</p> <p>Describe inspector actions and the sample strategies reviewed. Assess whether procedures were in place and could be used as intended.</p> <p>The inspector examined the station's established guidelines and implementing procedures for the B.5.b mitigation strategies and assessed how NextEra coordinated and documented the interface/transition between existing off-normal and emergency operating procedures with the mitigation strategies. The inspector selected several mitigation strategies and conducted plant walkdowns with operators to assess: the adequacy and completeness of the procedures/guidelines; familiarity of operators with the procedure objectives and specific guidance; staging and compatibility of equipment; and the practicality of the operator actions prescribed by the procedures, consistent with the postulated scenarios. The inspector also performed a table top review of a sample of B.5.b strategies not walked down to validate the procedures could be reasonably implemented. This was performed for selected portions of</p>

	<p>SAG 3, "Inject into Reactor Coolant System." The inspector identified a potential enhancement to EDMG-2 in that the procedure did not provide a step to remind the operators that pre-staged fire protection gear was available and inventoried in the fire protection annex building for fire fighting use. NextEra entered this issue into their CAP for resolution.</p>
	<p>Discuss general results including corrective actions by licensee.</p>
	<p>The various SAMG strategy implementing procedures were determined to be adequate and would accomplish the objective of the strategy. The inspector's review and walkdown of selected SAMG procedures in the field confirmed them to be adequate and executable. There were various minor procedural and equipment enhancements identified by NextEra in the course of their table top reviews, demonstration of procedures in the field and procedure walkdowns. The inspector verified the issues were appropriately entered into their CAP for resolution.</p>
<p>Licensee Action</p>	<p>Describe the licensee's actions and conclusions regarding training and qualifications of operators and support staff.</p>
<p>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</p>	<p>NextEra verified that the training and qualifications of operators and all emergency response organization positions were current for activities related to B.5.b and SAMGs. This review identified the number of personnel in each of the required positions and identified the associated required qualifications.</p>
	<p>Describe inspector actions and the sample strategies reviewed to assess training and qualifications of operators and support staff.</p>

<p>Security Order Section B.5.b and severe accident management guidelines as required by 10 CFR 50.54 (hh).</p>	<p>The inspector examined the training material provided to the site personnel to be tasked with implementing the B.5.b mitigation strategies. The inspector assessed the licensee's training and qualification activities by conducting a review of training and qualification materials and records related to B.5.b, SAMG and Supplemental SAMG event response. Additionally, the inspector discussed the training with selected individuals to assess the effectiveness of the training program.</p> <p>Discuss general results including corrective actions by licensee.</p> <p>Based upon the inspector's review of formal training lesson plans, interviews, and observations of plant staff during the walkdown of mitigating strategies in the field, the inspector concluded that overall B.5.b and SAMG training was appropriate. The licensee identified one notable issue regarding training. NextEra identified that primary responder initial training is provided for B.5.b and associated EDMGs/SAMGs; however, there was no continuing training established on EDMGs. The inspector verified the issue was entered into the CAP for evaluation.</p>
<p>Licensee Action</p>	<p>Describe the licensee's actions and conclusions regarding applicable agreements and contracts are in place.</p>
<p>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.</p>	<p>NextEra verified their agreement with the Seabrook Fire Department was still current and the required offsite support equipment was available to support their mitigation of the consequences of events.</p> <p>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).</p>

<p>This review should be done for a reasonable sample of mitigating strategies/equipment.</p>	<p>The inspector reviewed the agreement with the Seabrook Fire Department and verified that it was current and the agreement function was reasonable to assist in mitigation strategies.</p>
	<p>Discuss general results including corrective actions by licensee.</p>
	<p>No deficiencies were identified. The inspector concluded that the agreement was in place and capable of meeting the condition needed to mitigate the consequences of an event.</p>
<p>Licensee Action</p>	<p>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.</p>
<p>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.</p>	<p>Numerous corrective action documents were reviewed during this inspection, and are listed in the Attachment to this report. The condition reports were primarily enhancements to procedures and equipment. The inspector concluded that none of the issues identified would have a significant adverse impact on the B.5.b strategy mitigating capabilities.</p>

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.
<p>a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.</p>	<p>NextEra reviewed procedures used for mitigating SBO events to identify equipment relied on for mitigation of the event. NextEra then conducted walkdowns of the procedure to ensure equipment would be available and the actions were reasonable.</p>
	<p>Describe inspector actions to verify equipment is available and useable.</p>
	<p>The inspector assessed the NextEra's capability to mitigate SBO conditions by conducting a review of the NextEra's walkdown activities. In addition, the inspector selected a sample of equipment utilized/required for mitigation of a SBO and conducted independent walkdowns of that equipment to verify that the equipment was properly aligned and staged. The inspector independently reviewed the SBO coping analysis and performed walkdowns of selected equipment used in the procedures to verify that procedure actions were reasonable. The inspector also reviewed corrective actions relative to station battery calculations to ensure they were current and supported the operation of critical equipment relied on for the SBO assumed duration.</p>
	<p>Discuss general results including corrective actions by licensee.</p>

	<p>NextEra reviews verified that SBO equipment was ready to respond to a postulated SBO condition. Based on reviews of NextEra's actions and independent reviews and equipment walkdowns, the inspector concluded all required materials were properly staged, tested, and maintained.</p>
<p>Licensee Action</p>	<p>Describe the licensee's actions to verify the capability to mitigate an SBO event.</p>
<p>b. Demonstrate through walkdowns that procedures for response to an SBO are executable.</p>	<p>NextEra performed a demonstration of the SBO procedure using the plant simulator to ensure the procedures were adequate. Additionally, actions called out in the procedure outside of the control room were walked down to verify they were reasonable and executable.</p>
	<p>Describe inspector actions to assess whether procedures were in place and could be used as intended.</p>
	<p>The inspector assessed NextEra's SBO capabilities by conducting a review of their walkdown activities. In addition, the inspector selected several sections of the procedures walked down by NextEra and conducted walkdowns to independently verify their conclusions.</p>
	<p>Discuss general results including corrective actions by licensee.</p>
	<p>NextEra identified various minor enhancements to the procedures through their review of the simulator and equipment walkdowns. No deficiencies were identified which would have affected the ability to meet the objectives of the procedure. The inspector concluded that the SBO procedure was adequate and executable to support the required strategy.</p>

03.03 Assess the licensee’s capability to mitigate internal and external flooding events required by station design. Refer to IP71111.01, “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.
<p>a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.</p>	<p>NextEra actions included a review of the site flooding design bases for both internal and external flood events. NextEra identified required protective flood design features such as the existing seawall, site flood water runoff area assumptions and building exterior design for the external flood design bases. NextEra reviewed plant areas where hydrostatic barriers were required including penetration seal design features. Plant procedures were identified and reviewed, including those for areas such as turbine building flooding, to ensure the actions were consistent with maximum flood water assumptions to verify protection of adjacent rooms such as safety related switchgear. Additionally, credited flood mitigating equipment was also identified such as sump and tank level alarms. For active and selected passive equipment such as floor drain flood mitigating equipment, NextEra reviewed that the function was verified through the performance of periodic preventive maintenance procedures/testing. This included verification that the testing was being performed within its scheduled testing frequency. Passive equipment such as the seawall and revetments were validated to be functional through walkdowns. Credited room drains were verified through a review of preventive maintenance tasks. NextEra assessed the condition of flooding design features through visual examinations of barriers, doors and seals.</p>
	<p>Describe inspector actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.</p>

	<p>The inspector assessed NextEra's capabilities to mitigate external and internal flooding by conducting a walkdown of selected areas. This review involved the inspector accompanying licensee personnel during in-field walkdowns and independent walkdowns by the inspector of selected external and internal flood mitigation equipment. The inspector reviewed plant areas such as the residual heat removal (RHR) vaults, safety related switchgear rooms, cable spreading room, emergency feedwater (EFW) room and the EDG building to verify plant design flood features were in place. The inspector also reviewed design basis assumptions including credited operator response times to ensure they were reasonable. The inspector also ensured that selected equipment area/room elevations which may be subjected to outside water leakage from external flooding exceeded the highest assumed external design basis flooding elevations. The inspector's conclusions aligned with the results obtained by NextEra.</p>
	<p>Discuss general results including corrective actions by licensee.</p>
	<p>The inspector concluded that all required materials are adequate and properly staged, tested, and maintained to respond to an internal or external flood within the plant's design basis. While no operability or significant concerns were identified, NextEra identified issues with: the frequency of preventive maintenance activities on RHR vault sump level instruments; recurring EFW pumphouse floor drains blockage such that leakage through an adjacent room door had to be credited; and a minor UFSAR documentation issue. NextEra appropriately entered these issues into their CAP for further assessment and resolution, as listed in the Supplemental Information Attachment of this report. The inspector reviewed the associated condition reports, and determined NextEra's initial responses including their assessment of operability and prioritization of the issues were appropriate. The inspector concluded that NextEra had adequately verified the capability to mitigate internal and external flooding events required by station design.</p>



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.

<p>Licensee Action</p>	<p>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.</p>
<p>a. Verify through walkdowns that all required materials are adequate and properly staged, tested, and maintained.</p>	<p>NextEra used industry guidance to assess the potential impact of seismic events on the availability of equipment used in fire and flooding mitigation strategies. These guidelines were established to govern the conduct of walkdowns and inspections of equipment, both permanent and temporary. NextEra conducted walkdowns and documented the results. NextEra reviewed their seismic and fire protection design bases to identify credited fire protection equipment and to verify fire protection equipment functionality.</p>
	<p>Describe inspector actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.</p>

	<p>The inspector conducted multiple walkdowns, both independently and in conjunction with NextEra personnel, of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during a seismic event. This equipment included, but was not limited to:</p> <ul style="list-style-type: none"> <li>• B.5.b contingency response equipment;</li> <li>• portions of the installed fire protection and suppression equipment in various plant areas;</li> <li>• installed diesel and electric fire pumps and their controls; and</li> <li>• the seismic electric booster pump designed to give Seabrook the capability to backup the normal non-seismic fire fighting system for seismic Category I buildings.</li> </ul> <p>The inspector reviewed a sample of NextEra's flood and fire mitigation procedures to assess their adequacy. The inspector also reviewed the associated calculation for the seismic electric booster pump to ensure that the pump could achieve its required flowrate to hose stations for fire-fighting after a seismic event, given friction losses, service water head/pressure and actual tested booster pump performance data. The inspector concluded that NextEra meets the current licensing and design bases for fire protection and flooding.</p>
	<p>Discuss general results including corrective actions by licensee. Briefly summarize any new mitigating strategies identified by the licensee as a result of their reviews.</p>