September 7, 2007

Mr. Fred Dacimo
Site Vice President - Administration
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, NY 10511

SUBJECT: REGARDING LETTER DATED FEBRUARY 22, 2007, ENTERGY NUCLEAR OPERATIONS INC., REQUESTED AN AMENDMENT TO INDIAN POINT UNIT 1 PROVISIONAL OPERATING LICENSE

Dear Mr. Dacimo,

By letter dated February 22, 2007, (ML070740552) Entergy Nuclear Operations Inc. requested an amendment to Indian Point Unit 1 Provisional Operating License for use of the Fuel Handling Building crane for dry spent fuel cask handling operations.

After reviewing your request, the U.S. Nuclear Regulatory Commission staff has determined that additional information is required for completing the review. Please provide the additional information requested in the enclosure within 30 days of receipt of this letter.

If you have any questions, please call me at (301) 415-6721.

Sincerely,

**/RA/**

Theodore Smith, Project Manager
Decommissioning Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No: 50-003

Enclosure: Request for Additional Information

cc: Indian Point Service List

Indian Point Nuclear Generating Station, Unit 1
cc: Service List

Mr. Gary J. Taylor
Chief Executive Officer
Entergy Operations, Inc.
1340 Echelon Parkway
Jackson, MS 39213

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

Mr. Paul Rubin
General Manager, Plant Operations
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway
P.O. Box 249
Buchanan, NY 10511-0249

Mr. Oscar Limpias
Vice President Engineering
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Christopher Schwarz
Vice President, Operations Support
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. John F. McCann
Director, Licensing
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Ms. Charlene D. Faison
Manager, Licensing
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Michael J. Columb
Director of Oversight
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. James Comiotes
Director, Nuclear Safety Assurance
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, NY 10511-0249

Mr. Patric Conroy
Manager, Licensing
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
P. O. Box 249
Buchanan, NY 10511-0249

Assistant General Counsel
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Peter R. Smith, President
New York State Energy, Research, and
Development Authority
17 Columbia Circle
Albany, NY 12203-6399

Mr. Paul Eddy
New York State Department
of Public Service
3 Empire State Plaza
Albany, NY 12223

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Senior Resident Inspector's Office
Indian Point 2
U. S. Nuclear Regulatory Commission
P.O. Box 59
Buchanan, NY  10511

Senior Resident Inspector's Office
Indian Point 3
U. S. Nuclear Regulatory Commission
P.O. Box 59
Buchanan, NY  10511

Mr. Charles Donaldson, Esquire
Assistant Attorney General
New York Department of Law
120 Broadway
New York, NY 10271

Mayor, Village of Buchanan
236 Tate Avenue
Buchanan, NY 10511

Mr. Raymond L. Albanese
Four County Coordinator
200 Bradhurst Avenue
Unit 4 Westchester County
Hawthorne, NY 10532

Mr. William DiProfio
PWR SRC Consultant
139 Depot Road
East Kingston, NH 03827

Mr. Garry Randolph
PWR SRC Consultant
1750 Ben Franklin Drive, 7E
Sarasota, FL 34236

Mr. William T. Russell
PWR SRC Consultant
400 Plantation Lane
Stevensville, MD 21666-3232

Mr. Jim Riccio
Greenpeace
702 H Street, NW
Suite 300
Washington, DC 20001

Mr. Phillip Musegaas
Riverkeeper, Inc.
828 South Broadway
Tarrytown, NY 10591

Mr. Mark Jacobs
IPSEC
46 Highland Drive
Garrison, NY 10524

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Entergy Nuclear Operations, Inc.
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450 Broadway, GSB
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Theodore Smith, Project Manager
Decommissioning Directorate
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Office of Federal and State Materials
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Docket No: 50-003

Enclosure: Request for Additional Information

cc: Indian Point Service List
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| **NAME** | TSmith | BWatson |
| **DATE** | 9/7 /07 | 9/7 /07 |

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**REQUEST FOR ADDITIONAL INFORMATION**

**ENTERGY OPERATION, INC. INDIAN POINT, UNIT 1**

**USE OF THE FUEL HANDLING BUILDING CRANE FOR**

**DRY SPENT FUEL CASK HANDLING OPERATIONS**

**DOCKET NO: 50-003**

Reference: Letter NL-07-033 dated February 22, 2007 from Fred R. Dacimo of Indian Point Entergy Center to U.S. Nuclear Regulatory Commission with regard to License Amendment Request (LAR) - Indian Point Unit 1 Fuel Handling Building Crane Attachment One, "Safety Analysis Regarding Unit 1 Fuel Handling Building 75 Ton Crane"

Piping and Nondestructive Examination Branch

(1) Section 4.3 Crane Structural Steel:

(a) This section of the analysis states that the trolley-to-end truck bolting was - replaced to assure the adequacy of the bolting material to resist the calculated seismic stresses. Describe in detail how the material for the replaced bolting was selected to meet the functional and strength requirements.

(b) For the welds at the Crane, identify the welding codes/standards that are used to qualify the welding procedures and welders.

(c) This section of the analysis states that an engineering review of the crane's past inspection and maintenance history was performed. As a result of this review, critical structural areas were identified and inspected. Discuss the criteria that are used to identify the critical structural areas and describe in details of the inspection performed.

(d) This section of the analysis states that certain bridge rail tie-down bolting was replaced due to the concern of potential cracking. Provide additional information regarding the following:

(i) Please describe the conditions of the referenced bolting that raised concern of potential cracking;

(ii) Identify whether or not follow-up examination was performed on the replaced bolting to confirm the suspected cracking condition? Discuss the results if it was performed. Provide justification if it was not performed; and

(iii) Discuss augmented inspections that were performed on other bolting that may have a similar concern of potential cracking.

(2) Section 4.4 Crane Inspections and Tests:

(a) This section of the analysis states that the Indian Point-1 (IP-1) Fuel Handling Building (FHB) 75 ton crane receives pre-use inspections, operational inspections and an annual inspection. Describe these inspections in detail, especially the most recent annual inspection completed in August 2006. As a minimum, include the components, bolting and welds that were inspected, the inspection methods, the extent of inspection, inspection results, and any repair performed as a result of the inspections.

(b) This section of the analysis states that a non-destructive examination (NDE) inspection will be performed following the proof test to verify the condition of critical structural components. Additionally, Table 4 of the attachment states that a full load proof test will be performed on the crane prior to first lift of the transfer cask with fuel at the minimum operating temperature. Provide detailed information regarding the following:

(i) Please describe the proof test that will be performed on the subject crane and compare this test with that performed in the past;

(ii) Identify the critical structural components including bolting and welds that will be inspected by NDE after the proof test,

(iv) Describe what NDE will be performed on each critical structural component and to what extent;

(v) Describe the inspection procedures, equipment and personnel that will be used for the subject inspection and compare it with that of American Society of Mechanical Engineers (ASME) Code, Section XI requirements; and

(vi) Describe the criteria that are used to determine a component to be a critical component.

(3) Section 4.5 Crane Seismic Qualification:

(a) This section of the analysis states that the crane and supporting structure were determined to remain below material yield when subject to the maximum load lift combined with safe shutdown earthquake (SSE) loads. Describe how the material yield strength was determined for the critical structural components and discuss the safety margin that is incorporated into the load calculations.

Mechanical and Civil Engineering Branch (Evaluating structural adequacy of the crane)

(1) Section 3.1 Fuel Handling Building 75 Ton Crane Design and Licensing Considerations:

(a) The fourth paragraph of this section of the analysis states that only the main hoist (with a rated load of 75 tons) of the FHB crane is used to lift the transfer casks. What preventive measures/controls will the licensee have in place to ensure that the auxiliary hoists (rated load of 15 tons and 3 tons) are not used inadvertently in the transfer cask handling operations?

(2) Section 3.2 Fuel Building Loading Operations Summary:

(a) The third paragraph, of this section of the analysis states that the combined maximum lift weight, including rigging and lift yoke will not exceed 75 tons, which is the design rated load of the IP-1 FHB 75 ton crane. Please provide the following:

(i) Confirm whether or not the weight of the hook block is included in the design rated load and the maximum lift weight;

(ii) Provide the actual maximum lift weight (expected) to be lifted during spent fuel cask handling operations using the IP-1 FHB 75 ton crane.;

(iii) Please provide a breakdown of this load in terms of weights of the loaded fuel; canister; transfer cask; lifting yoke; hook block; rigging etc.; and demonstrate that the total load does not exceed 75 tons. Indicate if these weights are measured or calculated/estimated; and

(iv) Describe the minimum factor of safety associated with the 75 ton design rated load for the IP-1 FHB Crane. If the weights used are calculated or estimated, indicate how this factor of safety could be impacted by possible variations in the actual load.

(3) Section 4.3 Crane Structural Steel:

(a) Since the FHB 75 ton crane is of an older vintage (designed and procured in 1958 and installed in 1962), describe how age-related degradation effects were considered and evaluated for the crane structural steel during the licensee's review and inspection of the crane in preparation for the planned dry cask loading effort?

(b) Please list the welds that were selected as critical and subjected to NDE inspection. Please confirm specifically if the following welds were included and inspected as critical welds:

(i) The welds of the truck structure that supports and aligns the crane bridge and trolley wheels on their respective runway rails; and

(ii) The welds that align the wheel trucks relative to the bridge girders and;

(iii) Welds in the bridge girders and trolley load girder.

(4) Section 4.4 Crane Inspections and Tests:

(a) Please discuss the procedure and/or standard that will be used for performing the full load proof test of the crane.

(b) Staff notes that the FHB 75 ton crane proposed to be used for IP-1 dry cask handling operations is an older vintage (designed and procured in 1958 and installed in 1962) partly refurbished crane and the limiting dry spent fuel cask load that will be handled is at or close to the design rated load of 75 tons, with possible variation (increase) due to dynamic effects during cask load handling. Please discuss your basis for concluding that use of 100% of the design rated load of 75 tons as the proof test load for the crane should suffice to provide a proper verification of the structural adequacy of the crane for dry spent fuel cask handling operations.

(5) Section 4.5 Crane Seismic Qualification

(a) This section of the analysis states that an evaluation was performed which confirmed that the crane structure and its supporting structure are qualified to hold the maximum critical load during a seismic event. Please provide the following:

(i) Describe the methodology used for seismic qualification of the crane including the use of computer codes and models, if any, and the limiting loads considered;

(ii) Define the boundary of the crane system considered in the analysis and provide an explanation that the crane load has no impact outside of this boundary;

(iii) Describe what assumptions, if any, specific to the crane configuration were made for evaluating the structural response to a seismic event. Clarify whether these assumptions were realistic or resulted in conservative modeling of the crane seismic response; and

(iv) Please discuss the response spectra used and its appropriateness as input for the crane seismic evaluation. Also indicate the approach used (time domain, frequency domain) for applying the seismic load to the crane structural model.

(b) Explain the treatment of the load on the hook in the seismic analysis for both horizontal and vertical seismic excitation effects. How were seismically induced pendulum and swinging effects of the load considered in the analysis and design evaluation of the crane? Please provide justification for any seismic effects not considered.

(6) Section 4.5 Crane Seismic Qualification:

(a) The second paragraph of this section of the analysis states that “The crane and supporting structure were determined to remain below yield when subject to the maximum load lift combined with the SSE, ...” Staff notes that, although this criteria is acceptable for structural steel members when buckling limit states do not govern, the criteria is not appropriate for the structural steel members for which buckling considerations govern the design. Please provide the following:

(i) Clarify the acceptance criteria used for structural steel members of the crane, the wire ropes and other important load carrying components of the FHB crane system considering the governing failure limit states. Include references to the applicable code.

(ii) Please list the maximum force/stress levels in the important members/components of the crane and its supporting structure (including bolting, welds, wire ropes and foundations) under the critical load combination with seismic SSE loading, and the corresponding acceptance criteria with basis, and the factors of safety.

(iii) Please provide the factor of safety provided in the design/selection of lifting devices (including slings) attached to the load block?

(7) Section 4.6 Tornado Wind and Missile Loads:

(a) Describe what procedures and administrative controls would be followed prior to commencement of each cask loading operations in the IP-1 FHB building using the IP-1 FHB 75 ton crane to ensure that fuel handling is stopped and the FHB doors are closed in the event of imminent severe weather.

(b) Describe what actions will be taken if severe weather becomes imminent after a cask loading operation using the crane has commenced?

(8) Quality Assurance Program:

(a) With respect to the electrical refurbishment of the FHB crane indicated in Section 4.2 and replacement of the bridge rail tie-down bolting and the trolley-to-end truck bolting indicated in Section 4.3, please discuss the Quality Assurance (QA) program that was used in these refurbishment/replacement work activities performed on the crane.

(b) Please identify if the QA program used meets the criteria in Appendix B of 10 CFR 50? If not, discuss any deviations.

STRUCTURAL MECHANICS & MATERIALS BRANCH

(1) Section 4.7.1 Cask Loading Design Features and Section 4.7.2 Postulated Load Drops

(a) Section 4.7.1 states that “The design of the HI-TRAC-100D Version IP1 transfer cask and the MPC *precludes fuel damage* (emphasis added) if the loads are less than 64.8 g’s. (Ref 1).” Section 4.7.2 states that “It has been demonstrated that the fuel assembly deceleration limit for a vertical drop is 64.8 g’s as reported in HI-STORM FSAR (Final Safety Analysis Report) Section 3.5.” As part of their technical review, NRC staff performed an in-depth evaluation of the HI-STORM-100 FSAR Section 3.5. The evaluation found problems with the methods used by Holtec to calculate the 64.8 g deceleration load limit. This has resulted in Holtec’s withdrawal of Section 3.5 from the HI-STORM-100, Amendment 4 FSAR, as well as, two other FSARs currently being reviewed by NRC staff. Therefore, some basis other than the analysis in Section 3.5, must be provided for acceptance of the drop loads (impact decelerations) specified in the licensee’s analysis. Please provide an additional analysis of the IP-1 stainless steel clad fuel demonstrating that fuel damage will not occur for the load drops specified in Section 4.7.2 for the HI-TRAC-100D Version IP1 transfer cask and MPC (Multi-Purpose Canister).

(b) Provide the calculations, including the LS-DYNA input and output files, for the inclined loaded vertical transfer cask drop into the cask load pool discussed in Section 4.7.2 (b).

(i) The summary description of the analysis provided in Section 4.7.2 (b) is not clear and further explanation for the justification of “Key additional assumptions” needs to be provided.

(c) Provide the calculations for the drop case in Section 4.7.2 (c) where the loaded transfer cask tips into the cask load pool and impacts the west wall.

(i) The results in Section 4.7.2 state that "The calculated decelerations are less than the 64.8 g limit for the fuel and are, therefore, acceptable." This drop scenario induces both axial and lateral deceleration loads on the fuel cladding, yet no discussion of the lateral deceleration loads has been provided. What are these deceleration loads and what are the allowable axial and lateral deceleration limits for the stainless steel cladding?

(d) Provide the calculations for the MPC lid drop onto the MPC discussed in Section 4.7.2 (d) and the basis for the simplifying assumption that the water's "change in density is… proportional to the lid velocity."

(i) Section 4.7.2 (d) notes that one of the key assumptions used in the analysis is that "The water is considered approximately incompressible in that the change in density is assumed to be proportional to the lid velocity; the proportionality constant affords a simple way to account for the expected reduction in water velocity escaping through the lid-to-shell gap as the water density increases." NRC staff needs to understand the basis for this assumption, and how it affects the results.