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Ron Gaston
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10 CFR 50.90

NL-20-078

November 9, 2020

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Response to Requests for Additional Information - License Amendment Request to Revise the Indian Point Nuclear Generating Unit No. 3 Licensing Basis to Incorporate the Installation and Use of a New Auxiliary Lifting Device

Indian Point Nuclear Generating Unit No. 3
NRC Docket No. 50-286
Renewed Facility Operating License No. DPR-64

References:

1) Entergy Nuclear Operations, Inc. (Entergy) letter to U. S. Nuclear Regulatory Commission (NRC), "Proposed License Amendment to Revise the Indian Point Nuclear Generating Unit No. 3 Licensing Basis to Incorporate the Installation and Use of a New Auxiliary Lifting Device" (ADAMS Accession No. ML20084U773), dated March 24, 2020

2) NRC Electronic mail from R. Guzman (NRC) to R. Gaston (Entergy), Subject: "Indian Point Unit No. 3 - Request for Additional Information: LAR to Revise Licensing Basis for New Auxiliary Lifting Device [EPID L-2020-LLA-0051]," (ADAMS Accession No. ML20236J852), dated September 24, 2020

In Reference 1, Entergy Nuclear Operations, Inc. (Entergy) submitted a request for a proposed amendment to Renewed Facility Operating License (FOL) DPR-64 for Indian Point Nuclear Generating Unit No. 3 (IP3). The proposed amendment requested U.S. Nuclear Regulatory Commission (NRC) approval to incorporate, into the IP3 Licensing Basis, the installation and use of a new single failure proof auxiliary lifting device (i.e., the Holtec International (Holtec) HI-LIFT) to handle a dry cask storage (DCS) transfer cask (i.e., the HI-TRAC) in the IP3 Fuel Storage Building (FSB).

In Reference 2, the NRC transmitted requests for additional information (RAIs) identified by the NRC Plant Systems Branch concerning the proposed license amendment. The following Enclosures to this letter provide a response to the NRC RAIs.

Enclosure 1 provides a proprietary version of the narrative RAI responses. This enclosure contains information proprietary to Holtec, and is therefore supported by an affidavit signed by Holtec, the owner of the information, which is provided in Enclosure 5.

Enclosure 2 provides Revision 2 to Holtec Report HI-2188459, "HI-LIFT Specification for IPEC Unit 3," which is referenced in the RAI responses. This enclosure, in its entirety, contains information proprietary to Holtec, and is therefore supported by an affidavit signed by Holtec, the owner of the information, which is provided in Enclosure 5.

Enclosure 3 provides Revision 2 to Holtec Drawing 11654, "IPEC, IP3 HI-LIFT General Arrangement," which is referenced in the RAI responses as well as in HI-2188549, Revision 2. This enclosure, in its entirety, contains information proprietary to Holtec, and is therefore supported by an affidavit signed by Holtec, the owner of the information, which is provided in Enclosure 5.

Enclosure 4 provides a non-proprietary, redacted version of the narrative RAI responses.

Enclosure 5 provides the Holtec Affidavit in support of Enclosures 1, 2 and 3. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the NRC and addresses, with specificity, the considerations listed in paragraph (b)(4) of Section 2.390 of the Commission's regulations.

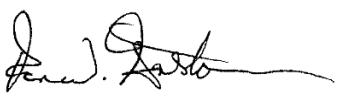
There are no new regulatory commitments in the enclosed RAI responses.

Should you have any questions or require additional information, please contact Ms. Mahvash Mirzai, IP2 and IP3 Regulatory Assurance Manager, at (914) 254-7714.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b), a copy of this application, with non-proprietary enclosures, is being provided to the designated State Officials.

I declare under penalty of perjury; the foregoing is true and correct. Executed on November 9, 2020.

Respectfully,



Ron Gaston

RWG/jls

Enclosure 1: Response to Requests for Additional Information, Proprietary
Enclosure 2: Holtec Report HI-2188549, "HI-LIFT Specification for IPEC Unit 3," Revision 2, Proprietary
Enclosure 3 Holtec Drawing 11654, "IPEC, IP3 HI-LIFT General Arrangement," Revision 2, Proprietary
Enclosure 4: Response to Requests for Additional Information, Non-proprietary
Enclosure 5: Holtec Affidavit Pursuant to 10 CFR 2.390, dated November 4, 2020

cc: NRC Region I Regional Administrator
NRC Senior Resident Inspector, Indian Point Nuclear Generating Unit Nos. 2 and 3
NRC Senior Project Manager, NRC/NRR/DORL
President and CEO, NYSERDA (without Enclosures 1, 2, and 3)
New York State Public Service Commission (without Enclosures 1, 2, and 3)
NYS Department of Health - Radiation Control Program (without Enclosures 1, 2, and 3)
NYS Emergency Management Agency (without Enclosures 1, 2, and 3)

Enclosure 1

NL-20-078

Response to Requests for Additional Information

Proprietary

Enclosure 2

NL-20-078

Holtec Report HI-2188549, "HI-LIFT Specification for IPEC Unit 3," Revision 2

Proprietary

Enclosure 3

NL-20-078

Holtec Drawing 11654, "IPEC, IP3 HI-LIFT General Arrangement," Revision 2

Proprietary

Enclosure 4

NL-20-078

Response to Requests for Additional Information

Non-proprietary

Response to Requests for Additional Information

Background

By letter dated March 24, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20084U773), Entergy Nuclear Operations, Inc., (Entergy, the licensee) submitted a license amendment request (LAR) for to revise the Indian Point Nuclear Generating Unit No. 3 (IP3) licensing basis for spent fuel cask handling. Specifically, the licensee requested approval to incorporate into the IP3 Licensing Basis the installation and use of a new single failure proof auxiliary lifting device (i.e., the Holtec International (Holtec) HI-LIFT) to handle a dry cask storage (DCS) transfer cask (i.e., the HI-TRAC) in the IP3 Fuel Storage Building (FSB). The change to the IP3 licensing would be documented in a revision to the IP3 Updated Final Safety Analysis Report (UFSAR).

The existing IP3 40-ton FSB Crane does not have the capacity to lift a fully loaded HI-TRAC (i.e., containing a multi-purpose canister (MPC-32) with 32 spent fuel bundles). Building constraints limited the potential options for increasing the load capability of the existing crane. Since 2012, the licensee has conducted DCS loading by moving spent fuel from the IP3 FSB to the Indian Point Nuclear Generating Unit No. 2 (IP2) FSB using a wet transfer method, which requires multiple transfers to transfer 32 spent fuel bundles. The proposed licensing basis change would permit the direct loading of the HI-TRAC without wet fuel transfer from IP3 to IP2 through use of the HI-LIFT as a single-failure-proof lifting device meeting the intent of guidance in American Society of Mechanical Engineers (ASME) NOG-1 2004 edition (ASME NOG-1), "Rules for Construction of Overhead and Gantry Cranes," NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," and NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants." Entergy described the HI-LIFT as a lifting device comprised of a U-shaped frame, strand jack hoisting device, hydraulic positioning cylinders, torque arms and stabilizing arm.

Section 1.3, "General Design Criteria," of the IP3 UFSAR states that the licensee conducted a study of the method of compliance with NRC regulations contained in 10 CFR Part 50, including the General Design Criteria (GDC) of Appendix A to 10 CFR Part 50, and that the results of the compliance study were updated to reflect changes made to the configuration since the study was completed. The study was conducted in accordance with the provisions of NRC Confirmatory Order of February 11, 1980, and were submitted to the NRC on August 11, 1980. The Nuclear Regulatory Commission (NRC) staff has determined that additional information is needed to complete its review, as described in the request for additional information (RAI) shown below.

RAI-1 (SCPB-Plant Systems): Qualification of Components

Regulatory Basis:

- In accordance with 10 CFR Part 50, Appendix A, GDC 1, "Quality standards and records," specifies that structures, systems, and components (SSCs) important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. Where generally recognized codes and standards are used, they shall be identified and evaluated to determine their applicability.

- Section 10 of NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants," specifies quality measures addressing the design, fabrication, installation, testing, and operation be applied to crane handling systems for safe handling of critical loads.

Issue(s):

(a) The proposed insert for IP3 UFSAR Section 9.5.7 in Attachment 5 to the Enclosure to the LAR included the following:

> The HI-LIFT is designed to meet the single-failure-proof criteria of NUREG-0554 ["Single-Failure-Proof Cranes for Nuclear Power Plants," May 1979] and NUREG-0612 ["Control of Heavy Loads at Nuclear Power Plants," July 1980] through compliance with ASME [American Society of Mechanical Engineers] NOG-1, 2004 ["Rules for Construction for Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)"]….
>
> Similar statements are included in other parts of the LAR, including Section 3.2, "Heavy Loads Requirements," and Section 4.3, "No Significant Hazards Consideration Analysis," of the Enclosure to the license amendment request. The words "meet" and "compliance" imply complete agreement with the referenced guidelines or standards

Request:

Modify the amendment request to accurately reflect the degree to which the HI-LIFT assembly would conform to the referenced guidelines and standards considering the many specified exceptions and alternatives to the applicable criteria and given the differences in the design from an overhead crane with a top-running trolley and multiple girders. Describe at a high level how the intent of the referenced standards and NRC guidelines would be satisfied with respect to procedures, training, inspection, maintenance, testing for continued compliance, and design (i.e., quality assurance, structural reliability, capability to withstand a single component failure, and pre-operational testing scope), as supported by the detailed compliance matrices in Attachment 2 to the amendment request.

Entergy Response:

Section 8 has been added to Holtec report HI-2188549, "HI-LIFT Specification for IPEC Unit 3," Revision 2 to provide the requested information. Enclosure 2 provides this document.

Commensurate with the importance of the safety functions of the HI-LIFT, all engineering, procurement, fabrication, testing, installation, training, operation, and maintenance activities are performed in accordance with the Holtec NQA-1 nuclear quality control program, or the Indian Point Energy Center (IPEC) NQA-1 nuclear quality control program. Thus, all activities are performed in accordance with written procedures, by qualified individuals. The provisions of 10 CFR 21, "Reporting of Defects and Non-compliance," must be applied to all safety significant activities.

The HI-LIFT performs the same essential function as a fuel handling overhead bridge crane, and therefore must be designed, fabricated, erected, and tested under quality standards of equal or greater rigor than the standards established for fuel handling overhead bridge cranes. The foundational standards for highly reliable fuel handling cranes are NUREG-0554 and

NUREG-0612, which have been well vetted and well proven by the industry over four decades of use. ASME NOG-1 is recognized as a comprehensive standard for high reliability fuel handling overhead bridge cranes, complying with and extending the requirements of NUREG-0554. All essential elements of the HI-LIFT design and implementation are evaluated against these three standards. Many elements of the HI-LIFT are demonstrated to be in direct compliance with these standards. Other elements of the HI-LIFT may not fit the exact form described in the overhead bridge crane standards, but are demonstrated as analogous to a form in the standards, and are demonstrated as meeting equivalent levels of safety. Where elements of the HI-LIFT are less directly analogous to forms in the overhead bridge crane standards, supplemental industry standards are employed to demonstrate equivalent levels of safety as the overhead crane standards.

All design criteria for the HI-LIFT directly comply with NOG-1. Environmental limits are well defined and load cases for the machine are well defined, including the magnitude and frequency of the lifted load, the range of motion, operating speeds, and off normal and extreme events, including seismic events. Load bearing materials in the HI-LIFT either directly comply with procurement and testing requirements of NOG-1, or in the case of the strand jack and swing cylinders, alternatively comply with ASME B30.1, "Jacks, Industrial Rollers, Air Casters, and Hydraulic Gantries." Fabrication techniques such as machining and welding directly comply with NOG-1 requirements, or comply with the code alternative ASME Boiler and Pressure Vessel Code, Section III, Subsection NF, or in the case of strand jack and swing cylinders, alternatively comply with ASME B30.1.

The overhead crane standards differentiate between "structural" and "mechanical" elements, based on load cycles and potential failure modes, and use this categorization to establish analysis methodology, stress limits and other acceptance criteria. The criteria for "single-failure proof" systems is defined in NUREG-0554 as "Other load-bearing items such as girders should be conservatively designed but not be considered to be single-failure proof." Each load bearing element of the HI-LIFT can be categorized using these same criteria and analyzed accordingly. Following the overhead crane standards, structural elements undergo approximately one stress cycle each time the load is lifted and subsequently set down, sometimes with stress fluctuations related to load translation. Structural elements are typically constructed of steel plate welded into box beams or frames. The analysis considers material stresses with special consideration for welds, and considers susceptibility to buckling, crippling and other stability failure modes to ensure high reliability of these elements. Consistent with guidance in the standards, structural elements are conservatively designed to ensure resiliency against all credible hazards and failure modes, but redundant structural elements are not provided, as no credible failure modes exist for the gross failure of structural elements in a cask handling crane. The HI-LIFT Support Arms, Torque Arms, Center Beam, Outrigger Arm, Mounting Feet, and Mounting Plates meet the loading profile, and physical form characteristic to structural elements, and are therefore considered as such.

Mechanical elements under ASME NOG-1, NUREG-0554, and NUREG-0612, are characterized by experiencing numerous stress cycles each time a load is lifted, and frequently by experiencing surface wear in service. The analysis of such components considers material stresses, with consideration for fatigue and allowances for wear. To ensure high reliability, mechanical elements are designed with redundancy, or alternatively are designed to support 200% of the maximum critical load. Once in service, mechanical components are subject to inspections and maintenance to mitigate wear. On a conventional overhead crane, mechanical elements include gears, brakes, and wire ropes. The HI-LIFT swing cylinders, strand jack, and

strands are considered mechanical elements. Strands are designed with redundancy, while the strand jack and swing cylinders are designed for 200% of the maximum critical load. HI-LIFT specification HI-2188549, Appendix E contains a detailed list of major HI-LIFT components, the analysis categorization (Structural or mechanical) and the sections of ASME NOG-1 or other supplemental codes that are applied to the design, material, fabrication, and inspections.

Material procurement and fabrication will be performed under the Holtec NQA-1 nuclear quality assurance program, and will be subject to the provisions of 10 CFR 21. Material and components are procured under written specifications. Strand jacks and hydraulic cylinders will be procured as commercial components and upgraded by testing to verify critical characteristics. Strand jacks will undergo testing per ASME B30.1, including proof load testing at 110% of 200% of Maximum Critical Load (MCL), and testing to ensure strands are gripped, ungripped, and regripped properly. All fabrication activities are performed in accordance with written procedures by qualified individuals, under the Holtec NQA-1 nuclear quality assurance program.

As described in Section 6 of HI-21488549, pre-operational testing is conducted in two major phases: Factory and site. By the conclusion of testing, all load path components will have been tested at 125% of MCL through the full range of motion, and mechanical components utilizing enhanced safety factors in lieu of redundancy, will be tested to 200% of MCL. Each anchor in concrete will be subject to pull out testing to a load that bounds the highest pull out demand load for the particular anchor, across all analyzed load cases, based on as-built anchor locations and details.

Holtec will provide a detailed Operations and Maintenance (O&M) manual for the HI-LIFT including requirements for inspection, maintenance, and testing for continued compliance. All personnel involved with operating, inspecting, or maintaining the HI-LIFT must be trained in accordance with relevant Holtec and plant procedures. Testing and maintenance of the system will be in accordance with ASME B30.2-1976, "Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)," Section 2-2 [5]. In addition, the strand jack and swing cylinders will be subject to the testing and maintenance provisions in ASME B30.1[17].

(b) For Paragraph **[[** PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390 **]]** in Attachment 2 to the Enclosure to the LAR, the compliance evaluation included the following:

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PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390

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The above statement does not define whether the manufacturer’s quality assurance program conforms with NRC regulations or provide another basis for concluding strand jacks from the manufacturer provide reliability commensurate with the safety-significance

of the proposed spent fuel cask handling operations, such as through commercial grade dedication, which may include analysis of operating experience with strand jacks made by the selected manufacturer (i.e., ASME NQA-1, Subpart 2-14, Method 4).

Request:

Describe how the strand jack assembly would be qualified for the DCS lift application. Please address whether the strand jack manufacturer has a quality assurance program satisfying NRC regulations or commercial-grade dedication of the strand jack under the HOLTEC NQA-1 program will provide the qualification. If commercial grade dedication would be used, describe the critical characteristics of the strand jack and how each characteristic would be evaluated against the related acceptance criteria. Also address design conformance to an appropriate national consensus standard.

Entergy Response:

The requirements for the strand jack in HI-2188549, Section 4 have been augmented to invoke ASME B30.1-2015 requirements. This standard includes guidance for design, manufacture, testing, and post-test inspection.

The strand jack is procured as a commercial item and dedicated under the Holtec NQA-1 quality assurance program. Dedication will follow NQA-1, Subpart 2.14, Method 1, and will consist of inspections and tests of the strand jack. Critical characteristics for dedication include functional performance and the ability to lift/lower/hold sufficient load. Functional requirements include the ability to grip and ungrip the strands at each anchor, extend and retract the main cylinder, and sequence these operations to lift and lower the load. Proof load testing requirements, proof load requirements, and post testing inspection shall comply with ASME B30.1-2015, Section 1-7.4. In accordance with ASME B30.1-2015 paragraph 1-7.4.2(b), the proof load test for each manufactured strand jack must be conducted at a minimum of 110% of the strand jack's rated load. The post-test inspection includes checks for worn, cracked, bent, or broken cylinder barrels, structural components and welds, as well as checks for hydraulic fluid leaks.

Note that HI-2188549, Appendix A, Paragraph 5111 clarifies that the strand jack rated capacity is at a minimum two times the lifted load. Proof load testing is based on the strand jack rated capacity, not the lifted load. Therefore, with a design for 100 ton lifted load, the strand jack minimum rated capacity is 200 tons, and the 110% proof load test is conducted at a minimum of 220 tons.

The requirements described above have been added to HI-2188549, Revision 2, Section 4. Additional details regarding component acceptance have been added to HI-2188549, Revision 2, Appendix A, Paragraph 7100.

(c) The HI-LIFT utilizes hydraulic cylinders for positioning of the HI-LIFT frame and translation of the load. The NRC staff recognizes that ASME NOG-1 permits use of commercial hydraulic cylinders as part of the hoist system in paragraph 5540.

Request:

Describe the hydraulic cylinder design conformance to an applicable national consensus standard.

Entergy Response:

The requirements for the hydraulic swing cylinders in HI-2188549, Revision 2 , Section 4 have been augmented to invoke ASME B30.1-2015 requirements for hydraulic jacks, to supplement the requirements already delineated in ASME NOG-1 2004. This standard includes guidance for design, manufacture, testing, and post-test inspection.

The hydraulic swing cylinders are procured as a commercial item and dedicated under the Holtec NQA-1 quality assurance program. Dedication will follow NQA-1, Subpart 2.14, Method 1, and will consist of inspections and tests of the swing cylinders. Critical characteristics for dedication include functional performance, and the ability to extend and retract against sufficient load. Proof load testing requirements, proof load requirements, and post testing inspection shall comply with ASME B30.1-2015 section 1-2.4. In accordance with ASME B30.1-2015, Paragraph 1-2.4.2(b), the proof load test for each manufactured hydraulic jack must be conducted at a minimum of 100% of the hydraulic jack's rated load. The post-test inspection includes checks for worn, cracked, bent, or broken cylinder barrels, structural components and welds, as well as checks for hydraulic fluid leaks.

The requirements described above have been added to HI-2188549, Revision 2, Section 4. Additional details regarding component acceptance have been added to HI-2188549, Revision 2, Appendix A, Paragraph 7100.

(d) For Paragraph **[[** PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390 **]]** in Attachment 2 to the Enclosure to the LAR, the compliance evaluation included the following statement:

> **[[** PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390
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The NRC staff concluded that these valves perform an essential function to prevent uncontrolled movement of the cylinders in the event of a hydraulic line break. The LAR did not provide sufficient information on the qualification of these valves on the swing cylinders for the essential function of locking the hydraulic cylinders on loss of hydraulic pressure.

Request:

Describe the qualification of the counterbalance valves on the swing cylinders.

Entergy Response:

The primary function of the counterbalance valve is to retain fluid in the hydraulic cylinder in the event of loss of pressure or emergency stop. The counterbalance valve is designed for direct mounting to the hydraulic cylinder to eliminate the possibility of line break between the retained fluid and the valve. The second mandatory function of the counterbalance valve is to open and close the main flow port in response to control fluid pressure.

As specified in HI-2188549, Revision 2, Section 4.3.2, counterbalance valves, and all other hydraulic components used in the control system of the swing cylinders must have a

manufacturer's rated pressure that exceeds the hydraulic pressure required for all normal, extreme and seismic operating conditions.

Counterbalance valves will be dedicated for service following NQA-1, Subpart 2.14, Method 1, and will consist of inspections and tests. Critical characteristics for dedication include functional performance, such as shutting flow and retaining fluid in the cylinder upon loss of supply pressure, and opening and closing the main flow port as expected in response to control pressure signals. Critical characteristics to demonstrate integrity include the ability to hold rated pressure. Functional and pressure tests may be performed in a fixture, however, final functional tests must be performed after mounting to the hydraulic swing cylinders. After the pressure test, visible surfaces of the counterbalance valves must be inspected for cracks, deformation, hydraulic fluid leaks, and any evidence of structural damage.

The requirements described above have been added to HI-2188549, Revision 2, Section 4. Additional details regarding component acceptance have been added to HI-2188549, Revision 2, Appendix A, Paragraph 7100.

RAI-2 (SCPB-Plant Systems): Strand Jack Support Configuration

Regulatory Basis:

- 10 CFR Part 50, Appendix A, GDC 4, "Environmental and Dynamic Effects Design Bases," specifies appropriate protection for SSCs important to safety against dynamic effects, including the effects of missiles that may result from equipment failures.

- Section 4.2, "Drum Support" of NUREG-0554 states that "Proper support of the rope drums is necessary to ensure that they would be prevented from falling…."

Issue:

The strand jack essentially functions as the rope drum and reeving system in a wire rope crane hoist. For Section **[[** PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390 **]]** in Attachment 2 to the Enclosure to the LAR, the compliance evaluation included the following:

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PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390

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Request:

Provide a drawing of the strand jack mounting details and an explanation of how the strand jack mounting would be analyzed to ensure it would meet ASME NOG-1 stress criteria and NUREG-0554 criteria for restraint.

Entergy Response:

The key elements of the strand jack mounting configuration are as follows:

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The strand jack is assembled with the strand guide and strand management device (re-coiler) on a common frame, such that the entire frame assembly can be installed and removed from the top beam of the HI-LIFT as a single unit, while maintaining relative alignments. This configuration allows more maintenance and inspection activities to be performed at ground level.

The strand jack sub frame is fabricated from welded structural steel. Elements and welds of the sub-frame and bolted connections that are relied upon to restrain the strand jack against credible loads are evaluated as structural components per the methodology and allowable stresses of ASME NOG-1, Section 4000. Note that the portion of the sub-frame between the strand jack and Center Beam is solid steel plate, effectively acting as a shim.

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PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390

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As discussed in HI-2188549, Revision 2, Appendix A, Paragraph 4134, wind loads, and tornado borne missiles are not credible inside the IP3 Fuel Storage Building. The seismic analysis documented in Holtec Report HI-2188625 indicates that the strands remain under downward tension at all times through OBE and SSE events. Comparison of the vertical and horizontal ZPA values for OBE and SSE events, demonstrates that the horizontal forces on the strand jack are insufficient to overcome sliding friction that would result in relative motion between the strand jack and HI-LIFT center beam. Given the lack of credible load cases that would cause movement of the strand jack, the strand jack mounting system can be regarded as a defense-in-depth device from a structural perspective, allowing the mounting system to be optimized for operations.

An additional sheet has been added to Holtec Drawing 11654 to illustrate strand jack mounting details. This revised drawing is provided as Enclosure 3. HI-2188549, Appendix A, Paragraphs 5421.1 and 5456.3 and Appendix C, Section 4.2 have been updated.

RAI-3 (SCPB-Plant Systems): Strand Jack Failure Modes and Effects

Regulatory Basis:

- 10 CFR Part 50, Appendix A, GDC 4, "Environmental and Dynamic Effects Design Bases," specifies appropriate protection for SSCs important to safety against dynamic effects, including the effects of missiles that may result from equipment failures.

- Section 4.9, "Hoist Braking System" of NUREG-0554 states that "Mechanical holding brakes in the hoisting system (raising and lowering) that are automatically activated when electric power is off or mechanically tripped by overspeed devices or overload devices in the hoisting system will help ensure that a critical load will be safely held or controlled in case of failure in the individual load-bearing parts of the hoisting machinery."

Issue:

For Section **[[** PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390 **]]** in Attachment 2 to the Enclosure to the LAR, the compliance evaluation included the following:

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Request:

With consideration of single failures in the strand jack hydraulic system or its control system that could actuate the hydraulic wedge lock release, explain the basis for the statement that no more than one strand could be disengaged by a single mechanical or hydraulic failure. Also describe how that design feature to prevent disengagement of wedges is verified (e.g., design condition or test) and provide supporting diagrams or test descriptions for the relevant design features.

Entergy Response:

Unlike the rope of a traditional crane, the strand bundle for the Strand Jack is comprised of numerous independent strand and wedge pairs that are held within the upper and lower anchor blocks of the strand jack frame. Please see Figure 1 below for an illustration of the basic components of the strand anchor. The load is shared among all strands and wedges such that any single mechanical failure of a strand or wedge does not result in any significant loss of load capacity, and would not impact the load holding ability of the strand jack.

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Special control modes for installation, maintenance and diagnostics are administratively restricted during lifts, and cannot be accidentally engaged. Manual bypass of wedge actuators requires a technician to be present at the strand jack, with hydraulic systems pressurized, a situation that does not occur accidentally.

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Figure 1: Simplified Strand Jack Wedge Diagram

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PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390

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Figure 2: Illustrated Strand Jack Operations

The strand jack safety features and controls will be tested according to the requirements of ASME NOG-1, Clause 7253. The factory acceptance test will verify all functionality of the machine, as well as all safety messages or electrical interlocks present in the control system. This requirement has been added to the Factory Acceptance Test description, in HI-2188549, Revision 2, Section 6.1.

Additional descriptions of the strand jack function and safety features have been added to HI-2188549, Revision 2, Section 4.2.1.

The ASME NOG-1 Compliance Matrix, (i.e., HI-2188549, Appendix A) has been updated to clarify the statement: "*The load is shared among all strands and wedges such that any single mechanical failure of a strand or wedge does not result in any significant loss of load capacity, and would not impact the load holding ability of the strand jack*".

RAI-4 (SCPB-Plant Systems): Testing and Maintenance

Regulatory Basis:

- In accordance with 10 CFR 50.34(b)(6)(iv), the final safety analysis report shall include a description of plans for conduct of normal operations, including maintenance, surveillance, and periodic testing of structures, systems, and components.

- Section 5.1.1, "General" of NUREG-0612, Item (6) states that "The crane should be inspected, tested, and maintained in accordance with Chapter 2-2 of ANSI.B30.2-1976 [Overhead and Gantry Cranes]."

Issue:

For Section **[[** PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390 **]]** in Attachment 2 to the Enclosure to the license amendment request, the compliance evaluation included the following:

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PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390

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Request:

Describe an inspection, testing, and maintenance program that encompasses the important components of the proposed HI-LIFT design and discuss consistency of the program with appropriate national consensus standards that include important HI-LIFT component types within the scope of the standard.

Entergy Response:

Holtec Report HI-2188549, Revision 2, has been revised to add Section 6.3 to provide the requested information. In addition, the NUREG-0612 compliance matrix in HI-2188549, Revision 2, Appendix B, Section 5.1.1 (item 6) has been updated to add code alternative ASME B30.1-2015.

An ongoing maintenance program for the HI-LIFT system will be prepared and issued prior to the delivery and first use of the HI-LIFT as a part of its O&M Manual. This document shall delineate the detailed inspections, testing, and parts replacement necessary to ensure continued radiological safety, proper handling, and performance of the HI-LIFT in accordance with the ASME NOG-1 and ASME B30.2 requirements. Additional requirements in ASME B30.1-2015 are applied for the strand jack, hydraulic swing cylinders, and counterbalance valves.

Contrary to a traditional overhead crane, the HI-LIFT has few mechanical components. As a result, only minimal maintenance will be required over its lifetime, and this maintenance would primarily consist of visual inspections during pre- and post-usage. Typical of such maintenance would be the reapplication of corrosion inhibiting materials on accessible external surfaces, weld inspection, and inspection of hydraulic lines. Such maintenance requires methods and procedures no more demanding than those currently in use at nuclear power plants. Manufacturer experience utilizing strand jacks in similar environments, including marine conditions, will be implemented per ASME B30.1 (1-7.8.3.b.4) to ensure highly reliable service.

A maintenance inspections and tests program schedule for the HI-LIFT is provided below.

Table 2: Maintenance Inspections and Tests Program Schedule

Task	**Schedule**
Strand Jack	
Visual inspection of assembly, including hydraulic lines, for loose or missing parts, cracks, deformation, or excessive wear.	Prior to loading each spent fuel canister.
Visual inspection for leaking hydraulic fluid.	Prior to loading each spent fuel canister.
Inspection of strands for signs of rust, debris, excessive wear, or reduction in diameter greater than 5% of the nominal diameter.	Prior to loading each spent fuel canister.
Visual inspection of assembly paint for corrosion, rust, or damage.	Prior to loading each spent fuel canister.
Inspection of upper and lower wedges. Replace if excessive wear or damage is seen.	Prior to loading each spent fuel canister[1].
Proof load test of assembled unit	After wedge or strand replacement[2] Test to minimum 100% of strand jack rated load.
Inspect tube banks (presser tubes)	At time of replacement for wedges.
Lubricate moving parts as needed.	Per manufacturer instructions.
Replace hydraulic seals	Per manufacturer instructions.
Hydraulic Swing Cylinders	
Visual inspection for any leakage oil around seals, pivot points, and hydraulic connections.	Prior to loading each spent fuel canister.
Visual inspection of assembly for loose or missing parts, cracks, deformation, or excessive wear.	Prior to loading each spent fuel canister.
Lubricate spherical bearings on rod ends and other moving parts that require regular lubrication.	Monthly or as specified by manufacturer
Visual inspection of assembly paint for corrosion, rust, or damage.	Monthly
Inspect and replace hydraulic seals	Yearly or per manufacturer instructions
Counter-balance valves	
Visual inspection for any leakage oil around seals, pivot points, and hydraulic connections	Prior to loading each spent fuel canister.
Functional test - Verify that valves close and hold the position of the swing arms as expected. Test in both directions of travel.	Prior to loading each spent fuel canister.

Table 1: Maintenance Inspections and Tests Program Schedule (continued)

Task	Schedule
Hydraulic Power Unit	
Inspect hydraulic system for any oil leakage around seals, and hydraulic connections	Prior to loading each spent fuel canister.
Verify oil in reservoir is adequate, adding additional oil if necessary	Prior to loading each spent fuel canister.
Check all pilot lights on control system, replacing any broken or damaged items.	Prior to loading each spent fuel canister.
Replace particulate filters	100 hours of service or per manufacturer instructions.
Clean suction strainer of all debris and particulates.	100 hours of service.
Drain and replace hydraulic fluid	1000 hours of service or per manufacturer instructions.
HI-LIFT Structure	
Visual inspection for signs of loose or missing parts, cracks, deformation, or excessive wear	Prior to each fuel loading
Inspect paint coating for corrosion, rust, or damage	Monthly

Note 1: Strand jack manufacturers recommend starting with a very conservative maintenance interval (typically 500 linear feet of lifting). As part of the strand jack maintenance, wear items can be measured to quantify the wear occurring in a particular application, to determine if longer maintenance intervals can be justified. Since the strand jack on the HI-LIFT operates indoors, in a clean environment, and is utilized at less than 50% of its nameplate rating, the wedges are expected to wear at a noticeably lower rate than strand jacks employed in general construction applications.

Note 2: Wedges are part of the primary load path and must be load tested prior to usage if repaired or replaced. Strand jack test loads must be isolated from the HI-LIFT structure for all testing above 125% of MCL, including proof load testing. Strand jack may be removed from the HI-LIFT structure, load tested in isolation, and reinstalled on the HI-LIFT structure without impacting load test validity for entire HI-LIFT assembly.

RAI-5 (SCPB-Plant Systems): Material Compatibility

Regulatory Basis:

- In accordance with 10 CFR 50.34(b)(6)(iv), the final safety analysis report shall include a description of plans for conduct of normal operations, including maintenance, surveillance, and periodic testing of structures, systems, and components.

- Paragraph 1145(b), "Chemical" of NOG-1, states that, if a crane's load block and wire rope would be immersed in a pool, "Requirements for the materials and lubricants of the load block and wire rope shall also be specified to insure compatibility with the pool chemistry."

Issue:

For Paragraph **[[** PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390 **]]** in Attachment 2 to the Enclosure to the license amendment request, the compliance evaluation included the following:

[[

PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390

]]

Lubricants and chemicals, such as boric acid crystals, could adversely affect the grip of the strand jack wedge locks, in addition to potentially adversely affecting the materials of construction.

Request:

Explain the configuration of the strand attachment to the load block and specify the materials to be used in the strands, the strand attachment to the load block, and the load block. Explain how environmental compatibility will be ensured during operation of the strand jack to prevent adverse effects

Entergy Response:

Construction of the strands, wedges, and load block will be from structural quality steel. Connection to the load block is accomplished in a similar manner to the strand movement connections. Figure 1 provides an illustrated example of this connection. An anchor block with a set of anchor wedges is used to capture the ends of the strands. This anchor block utilizes a retainer plate and bolts to ensure the wedges remain engaged and gripped to the strands. The only method of releasing the wedges is to un-bolt the retainer plate. These wedges do not move and are not subject to wear considerations as lifting wedges. This anchor can be directly pinned or interlocked into a lifting yoke or other lifting ancillary for use.

[[

PROPRIETARY INFORMATION WITHHELD PER 10 CFR 2.390

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Figure 1: Illustrated Strand Jack End Anchor

Strand jacks have been historically used in extreme marine environments, including seawater contact of major components including strands, wedges, and anchors. Large lifting operations in these environments are of durations far longer than the expected cask loading cycle for the HI-LIFT, while seeing little impact on operation of strand jack or machine reliability. Since Spent Fuel Pool water is less deleterious than seawater, wear on the major mechanical items due to contact with the Spent Fuel Pool water will be limited.

Unlike conventional wire rope, strands do not use lubrication. Strand jack wedges are not lubricated on the gripping surfaces, and only use a light application of solid lubricant on the conical sliding surfaces. Site procedures will be developed to decontaminate and clean materials as they emerge from the spent fuel pool, as is already done with spent fuel casks and the Shielded Transfer Canister at IPEC Strands will be cleaned with demineralized water, or equivalent, before reaching the wedges to remove residual boron. Inspection of strands and wedges during dry-runs on-site will confirm that cleaning efforts are sufficient to prevent adverse impacts on hardware functionality. Cleaning procedures may be adapted based on ongoing inspection results. This will limit any contamination buildup on the strands or load block and prevent any debris within the strand wedges.

The HI-LIFT system will be inspected and maintained according to requirements as described in HI-2188549, Revision 2, and in accordance with the IPEC UFSAR. Visual inspections of the system will be performed for external surface coating and component damage including surface denting, surface penetrations, weld cracking, chipped or missing coating. Where necessary, protective coatings will be reapplied. Coating wear and tear from normal use will not impact the safety of the system.

Additional information on the material selection and coating requirements has been added to HI-2188549, Revision 2, Section 4.2.5. In addition, HI-2188549, Revision 2, Section 5 has been augmented to clarify decontamination and cleaning requirements.

Enclosure 5

NL-20-078

Holtec Affidavit Pursuant to 10 CFR 2.390
dated November 4, 2020

AFFIDAVIT PURSUANT TO 10 CFR 2.390

I, Kimberly Manzione, being duly sworn, depose and state as follows:

(1) I have reviewed the information described in paragraph (2) which is sought to be withheld, and I am authorized to apply for its withholding.

(2) The information sought to be withheld is information provided in Enclosures 1, 2, and 3 to NL-20-078. These attachments contain Holtec Proprietary information.

(3) In making this application for withholding of proprietary information of which it is the owner, Holtec International relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4) and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10CFR Part 9.17(a)(4), 2.390(a)(4), and 2.390(b)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

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(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by Holtec's competitors without license from Holtec International constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product.

c. Information which reveals cost or price information, production, capacities, budget levels, or commercial strategies of Holtec International, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future Holtec International customer-funded development plans and programs of potential commercial value to Holtec International;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs 4.a, 4.b, and 4.e above.

(5) The information sought to be withheld is being submitted to the NRC in confidence. The information (including that compiled from many sources) is of a sort customarily held in confidence by Holtec International, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by Holtec International. No public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to

regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within Holtec International is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his designee), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside Holtec International are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information classified as proprietary was developed and compiled by Holtec International at a significant cost to Holtec International. This information is classified as proprietary because it contains detailed descriptions of analytical approaches and methodologies not available elsewhere. This information would provide other parties, including competitors, with information from Holtec International's technical database and the results of evaluations performed by Holtec International. A substantial effort has been expended by Holtec International to develop this information. Release of this information would improve a competitor's position because it would enable Holtec's competitor to copy our technology and offer it for sale in competition with our company, causing us financial injury.

AFFIDAVIT PURSUANT TO 10 CFR 2.390

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to Holtec International's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of Holtec International's comprehensive spent fuel storage technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology, and includes development of the expertise to determine and apply the appropriate evaluation process.

The research, development, engineering, and analytical costs comprise a substantial investment of time and money by Holtec International.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

Holtec International's competitive advantage will be lost if its competitors are able to use the results of the Holtec International experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to Holtec International would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive Holtec International of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

AFFIDAVIT PURSUANT TO 10 CFR 2.390

STATE OF NEW JERSEY)
) ss:
COUNTY OF CAMDEN)

Kimberly Manzione, being duly sworn, deposes and says:

That she has read the foregoing affidavit and the matters stated therein are true and correct to the best of her knowledge, information, and belief.

Executed at Camden, New Jersey, this 4th day of November, 2020.

Kimberly Manzione
Licensing Manager
Holtec International

Subscribed and sworn before me this 4thth day of November, 2020.

Erika Grandrimo
NOTARY PUBLIC
STATE OF NEW JERSEY
MY COMMISSION EXPIRES January 17, 2022