Entergy

Entergy Nuclear Northeast
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, NY 10511-0249
Tel 914 734 6700

Fred Dacimo
Site Vice President
Administration

June 16, 2004

Re: Indian Point, Unit No. 2

Docket No. 50-247
NL-04-011

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station O-P1-17
Washington, DC 20555-0001

Subject: Fuel Storage Building Single-Failure-Proof Gantry Crane

References: 1) Letter dated November 21,2003 from USNRC to Mr. Michael Kansler Indian Point Generating Station Unit No.2 Amendment Re: Conversion to Improved Technical Specification (TAC No. MB4739)

Dear Sir/Madam:

Entergy Nuclear Northeast (ENN) Indian Point Energy Center Unit 2 submits the Fuel Storage Building Single Failure Proof Gantry Crane for use in the SFP Building to the NRC for review and acceptance. Indian Point Unit 2 Technical Specification 3.8.C.1 required: "The spent fuel cask shall not be moved over any region of the spent fuel pit until the cask handling system has been reviewed by the Nuclear Regulatory Commission and found to be acceptable" until the specification was relocated with the approval of the IP2 Improved Technical Specification (Reference 1). The administrative controls implemented to capture the relocated Technical Specification will be retained pending NRC review and acceptance. The crane description and analysis to demonstrate compliance with NUREG 0612 is contained in Attachment 1.

There are commitments contained in this letter identified in Attachment 2. They pertain to implementation of the general guidelines of NUREG-0612 with regard to the new Fuel Storage Building gantry crane: (1) establishment of safe load paths; (2) development of procedures; (3) training and qualification of crane operators; (4) selection of special lifting devices; (5) selection of slings; and (6) inspection, testing and maintenance.

ENN requests acceptance of the crane for moving a spent fuel cask into the spent fuel pool by June 30, 2005. This request allows a nominal 12-month review by the NRC and supports ENN's schedule for moving spent fuel into dry storage in September 2005. A 10 CFR 50.59 review will be performed as part of the modification process.

If you have any questions or require additional information, please contact Geoffrey E. Schwartz, Manager Dry Cask Storage, at 914-734-6684.

A001

Pursuant to 28 USC 1746, I declare under penalty of perjury that the foregoing is true and correct. Executed on 6-16-04.

Sincerely,

Fred R. Dacimo
Site Vice-President
Indian Point Energy Center

Attachments:

1) Crane Description and Analysis
2) NUREG-0612 General Guidelines Compliance
3) Ederer Topical Report EDR-1 (NP)-A, Appendices B and C
4) Structural Summary Report, Gantry Crane
5) Structural Summary Report, Anchorage System for Gantry Crane

cc: See page 3

cc: Mr. Hubert J. Miller
Regional Administrator - Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406-1498

Mr. Patrick D. Milano, Senior Project Manager
Project Directorate I-1
Division of Licensing Project Management
U.S. Nuclear Regulatory Commission
Mail Stop O-8-C2
Washington, DC 20555-0001

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Indian Point Unit 2
P.O. Box 59
Buchanan, NY 10511-0059

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

Mr. Paul Eddy
State of NY Public Service Commission
3 Empire Plaza
Albany, NY 12223-1350

Mr. Peter R. Smith
President, NYSERDA
17 Columbia Circle
Albany, NY 12203

ATTACHMENT 1 TO NL-04-011

Crane Description and Analysis

Indian Point Nuclear Generating Unit No. 2
Fuel Storage Building Single-Failure-Proof Gantry Crane

Fuel Storage Building Gantry Crane Description and Analysis

Description of the New Gantry Crane

A new traveling single failure proof gantry crane with a design rated load capacity of 110 tons will be installed in the IP-2 Fuel Storage Building (FSB). The crane will be used to move dry cask storage equipment into and out of the spent fuel pool. The crane design and associated handling equipment conform to the requirements of NUREG-0554, Single-Failure-Proof Cranes for Nuclear Power Plants, and NUREG-0612, Control of Heavy Loads at Nuclear Power Plants, for heavy load lifts over the spent fuel pit. The new crane will be provided by Ederer LLC (Ederer) and is designed to lift the fully loaded Holtec HI-TRAC 100 spent fuel transfer cask and associated components. The FSB gantry crane will not handle the Holtec HI-Storm 100 Overpack and lid.

The NRC has approved the Ederer Generic Licensing Topical Report, EDR-1 (NP)-A, Revision 3, concerning the eXtra Safety And Monitoring (X-SAM) crane design confirming that it meets the requirements of NUREG-0554. Entergy decided to install the new IP-2 FSB gantry crane since the existing 40-ton FSB overhead crane does not have the capacity to handle the HI-TRAC 100 spent fuel transfer cask. Ederer report references the requirements in NRC Regulatory Guide 1.104, which was replaced by NUREG-0554. NUREG-0612 does not require load drop consequence analysis for heavy loads handled by a crane that meets the single-failure-proof guidance of NUREG-0554. The IP-2 FSB gantry crane information regarding the interfacing requirements is provided in Appendices B and C to the Ederer Topical Report in Attachment 3.

The current 40-ton FSB overhead crane is not single-failure-proof and is restricted from handling spent fuel casks over spent fuel in the spent fuel pit. The 40-ton crane will remain in place, however, as it is utilized for other load handling activities in the FSB.

Background

1. *Requirement for Submittal*

   General Design Criterion (GDC) 4, "Environmental and Dynamic Effects Design Bases," of Appendix A to 10 CFR Part 50 specifies, in part, that structures, systems, and components important to safety shall be appropriately protected against dynamic effects, including the effects of missiles, that may result from equipment failures. GDC 2, "Design Bases for Protection Against Natural Phenomena," specifies, in part, that structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena, such as earthquakes. GDC 61 Fuel storage and handling and radioactivity control, Safe Section 9.1.5, "Overhead Heavy Load Handling Systems," of NUREG-0800,

"NRC Standard Review Plan," references the guidelines of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," and NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants," for implementation of these criteria in the design of heavy load handling systems.

In a letter dated December 22, 1980, "Control of Heavy Loads" as supplemented by Generic Letter (GL) 81-07, "Control of Heavy Loads," dated February 3, 1981, the NRC requested that all licensees describe the extent to which the guidelines of NUREG-0612 were satisfied at their facility and what additional modifications would be necessary to fully satisfy the guidelines. The IP-2 response to NRC's request to satisfy the Phase I guidelines of NUREG-0612 is dated June 22, 1981 (Reference 1). In the response it was stated that no specific type of spent fuel cask had yet been chosen to use and no heavy loads were planned to be moved by the Fuel Storage Building crane in the immediate future. Therefore, the Fuel Storage Building crane was not reviewed by the NRC staff in response to NUREG-0612 guidelines for handling spent fuel casks.

GL 85-11, "Completion of Phase II of Control of Heavy Loads at Nuclear Power Plants, NUREG-0612," dated June 28, 1985, dismissed the need for the NRC to review the Phase II responses received from licensees, based on the improvements observed during review of the Phase I responses. However, GL 85-11 encouraged licensees to implement actions they perceived to be appropriate to provide adequate safety.

In NRC Bulletin 96-02, "Movement of Heavy Loads over Spent Fuel, Over Fuel in the Reactor Core, or Over Safety-Related Equipment," dated April 11, 1996, the NRC staff addressed specific instances of heavy load handling concerns and requested licensees to provide specific information detailing their extent of compliance with the guidelines and their licensing basis.

IP-2 responded to Bulletin 96-02 by letter dated July 12, 1996 (Reference 2). This letter reiterated the lack of current need to handle spent fuel casks over the spent fuel pit in the Fuel Storage Building and identified Technical Specification 3.8.C.1 as prohibiting the handling of a spent fuel cask without prior NRC review and approval. This requirement was relocated to administrative controls during the conversion to Standard Technical Specifications. This submittal complies with those controls.

2. Technical Analysis

Background for Fuel Storage Building, Spent Fuel Storage Pit and Current FSB Overhead Crane

All systems and components of the IP-2 facility are classified according to their importance. Those items vital to safe shutdown and isolation of the reactor or whose failure might cause or increase the severity of a loss-of-coolant accident or result in an uncontrolled release of excessive amounts of radioactivity are designated Class I. Those items important to reactor operation but not essential to safe shutdown and isolation of the reactor or control of the release of substantial amounts of radioactivity are designated Class II. Those items not related to reactor operation or safety are designated Class III.

The fuel storage building for IP-2 consists of the spent fuel pit constructed of reinforced concrete and founded on rock. The spent fuel pit is a Class I structure. The fundamental frequency of the pit is approximately 22 cps and therefore can be considered rigid. The steel superstructure above the pit encloses the pit and supports the existing 40-ton overhead crane. This structure was designed as a Class III structure. The FSB was evaluated and the building superstructure was determined to be adequately designed to carry the seismic load defined for the site.

Spent Fuel Storage Pit

The spent fuel storage pit is described in Final Safety Analysis Report (FSAR) Section 9.5.2.1.4. It is designed for the underwater storage of spent fuel assemblies, failed fuel cans if required, and control rods after their removal from the reactor.

The spent fuel storage pit is constructed of reinforced concrete and is seismic Class I design. This structure was analyzed to determine compliance with ACI-318 (77), and SRP 3.8 of NUREG-0800. In addition to the mechanical loadings, the pool structure was also analyzed to include temperature-induced loadings.

The pit is lined with a leak-proof stainless steel liner. All welds were vacuum-box tested during construction to assure a leak tight membrane. The effect of a thermal gradient would be to compress the liner. A review of the stress factors resulting from the finite element analyses demonstrates that an adequate design margin exists for the spent fuel pit liner walls and basemat.

Storage racks are provided to hold spent fuel assemblies and are erected on the pit floor. Fuel assemblies are held in a square array, and placed in vertical cells. Fuel inserts are stored in place inside the spent fuel assemblies. An area of the pit is set aside for the placement of a spent fuel cask.

New 110-Ton FSB Gantry Crane

The installation of a new 110-ton Fuel Handling Building gantry crane will facilitate handling of the transfer cask for the Holtec HI-STORM 100 Cask System. The crane main hoist has a 110-ton capacity while an auxiliary hoist has a 45-ton capacity. Each hoist meets the single-failure-proof requirements of NUREG-0554. The new crane will allow the spent fuel cask handling process to proceed efficiently and with high load-handling reliability. The new crane will also allow removal of the existing restriction regarding moving spent fuel casks over the spent fuel pit as a result of the current 40-ton overhead crane not being single-failure-proof or being considered in the NUREG-0612 compliance review. As part of the installation of the new gantry crane, the FSB floor in the truck bay is currently being modified to enable anchoring the crane. The modified floor was analyzed consistent with the loading due to the new crane.

In order to meet the single-failure-proof requirements of NUREG-0554 and the guidelines of NUREG-0612, design acceptance criteria are consistent with the IP-2 FSAR for safe shutdown earthquake loads. Standards and guides, which have been used for determining allowable stress limits and other acceptance criteria, are consistent with industry practice similar applications. These include the American Institute of Steel Construction (AISC) Manual 9th Edition, the Crane Manufacturers Association of America (CMAA) Specification No. 70 (2000), the American Concrete Institute (ACI) 318-02, "Building Code Requirements for Reinforced Concrete," the American Welding Society (AWS) D1.1 Standard, and the American Society for Mechanical Engineers (ASME) NOG-1-2002, "Rules for Construction of Overhead and Gantry Cranes."

The crane will utilize a gantry that can traverse a portion of the FSB truck bay and a cantilever girder-mounted trolley that extends to the spent fuel pit. The trolley will house an Ederer X-SAM hoist, which is a single-failure-proof design. The capacity of 110 tons is provided to lift the Holtec HI-TRAC 100 transfer cask planned for use at IP-2, which has a fully loaded weight of approximately 100 tons including the lifting device. An auxiliary hoist of 45-ton capacity is also provided to handle ancillary components associated with the HI-STORM 100 Cask System. The auxiliary hoist is also an Ederer X-SAM design.

NUREG-0612 Compliance

With a single-failure-proof crane, the guidelines of NUREG-0612 for control of heavy loads are satisfied without additional actions, such as load drop analyses, beyond implementation of the general measures specified in Section 5.1.1 of NUREG-0612. Attachment 2 discusses how the objectives and general guidelines of NUREG-0612 are satisfied following installation of the new gantry crane. Attachment 2 describes implementation of the general

guidelines with regard to: (1) establishment of safe load paths; (2) development of procedures; (3) training and qualification of crane operators; (4) selection of special lifting devices; (5) selection of slings; (6) inspection, testing and maintenance of cranes; and (7) application of standards to crane design. Administrative controls will continue to ensure that unauthorized movement of heavy loads over the spent fuel pool will be prevented for the existing 40-ton overhead crane.

NUREG-0554 Compliance

In a letter dated August 26, 1983, the NRC staff approved Ederer's Generic Licensing Topical Report EDR-1 (NP)-A, "Ederer's Nuclear Safety Related eXtra Safety And Monitoring (X-SAM) Cranes," Revision 3 dated October 8, 1982, as an acceptable method of meeting the guidelines of NUREG-0554 and NUREG-0612. In accepting EDR-1 (NP)-A for reference in plant-specific licensing actions, the NRC staff noted that the acceptance applied only to the features described in the topical report, and did not constitute acceptance of the total crane handling system or the requirements which may be necessary to assure the safe application of the crane system within the nuclear power plant. Licensees who incorporated the use of Ederer's hoist and trolley into the design of a crane are to submit Appendices B and C to address how plant specific application of the Ederer system satisfies the guidelines of NUREG-0612 and NUREG-0554. The plant-specific information required, as identified in Appendices B and C of EDR-1 (NP)-A, is included in Attachment 3. Appendix B summarizes the plant specific crane data supplied by Ederer. Appendix C summarizes the regulatory positions to be addressed. The plant-specific information relates to the design of the hoist, the adequacy of specific components, the response of the crane to potential component failures, and the test information demonstrating satisfactory performance of the overall crane.

Technical Evaluation of Structural Impacts

Design criteria, loads and loading combinations, analytical methodology, and the acceptance criteria for the analytical results relate to the new gantry crane and supporting structure. The loading considered included various combinations of dead, live, lifted, impact, and seismic loads. A summary report of the structural analysis of the new gantry crane, including interfaces with the floor anchorage system discussed below, is contained in Attachment 4.

The design of the new gantry crane includes cantilevered girders for the main hoist trolley that will extend over the spent fuel pit cask laydown area. From the spent fuel pit the transfer cask is moved to the FSB truck bay where multi-purpose canister (MPC) drying, inerting and sealing activities occur prior to transferring the MPC to the HI-STORM 100 overpack. The gantry crane requires provisions to ensure stability against overturning. This is accomplished via a floor anchorage system with fixed-in-place hold-down features that

oppose crane uplift forces. A summary report of the structural analysis of the anchorage system is contained in Attachment 5.

The maximum critical load (MCL) is considered as the design rated load (DRL) for crane components. This load is 110 tons. Only the safe shutdown earthquake (SSE) seismic load case has been evaluated. Since the IP-2 Fuel Storage Building Structure is a Class III structure it was not designed for OBE or SSE loads. SSE loads were considered in the design of the new crane and floor anchorage system so that conformance to NUREG-0612 and NUREG-0554 would be demonstrated. This is consistent with IP-2 FSAR Section 1.11.1 for seismic Class I structures.

3. Regulatory Analysis

The new 110-ton Fuel Storage Building gantry crane will handle the HI-TRAC 100 transfer cask for the HI-STORM 100 Cask System. The crane meets the single-failure-proof requirements of NUREG-0554. As part of the installation of the new crane, a new floor anchorage system was designed to oppose uplift forces imposed by the crane-cantilevered trolley. Entergy commits to implementing the general guidelines of NUREG-0612 Section 5.1.1 and 5.1.6 as described in Attachment 2. These combined provisions satisfy NUREG-0612 guidance in assuring a heavy load handling system that is sufficiently reliable to preclude the consideration of load drops.

In order to meet the single-failure-proof requirements of NUREG-0554 and the guidelines of NUREG-0612, design acceptance criteria consistent with IP-2 FSAR Section 1.11.1 for seismic Class I components and structures as applied to the safe shutdown earthquake were used. Standards and guides, which have been used for determining allowable, stress limits and other acceptance criteria are consistent with industry practice for similar applications. These include the American Institute of Steel Construction (AISC) Manual 9th Edition, the Crane Manufacturers Association of America (CMAA) Specification No. 70 (2000), the American Concrete Institute (ACI) 318-02, "Building Code Requirements for Reinforced Concrete," the American Welding Society (AWS) D1.1 Standard, and the American Society for Mechanical Engineers (ASME) NOG-1-2002, "Rules for Construction of Overhead and Gantry Cranes."

The Ederer quality assurance (QA) program was invoked on the new gantry crane. The Ederer QA program complies with the requirements of 10 CFR Part 50, Appendix B and American National Standards Institute (ANSI)/ASME NQA-1. The program encompasses the procurement of basic components from approved suppliers and the dedication of commercial-grade items by Ederer for use in safety related applications. This dedication was done in accordance with Electric Power Research Institute NP-5652, "Guideline for the Utilization of Commercial Grade Items in Nuclear Safety Related Applications (NCIG-07)." Upon arrival on site, the Entergy Quality Assurance Program Manual will be invoked for the

installation process using the engineering design change process. The gantry crane and trolley meet the NDE requirements as reflected in EDR-1(NP)-A, as applicable.

The new single-failure-proof gantry crane allows the spent fuel cask handling process to occur without significant restraints associated with handling of loads. It also allows for the removal of existing prohibitions regarding handling spent fuel casks over the spent fuel pit.

References

1) Letter dated June 22, 1981 from John D. O'Toole (Consolidated Edison) to Darrel G. Einsenhut (NRC)

2) Letter dated July 12, 1995 from Stephen E. Quinn (Consolidated Edison) to USNRC, Response to NRC Bulletin 96-02, "Movement Of Heavy Loads Over Spent Fuel, Over Fuel In The Reactor Core, Or Over Safety-Related Equipment"

ATTACHMENT 2 TO NL-04-011

Indian Point Nuclear Generating Unit No. 2
Fuel Storage Building
Single-Failure-Proof Gantry Crane

NUREG-0612 General Guidelines Compliance

Indian Point Nuclear Generating Unit No. 2
Fuel Storage Building Gantry Crane
Discussion of Compliance to NUREG-0612
General Guidelines – Section 5.1.1

To aid in assuring that the guidelines in NUREG-0612, Section 5.1.1, General, are met, the following areas will be satisfied for handling heavy loads over the spent fuel pit with the IP-2 fuel storage building gantry crane. Since heavy load lifts over the spent fuel pit will be accomplished with a single-failure-proof handling system the additional guidelines of Section 5.1.6 are also considered.

1) Safe load paths (Commitment No. 1)

The FSB gantry crane by design will be unable to move spent fuel casks over any area of the spent fuel pit where spent fuel is stored. Nonetheless, safe load paths will be determined, analyzed, and documented in procedures for control of heavy loads handled by the FSB gantry crane to minimize the potential for a heavy load impacting irradiated fuel in the spent fuel pit. The load paths will be defined in procedures and shown on equipment layout drawings. Deviations from defined load paths will require written alternative procedures reviewed and approved in accordance with IPEC procedures.

2) Procedures (Commitment No. 2)

Gantry crane operating procedures utilized for cask and cask component lifts will be prepared to include: identification of required equipment; inspections and acceptance criteria required before load movement; the steps and proper sequence to be followed in handling the load; defining the safe load path; and other precautions. A specific cask loading and handling procedure will provide additional details for controlled movement during cask handling operations, including requirements for 1.5-foot clearance between load and surface.

3) Crane operators (Commitment No. 3)

Crane operators receive initial and continuing training in accordance our systematic approach to training process that includes the provisions of Chapter 2-3 of ANSI B30.2.0 – 1976. In addition, completion of a crane-specific training qualification card is required.

4) Special lifting devices (Commitment No. 4)

The HI-TRAC lifting yoke is the only special lifting device that is required to meet the guidelines of ANSI-N14.6. It complies with ANSI-N14.6-1993 and the additional guidelines of NUREG-0612, Section 5.1.6(1)(a).

5) Lifting devices that are not specially designed (Commitment No. 5)

Other lift components, utilized with the HI-STORM 100 Cask System, meet ANSI-B30.9-1971 requirements including the additional guidelines of NUREG-0612, Section 5.1.6(1)(b).

6) Crane inspection, test and maintenance (Commitment No. 6)

The FSB gantry crane will be inspected, tested, and maintained in accordance with Chapter 2-2 of ANSI B30.2-1976 and the additional guidance contained in NUREG-0612, Section 5.1.1(6) regarding frequency of inspections and test.

7) The crane should be designed to Chapter 2-1 of ANSI B30.2-1976 and to CMAA 70

The FSB gantry crane is designed in accordance with the requirements of the Crane Manufacturers Association of America (CMAA Specification #70-2000) and NUREG-0554 for single-failure-proof cranes. Attachment 3 provides site-specific information regarding compliance with the Ederer Generic Topical Report for single-failure-proof X-SAM cranes. The design of the new crane follows the guideline of NUREG-0612, Section 5.1.6(2).

8) Interfacing lift points

The HI-TRAC 100 cask trunnions and other lift points for associated components comply with NUREG-0612, Section 5.1.6(3). The FSB gantry crane will not handle the HI-STORM 100 overpack and lid.

ATTACHMENT 3 TO NL-04-011

Indian Point Nuclear Generating Unit No. 2
Fuel Storage Building
Single-Failure-Proof Gantry Crane

Ederer Topical Report EDR-1 (NP)-A
Appendices B and C

APPENDIX B SUPPLEMENT TO GENERIC LICENSING TOPICAL REPORT EDR-1

SUMMARY OF PLANT SPECIFIC CRANE DATA SUPPLIED BY EDERER, LLC

INDIAN POINT ENERGY CENTER
UNIT 2
SINGLE FAILURE PROOF UPGRADE

CONTRACT NO. 4500523122

EDERER, LLC S.O. NO. F-2725

PREPARED: _____
PROJECT ENGINEER
EDERER, LLC

CHECKED: _____
EDERER, LLC

REVIEWED: _____
QUALITY ASSURANCE MANAGER
EDERER, LLC

APPROVED: _____
CHIEF ENGINEER
EDERER, LLC

TABLE OF CONTENTS AND REVISION STATUS

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION		INFORMATION TO BE PROVIDED		SPECIFIC CRANE DATA
C.1.a	III.C (C.1.a)	1.	THE ACTUAL CRANE DUTY CLASSIFICATION OF THE CRANE SPECIFIED BY THE APPLICANT.	1.	THE MAIN HOIST HAS A CLASS "C" CRANE DUTY CLASSIFICATION IN ACCORDANCE WITH CMAA SPECIFICATION #70. THE GANTRY, TROLLEY AND AUX. HOIST HAVE 'C' CRANE DUTY CLASSIFICATION IN ACCORDANCE WITH CMAA SPECIFICATION #70.
C.1.b	III.C (C.1.b)	1.	THE MINIMUM OPERATING TEMPERATURE OF THE CRANE SPECIFIED BY THE APPLICANT.	1.	THE CRANE MINIMUM OPERATING TEMPERATURE IS 60°F. CRANE MATERIALS ARE TESTED AT 30°F TO MEET THE REQUIREMENTS OF NOG 1 2000.
C.2.b	III.C (C.2.b) III.E.4	1.	THE MAXIMUM EXTENT OF LOAD MOTION AND THE PEAK KINETIC ENERGY OF THE LOAD FOLLOWING A DRIVE TRAIN FAILURE.	1.	THE MAIN HOIST WAS DESIGNED SUCH THAT THE MAXIMUM VERTICAL LOAD MOTION FOLLOWING A DRIVE TRAIN FAILURE IS LESS THAN 1.5 FOOT AND THE MAXIMUM KINETIC ENERGY OF THE LOAD IS LESS THAN THAT RESULTING FROM ONE INCH OF FREE FALL OF THE MAXIMUM CRITICAL LOAD. THE TRANSER HOIST WAS DESIGNED SUCH THAT THE MAXIMUM VERTICAL LOAD MOTION FOLLOWING A DRIVE TRAIN FAILURE IS LESS THAN 1.5 FOOT AND THE MAXIMUM KINETIC ENERGY OF THE LOAD IS LESS THAN THAT RESULTING FROM 2.5 INCHES OF FREE FALL OF THE MAXIMUM CRITICAL LOAD.
		2.	PROVISIONS FOR ACTUATING THE EMERGENCY DRUM BRAKE PRIOR TO TRAVERSING WITH THE LOAD, WHEN REQUIRED TO ACCOMMODATE THE LOAD MOTION FOLLOWING A DRIVE TRAIN FAILURE.	2.	PROVISIONS FOR AUTOMATICALLY ACTUATING THE EMERGENCY DRUM BRAKE PRIOR TO TRAVERSING WITH THE LOAD ARE NOT REQUIRED SINCE USE OF EXISTING LOAD PATHS PREVENT LOAD TRAVERSING OVER SAFE SHUTDOWN EQUIPMENT. THE LOAD WILL BE ADMINISTRATIVELY CONTROLLED TO MAINTAIN > 1.5 FEET WHEN TRAVERSING THE FLOOR.

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION		INFORMATION TO BE PROVIDED		SPECIFIC CRANE DATA
C.3.e	III.C (C.3.e)	1.	THE MAXIMUM CABLE LOADING FOLLOWING A WIRE ROPE FAILURE IN TERMS OF THE ACCEPTANCE CRITERIA ESTABLISHED IN SECTION III.C (C.3.e).	1.	THE MAXIMUM CABLE LOADING FOLLOWING A WIRE ROPE FAILURE IN THE MAIN AND TRANSFER HOISTS MEET THE MAXIMUM ALLOWED BY THE ACCEPTANCE CRITERIA ESTABLISHED IN SECTION III.C (C.3.e).
C.3.f	--	1.	MAXIMUM FLEET ANGLE.	1.	3.5 DEGREES, MAIN AND TRANSFER HOISTS EXCEPT FOR THE LAST 3.0 FEET OF MAXIMUM LIFT.
		2.	NUMBER OF REVERSE BENDS.	2.	NONE, OTHER THAN THE ONE BETWEEN THE WIRE ROPE DRUM AND THE FIRST SHEAVE IN THE LOAD BLOCK OF THE MAIN HOIST.
		3.	SHEAVE DIAMETER (MINIMUM)	3.	20 X WIRE ROPE DIAMETER, MAIN HOIST RUNNING SHEAVES.
C.3.h	III.C (C.3.h) III.E.11	1.	THE MAXIMUM EXTENT OF MOTION AND PEAK KINETIC ENERGY OF THE LOAD FOLLOWING A SINGLE WIRE ROPE FAILURE.	1.	THE MAIN AND TRANSFER HOISTS WERE DESIGNED SUCH THAT THE MAXIMUM LOAD MOTION FOLLOWING A SINGLE WIRE ROPE FAILURE IS LESS THAN 1.5 FOOT AND THE MAXIMUM KINETIC ENERGY OF THE LOAD IS LESS THAN THAT RESULTING FROM ONE INCH OF FREE FALL OF THE MAXIMUM CRITICAL LOAD.
C.3.i	III.C (C.3.i)	1.	THE TYPE OF LOAD CONTROL SYSTEM SPECIFIED BY THE APPLICANT.	1.	EDERER AC FLUX VECTOR, MAIN AND TRANSFER HOIST.
		2.	WHETHER INTERLOCKS ARE RECOMMENDED BY REGULATORY GUIDE 1.13 TO PREVENT TROLLEY AND BRIDGE MOVEMENTS WHILE FUEL ELEMENTS ARE BEING LIFTED AND WHETHER THEY ARE PROVIDED FOR THIS APPLICATION.	2.	THE CRANE WILL NOT BE USED TO LIFT FUEL ELEMENTS FROM THE SPENT FUEL RACKS. THEREFORE, INTERLOCKS TO PREVENT TROLLEY AND BRIDGE MOVEMENTS WHILE HOISTING HAVE NOT BEEN PROVIDED.

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION		INFORMATION TO BE PROVIDED		SPECIFIC CRANE DATA
C.3.j	III.C (C.3.j)	1.	THE MAXIMUM CABLE AND MACHINERY LOADING THAT WOULD RESULT IN THE EVENT OF A HIGH SPEED TWO BLOCKING, ASSUMING A CONTROL SYSTEM MALFUNCTION THAT WOULD ALLOW THE FULL BREAKDOWN TORQUE OF THE MOTOR TO BE APPLIED TO THE DRIVE MOTOR SHAFT.	1.	THE ENERGY ABSORBING TORQUE LIMITERS (EATL) WERE DESIGNED SUCH THAT THE MAXIMUM MACHINERY LOAD, WHICH WOULD RESULT IN THE EVENT A TWO- BLOCKING OCCURS WHILE LIFTING THE RATED LOAD AT THE RATED SPEED AND THAT ALLOWS THE FULL BREAKDOWN TORQUE OF THE MOTOR TO BE APPLIED TO THE DRIVE SHAFT, WILL NOT EXCEED 3 TIMES THE DESIGN RATED LOADING. IN ADDITION, THE EATL DESIGN DOES NOT ALLOW THE MAXIMUM CABLE LOADING TO EXCEED THE ACCEPTANCE CRITERIA ESTABLISHED IN SECTION III.C (C.3.e) DURING THE ABOVE DESCRIBED TWO-BLOCKINGS.
C.3.k	III.C (C.3.k)	1.	TYPE OF DRUM SAFETY SUPPORT PROVIDED.	1.	THE ALTERNÁTE DESIGN DRUM SAFETY RESTRAINT SHOWN IN FIGURE III.D.4 OF EDR-1 IS ARRANGED TO COUNTER GEAR AND BRAKE FORCES AS WELL AS DOWNWARD LOADS. THESE BRACKETS ACT ON THE DIAMETER OF THE ENDS OF THE DRUM ON THE MAIN AND TRANSFER HOISTS.
C.3.o	--	1.	TYPE OF HOIST DRIVE TO PROVIDE INCREMENTAL MOTION.	1.	AC FLUX VECTOR, ON MAIN AND TRANSFER HOISTS.
C.3.p	--	1.	MAXIMUM TROLLEY SPEED.	1.	24.9 FPM.
		2.	MAXIMUM BRIDGE SPEED.	2.	43.6 FPM.
		3.	TYPE OF OVERSPEED PROTECTION FOR THE TROLLEY AND BRIDGE DRIVES.	3.	OVERSPEED SWITCHES, WHICH ACTUATE THE BRAKES, ARE PROVIDED FOR THE TROLLEY AND BRIDGE DRIVES.

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION		INFORMATION TO BE PROVIDED		SPECIFIC CRANE DATA
C.3.q	--	1.	CONTROL STATION LOCATION.	1.	A PORTABLE RADIO CONTROL BOX IS PROVIDED AND CONTROLS ALL CRANE FUNCTIONS, EXCEPT BRIDGE RAISING, BRIDGE EXTENSION AND LOCKS. THE SAME CONTROLS ARE PROVIDED ON A SEPARATE PENDANT. BRIDGE RAISING, BRIDGE EXTENSION AND LOCKING ARE EACH CONTROLLED ON SEPARATE PENDANTS.
--	III.D.1	1.	THE TYPE OF EMERGENCY DRUM BRAKE USED, INCLUDING TYPE OF RELEASE MECHANISM.	1.	PNEUMATICALLY RELEASED BAND BRAKES WILL BE USED FOR THE MAIN AND TRANSFER HOISTS.
		2.	THE RELATIVE LOCATION OF THE EMERGENCY DRUM BRAKE.	2.	THE EMERGENCY DRUM BRAKE ENGAGES THE WIRE ROPE DRUM OF THE MAIN AND TRANSFER HOISTS.
		3.	EMERGENCY DRUM BRAKE CAPACITY.	3.	THE MAIN AND TRANSFER HOISTS EMERGENCY DRUM BRAKES HAVE A MINIMUM CAPACITY OF 125% OF THAT REQUIRED TO HOLD THE DESIGN RATED LOAD.
--	III.D.2	1.	NUMBER OF FRICTION SURFACES IN EATL.	1.	THE MAIN HOIST EATL HAS 21 FRICTION SURFACES. THE TRANSFER HOIST EATL HAS 21 FRICTION SURFACES.
		2.	EATL TORQUE SETTING.	2.	THE SPECIFIED EATL TORQUE SETTING IS APPROXIMATELY 130% OF THE MAIN HOIST DESIGN RATED LOAD.
--	III.D.3	1.	TYPE OF FAILURE DETECTION SYSTEM.	1.	TOTALLY MECHANICAL DRIVE TRAIN CONTINUITY DETECTORS AND EMERGENCY DRUM BRAKE ACTUATORS HAVE BEEN PROVIDED IN ACCORDANCE WITH APPENDIX G OF REVISION 3 OF EDR-1 FOR THE MAIN AND TRANSFER HOISTS.

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION		INFORMATION TO BE PROVIDED		SPECIFIC CRANE DATA
--	III.D.5	1.	TYPE OF HYDRAULIC LOAD EQUALIZATION SYSTEM.	1.	THE MAIN HOIST LOAD EQUALIZATION SYSTEM CONSISTS OF AN EQUALIZER BAR IN THE UPPER BLOCK, DAMPENED BY A HYDRAULIC CYLINDER. THE TRANSFER HOIST LOAD EQUALIZATION SYSTEM CONSISTS OF A SHORT TRAVEL EQUALIZER IN THE LOWER BLOCK, DAMPENED BY ROPE ELONGATION.
--	III.D.6	1.	TYPE OF HOOK.	1.	BOTH THE MAIN AND TRANSFER HOOKS HAVE A SINGLE LOAD PATH. DUAL, EYE HOOKS.
		2.	HOOK DESIGN LOAD.	2.	THE MAIN HOOKS DESIGN CRITICAL LIFT LOAD IS 110 TONS WITH A 10:1 FACTOR OF SAFETY ON ULTIMATE. THE TRANSFER HOOKS DESIGN CRITICAL LIFT LOAD IS 45 TONS WITH A 10:1 FACTOR OF SAFETY ON ULTIMATE.
		3.	HOOK TEST LOAD.	3.	THE TEST LOAD FOR EACH LOAD PATH OF THE MAIN HOIST EYE HOOKS WILL BE 110 TONS (200%). THE TEST LOAD FOR EACH LOAD PATH OF THE TRANSFER HOIST EYE HOOKS WILL BE 45 TONS (200%).

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION	INFORMATION TO BE PROVIDED	SPECIFIC CRANE DATA
--	III.F.1	1. DESIGN RATED LOAD.	1. MAIN HOIST – 110 TONS TRANSFER HOIST – 45 TONS
		2. MAXIMUM CRITICAL LOAD RATING.	2. MAIN HOIST – 110 TONS TRANSFER HOIST – 45 TONS
		3. TROLLEY WEIGHT (NET).	3. 101,000 LBS.
		4. TROLLEY WEIGHT (WITH LOAD)	4. 321,000 LBS.
		5. HOOK LIFT.	5. MAIN HOOK – 44 FEET, 6 INCHES TRANSFER HOOK – 44 FEET, 6 INCHES
		6. NUMBER OF WIRE ROPE DRUMS.	6. THE MAIN AND TRANSFER HOISTS EACH HAVE ONE WIRE ROPE DRUM.
		7. NUMBER OF PARTS OF WIRE.	7. MAIN HOIST - 8 PARTS PER WIRE ROPE. TRANSFER HOIST – 2 PARTS PER WIRE ROPE.
		8. DRUM SIZE (PITCH DIAMETER).	8. MAIN HOIST – 69 INCHES TRANSFER HOIST – 24 INCHES
		9. WIRE ROPE DIAMETER.	9. MAIN HOIST – 1 INCH TRANSFER HOIST – 1-1/8 INCH
		10. WIRE ROPE TYPE.	10. MAIN HOIST – 6 X 37 CLASS EEIPS/IWRC TRANSFER HOIST – 6 X 37 CLASS EEIPS/ IWRC – COMPACTED
		11. WIRE ROPE MATERIAL.	11. MAIN HOIST AND TRANSFER HOIST – CARBON STEEL
		12. WIRE ROPE BREAKING STRENGTH.	12. MAIN HOIST – 113,800 LBS. TRANSFER HOIST - 175,600 LBS.
		13. WIRE ROPE YIELD STRENGTH.	13. MAIN HOIST – 91,040 LBS. TRANSFER HOIST – 140,480 LBS.
		14. WIRE ROPE RESERVE STRENGTH.	14. MAIN HOIST – 0.56 TRANSFER HOIST – 0.57
		15. NUMBER OF WIRE ROPES.	15. THE MAIN AND TRANSFER HOISTS HAVE TWO ROPES EACH.

APPENDIX C SUPPLEMENT TO GENERIC LICENSING TOPICAL REPORT EDR-1

SUMMARY OF PLANT SPECIFIC CRANE DATA SUPPLIED BY EDERER, LLC

INDIAN POINT ENERGY CENTER
UNIT 2
SINGLE FAILURE PROOF UPGRADE

CONTRACT NO. 4500523122

EDERER, LLC S.O. NO. F-2725

PREPARED: _____
PROJECT ENGINEER
EDERER, LLC

CHECKED: _____
EDERER, LLC

REVIEWED: _____
QUALITY ASSURANCE MANAGER
EDERER, LLC

APPROVED: _____
CHIEF ENGINEER
EDERER, LLC

TABLE OF CONTENTS AND REVISION STATUS

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION	INFORMATION TO BE PROVIDED	SPECIFIC CRANE DATA
--	III.C(C.1.b.(1))	1. THE EXTENT OF VENTING OF CLOSED BOX SECTIONS.	1. CLOSED BOX SECTIONS ARE NOT VENTED SINCE THE FUEL STORAGE BUILDING THAT HOUSES THE CRANE WILL NOT BE PRESSURIZED.
C.1.b(3) C.1.b(4) C.4.d	III.C(C.1.b(3)) III.C(C.1.b(4)) III.C(C.4.d)	1. THE NONDESTRUCTIVE AND COLD PROOF TESTING TO BE PERFORMED ON EXISTING STRUCTURAL MEMBERS FOR WHICH SATISFACTORY IMPACT TEST DATA IS NOT AVAILABLE.	1. NOT APPLICABLE, AS NO EXISTING CRANE COMPONENTS ARE RE-USED.
C.1.c	III.C(C.1.c)	1. THE EXTENT THE CRANE'S STRUCTURES WHICH ARE NOT BEING REPLACED ARE CAPABLE OF MEETING THE SEISMIC REQUIREMENTS OF REGULATORY GUIDE 1.29.	1. NOT APPLICABLE, AS NO EXISTING CRANE COMPONENTS ARE RE-USED.
C.1.d	III.C(C.1.d)	1. THE EXTENT WELDS JOINTS IN THE CRANE'S STRUCTURES, WHICH ARE NOT BEING REPLACED, WERE NONDESTRUCTIVELY EXAMINED.	1. NOT APPLICABLE, AS NO EXISTING CRANE COMPONENTS ARE RE-USED.
		2. THE EXTENT THE BASE MATERIAL, AT JOINTS SUSCEPTIBLE TO LAMELLAR TEARING, WAS NONDESTRUCTIVELY EXAMINED.	2. NOT APPLICABLE, AS NO EXISTING CRANE COMPONENTS ARE RE-USED.
C.1.e	III.C(C.1.e)	1. THE EXTENT THE CRANE'S STRUCTURES, WHICH ARE NOT BEING REPLACED ARE CAPABLE OF WITHSTANDING THE FATIGUE EFFECTS OF CYCLIC LOADING FROM PREVIOUS AND PROJECTED USAGE, INCLUDING ANY CONSTRUCTION USAGE.	1. NOT APPLICABLE, AS NO EXISTING CRANE COMPONENTS ARE RE-USED.

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION	INFORMATION TO BE PROVIDED	SPECIFIC CRANE DATA
C.1.f	III.C(C.1.f)	1. THE EXTENT THE CRANE'S STRUCTURES WHICH ARE NOT BEING REPLACED, WERE POST-WELD HEAT-TREATED IN ACCORDANCE WITH SUB ARTICLE 3.9 OF AWS D1.1, "STRUCTURAL WELDING CODE".	1. NOT APPLICABLE, AS NO EXISTING CRANE COMPONENTS ARE RE-USED.
C.2.b	III.C(C.2.b) III.E.4	1. PROVISIONS FOR ACCOMMODATING THE LOAD MOTION AND KINETIC ENERGY FOLLOWING A DRIVE TRAIN FAILURE WHEN THE LOAD IS BEING TRAVERSED AND WHEN IT IS BEING RAISED OR LOWERED.	1. ADMINISTRATIVE PROCEDURES WILL BE USED TO ASSURE THAT A MINIMUM OF 1.5 FEET OF CLEARANCE IS MAINTAINED BETWEEN THE LOAD AND SURFACES THAT CANNOT WITHSTAND THE KINETIC ENERGY ASSOCIATED WITH FREE FALL OF THE LOAD INVOLVED.
C.2.c	III.C(C.2.c)	1. LOCATION OF SAFE LAYDOWN AREAS FOR USE IN THE EVENT REPAIRS TO THE CRANE ARE REQUIRED THAT CANNOT BE MADE WITH THE LOAD SUSPENDED.	1. THE FLOOR OF THE FUEL STORAGE BUILDING IS THE LOCATION OF SAFE LAYDOWN AREAS. THE REDESIGNED FLOOR HAS BEEN ANALYZED FOR ALL LOADS ASSOCIATED WITH THE DRY CASK SYSTEM.
C.2.d	III.C(C.2.d)	1. SIZE OF MODIFIED COMPONENTS THAT CAN BE BROUGHT INTO THE BUILDING FOR REPAIR OF THE CRANE WITHOUT HAVING TO BREAK THE BUILDING INTEGRITY.	1. THE EXISTING OPENING IN THE BUILDING IS THE TRUCK BAY DOOR, WHICH HAS A 12'-0" BY 14'-4" OPENING.
		2. LOCATION OF AREA WHERE REPAIR WORK CAN BE ACCOMPLISHED ON THE CRANE WITHOUT AFFECTING THE SAFE SHUTDOWN CAPABILITY.	2. THE FLOOR IN THE FUEL STORAGE BUILDING IS THE REPAIR AREA AND DOES NOT AFFECT THE SAFE SHUTDOWN CAPABILITY.
		3. ANY LIMITATIONS ON OPERATIONS THAT WOULD RESULT FROM CRANE REPAIRS.	3. THERE ARE NO LIMITATIONS ON OPERATIONS SINCE THE CRANES PRIMARY FUNCTION IS THE HANDLING OF LOADS DURING THE DRY CASK STORAGE PROCESS.

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION	INFORMATION TO BE PROVIDED	SPECIFIC CRANE DATA
C.3.b	III.C(C.3.b)	1. THE DESIGN MARGIN AND TYPE OF LIFTING DEVICES THAT ARE ATTACHED TO THE HOOK TO CARRY CRITICAL LOADS.	1. AS AN ALTERNATIVE TO A DUAL LOAD PATH SYSTEM, THE NORMAL STRESS DESIGN FACTORS HAVE BEEN DOUBLED. EACH LIFTING DEVICE ATTACHED TO THE HOOK TO CARRY CRITICAL LOADS WILL SUPPORT A LOAD SIX TIMES THE STATIC PLUS DYNAMIC LOAD BEING HANDLED WITHOUT PERMANENT DEFORMATION. THE SAFETY FACTOR IS 10:1 WHEN COMPARED TO ULTIMATE. THIS IS IN ACCORDANCE WITH NUREG 0612, SECTION 5.1.6, PARAGRAPH 1(A) AND ANSI N14.6, SECTION 7.2.1. **NOTE: CUSTOMER TO CONFIRM.**
C.3.t	III.C(C.3.t)	1. THE EXTENT CONSTRUCTION REQUIREMENTS FOR THE CRANE'S STRUCTURES, WHICH WILL NOT BE REPLACED, ARE MORE SEVERE THAN THOSE FOR PERMANENT PLANT SERVICE.	1. NOT APPLICABLE, AS NO EXISTING STRUCTURE WILL BE RE-USED.
		2. THE MODIFICATIONS AND INSPECTIONS TO BE ACCOMPLISHED ON THE CRANE FOLLOWING CONSTRUCTION USE, WHICH WAS MORE SEVERE THAN THOSE FOR PERMANENT PLANT SERVICE.	2. NOT APPLICABLE. CRANE NOT USED FOR CONSTRUCTION.
C.3.u	--	1. THE EXTENT OF INSTALLATION AND OPERATING INSTRUCTIONS.	1. THE INSTALLATION AND OPERATING INSTRUCTIONS WILL BE UPDATED TO FULLY COMPLY WITH THE REQUIREMENTS OF SECTION C.3.u OF REGULATORY GUIDE 1.104 AND SECTIONS 7.1 AND 9 OF NUREG-0554.

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION	INFORMATION TO BE PROVIDED	SPECIFIC CRANE DATA
C.4.a C.4.b C.4.c C.4.d	--	1. THE EXTENT OF ASSEMBLY CHECKOUT, TEST PROCEDURES, LOAD TESTING AND RATED LOAD MARKING OF THE CRANE.	1. PRIOR TO HANDLING CRITICAL LOADS, THE CRANE WILL BE GIVEN A COMPLETE ASSEMBLY CHECKOUT, AND THEN GIVEN A NO-LOAD TEST OF ALL MOTIONS IN ACCORDANCE WITH PROCEDURES PROVIDED BY EDERER. A NO-LOAD TEST OF ALL MOTIONS, A TWO-BLOCKING TEST, 125% STATIC LOAD TEST AND A 100% PERFORMANCE TEST WILL BE PERFORMED BY EDERER PRIOR TO DELIVERY OF THE CRANE. THE MAXIMUM CRITICAL LOAD IS PLAINLY MARKED ON EACH SIDE OF THE CRANE.
C.5.a	III.C(C.5.a)	1. THE EXTENT THE PROCUREMENT DOCUMENTS FOR THE CRANE'S STRUCTURE'S, WHICH WILL NOT BE REPLACED, REQUIRED THE CRANE MANUFACTURER TO PROVIDE A QUALITY ASSURANCE PROGRAM CONSISTENT WITH THE PERTINENT PROVISIONS OF REGULATORY GUIDE 1.28.	1. NOT APPLICABLE, AS NO EXISTING STRUCTURE WILL BE RE-USED.

ATTACHMENT 4 TO NL-04-011

Indian Point Nuclear Generating Unit No. 2
Fuel Storage Building
Single-Failure-Proof Gantry Crane

Structural Summary Report
Gantry Crane

NUREG-0554 Compliance Report (Rev 1)

Indian Point Energy Center Unit 2
Fuel Storage Building Single-Failure-Proof Crane

Overview and Description

A new single-failure-proof (SFP) gantry crane designed and manufactured by Ederer, LLC of Seattle, Washington will be installed in the Indian Point Energy Center (IPEC) Unit 2 Fuel Storage Building (FSB). The crane has a main hoist with a dual-hook load block designed for handling spent fuel transfer casks, and an auxiliary hoist designed for handling Multi-Purpose Canisters (MPC) associated with the transfer cask.

The main hoist rating is 110 tons Maximum Critical Load (MCL) and Design Rated Load (DRL). The auxiliary hoist is rated at 45 tons MCL and DRL. Both hoists are designed in accordance with Ederer Generic Licensing Topical Report EDR-1 (P)-A, Revision 3 dated 10/8/82, Amendment 3, on file at the NRC. This Licensing Topical Report (LTR) was initially accepted by the NRC for meeting the guidelines of NUREG-0554 on January 2, 1980. Revision 3 was accepted by the NRC on August 26, 1983. The structural and machinery components of the crane (together, the Gantry) are designed in accordance with the guidelines of NUREG-0554 for new bridge crane structures.

The entire new crane is seismically qualified by response spectrum analysis in accordance with NRC Regulatory Guide 1.29, "Seismic Design Classification" as referenced in section 2.5 of NUREG-0554, to assure that the crane structure and trolley will maintain their structural integrity, remain in place on their rails, retain control of and hold the rated load, and generate no missiles when subjected to the seismic forces equivalent to the specified Safe Shutdown Earthquake (SSE) for the IPEC-2 FSB. A seismically qualified accelerometer and shutdown switch are provided to shut off power to the crane system in event of an earthquake greater than the specified SSE. This ensures that the controls will not cause uncommanded crane motions and that the brakes will be de-energized, causing them to set by spring force and retain the rated load.

The SFP gantry crane is installed on new crane rails on a new foundation forming part of the reconstructed truck bay floor in the FSB, designed and built to withstand the static and seismic loads, including uplift forces, imposed by the new crane. Restraining lugs and anchors are provided to withstand the calculated uplift forces.

The girders of the gantry crane extend over the spent fuel pool. This enables the hoists to travel over the pool to the center of the cask loading pit, for the purpose of placing the transfer cask with MPC into the pit for loading of spent fuel into the MPC, and removal of the transfer cask/MPC assembly from the spent fuel pool onto the truck bay floor. The gantry crane is also designed to place the transfer cask on top of the storage cask and support it there while downloading the MPC from the transfer cask into the storage cask (by means of the auxiliary hoist), on the truck bay floor inside the FSB.

Compliance with NUREG-0554

As noted above, the new gantry crane is in compliance with NUREG-0554, as implemented in Generic Licensing Topical Report EDR-1. In complying with NUREG-0554, the crane also complies with NUREG-0612, particularly sections 5.1.2(1) and 5.1.6(2).

In accordance with the provisions of LTR EDR-1, Appendices B and C thereto are provided, attached hereto. Appendix B includes the specific design criteria for the IPEC-2 SFP gantry crane main and auxiliary hoisting machinery and related components. It includes detailed information for both the main and auxiliary hoists. Appendix C includes the specific design criteria for the IPEC-2 SFP gantry crane structure. All of the guidelines of NUREG-0554, as implemented in LTR EDR-1, are met for the IPEC-2 SFP gantry crane. Since the entire crane, including the bridge / gantry structure and driving machinery, is new, there are no exceptions or variances from the guidelines of NUREG-0554 for crane structures. The specifics for the bridge / gantry compliance are detailed in Appendix C.

Quality Assurance and Load Testing

The gantry crane is designed and manufactured under the supplier's Quality Assurance Program, which complies with the provisions of 10CFR50 Appendix B, ASME NQA-1, and the IPEC quality requirements for the crane.

Upon completion of fabrication, the entire gantry crane including gantry structure, trolley and hoists, and electrical control system will be assembled and load tested at the manufacturer's facilities in accordance with section 8 of NUREG-0554. This will also include the Two-Block Test described in section 8.3. The testing will also meet the guidelines of section 5.1.1(6) of NUREG-0612.

ATTACHMENT 5 TO NL-04-011

Indian Point Nuclear Generating Unit No. 2
Fuel Storage Building
Single-Failure-Proof Gantry Crane

Structural Summary Report
Anchorage System for Gantry Crane

Indian Point Nuclear Generating Unit No. 2
Fuel Storage Building Gantry Crane
Structural Summary Report
Anchorage System for Gantry Crane

BACKGROUND & OBJECTIVE

Indian Point Unit No.2 intends to transfer the spent fuel in the existing spent fuel pool located in the Fuel Storage Building (FSB) into dry storage canisters and casks. The significant size and weight of these casks require that a new floor mounted gantry crane be installed in the building. The gantry crane is designed to cantilever over the pool to perform the removal of spent fuel from the pool. This configuration of the crane causes significant uplift forces. As part of the design, Ederer, the crane manufacturer, is specifying turnbuckles that are to be used as tie-downs while the crane is performing any operation in the cantilever section. In order to provide a foundation system capable of resisting these uplift forces from the turnbuckles, a box made of steel and filled with steel plates will be provided to act as a counterbalance. The box will be designed not only to support the uplift forces from the turnbuckles, but will also support the maximum crane wheel reactions transmitted through the crane rail.

METHOD OF ANALYSIS

The design of the steel ballast box and the sole plate system consisted of the following steps:

- The crane has been analyzed for SSE loading in accordance with NUREG-0554 and the vendor has provided the resultant uplift forces at each support point. The design is intended to provide a counterweight box embedded below the floor to resist the uplift forces. The required weight of the counterweight box (ballast box) was determined by treating the box as a foundation and providing resistance meeting the requirements of NUREG-0800, Section 3.8.5 considering both OBE and SSE loading. Determination of equivalent OBE loading was made using the relationship OBE=2/3 SSE for the horizontal loads. The conversion from 7% damping curves for SSE to 4% damping curves for OBE was made using the Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment.
- Using the governing loads and the appropriate NUREG overturning factors, the box was sized to provide adequate counterbalance for the loads induced by the crane.
- The box was analyzed using ANSYS to determine stresses at the welds and at the turnbuckle connection points.

CALCULATION & BOX ANALYSIS

Entergy Calculation No. FCX-00545-00, Revision 0 provides the structural analysis and evaluation of the ballast box. The analysis was performed using ANSYS Finite Element Program Version 6.1. Stress evaluations of the structure were performed in accordance with the requirements of the American Institute of Steel Construction (AISC) ASD - Manual of Steel Construction, 9th Edition. The calculation and analysis concludes that the steel ballast box, with the dimensions and characteristics as identified in the calculation will provide the new gantry crane (to be installed in the IP-2 FSB) with the proper support foundation.