



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

May 13, 2011

Mr. Joseph E. Pollock  
Site Vice President  
Entergy Nuclear Operations, Inc.  
Indian Point Energy Center  
450 Broadway, GSB  
P.O. Box 249  
Buchanan, NY 10511-0249

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT 2 – NRC TEMPORARY  
INSTRUCTION 2515/183 INSPECTION REPORT 05000247/2011009

Dear Mr. Pollock:

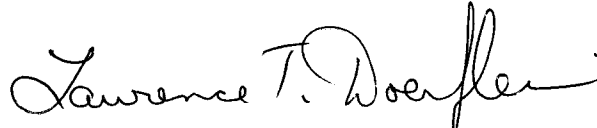
On April 27, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Indian Point Nuclear Generating Unit 2, using Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event." The enclosed inspection report documents the inspection results which were discussed on April 28, 2011, with you and other members of your staff.

The objective of this inspection was to promptly assess the capabilities of Indian Point Nuclear Generating Unit 2 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.

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 Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

A handwritten signature in black ink that reads "Lawrence T. Doerflein". The signature is written in a cursive style with a long, sweeping tail on the final letter.

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

Docket No.: 50-247  
License No.: DPR-26

Enclosure: Inspection Report No. 05000247/2011009

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J. Pollock

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Sincerely,

*/RA/*

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

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J. Pollock

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.: 50-247

License No.: DPR-26

Report No.: 05000247/2011009

Licensee: Entergy Nuclear Northeast (Entergy)

Facility: Indian Point Nuclear Generating Unit 2

Location: 450 Broadway, GSB  
Buchanan, NY 10511-0249

Dates: April 18 through April 27, 2011

Inspectors: M. Catts, Senior Resident Inspector – Indian Point 2  
O. Ayegbusi, Resident Inspector – Indian Point 2

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

## **SUMMARY OF FINDINGS**

IR 05000247/2011009; 04/18/2011 – 04/27/2011; Indian Point Nuclear Generating Unit 2; 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 two 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 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 sample of mitigating strategies/equipment.</p>	<p>The licensee identified equipment (active and passive) utilized for implementation of B.5.b actions and any additional equipment used in Severe Accident Management Guidelines (SAMGs). The scope of the equipment was defined as that equipment specifically designated for B.5.b or SAMG mitigation (i.e., special hoses, fittings, diesel driven pump, etc.). Permanent plant equipment (i.e., in situ equipment) was not considered in the scope, since it is normally in service, subjected to planned maintenance, and/or checked on operator rounds. Passive equipment within the scope was walked down, inventoried, and inspected. The licensee reviewed the last test of the B.5.b pump and determined it was completed satisfactorily.</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>The inspectors walked down and evaluated the adequacy of installed and portable equipment staged explicitly for implementation of the mitigation strategies. 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; portable radios and communications devices; and equipment lockers and associated tools. The inspectors' review included field verification and inventory checks of standby and staged equipment, and compatibility of the portable equipment with installed systems. In addition, the inspectors evaluated the staging/storage locations of B.5.b related equipment to ensure the survivability and availability of equipment. The inspectors also</p>

	<p>reviewed and discussed with responsible station personnel the results of any field testing of equipment performed to validate its applications in the postulated scenarios. Documents reviewed by the inspectors are listed in the Supplemental Information Attachment to this report.</p> <p>Discuss general results including corrective actions by licensee.</p> <p>The licensee identified no gaps in the ability to implement these actions. The licensee did identify several enhancements and wrote condition reports (CR) for those enhancements.</p> <p>The inspectors concluded that overall the required equipment is available and functional. However, as a result of the NRC inspection, the inspectors identified an unresolved item for Entergy not ensuring the operability of the containment hydrogen recombiners as required in Technical Requirements Manual Section 3.7.F, "Post Accident Containment Venting System." Specifically, Entergy had not performed testing as described in UFSAR Section 6.8.5, "Post Accident Hydrogen Control Systems – Inspections and Tests," each refueling outage. The test was last performed in accordance with Procedure 2-CY-3610, "Passive Hydrogen Recombiner Inspection and Testing," in April 2006. The licensee entered this issue into their corrective action program (CAP) as CR-IP2-2011-2017. This issue is an unresolved item (URI 05000247/2011009-01) to determine if failing to perform this test is more than minor. Details on this unresolved item will be documented in NRC IR 05000247/2011003.</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</p>	<p>The licensee identified those procedures utilized to mitigate the consequences of a B.5.b event or SAMG scenario. Procedures dealing with permanently installed equipment with an associated surveillance test were walked through in a table top format to ensure the procedures are executable. For procedures involving non-permanently installed equipment, or equipment without surveillance tests, the licensee performed walkdowns to ensure the procedures are executable.</p>



<p>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>Describe inspector actions and the sample strategies reviewed. Assess whether procedures were in place and could be used as intended.</p> <p>The inspectors examined the station's established guidelines and implementing procedures for the B.5.b and SAMG mitigation strategies. The inspectors assessed how the licensee coordinated and documented the interface/transition between existing off-normal and Emergency Operating Procedures (EOPs) with the mitigation strategies. The inspectors assessed the licensee's capabilities by conducting a review of the licensee's walkdown activities. The inspectors selected a number of mitigation strategies and conducted plant walkdowns with a licensed operator and responsible plant staff to independently assess: the adequacy and completeness of the procedures; 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. Documents reviewed by the inspectors are listed in the Supplemental Information Attachment to this report</p> <p>Discuss general results including corrective actions by licensee.</p> <p>The licensee determined the B.5.b and SAMG procedures are executable and written to the expected level of skill and training of the personnel who would be implementing the procedures. The licensee identified no gaps in the ability to implement these actions. The licensee did identify several enhancements and wrote CRs for those enhancements.</p> <p>Based on their review, the inspectors determined that overall strategies and procedures are executable.</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 Security Order Section B.5.b and severe accident management guidelines as required by 10 CFR 50.54 (hh).</p>	<p>The licensee identified the training/qualification requirements for operators for the implementation of actions needed to mitigate a B.5.b related event, and for the implementation of actions needed for the SAMGs. The licensee identified the personnel required to implement these actions including operations, fire protection, security, offsite responders, engineering, and emergency response organization (ERO) personnel to ensure training was complete and current.</p>
	<p>Describe inspector actions and the sample strategies reviewed to assess training and qualifications of operators and support staff.</p>
	<p>The inspectors examined the introductory and periodic/refresher training provided to operations personnel and ERO personnel required to implement the B.5.b mitigation strategies and SAMGs. The inspector's review consisted of examination of training presentations, lecture notes, and training records, as well as, interviews with station personnel. Documents reviewed by the inspectors are listed in the Supplemental Information Attachment to this report.</p>
	<p>Discuss general results including corrective actions by licensee.</p>
	<p>The licensee identified no gaps or enhancements in this area.</p> <p>Based upon the inspectors' review of formal training, interviews, and observations of plant staff during the walkdown of mitigating strategies in the field, the inspectors concluded that overall B.5.b training provided by Entergy staff was appropriate and consistent with industry guidelines.</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>This review should be done for a reasonable sample of mitigating strategies/equipment.</p>	<p>The licensee verified that the relevant support agreements, memoranda of understanding, and contracts were in place to support accident mitigation. These included contracts with municipal fire departments and vendors. The licensee assured the agreements from the municipal fire departments and other commitments for various pieces of support equipment required to implement the strategies were in place and active.</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>The inspectors verified that the licensee had in place a current Indian Point Fire and Emergency Medical Services Response and Mutual Aid Plan with off-site agencies to provide assistance in mitigation strategies. The inspectors talked to personnel at a sample of local municipal fire stations to verify that they had, and understood the requirements of the Indian Point Fire and Emergency Medical Services Response and Mutual Aid Plan. In addition, the inspectors verified they had adequate equipment as required for the mitigating strategies. Documents reviewed by the inspectors are listed in the Supplemental Information Attachment to this report</p> <p>Discuss general results including corrective actions by licensee.</p> <p>The licensee identified no gaps or enhancements in this area.</p> <p>Based on their review, the inspectors concluded that overall agreements and contracts are in place and appropriate for the strategies evaluated.</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>No issues were identified by the licensee that posed a significant potential to prevent the success of any existing mitigating strategy. The licensee did identify one material condition documented in CR-IP2-2011-1534 associated with the city water line to the spent fuel building and repaired the condition under work order (WO) 215667. The licensee verified other strategies were in place in lieu of this city water line. The licensee identified no additional gaps in the ability to implement these actions. The licensee also identified several enhancements and wrote CRs for those enhancements.</p> <p>CR-IP2-2011-01467 was written to capture the need to evaluate the beyond design basis aspect of simultaneous B.5.b events on both units. In particular, Entergy identified that compliance with the original B.5.b order, resulted in less than the anticipated amount of equipment to implement mitigation strategies if certain B.5.b events occurred on both units simultaneously.</p> <p>Based on independent walkdowns and CR reviews, the inspectors concluded none of the issues had a significant impact on implementing the existing mitigating strategies.</p>
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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>The licensee identified the equipment utilized/required for mitigation of a SBO. The licensee identified that most SBO equipment is permanently installed plant equipment which is tested and monitored through routine surveillance tests. For equipment that is not permanently installed, the licensee conducted walkdowns of this equipment to ensure the equipment was adequate and properly staged. The licensee then reviewed surveillances/tests and the testing performance frequency for the identified equipment to ensure equipment was tested satisfactorily.</p>
	<p>Describe inspector actions to verify equipment is available and useable.</p>
	<p>The inspectors assessed the licensee's capability to mitigate SBO conditions by conducting a review of the licensee's walkdown activities. In addition, the inspectors 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 sample of equipment selected by the inspectors included, but was not limited to, the SBO diesel generator and the cross-tie to the Unit 3 SBO diesel generator. The inspectors also reviewed recent tests and maintenance for a sample of SBO equipment. Documents reviewed by the inspectors are listed in the Supplemental Information Attachment to this report.</p>
	<p>Discuss general results including corrective actions by licensee.</p>

	<p>The licensee concluded that the SBO materials were adequately staged, tested, and maintained. The inspectors concluded that the overall required materials to mitigate SBO conditions were adequately staged, tested, and maintained.</p> <p>The inspectors identified a minor deficiency, in that Entergy did not periodically verify backup nitrogen bottle pressure to ensure there was adequate pressure to operate the atmospheric dump valves, as required by plant design. Entergy entered this issue into their CAP as CR-IP2-2011-1959 and, as an immediate corrective action, implemented a special log to record the bottle pressures until a permanent procedure change is made. The inspectors determined this was a minor issue because the actual bottle pressures were verified to be greater than the minimum required pressure during the inspection period. The inspectors reviewed immediate and proposed actions, including their assessment and prioritization, and concluded they were reasonable.</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>The licensee identified the procedures required for response to a SBO. Permanently installed equipment under a surveillance requirement was walked through in a table top format to ensure procedures can be executed. For procedures and actions dealing with non-permanently installed plant equipment or equipment not tested under a surveillance requirement, procedure walkdowns in the field were performed by the licensee to ensure procedures can be executed. The licensee reviewed the initial and requalification training of operations personnel on SBO.</p> <p>Describe inspector actions to assess whether procedures were in place and could be used as intended.</p>

	<p>The inspectors assessed the licensee's capabilities by conducting a review of the licensee's walkdown activities. In addition, the inspectors selected several sections of a sample of the procedures walked down by the licensee and walked those down to independently verify the licensee's conclusions and ensure the procedures are executable. The inspectors also reviewed the timed test to ensure the SBO diesel can be started and provide power to safety related loads in the time required to mitigate an event. The inspectors further reviewed the training for operations personnel on SBO procedures. Documents reviewed by the inspectors are listed in the Supplemental Information Attachment to this report.</p>
	<p>Discuss general results including corrective actions by licensee.</p>
	<p>The licensee determined the SBO procedures are executable and written to the expected level of skill and training of the personnel who would be implementing the procedures. The licensee also identified several enhancements and wrote CRs for those enhancements.</p> <p>Based on their review, the inspectors concluded that the overall SBO procedures are executable.</p>

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.

<p>Licensee Action</p>	<p>Describe the licensee's actions to verify the capability to mitigate existing design basis flooding events.</p>
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<p>a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.</p>	<p>The licensee identified the equipment (i.e., penetration seals, floor drains, sump pumps, flood alarms) utilized/required for mitigation of internal and external flooding. The licensee then conducted walkdowns of this equipment to verify that flood protection measures were satisfactory. Flood procedures dealing with permanently installed plant equipment covered by a surveillance test were walked-through in a table top format. For procedures and actions dealing with non-permanently installed plant equipment or equipment not tested under a surveillance requirement, the licensee performed field walkdowns to ensure equipment and materials were adequate to implement flood protection procedures.</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 inspectors assessed the licensee's capabilities by conducting a review of the licensee's walkdown activities. In addition, the inspectors selected several sections of a sample of the procedures walked down by the licensee and walked those down to independently verify the licensee's conclusions and ensure the procedures are executable. The inspectors also reviewed a sample of the flood protection equipment testing and maintenance. Documents reviewed by the inspectors are listed in the Supplemental Information Attachment to this report.</p> <p>Discuss general results including corrective actions by licensee.</p> <p>The inspectors 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, the licensee identified several enhancements and the inspectors identified an issue with the frequency of performance of the structural inspection for the intake structure, which includes the circulating water pumps bays and the safety-related service water pump bays. Specifically, a portion of the structural maintenance rule inspection for the intake structure, the circulating water pumps bays and the safety related service water pump bays, was not performed within the 5 year required interval or within the 25% grace period, and there was no planned date for this inspection. Entergy wrote CR-IP2-2011-2006 for</p>



	<p>this issue. This issue is an unresolved item to determine if failing to perform this inspection is more than minor. (URI 05000247/2011009-02) Details on this unresolved item will be documented in NRC IR 05000247/2011003.</p> <p>The licensee also initiated the appropriate condition reports for the other identified issues for further assessment and resolution, as listed in the Attachment to this report. The inspectors reviewed the associated condition reports and determined that the licensee's initial responses, including their assessment and prioritization, were appropriate. The inspector plans to review the licensee's future actions relative to the intake structure inspection as part of normal baseline activities.</p>
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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>The licensee identified the equipment utilized/required for mitigation of fire and flood events. The licensee performed walkdowns to assess the ability of this equipment to withstand a safe shutdown earthquake (SSE). The licensee included items of non-seismic design and construction, and the walkdowns assessed the capability of these items to withstand a SSE. Some of the items that were non-seismic by design were judged by qualified engineers to be capable of surviving the SSE earthquake. For equipment judged not likely to survive a SSE, the licensee identified mitigating strategies.</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 inspectors conducted multiple walkdowns, both independently and in conjunction with licensee 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, B.5.b contingency response equipment staged throughout the site; SBO equipment; fire protection and suppression equipment; and flood detection and mitigation equipment. Licensee flood and fire mitigation procedures were reviewed to verify usability. Documents reviewed by the inspectors are listed in the Supplemental Information Attachment to this report.</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>

The inspectors determined the licensee meets the current design and licensing bases for B.5.b, fire protection, and flooding. For equipment judged by Entergy as not likely to survive a SSE, the licensee identified a mitigating strategy as an alternate method to cope with the loss of the fire suppression or flood protection function. Entergy also determined that the site response to a flooding event would not be compromised by a safe shutdown earthquake (SSE). The licensee identified a number of potential vulnerabilities regarding firefighting following a SSE. The potential vulnerabilities stem from the fact that the fire protection system in non-safety related buildings, buried / underground fire headers, fire pumps, and the city water makeup supply are not seismically designed which could result in a loss of portions of the fire protection system following a SSE. The licensee documented these vulnerabilities in CR-IP2-2011-1681. The licensee's preliminary mitigation strategies involve the immediate response by the onsite fire brigade and supplemental support, as necessary, by the Indian Point Fire and Emergency Medical Services Response and Mutual Aid.

Additionally, Entergy staged submersible pumps in a common U1 location, which was determined to be seismically robust (i.e., likely to withstand an earthquake).

In reviewing seismic vulnerabilities associated with this TI, the inspectors identified additional conditions that are outside the design and licensing basis that could present a challenge during a seismic or other event. Specifically:

1. Generally, reactor sites were not required and did not implement mitigating actions to cope with an SBO in conjunction with a seismic event; and
2. During beyond design basis events, in which the SAMGs direct depressurizing the PWR containment, conditions could exist in which mitigation equipment is damaged due to elevated containment pressures and potentially prevent containment depressurization and/or isolation.

Generic issues associated with SBO and SAMG are currently under review by an NRC task force following up on the Fukushima Daiichi Nuclear Station fuel damage event. A condition report, CR-IP2-2011-1467, was generated by the licensee as a part of their inspection to evaluate acquiring additional equipment to mitigate beyond design basis vulnerabilities

## Meetings

### 40A6 Exit Meeting

The inspectors presented the inspection results to Mr. Joseph Pollock and other members of licensee management at the conclusion of the inspection on April 28, 2011. Proprietary information reviewed by the inspectors during the inspection was returned to the licensee. The inspectors verified the inspection report does not contain proprietary information.

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Entergy Personnel

J. Pollock, Site Vice President  
K. Brooks, Shift Manager  
R. Burroni, Manager – System Engineering  
J. Dinelli, Manager - Operations  
T. McCaffrey, Manager – Design Engineering  
B. McCarthy, Assistant Operations Manager  
V. Myers, Supervisor, Engineering  
T. Orlando, Director – Engineering  
S. Prussman, Specialist – Nuclear Safety/License IV  
R. Robenstein, Superintendent – Simulator  
M. Tesoriero, Manager – Programs and Components  
A. Vitale, General Manager – Plant Operations  
R. Walpole, Manager – Licensing  
A. Williams, Assistant General Manager – Plant Operations  
W. Wittick, Supervisor, Engineering

Nuclear Regulatory Commission

P. Cataldo, Senior Resident Inspector – Indian Point 3  
C. Cahill, Senior Reactor Analyst, NRC Region I  
W. Schmidt, Senior Reactor Analyst, NRC Region I

Other

G. Tarvell, Fire Protection Specialist, Department of State (New York)  
P. Eddy, Utility Supervisor, New York State, Department of Public Service

**LIST OF ITEMS OPENED OR CLOSED**

Opened

05000247/2011009-01	URI	Testing of Hydrogen Recombiners (Section 03.01a)
05000247/2011009-02	URI	Intake Structure Maintenance Rule Inspection (Section 03.03a)

## 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 or 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**

#### Procedures:

0-PT-Q003, B.5.b Equipment Inventory and Diesel Driven Pump Test, Rev. 5  
 2-AOP-FH-1, Fuel Damage or Loss of Spent Fuel Pool/Refueling Cavity Level, Rev. 5  
 2-AOP-SF-1, Loss of Spent Fuel Pit Cooling, Rev. 2  
 2-CY-3610, Passive Hydrogen Recombiner Inspection and Testing, Rev. 0  
 2-PT-2Y013, Post Accident Containment Air Vent Filtration System, Rev. 2  
 2-PT-6Y001, B.5.b Diesel Driven Pump Capacity Test, Rev. 0  
 2-SACRG-1, Severe Accident Control Room Guideline, Rev. 3  
 2-SACRG-2, Severe Accident Control Room Guidelines for Transients after the TSC is Functional, Rev. 3  
 2-SAG-3, SAMG – Inject into the RCS, 04/11/11  
 2-SAG-7, SAMG – Reduce Containment Hydrogen, 04/11/11  
 2-SCG-2, SAMG – Depressurize Containment, Rev. 2  
 2-SOP-10.9.2, Post Accident Vent System Operation, Rev. 10  
 2-SOP-ESP-001, Local Equipment Operation and Contingency Actions, Rev. 5  
 PFP-168, Pre-Fire Plan – Utility Tunnel – Exterior Buildings, Rev. 5  
 PFP-217, Pre-Fire Plan – Fuel Storage Building, Rev. 11  
 0-CA-4, Volumetric Release Rate From Containment Vent, Rev. 1  
 0-CA-7, Hydrogen Impact When Depressurizing Containment, Rev. 1  
 0-CY-1810, Diesel Fuel Oil Monitoring, Rev. 10

#### Drawings:

9321-F-40223, Flow Diagram Ventilation System for Containment, Primary Auxiliary and Fuel Storage Buildings, Rev. 33  
 B208879, Flow Diagram Post Accident Containment Venting System – UFSAR Figure No. 6.8-3, Rev. 23

#### Calculations/Evaluations:

CN-SEE-03-24, IP2 Spent Fuel Pit T/H Analysis to Support 4.7% Power Uprate, Rev. 3  
 CN-SEE-04-76, IP2 Spent Fuel Pool Evaluation of Time to Boiling, Rev. 0  
 FIX-00030, Establish the Backup Nitrogen System Capacity Requirements, Rev. 3  
 IP-CALC-06-00318, Determine the Minimum Nitrogen Bottle Pressure for the Four Steam Generator Atmospheric Dump Valves, Rev. 0

Completed Tests:

0-PT-Q003, B.5.b Equipment Inventory and Diesel Driven Pump Test, 7/14/08  
2-CY-3610, Passive Hydrogen Recombiner Inspection and Testing, 4/30/06  
2-PC-EM12, Charging Flow Transmitter, 3/24/10  
2-PC-R37, Alternate Safe Shutdown and Remote Shutdown Instruments, 3/22/10  
2-PC-R62, Reactor Vessel Level Instrumentation System Calibration, 3/18/10  
2-PT-2Y013, Post Accident Containment Air Vent Filtration System, 10/23/07  
2-PT-A020, Fire Hydrant Drain Valve Operation, 10/16/10  
52241927, 2Y Cal Cont. Air O2 Ch-2 (AR-5110), 7/29/10  
52263218, 2Y Cal AR-5109 VC H2/O2 Ch 1 - ICPM-1663, 10/18/10

Condition Reports:

CR-IP2-2011-1717, 28 Sump Pump in Fuel Storage Building Testing Issues, 4/10/11  
CR-IP2-2011-1739, QA Review Identified Incomplete Training for Five ERO Personnel, 4/12/11  
CR-IP2-2011-1863, 2-SAG-7 Table in Section B.3 Temperature Indicators Incorrect Indicator Numbers, 4/19/11  
CR-IP2-2011-1938, Procedure 2-SOP-ESP-001 not Added to B.5.b Trailer, 4/21/11  
CR-IP2-2011-1943, Hose Stations in Lower Portion of Utility Tunnel Not Consistent with Pre-Fire Plan, 4/21/11  
CR-IP2-2011-1946, Procedure 0-PT-Q-003 Specifies a Water and Sediment Content Acceptance Criteria of 0.5%, Should be 0.05%, 4/21/11  
CR-IP2-2011-1965, Containment Hydrogen Recorders PM Performed before Testing, 4/22/11  
CR-IP2-2011-2017, Hydrogen Recombiners not Tested Every Refueling Outage, 4/26/11  
CR-IP2-2011-2066, Nitrogen Backup Bottle Pressure not Checked in Operator Logs, 4/28/11  
CR-IP2-2011-1444, Three Water Hoses not Staged for 0-AOP-SEC-3, 3/21/11  
CR-IP2-2011-1405, Enhancements to 0-SOP-ESP-002, 3/18/11  
CR-IP2-2011-1438, Enhancement to Equipment Staged for B.5.b, 3/21/11  
CR-IP2-2011-1437, Enhancements to 0-SOP-ESP-002, 3/21/11  
CR-IP2-2011-1442, Enhancements to 0-SOP-ESP-003, 3/21/11  
CR-IP2-2011-1462, Deficiencies in SAMG Guidelines, 3/23/11  
CR-IP2-2011-1534, Deficiency in City Water Line, 3/28/11

Other:

I2LP-ILO-FPS001, City Water and Fire Protection Instructor Lesson Plan, Rev. 3  
I2LP-LOR-SMG, Sever Accident Progression and Phenomena, Rev. 2  
Indian Point Fire and Emergency Medical Services Response and Mutual Aid Plan, 08/05  
IOLP-LOR-SAMG, SAMG Refresher Training Lesson Plan Slides  
IPEC-LOR-Cycle 0801, B.5.b Walkdown Lesson Plan, Rev. 0  
Operations Document Feedback Form – Change Caution “May Be Prudent to Strip Loads Prior to Energizing Bus,” to a Step to Remove Loads, 04/20/11  
SH – SF – SFPC, System Health Report – Spent Fuel Pool Cooling, 4Q10  
TRM 3.7.F, TRM 3.7.F – Post-Accident Containment Venting System, Rev. 2  
TS 3.6.4, Technical Specification 3.6.4 – Containment Pressure, Amend. 238  
UFSAR 6.8, Post-Accident Hydrogen Control Systems, Rev. 22  
Wacker Neuson Trash Pump Technical Manual, December 2010

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

Procedures:

2-ECA-0.0, Loss of all AC Power, Rev. 6  
2-ECA-0.1, Loss of all AC Power Recovery without Safety Injection Required, Rev. 0  
2-ECA-0.2, Loss of all AC Power Recovery with Safety Injection Required, Rev. 1  
2-SOP-27.6, Unit 2 Appendix R Diesel Generator, Rev. 6

Calculations/Evaluations:

2-BRK-015-ELC, Westinghouse DB-50 and DB-75 Breaker Modifications, 9/21/07  
FIX-00030, Establish the Backup Nitrogen System Capacity Requirements, Rev. 3  
IP-CALC-06-00318, Determine the Minimum Nitrogen Bottle Pressure for the Four Steam Generator Atmospheric Dump Valves, Rev. 0

Completed Tests:

0-BRK-406-ELC, Westinghouse 6900 Volt Breaker Inspection and Cleaning, 3/21/11  
0-BRK-406-ELC, Westinghouse 6900 Volt Breaker Inspection and Cleaning, 3/24/10  
2-BRK-023-ELC, DB Breaker Amptector/Westector Overcurrent Test, 9/21/07  
2-BRK-024-ELC, DB Breaker Amptector/Westector Calibration Test, 9/21/07  
2-PT-2Y043A, Appendix R Diesel Generator Lineup Timing Test, 10/1/10

Condition Reports:

CR-IP2-2008-3816, NRC Identified Non-Cited Violation for not Controlling Revisions to SBO Test or to Review and Approve Test Results, 8/14/08  
CR-IP2-2011-1523, Procedural Enhancements to ECA- 0.0, 3/27/11  
CR-IP2-2011-1534, Deficiency in City Water Line, 3/28/11  
CR-IP2-2011-1959, Nitrogen Bottle Pressure not on Operator Rounds, 4/21/11  
CR-IP2-2011-2066, Nitrogen Backup Bottle Pressure not Checked in Operator Logs, 4/28/11

Other:

12SG-LOR-EOP006, ECA-0.0 Series with Rapid Plant Shutdown Training Lesson Plan, Rev. 2  
IOLP-LOR-EOP006, Loss of all AC Training Slides  
NL-11-014, Revised Tables From Responses to Requests for Additional Information Regarding Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2 for Use of Operator Manual Actions for Indian Point Unit No. 2, 2/10/11  
TRM 3.8.B, Technical Requirements Manual – SBO/ Appendix R Diesel Generator and Electrical Distribution System, Rev. 1



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

Procedures:

0-MS-402, Cleaning and Inspection of Check Valves, Rev. 0  
2-AOP-FLOOD-1, Flooding, Rev. 7  
2-AOP-LEAK-1, Sudden Increase in Reactor Coolant System Leakage, Rev. 7  
2PT-2Y017, Penetration Fire Barrier Seal Inspections, Rev. 1

Drawings:

9321-F-4011-14, Miscellaneous Drainage Plant Area Plans, Sections and Details, Rev. 13  
B228009, Plan View of Fire Barrier – Auxiliary Feedwater Building, Rev. 6  
B228051, Fire Barrier Penetration Schedule Floor 60A/23, Rev. 7

Calculations/Evaluations:

Analysis of High Energy Lines 4/9/73  
Modifications to the Auxiliary Feedwater Pump Building Doors, 2/18/75

Completed Tests:

195578, 2Y Cal of Volumetric Containment Temperature Instruments (Loop 1203), 7/8/09  
27174, Work Order - Open and Inspect Discharge Check Valve, 4/1/11  
2-PT-M032, Condenser Pit Flood Alarms, 2/9/11  
2-PT-R022A, Steam Driven Auxiliary Feed Pump Full Flow, 4/8/10  
51642373, 2Y Insp (External) and Test (MD-500), 8/26/09  
51653268, 2Y Insp Valve FP-955 - Inst Air System Equipment Drain Backwater Valve, 12/5/08  
51657884, 2Y Insp (External) and Test (MD-501), 8/26/09

Condition Reports:

CR-IP3-2007-2301, Internal Response to Information Notice 2007-01, Recent Operating Experience Concerning Hydrostatic Barriers, 5/15/07  
CR-IP3-2010-3336, Corrective Action to Evaluate the Need to Test or Demonstrate Capability of IP2 Zurn Strainer Pit Sump Pump Discharge Line Check Valve, 11/23/10  
CR-IP2-2011-2039, Mesh Screens around Turbine Building Floor Drains Pulled out, 4/26/11  
CR-IP2-2011-2006, Portion of the Structural Maintenance Rule Inspection for IP2 Intake Structure not Completed within Requirement, 4/25/11  
CR-IP2-2011-1944, Floor Drain Plugs not Correct for Turbine Building, 4/21/11  
CR-IP2-2011-1939, Retired in Place Air Line Penetrates SW Zurn Pit to SW Pump Bay, 4/21/11  
CR-IP2-2011-1919, Potential Service Water Zurn Pit In-Leakage Sources, 4/20/11  
CR-IP2-2011-1658, Winterization Plywood Covering Louvers in Main Feed Regulating Valve Area Could Restrict Flow of Water in Event of a Main Feed Line Break, 4/5/11  
CR-IP2-2011-1628, Walkdowns Identified Field Discrepancies Credited for Mitigating Consequences of an Internal Flood, 4/3/11

CR-IP2-2011-1627, Plant Response Enhancement to Store Portable Trash Pumps Outside the Flood Zone and Ensuring Onsite Availability of Sand and Sandbags, 4/3/11  
CR-IP2-2011-1625, Some Components Credited for Mitigating the Consequences of an Internal Flood do not have or do not have an Active PM, 4/3/11  
CR-IP2-2011-1871, Debris in 480 Vac Room Floor Drain, 4/19/11

Other:

Consolidated Edison Response to NRC Letter Dated 9/26/72, 12/18/72  
I2LP-ILO-FPS001, City Water and Fire Protection Instructor Lesson Plan, Rev. 3  
I2SG-LOR-AOP013, 2-AOP-LEAK-1 Instructor Lesson Plan, Rev. 3  
IP2 Probabilistic Safety Assessment Internal Flooding Analysis  
IP-RPT-05-00411, Maintenance Rule Structural Monitoring Inspection Report for the Intake Structure, Rev. 1  
Keen Sewage/Trash Pump Vendor Catalog  
Letter from ConEd to NRC Regarding Level Alarms in the Turbine Hall and Letter from ConEd to NRC Regarding the Request for Additional Information Concerning the Effects of Flooding Due to Failure of Non-Class I Seismic Equipment, 7/14/80  
Letter From NRC to ConEd Requested Review of Effect of Failure of Non-Category I Seismic Equipment on Safety-Related Equipment, 9/26/72

**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**

Procedures:

0-AOP-SEISMIC-1, Seismic Event, Rev. 2  
0-PT-Q003, B.5.b Equipment Inventory and Diesel Driven Pump Test, Rev. 5  
2-AOP-FLOOD-1, Flooding, Rev. 7  
2-AOP-LEAK-1, Sudden Increase in Reactor Coolant System Leakage, Rev. 7  
2-AOP-SF-1, Loss of Spent Fuel Pit Cooling, Rev. 2  
2-ECA-0.0, Loss of all AC Power, Rev. 6  
2-ECA-0.2, Loss of all AC Power Recovery with Safety Injection Required, Rev. 1  
2-PT-2Y013, Post Accident Containment Air Vent Filtration System, Rev. 2  
2-SACRG-1, Severe Accident Control Room Guideline, Rev. 3  
2-SACRG-2, Severe Accident Control Room Guidelines for Transients after the TSC is Functional, Rev. 3  
2-SAG-3, SAMG – Inject into the RCS, 4/11/11  
2-SAG-7, SAMG – Reduce Containment Hydrogen, 4/11/11  
2-SCG-2, SAMG – Depressurize Containment, Rev. 2  
2-SOP-10.9.2, Post Accident Vent System Operation, Rev. 10  
2-SOP-27.6, Unit 2 Appendix R Diesel Generator, Rev. 6  
2-SOP-ESP-001, Local Equipment Operation and Contingency Actions, Rev. 5

Completed Tests:

2-PC-R37, Alternate Safe Shutdown and Remote Shutdown Instruments, 3/22/10  
2-PT-A020, Fire Hydrant Drain Valve Operation, 10/16/10  
2-PT-M032, Condenser Pit Flood Alarms, 2/9/11  
2-PT-2Y043A, Appendix R Diesel Generator Lineup Timing Test, 10/1/10

Condition Reports:

CR-IP3-2007-2301, Internal Response to Information Notice 2007-01, Recent Operating Experience Concerning Hydrostatic Barriers, 5/15/07  
CR-IP2-2009-1143, Concrete Damage/Spalling in Corner of 480 Vac Room, 3/30/09  
CR-IP3-2010-3336, Corrective Action to Evaluate the need to Test or Demonstrate Capability of IP2 Zurn Strainer Pit Sump Pump Discharge Line Check Valve, 11/23/10  
CR-IP2-2011-1625, Some Components Credited for Mitigating the Consequences of an Internal Flood do not have or do not have an Active PM, 4/3/11  
CR-IP2-2011-1627, Plant Response Enhancement to Store Portable Trash Pumps Outside the Flood Zone and Ensuring Onsite Availability of Sand and Sandbags, 4/3/11  
CR-IP2-2011-1628, Walkdowns Identified Field Discrepancies Credited for Mitigating Consequences of an Internal Flood, 4/3/11  
CR-IP2-2011-1658, Winterization Plywood Covering Louvers in Main Feed Regulating Valve Area Could Restrict Flow of Water in Event of a Main Feed Line Break, 4/5/11  
CR-IP2-2011-1681, Fire Suppression Systems in Non Safety-Related Buildings Not Seismically Designed, 4/7/11  
CR-IP2-2011-1691, Walkdowns Identified Flood Features that are not Seismic and are Assumed not Available for a Flood, 4/8/11  
CR-IP2-2011-1915, Spill Kit on Grating above Containment Spray Pumps not Properly Restrained for Seismic Event, 4/20/11  
CR-IP2-2011-1919, Potential Service Water Zurn Pit In-Leakage Sources, 4/20/11  
CR-IP2-2011-1939, Retired in Place Air Line Penetrates SW Zurn Pit to SW Pump Bay, 4/21/11  
CR-IP2-2011-1944, Floor Drain Plugs Not Correct for Turbine Building, 4/21/11  
CR-IP2-2011-2006, Portion of the Structural Maintenance Rule Inspection for IP2 Intake Structure Not Completed within Requirement, 4/25/11  
CR-IP2-2011-2011, 23 Charging Pump Relief Valve Discharge Line Unistrut Missing One of Two U-Bolt Nuts, 4/20/11  
CR-IP2-2011-2039, Mesh Screens around Turbine Building Floor Drains Pulled out at Bottom, 4/26/11  
CR-IP2-2011-1534, Deficiency in City Water Line, 3/28/11  
CR-IP2-2011-1871, Debris in 480 Vac Room Floor Drain, 4/19/11

Other:

I2LP-ILO-FPS001, City Water and Fire Protection Instructor Lesson Plan, Rev. 3  
I2LP-LOR-SMG, Severe Accident Progression and Phenomena, Rev. 2  
I2SG-LOR-AOP013, 2-AOP-Leak-1 Licensed Operator Requalification Lesson Plan, Rev. 3  
I2SG-LOR-EOP006, ECA-0.0 Series with Rapid Plant Shutdown Training Lesson Plan, Rev. 2  
IPEC-LOR-Cycle 0801, B.5.b Walkdown Lesson Plan, Rev. 0  
PFP-168, Pre-Fire Plan – Utility Tunnel – Exterior Buildings, Rev. 5

PFP-217, Pre-Fire Plan – Fuel Storage Building, Rev. 11  
 PFP-265, Diesel Fire Pump House, Rev. 0  
 SH – SF – SFPC, System Health Report – Spent Fuel Pool Cooling, 4Q10  
 SSD DBD, Seismic Structures and Devices – Design Basis Document, Rev. 0  
 TRM 3.7.A, Shock Suppressors (Snubbers), Rev. 2  
 TRM 3.7.E, City Water Supply, Rev. 2  
 TRM 3.7.F, TRM 3.7.F – Post-Accident Containment Venting System, Rev. 2  
 TS 3.6.4, Technical Specification 3.6.4 – Containment Pressure, Amend. 238  
 UFSAR 1.11, Design Criteria for Structures and Components, Rev. 22  
 UFSAR 6.8, Post-Accident Hydrogen Control Systems, Rev. 22

**LIST OF ACRONYMS USED**

ADAMS	Agencywide Documents Access and Management System
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
EOP	Emergency Operating Procedure
ERO	Emergency Response Organization
IP	Inspection Procedure
NRC	Nuclear Regulatory Commission
SAMG	Severe Accident Management Guidelines
SBO	Station Blackout
SSE	Safe Shutdown Earthquake
TRM	Technical Requirements Manual
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
WO	Work Order