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10 CFR 50.90
L-2010-022
February 16, 2010

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

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
License Amendment Request No. 202
Technical Specification Changes Regarding Heavy Loads over the Spent Fuel Pools

In accordance with the provisions of Sections 50.90 and 50.91(a)(1) of Title 10 of the Code of Federal Regulations (10 CFR), Florida Power and Light Company (FPL) hereby submits an application for amendment to the Renewed Facility Operating License DPR-31 for Turkey Point Unit 3 and DPR-41 for Turkey Point Unit 4. The application proposes changes to the Technical Specifications (TS) for the removal of two TS that restrict movements of heavy loads over the spent fuel pools.

The proposed changes to the TS are related to heavy load transport activities by crane travel over the spent fuel pools of Turkey Point Units 3 and 4. Specifically, it is proposed to delete TS 3/4.9.7 requirements, associated with load limitations over the spent fuel pool, and retain them in licensee controlled documents. The deletion of TS 3/4.9.7 requirements is based on the operational limits and safety margins that are in place for the control of heavy loads, consistent with the Turkey Point responses to NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980, in licensee controlled documents.

Additionally, it is proposed to delete TS 3/4.9.12 that limits the handling of the spent fuel cask under certain conditions. The deletion of TS 3/4.9.12 is justified based on the installation of a new single-failure-proof spent fuel cask handling crane meeting the requirements of NUREG-0554, "Single-Failure-Proof Cranes For Nuclear Power Plants," May 1979.

Attachment 1 provides the proposed changes and the supporting justification including the Determination of No Significant Hazards and Environmental Considerations. Attachment 2 contains marked copies of the proposed TS pages. Attachment 3 is a NUREG-0554 compliance matrix for the new single-failure-proof crane.

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The Plant Nuclear Safety Committee has reviewed the proposed amendment. In accordance with 10 CFR 50.91(b)(1), copies of the proposed amendment are being forwarded to the State Designee for the State of Florida.

FPL requests approval of this application within 12 months of receipt by the NRC in order to prepare for the transfer of spent fuel to dry storage in 2011. Implementation by FPL will be within 60 days of license amendment issuance by the NRC.

Please contact Mr. Robert Tomonto at 305-246-7327 if there are any questions about this license amendment application.

I declare under penalty of perjury that the foregoing is true and correct.

Very truly yours,

Paul W. Rubin

2/16/2010
Executed on

Michael Kiley
Vice President – Turkey Point Nuclear Plant

Attachments:
1) Evaluation of Proposed Technical Specification Changes
2) Marked-up Technical Specification Pages
3) NUREG-0554 Compliance Matrix

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant
Mr. W. A. Passetti, Florida Department of Health

Attachment 1

Florida Power and Light Company
Turkey Point Units 3 and 4
Renewed Facility Operating License Nos. DPR-31 and DPR-41
Docket Nos. 50-250 and 50-251
License Amendment Request to Change the Technical Specifications
Regarding Heavy Loads over the Spent Fuel Pools

Evaluation of Proposed Changes

1.0 INTRODUCTION

In accordance with the provisions of Sections 50.90 and 50.91(a)(1) of Title 10 of the Code of Federal Regulations (10 CFR), Florida Power and Light Company (FPL) hereby submits an application for amendment to the Renewed Facility Operating License DPR-31 for Turkey Point Unit 3 and DPR-41 for Turkey Point Unit 4. The application proposes changes to the Technical Specifications (TS) for the deletion of two TS that restrict movements of heavy loads over the spent fuel pools.

2.0 DESCRIPTION OF PROPOSED LICENSE AMENDMENTS

The proposed TS changes for Turkey Point Units 3 and 4 are as follows:

TS 3/4.9.7, "Crane Travel – Spent Fuel Storage Areas," would be deleted. TS 3/4.9.7 defines restrictions for heavy loads carried over irradiated fuel stored in the spent fuel pool. The load limitation defined in TS 3/4.9.7 is preserved and implemented in existing plant documents which have been established based on the operating limits and safety margins for the control of heavy loads consistent with FPL responses to NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980 [Reference 1].

TS 3/4.9.12, "Handling of Spent Fuel Cask," would be deleted. TS 3/4.9.12 specifies the requirements for the movement of a spent fuel cask. The deletion of TS 3/4.9.12 is based on the installation of a new single-failure-proof spent fuel cask handling crane meeting the requirements of NUREG-0554, "Single-Failure Proof Cranes For Nuclear Power Plants," May 1979 [Reference 2].

3.0 BACKGROUND

Turkey Point Units 3 and 4 are owned and operated by FPL. The plant is located on the shore of Biscayne Bay in Miami-Dade County, Florida, about 25 miles south of Miami, Florida. The plant consists of two Westinghouse pressurized water reactor nuclear units. Each unit utilizes a spent fuel pool for the storage of spent nuclear fuel assemblies to remove decay heat and provide radiation shielding.

The spent fuel handling crane, described in the Turkey Point Updated Final Safety Analysis Report (UFSAR), Section 9.5.4, "Fuel Handling System," and used for spent fuel handling, is a traveling bridge with a top-running trolley mounted on an overhead structure. Loads in excess of 2000 pounds are prohibited from travel over fuel assemblies by TS 3/4.9.7. The spent fuel handling crane has operational limits and safety margins that are currently in place for the control of heavy loads consistent with NUREG-0612. The trolley is equipped with two hoists, one on each side of the bridge. The hoists are provided with limit switches, overload sensors and other safety features to withstand two-blocking, load hang-ups and other overloading, mis-reeving, and single cable failures. The capacity of each hoist is two tons.

In addition, an in-line weight sensing system is provided for each hoist to limit the lifting load to preclude accidental fuel damage should binding occur. When lifting over spent fuel, the total load is limited to 2000 pounds by procedures, limit switches and load sensors.

The current spent fuel cask handling crane is a 105/15 ton main/auxiliary hook capacity cask crane of the overhead bridge type, and services both units for spent fuel cask handling operations. The crane is located outdoors, where it can access each unit's auxiliary building, as well as adjacent outside laydown areas and the plant road. The crane is not currently single-failure-proof and its original design included only static seismic factors. Access to the cask handling/storage area of each unit's spent fuel pool is through an opening in the Auxiliary Building's roof and east wall, which is normally closed, by an inverted "L" shaped door. The crane is prevented by electrical interlocks and the physical location of the sliding roof/door opening, from carrying a load over the fuel storage areas of the spent fuel pools.

Based on the current inventory and the anticipated future generation of spent fuel at Turkey Point, FPL has decided on the implementation of an Independent Spent Fuel Storage Installation (ISFSI) for future storage of spent fuel in a dry cask storage system. In a typical cask loading campaign, the casks are loaded with spent fuel assemblies inside the spent fuel pool area; then the cask is lifted out of the pool using the spent fuel cask handling crane and placed in a cask handling facility where it is prepared for transfer to the ISFSI storage facility. The cask assembly for this system is a multiple fuel assembly configuration, in contrast to a single fuel assembly configuration as currently specified by TS 3/4.9.12.

FPL is in the process of upgrading the spent fuel cask handling crane to a single-failure-proof crane design (design rated load of 130 tons for the main hoist and 25 tons for the auxiliary hoist), which includes the replacement of the main and auxiliary hoists, trolley, bridge and electronics. Upgrade of the crane support structure is also being implemented to meet the increased load handling capabilities of the spent fuel cask handling crane.

4.0 TECHNICAL ANALYSIS

Description of Proposed Changes

Marked-up pages of the proposed Unit 3 and Unit 4 TS changes are shown in Attachment 2 to this application. The description of the proposed changes is summarized below.

The following TS are to be deleted:

Section 3/4.9.7	Crane Travel - Spent Fuel Storage Areas
Section 3/4.9.12	Handling of Spent Fuel Cask

TS 3/4.9.7 Limiting Condition for Operation (LCO) prohibits loads in excess of 2000 pounds from travel over fuel assemblies in the spent fuel storage pools.

TS 3/4.9.12 LCO specifies the spent fuel cask configuration and fuel aging requirements that must be met before the spent fuel cask can be moved. The LCO is applicable during movement of the spent fuel cask in the spent fuel storage area.

Proposed Technical Specification Changes

A. TS 3/4.9.7, Crane Travel – Spent Fuel Storage Areas (both units)

Summary of Specification and Its Bases

The TS 3/4.9.7 LCO prohibits loads weighing in excess of the nominal weight of a fuel assembly, control rod assembly, and associated handling tool from travel over irradiated fuel assemblies in the spent fuel pool. This weight limit is 2000 pounds and is the same for both units. The Surveillance Requirements (SR) specify verification of the load being 2000 pounds or less prior to the operation of the spent fuel handling crane over fuel assemblies. The Bases for these load restrictions support analyses assumptions to: 1) limit the activity released on a load drop to no more than the contents of a single fuel assembly; and 2) prevent a load drop from distorting fuel in the storage racks that would result in a critical geometry.

Evaluation of Proposed Change

TS 3/4.9.7 is being deleted because the spent fuel-related crane requirements are not of controlling importance to operational safety. This rationale is consistent with the Improved Standard Technical Specifications for Westinghouse Plants and the 1993

NRC Policy Statement. The proposed deletion of TS 3/4.9.7 is based on the guidelines of the NRC Staff Review of NSSS Vendor Groups' Application of the Commission's Interim Policy Statement Criteria to Standard Technical Specifications ("split report"), dated May 9, 1988. TS 3/4.9.7 is listed in Appendix B, Table 2 (Westinghouse Plants) of the "split report" as an LCO which may be "wholly or partially relocated" to licensee controlled documents. FPL proposes to delete TS 3/4.9.7 and relocate its requirements that are currently implemented in existing plant documents which include procedures and the Updated Final Safety Analysis Report. These documents have been established based on the operating limits and safety margins for the control of heavy loads consistent with FPL responses to NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980. Therefore, an administrative basis exists for removing the TS 3/4.9.7 load limiting requirements and associated Bases from the Turkey Point Units 3 and 4 TS.

B. TS 3/4.9.12, Handling of Spent Fuel Cask (both units)

Summary of Specification and its Bases

The TS 3/4.9.12 LCO prohibits the handling of the spent fuel cask under certain conditions. These conditions include a limitation that the cask not be moved into the spent fuel pit (pool) until all the fuel in the spent fuel pit has decayed for a minimum of 1525 hours. Second, only a single element cask can be moved into the spent fuel pit. Finally, a fuel assembly shall not be removed from the pit in a shipping cask until it has decayed for a minimum of 120 days. Limiting spent fuel decay time from last time critical to a minimum of 1,525 hours prior to moving a spent fuel cask into the spent fuel pit ensures that potential offsite doses are a fraction of 10 CFR Part 100 limits should a dropped cask strike stored fuel assemblies. The SR require determination of the required decay times of the spent fuel assemblies prior to the movement of the spent fuel cask. In addition, the spent fuel cask handling crane interlock shall be demonstrated operable within 7 days of crane operation and at least once per 7 days when the crane is being used.

The restriction to allow only a single element cask to be moved into the spent fuel pit ensures the maintenance of water inventory in the unlikely event of an uncontrolled cask descent. Use of a single element cask, which nominally weighs about twenty-five tons, increases crane safety margins by about a factor of four.

Requiring that spent fuel decay time from last time critical be at least 120 days prior to moving fuel assemblies outside the fuel storage pit in a shipping cask ensures that potential offsite doses are a fraction of 10 CFR 100 limits should a dropped

cask and ruptured fuel assembly release activity directly to the atmosphere.
Evaluation of Proposed Change

The determination has been made that TS 3/4.9.12 can be deleted based on the upgrade of the new spent fuel cask handling crane to a single-failure-proof design, meeting applicable requirements of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980, and NUREG-0554, "Single-Failure Proof Cranes For Nuclear Power Plants," May 1979, ASME NOG-1, "Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)" [Reference 6] and CMAA 70-04, "Specifications for Top Running Bridge & Gantry Type Multiple Girder Electric Overhead Traveling Cranes" [Reference 7]. Operating experience and inspection information related to upgrading existing cranes to single-failure-proof for the movement of heavy loads, provided in NRC Regulatory Issue Summary 2005-25 [Reference 8] is also incorporated in the design considerations.

A Compliance Matrix is contained in Attachment 3 to this application demonstrating specific compliance with each section of NUREG-0554.

This implementation of the new single-failure-proof spent fuel cask handling crane eliminates the need for the cask drop accident analyses currently included in the UFSAR for each plant because the potential for a cask drop is considered to be extremely small.

The single-failure-proof spent fuel cask handling crane is designed, and will be fabricated, installed and tested to ensure that a single failure will not result in the loss of the capability of the system to safely retain the load. Dynamic analysis has been performed for the applicable seismic conditions defined in the UFSAR. During a seismic event (Design Earthquake and Maximum Earthquake), the crane and main and auxiliary hoists are designed to retain control of and hold the maximum critical load (MCL). The analyzed design rated load (DRL) of the trolley and main hoist of the spent fuel cask handling crane is 130 tons. The DRL for the auxiliary hoist is 25 tons. The spent fuel cask handling crane system component parts subject to wear and exposure are designed for a minimum of 15 percent above the design rated load in accordance with Section 2.2 of NUREG-0554 for additional safety margin. Similarly, the bridge and trolley are designed to remain in place on their respective runways with their wheels prevented from leaving the tracks during a seismic event.

The operational limits, interlocks, procedural and administrative controls, that restrict the handling of heavy loads over fuel stored in the spent fuel pool will continue to be in place and will be applicable to the new spent fuel cask handling crane.

The deletion of TS 3/4.9.12 is based on the new single-failure-proof crane and the implementing procedures that will meet the applicable requirements of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," Section 5.1.6, "Single Failure Proof Handling Systems," July 1980, and NUREG-0554, "Single-Failure Proof Cranes For Nuclear Power Plants," May 1979.

5.0 REGULATORY ANALYSIS

Applicable Regulatory Requirements/Criteria

Section 182a of the Atomic Energy Act of 1954, as amended (the Act) requires applicants for nuclear power plant operating licenses to include the TSs as part of the license. The Commission's regulatory requirements related to the content of TSs are set forth in Section 50.36 of Title 10 of the Code of Federal Regulations (10 CFR). The regulation requires that the TSs include items in specific categories, including: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) surveillance requirements; (4) design features; and (5) administrative controls.

The regulation does not specify the particular requirements to be included in the TSs. The four criteria defined by 10 CFR 50.36(c)(2)(ii) [Reference 3] determine whether particular items are required to be included in the TS LCOs. The design basis accidents and transient analyses discussed in Criteria 2 and 3 include any design basis event described in the UFSAR, not just those events described in Chapters 6, "Engineered Safety Features," or Chapter 15, "Accident Analysis." The initial conditions captured under Criterion 2 should not be limited to only process variables assumed in the safety analyses, they should also include certain active design features and operating restrictions needed to preclude unanalyzed accidents. In this context, active design features include only those design features under the control of operations personnel (i.e., licensed operators and personnel who perform control functions at the direction of licensed operators).

Furthermore, should the TSs involve physical, designed-in features that prevent operations staff from immediately exceeding the assumptions in the bounding analysis in the course of operations, then the TSs would not meet Criterion 2 and could be relocated to the UFSAR or other similarly controlled document. The NRC staff documented its decisions on the relocation of TSs in the "NRC Staff Review of Nuclear Steam Supply System Vendor Groups' Application of the Commission's Interim Policy Criteria to Standard Technical Specifications," transmitted to the various nuclear industry owners groups on May 9, 1988. Existing TSs that fall within or satisfy any of the above criteria must be retained in the TSs; those that do not fall within or satisfy these criteria may be relocated to other licensee-controlled documents.

NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants," dated May 1979, identifies features of the design, fabrication, installation, inspection, testing, and operation of single-failure-proof overhead crane handling systems that are used for handling critical loads. The NUREG superseded Draft Regulatory Guide 1.104, Overhead Crane Handling Systems for Nuclear Power Plants, dated 1976.

In NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980, the NRC staff provided regulatory guidelines for control of heavy load lifts to assure safe handling of heavy loads in areas where a load drop could impact on stored spent fuel, fuel in the reactor core, or equipment that may be required to achieve safe shutdown or permit continued decay heat removal. Section 5.1.1 of NUREG-0612 provides guidelines for reducing the likelihood of dropping heavy loads and provides criteria for establishing safe load paths; procedures for load-handling operations; training of crane operators; design, testing, inspection, and maintenance of cranes and lifting devices; and analyses of the impact of heavy load drops.

The guidelines in Sections 5.1.2 through 5.1.6 of NUREG-0612 address alternatives to either further reduce the probability of a load handling accident or mitigate the consequences of heavy load drops. These alternatives include using a single-failure-proof crane to improve reliability through increased factors of safety and through redundancy or duality in certain active components. Criteria for design of single-failure-proof cranes are included in NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants."

In NRC Bulletin (NRCB) 96-02, Movement of Heavy Loads over Spent Fuel, Over Fuel in the Reactor Core, or Over Safety-Related Equipment, dated April 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.

6.0 NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

FPL has evaluated these TS changes to determine if a significant hazard is present. The

No Significant Hazards Consideration evaluation required by 10 CFR 50.92 is provided below for each TS change.

TS 3/4.9.7, Crane Travel–Spent Fuel Storage Areas (reviewed for both units)

FPL has evaluated whether or not a significant hazards consideration is involved with removing the TS 3/4.9.7, "Crane Travel – Spent Fuel Storage Areas," from the Turkey Point Units 3 and 4 TS by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1) Would operation of the facility in accordance with the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The removal of TS 3/4.9.7 will not increase the probability of a fuel handling accident (FHA), as evaluated in Chapter 14.2.1 of the UFSAR, and is considered remote because of the administrative controls and physical limitations imposed on fuel handling operations. The load limit restriction, in conjunction with existing plant documents (for example, Turkey Point heavy load handling procedures) that restrict crane or other heavy load handling operations provide a defense-in-depth approach to handling heavy loads in the spent fuel pool vicinity. The load limitation defined in TS 3/4.9.7 is preserved and will be implemented based on the operation limits and safety margins for the control of heavy loads consistent with NUREG-0612. The TS change does not represent any physical change to the plant systems, structures, or components. Therefore, the systems credited with mitigating the dose consequences of a FHA remain in place. The dose consequences of a fuel handling accident as discussed in Turkey Point UFSAR Chapter 14.2.1 will not increase because of the administrative controls and physical limitations imposed on fuel handling operations which minimize the likelihood of a FHA.

   Therefore, facility operation in accordance with the proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.

2) Would operation of the facility in accordance with the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The removal of TS 3/4.9.7 does not represent any physical change to the plant systems, structures, or components. The same operational functions of moving new fuel, spent fuel, or other loads over the spent fuel pool are retained and therefore do not create or increase the possibility of a new or different kind of accident from any accident previously evaluated. Additionally, the load limit of 2000 pounds over the spent fuel pool defined in TS 3/4.9.7 is preserved and implemented in existing plant documents and are established based on the operational limits and safety margins for the control of heavy loads consistent with NUREG-0612. Other measures which preclude the creation of a new or different type of accident include interlocks and physical stops, operator training, and load handling procedures.

Therefore, operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated.

3) Would operation of the facility in accordance with the proposed amendment involve a significant reduction in a margin of safety?

Response: No

The removal of TS 3/4.9.7 does not change the operational process of moving loads over the spent fuel pool. There are no changes to any physical plant systems, structures, or components. The spent fuel handling crane has weight sensors that are interlocked to limit the total load. In addition, an in-line weight sensing system is provided for each hoist to limit the lifting load to preclude accidental fuel damage should binding occur. When lifting over spent fuel, the total load is limited to 2000 pounds by current procedures, limit switches and load sensors. Because of these measures no margin of safety is reduced or compromised.

Therefore, operation of the facility in accordance with the proposed amendment will not involve a significant reduction in a margin of safety.

Based on the above, FPL concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

TS 3/4.9.12, Handling of Spent Fuel Cask (reviewed for both units)

FPL has evaluated whether or not a significant hazards consideration is involved with the proposed amendment of removing TS 3/4.9.12, "Handling of Spent Fuel Cask," by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1) Would operation of the facility in accordance with the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The removal of TS 3/4.9.12 will not involve a significant increase in the probability or consequences of an accident previously evaluated. The accident evaluated for the existing spent fuel cask handling crane is the drop of a single element cask as cited in UFSAR Section 14.2.1.3, "Cask Drop Accident." This cask drop accident was analyzed and the radiological dose consequence, as a result of the cask drop, is determined to be within the limits of 10 CFR 100. The current spent fuel cask handling crane at Turkey Point Units 3 and 4 has a single 105/15 ton main/auxiliary hook design capacity and is not designed as single-failure-proof. The new spent fuel cask handling crane will be single-failure-proof meeting all of the requirements of NUREG-0554, "Single Failure Proof Cranes for Nuclear Power Plants" and also NUREG-0612, Section 5.1.6, "Single Failure Proof Handling Systems." The probability of a cask drop accident using a single-failure-proof crane designed and operated to these NUREG requirements is considered to be extremely small.

   The design for the upgrade of the spent fuel cask handling crane is to increase the capacity to 130/25 tons (main/auxiliary hook). All crane components (hoist, bridge, girders, etc.) are designed and fabricated to retain control of and hold the maximum critical load (a planned 32 element spent fuel cask) in the unlikely event of the failure of a single component, coincident with a Design or Maximum earthquake.

   The objectives cited in Section 5.1 of NUREG-0612, "Recommended Guidelines," for the control of heavy loads are satisfied. The probability of a cask drop accident using the new single-failure-proof spent fuel cask crane, as compared to the existing non-single-failure-proof crane, is therefore not increased. The increase of the consequences of an accident previously evaluated is also not increased because the potential for a cask drop by the new upgraded spent fuel cask handling crane is considered to be extremely small.

Further, operational limits, interlocks, procedural and administrative controls, that restrict the handling of heavy loads over fuel stored in the spent fuel pool, provide additional defense-in depth to ensure that a load could not be dropped that would result in dose consequences greater than previously evaluated.

It is concluded that facility operation in accordance with the proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.

2) Would operation of the facility in accordance with the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

Operation of the spent fuel cask handling crane after the upgrade to a single-failure-proof design will remain the same as the operation of the existing spent fuel cask handling crane. The distinction is the load that will be lifted.

The new spent fuel cask is a multiple assembly cask, in contrast to a single assembly cask as currently specified for use. The current spent fuel cask handling crane is designed to lift a single element spent fuel cask. The upgraded capacity of the new spent fuel cask handling crane will allow for lifting a cask designed to hold a maximum of 32 spent fuel assemblies. Current operating and administrative procedures that restrict the movement of heavy loads over fuel stored in the spent fuel pool remain in place. The new spent fuel cask handling crane is designed, fabricated and tested to single-failure-proof requirements (NUREG-0554, "Single Failure Proof Cranes for Nuclear Power Plants" and NUREG-0612, Section 5.1.6, "Single Failure Proof Handling Systems") and will be operated within the procedural and administrative framework as the currently installed spent fuel cask handling crane. Therefore, the possibility of a new or different kind of accident from any accident previously evaluated is not created from the removal of TS 3/4.9.12.

Therefore, it can be concluded that the operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated.

3) Would operation of the facility in accordance with the proposed amendment involve a significant reduction in a margin of safety?

Response: No

The existing spent fuel cask handling crane is not designed as single-failure-proof in accordance with NUREG-0612. The new spent fuel cask handling crane is designed, and will be fabricated, installed and tested to the single-failure-proof requirements as outlined in NUREG-0612, Section 5.1.6, "Single Failure Proof Handling Systems." The use of the defense-in-depth approach for the control and handling of heavy loads as cited in Section 5.1 of NUREG-0612, "Recommended Guidelines," provides assurance that there is a sufficient margin of safety in the handling of heavy loads. Thereby, the removal of TS 3/4.9.12 will not involve a significant reduction in the margin of safety.

Defense-in-depth measures include operational limits, interlocks, procedural and administrative controls, rigging, load paths, testing, training, maintenance and other related considerations. These measures provide assurance that the margin of safety is not reduced in the operation of the facility by meeting all the requirements of NUREG-0612 and NUREG-0554. The specific requirements and FPL compliance with them is documented in the NUREG-0554 Compliance Matrix [Attachment 3 to this application].

The design for the upgrade of the spent fuel cask handling crane is to increase the capacity to 130/25 tons (main/auxiliary hook). The spent fuel cask handling crane has a Main Hoist and Auxiliary Hoist Cable Safety Factor of a minimum 10:1 on nominal breaking strength at 130 tons and 25 tons respectively and is fully compliant with ASME NOG-1 Section 5425.1. The Main Hoist Hook and Auxiliary Hoist Hook Safety Factor have a 10:1 minimum on ultimate strength at 130 tons and 25 tons, respectively.

Therefore, operation of the facility in accordance with the proposed amendment will not involve a significant reduction in a margin of safety.

Based on the above, FPL concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

7.0 ENVIRONMENTAL IMPACT CONSIDERATION DETERMINATION

10 CFR 51.22(c)(9) provides criteria for identification of licensing and regulatory actions eligible for categorical exclusion from performing an environmental assessment. A proposed amendment to an operating license for a facility requires no environmental

assessment if operation of the facility in accordance with the proposed amendment would not:

(i) involve a significant hazards consideration,

(ii) result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, and

(iii) result in a significant increase in individual or cumulative occupational radiation exposure.

FPL has reviewed the proposed amendment to remove two TS, which restrict movements of loads over the spent fuel pool, from the Turkey Point Nuclear Plant Unit 3 and 4 Operating Licenses. It has been concluded that the proposed amendment involves no significant increase in the amounts, with no significant change in the types, of any effluents that may be released offsite since existing effluent pathways are not impacted by the proposed change and new pathways are not created. There is no significant increase in individual or cumulative occupational radiation exposure since the activities supported by the load handling systems involved in the proposed amendment are not changed. The proposed amendment also involves no significant hazards consideration as discussed in Section 6.0 of this evaluation and meets the criteria for categorical exclusion set forth in 10 CFR 51.22(b). An environmental impact statement or environmental assessment need not be prepared in connection with issuance of the amendment.

8.0 PRECEDENT

Licensing precedents for similar changes to remove spent fuel-related heavy load limitations include:

Oyster Creek received a license amendment on January 23, 2002 [Reference 4] which deleted Oyster Creek TS 5.3.1.B and 5.3.1.C. These TS restricted the handling of heavy loads over irradiated fuel stored in the spent fuel pool. The basis for deleting these TS was the upgrade of the reactor building crane and associated handling systems to a single-failure-proof system. In comparison, from a spent fuel handling point of view, the Oyster Creek reactor building crane is equivalent to the Spent Fuel Cask Crane at Turkey Point Units 3 and 4.

St. Lucie Units 1 and 2 received license amendments on April 28, 2004 [Reference 5] for the relocation of Spent Fuel Crane TS requirements by applying the 10 CFR 50.36 criteria. The basis for the relocation of the TS was the certification that the replacement cask cranes were designed, installed, and load tested to the single-failure-proof criteria of NUREG-0554 under 10 CFR 50.59. Even though Turkey Point is not "relocating" the TS as described in the St. Lucie amendments, the load handling requirements and the associated activities, such as the replacement of the cask crane(s), are equivalent for comparison.

9.0 REFERENCES

1. NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980.
2. NUREG-0554, "Single-Failure Proof Cranes For Nuclear Power Plants," May 1979.
3. 10 CFR 50.36(c)(2)(ii), Technical Specifications [screening criteria].
4. Letter from NRC to Mr. Oliver D. Kingsley, Exelon Nuclear, "Oyster Creek Nuclear Generating Station- Issuance of Amendment Re: Handling of Heavy Loads Over Irradiated Fuel Stored in the Spent Fuel Pool (TAC No. MB1747)," January 23, 2002.
5. Letter from NRC to Mr. J. A. Stall, Florida Power and Light, "St. Lucie Units 1 and 2– Issuance of Amendments Regarding the Relocation of Spent Fuel Pool Crane Technical Specification Requirements (TAC Nos. MB5667 and MB 5668)," April 28, 2004.
6. ASME NOG-1, "Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)," May 2005.
7. CMAA 70-04, "Specifications for Top Running Bridge & Gantry Type Multiple Girder Electric Overhead Traveling Cranes," January 2004
8. NRC Regulatory Issue Summary 2005-25: Clarification of NRC Guidelines for Control of Heavy Loads, October 31, 2005.

Attachment 2

Florida Power and Light Company
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Regarding Heavy Loads over the Spent Fuel Pools

Marked-up Technical Specification Pages

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3/4.9.7 ~~CRANE TRAVEL - SPENT FUEL STORAGE AREAS~~ DELETED

LIMITING CONDITION FOR OPERATION

3.9.7 Loads in excess of 2000 pounds shall be prohibited from travel over fuel assemblies in the storage pool.

APPLICABILITY: With fuel assemblies in the storage pool.

ACTION:

a. With the requirements of the above specification not satisfied, place the crane load in a safe condition.

b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.7 Prior to crane operation over fuel assemblies in the spent fuel storage pool, verify that each load is 2000 pounds or less.

3/4.9.12 ~~HANDLING OF SPENT FUEL CASK~~ DELETED

LIMITING CONDITION FOR OPERATION

3.9.12 The handling of spent fuel cask shall be limited to the following conditions:

1) The spent fuel cask shall not be moved into the spent fuel pit until all the spent fuel in the pit has decayed for a minimum of one thousand five hundred twenty-five (1,525) hours.

2) Only a single element cask may be moved into the spent fuel pit.

3) A fuel assembly shall not be removed from the spent fuel pit in a shipping cask until it has decayed for a minimum of one hundred twenty (120) days.

APPLICABILITY: During movement of spent fuel cask in the spent fuel storage area.

ACTION:

With the requirement of the above specification not satisfied, suspend all movement of the spent fuel cask within the spent fuel storage area.

SURVEILLANCE REQUIREMENTS

4.9.12.1 The following required decay times of the spent fuel assemblies shall be determined prior to the movement of a spent fuel cask by verification of date and time the spent fuel assemblies were placed into the spent fuel pit:

a. 1525 hours of decay of all spent fuel assemblies in the spent fuel pit for movement of a spent fuel cask into the spent fuel pit.

b. 120 days of decay of the spent fuel assembly in the spent fuel cask prior to removal of the spent fuel cask from the spent fuel pit.

4.9.12.2 Prior to any operations involving spent fuel cask movement into the spent fuel pit, verify only a single element cask will be moved into the spent fuel pit.

4.9.12.3 The spent fuel cask crane interlock shall be demonstrated OPERABLE within 7 days of crane operation and at least once per 7 days (7 days is maximum time between tests; specification 4.0.2 does not apply here) when the crane is being used to maneuver the spent fuel cask.

Attachment 3

Florida Power and Light Company
Turkey Point Units 3 and 4
Renewed Facility Operating License Nos. DPR-31 and DPR-41
Docket Nos. 50-250 and 50-251
License Amendment Request to Change the Technical Specifications
Regarding Heavy Loads over the Spent Fuel Pools

NUREG-0544 Compliance Matrix

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NOTES:

1. NUREG-0612 incorporates NUREG-0554 as the referenced document for single-failure-proof cranes. Compliance with NUREG-0554 stated herein also ensures compliance with NUREG-0612.

2. The crane including main and auxiliary hoists, trolley and bridge are designed, manufactured and tested in accordance with the specific requirements of ASME NOG-1-2004 for a Type 1 Crane (i.e. single-failure-proof crane). The ASME committee has prepared a matrix comparing the requirements of ASME NOG-1 Type 1 vs. NUREG-0554. This matrix indicates that a design compliant with ASME NOG-1 for a Type 1 Crane meets or exceeds the intent of NUREG-0554. The intent for the body of this document is to address specific requirements of NUREG-0554, unless otherwise indicated.

3. NRC REGULATORY ISSUE SUMMARY 2005-25, SUPPLEMENT 1 CLARIFICATION OF NRC GUIDELINES FOR CONTROL OF HEAVY LOADS, states "ASME NOG-1, "Rules for Construction of Overhead and Gantry Cranes." In Revision 1 to Section 9.1.5 of the Standard Review Plan (NUREG-0800), the NRC staff also enhanced the RIS 2005-25, Supplement 1 guidelines for the design of single-failure-proof cranes. The NRC staff has concluded that the application of the criteria for Type 1 cranes from ASME NOG-1-2004, "Rules for Construction of Overhead and Gantry Cranes," to the design of new overhead heavy load handling systems is an acceptable method for satisfying the guidelines of NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants." These guidelines provide licensees and applicants with guidance that the NRC considers acceptable for the use in designing new single-failure-proof cranes. The NRC staff has participated in the ASME Cranes for Nuclear Facilities Committee as it has developed a comparison of ASME NOG-1 design criteria to the criteria of NUREG-0554. The NRC staff understands that the committee will provide the comparison as an appendix to a future revision of ASME NOG-1."

4. This document applies to the new components supplied as part of FPL'S vendor's scope for the new crane including the new bridge, trolley, main hoist, auxiliary hoist and electrical controls.

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
2.1 Construction And Operating Periods	Design criteria for construction phase operation.	The replacement crane system including trolley and bridge was not utilized in the construction of the plant nor for any construction lifts. The usage of the replacement crane system is limited to operational load handling. The replacement crane system did not have a separate construction specification.	No exceptions noted.
	Allowable design stress limits of Table 3.3.3.1.3-1 of CMAA Specification #70–1975.	The existing crane system is being replaced with a new crane system; hence the new crane design is in accordance with the latest revision of CMAA Specification #70. The replacement crane system meets the applicable allowable stress limits for plant operation as indicated in section 3.4 of CMAA Specification #70-2004.	
	Design reflects the appropriate duty cycle in CMAA Specification #70.	The replacement crane system including main hoist, auxiliary hoist, trolley and bridge is being designed and manufactured in accordance with CMAA #70-2004 for Class C service, minimum. This service class is consistent with the anticipated crane usage.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
	Sum total of simultaneously applied loads (static and dynamic) should not result in stress levels causing permanent deformation, other than localized strain concentration, in any part of the handling system.	Structural analysis for various load combinations is used to maintain allowable design margins. The replacement crane system including main hoist, auxiliary hoist, trolley and bridge is designed for the applicable loading combinations from ASME NOG-1, CMAA Specification #70-2004 and NUREG-0554 design basis accident conditions (broken rope, two-blocking and load hang-up) and OBE (Operating Basis Earthquake) and SSE (Safe Shutdown Earthquake) combinations.	
	Effects of cyclic loading induced by jogging or plugging .... included in the design specifications.	The main and auxiliary hoist motions employ flux vector variable frequency drives while the trolley and bridge motions employ scalar frequency drives to provide smooth slow speed positioning and gradual acceleration and deceleration, eliminating the effects of cyclic loadings induced by jogging and plugging.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
2.2 Maximum Critical Load	Single-failure-proof crane should be designed to handle the maximum critical load (MCL) ...	The main hoist, trolley and bridge is designed for the specified maximum critical load (MCL) of 130 tons. The auxiliary hoist is designed for the specified MCL of 25 tons.	No exceptions noted.
	Increase of approximately 15% of the design load (MCL) for component parts subjected to degradation due to wear and exposure.	Wearing components in the main and auxiliary hoists including hooks, brakes, reducers and bearings are designed with at least a 15% increase above their respective MCL ratings to account for degradation due to wear and exposure.	
	The MCL rating should be clearly marked on the crane.	The MCL and DRL (Design Rated Load) ratings of 130 tons and 25 tons will be clearly marked on the trolley, crane bridge and on both sides of the main and auxiliary hoist lower blocks.	
	Certain single-failure-proof cranes may be required to handle non-critical loads of magnitude greater than the MCL during plant maintenance period.	The DRL is the same as the MCL at 130 tons for the main hoist. The DRL is the same as the MCL at 25 tons for the auxiliary hoist. Therefore, this requirement is not applicable to the new crane.	
	The DRL rating marked on the crane separately from the MCL marking.	The MCL and DRL ratings of 130 tons and 25 tons will be clearly marked on the trolley, crane bridge and on both sides of the blocks.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
2.3 Operating Environment	Operating environment … specified for the crane and lifting fixtures.	28°F to 110°F, 100% maximum relative humidity, atmosphere pressure, and no emergency corrosive or hazardous conditions are specified as design criteria. The main and auxiliary hoist lower blocks are of an open design to permit drainage and supplied with lubricants compatible with the spent fuel pool chemistry. FPL does not intend to submerse the lower blocks in the spent fuel pool.	No exceptions noted.
	Closed boxed sections of the crane structure vented to avoid collapse during containment pressurization.	The crane is located outdoors and outside of containment. The crane is not subject to pressurization from tests or plant operational loads; therefore box sections are closed and not vented. The crane is not exposed to containment spray.	
	Drainage should be provided to avoid standing water in the crane structure.	The design of the crane includes design features to prevent accumulation of water on the trolley or crane structure.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
2.4 Material Properties	Already fabricated crane structural components should be tested by subjecting the crane to a test lift at the lowest anticipated operating temperature (i.e. cold proof load test).	All structural members essential to structural integrity of the new replacement crane will be subjected to impact testing utilizing the Charpy V-notch testing method per ASTM A-370. As such, the alternative of a cold proof load test was not utilized and not required.	No exceptions noted.
	Structural members (exceeding ½ inch) essential to structural integrity tested in accordance with the following impact test requirements. Either drop weight test per ASTM E-208 or Charpy test per ASTM A-370 may be used for impact testing.	All structural members essential to structural integrity of the new replacement crane will be subjected to impact testing utilizing the Charpy V-notch testing method per ASTM A-370.	Impact testing is not required for material with nominal thickness of 5/8 inch or less per ASME NOG-1 and ASME Section III, NC-2300 and ND-2300, as applicable.

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
	Toughness recommendations were developed … typical material section thickness for crane girders … (2 in.). Later information indicates that material thickness of (4 in.) or more … The rules of ASME Code Class 3 Charpy testing do not make adjustments for thickness greater than (2 1/2 in)…	The replacement trolley and bridge structure are fabricated from plates and structural shapes rolled from carbon steel with thicknesses ranging from ¼ in. to 1 ½ in. For the structural members essential to the structural integrity of the replacement trolley and bridge structure, the required energy values of Table NOG-4212-1 are satisfied. The required energy values from Table NOG-4212-1 are extracted from Table ND-2311(a)-1 of Section III, Division 1 of the ASME Boiler and Pressure Vessel Code.	No exceptions noted.
2.4 Material Properties (continued)	As an alternative, cold proof testing consisting of a single dummy test load equal to 1.25 times the MCL shall be used to establish the minimum operating temperature.	All structural members essential to structural integrity of the new replacement crane are subjected to impact testing utilizing the Charpy V-notch testing method per ASTM A-370. The minimum operating temperature for the replacement crane is specified at 28°F. Charpy impact testing is performed at a test temperature of 30°F less than the specified minimum operating temperature in accordance with ASME NOG-1. As such, the alternative of a cold proof load test is not utilized and not required.	No exceptions noted.

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
	The cold proof test should be followed by a non-destructive examination of welds whose failure could result in the drop of the critical load. The nondestructive examination of critical areas should be repeated at 4 year intervals or less.	The alternative of a cold proof load test is not utilized and not required. Welds on the replacement trolley and bridge structure whose failure could result in the drop of the critical load, will be nondestructively tested during initial fabrication. As such, nondestructive testing subsequent to site load testing of the replacement crane and thereafter is not required.	
	Cranes and lifting fixtures made of low-alloy steel such as ASTM A514 should be subjected to the cold-proof test in any case.	The main hoist lower block side plates are the only components of the new replacement trolley or bridge structure fabricated from ASTM A514 steel. Charpy impact testing is performed in accordance with ASTM A370 at a test temperature of 30 degrees less than the specified minimum operating temperature in accordance with ASME NOG-1. This approach is satisfactory to preclude brittle fracture of materials.	Exception to cold proof testing of A514, but justified by performing impact testing.
	Cast iron should not be used for load-bearing components such as rope drums. Cast iron may be used for electric motor frames and brake drums.	Cast iron is not used for any load bearing components on the replacement trolley or bridge structure.	No exceptions noted.
	Alternative methods of fracture analysis that achieve an equivalent margin of safety against fracture ...	Not applicable for supplied equipment.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
2.5 Seismic Design	Crane designed to retain control of and hold the load.	The crane is designed to retain control of the 130 ton MCL (Main Hoist) and 25 ton MCL (Auxiliary Hoist) for all load combinations including broken rope, two-blocking, load hang-up, and OBE and SSE seismic events.	No exceptions noted.
	Bridge and trolley designed to remain in place during a seismic event with their wheels prevented from leaving the tracks.	The seismic and structural analysis of the crane determined that there is no appreciable trolley or bridge uplift for all applied loading combinations. The replacement trolley and bridge structure will be provided with seismic restraints to ensure the bridge and trolley remain on the respective rails.	
	Bridge remains on the runway with brakes applied, and the trolley remains on the crane girders with brakes applied during a SSE event.	Analysis determined that the bridge would remain on the runway and the trolley will remain on the bridge with brakes applied during an OBE or SSE event. All crane brakes will be set when the crane is not being operated or power is removed.	
	Crane designed and constructed in accordance with regulatory position 2 of Regulatory Guide 1.29.	The crane's design satisfies regulatory position 2 of Regulatory Guide 1.29. The crane is designed to remain in place and hold the load during and after an OBE or SSE event.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
	The MCL plus operational and seismically induced pendulum and swinging load effects … considered in the trolley design and they should be added to the trolley weight for the bridge design.	The crane mathematical model appropriately considers seismically induced pendulum and swinging load effects. The pendulum effect due to horizontal seismic input and swinging load effects is evaluated and determined to be insignificant.	
2.6 Lamellar Tearing	Examine the (weld) joints by radiography or ultrasonic inspection … to ensure the absence of lamellar tearing in the base metal and soundness in the weld metal.	Lamellar tearing is predominant in highly restrained joints such as connections utilizing thick plates and full penetration welds. The structural components of the replacement trolley and bridge structures are fabricated primarily from thin plate sections and welded together via primary structural fillet welds eliminating the concern of lamellar tearing. Additionally, non-destructive examinations of critical welds on the replacement trolley and bridge structure are performed in accordance with ASME NOG-1. Hoist drum shell and hub full penetration butt weld integrity are verified by radiography or ultrasonic inspection.	No exceptions noted.

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
	Weld joints whose failure could result in the drop of a critical load should be nondestructively examined. If these weld joint geometries would be susceptible to lamellar tearing, the base metal at the joint should be nondestructively examined.	Non-destructive examinations of critical welds on the replacement trolley and bridge structure are performed in accordance with ASME NOG-1. Lamellar tearing is predominant in highly restrained joints such as connections utilizing thick plates and full penetration welds. The structural components of the replacement trolley and bridge structures are fabricated primarily from thin plate sections and welded together via primary structural fillet welds eliminating the concern of lamellar tearing.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
2.7 Structural Fatigue	Fatigue analysis should be considered for the critical load-bearing structures and components of the crane handling system	Historical data, as well as projected crane usage indicates far less than 20,000 cycles will be applied to the replacement trolley and bridge structure. Therefore, additional fatigue analysis is not needed for any components on the trolley or bridge structure, as CMAA Specification #70 used 20,000 cycles, minimum, as its design basis.	No exceptions noted.
	Cumulative fatigue usage factors should reflect effects of the cyclic loading from both construction and operating periods.	The structural fatigue usage factors from CMAA Specification #70-2004, Table 3.4.7-1 are used in the design of the replacement trolley and bridge structure. The design of the mechanical components of the replacement trolley and bridge considered the allowable stresses from CMAA Specification #70-2004 for the appropriate service class (Class C). The replacement trolley and bridge structure are not used for construction. The cumulative usage factor appropriately reflects the operating period for the crane.	
2.8 Welding Procedures	Preheat temperatures for all weldments specified in the weld procedures.	All welding procedures for the replacement trolley and bridge structure specify preheat temperatures where required by AWS D1.1.	No exceptions noted.
	Post weld heat treatment for all weldments specified in the weld procedures. To include Section 2.6 welds, which shall be post-weld heat treated in accordance with Sub Article 3.9 of AWS D1-1.	All welding procedures for the replacement trolley and bridge structure specify post-weld heat treatment where required by AWS D1.1, 2006. This is in accordance with Sub Article 3.9 of AWS D1.1, 1976.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
3.1 General	Primary or principal load-bearing components, equipment, and subsystems such as driving equipment, drum, rope reeving system, hooks, blocks, control systems, and braking system should receive special attention.	The quality inspections and checks for the primary or principle load bearing components of the replacement trolley and bridge structure are consistent with Table 7200-1 of ASME NOG-1.	No exceptions noted.
3.2 Auxiliary Systems	Auxiliary hoisting systems of the main crane handling system … single-failure-proof.	The new single-failure-proof trolley includes a 25 ton single-failure-proof auxiliary hoist.	No exceptions noted.
	Auxiliary systems or dual components for the main hoisting mechanism … immobile safe position.	Dual systems are provided on the main and auxiliary hoists ensuring the load will be retained upon a component or subsystem failure.	
3.3 Electric Control Systems	Automatic controls and limiting devices designed … disorders due to inadvertent operator action, component malfunction … will not prevent the handling system from stopping and holding the load.	Special features are provided in the design to sense over travel (control and power), overweight, overspeed, mis-spooling and unbalanced reeving. The electrical design addresses the effects of phase reversal or phase loss in the hoist power supply (USNRC letter GL 83-042 dated Aug. 26, 1983) as well as undervoltage, overvoltage, and overcurrent protection. Detection of any of the above faults removes power from the hoists, placing them in a safe condition. Bridge and trolley motions are limited by travel limit switches, which de-energize the motor at ends of travel.	No exceptions noted.

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
	Emergency stop button added to the control station to stop all motion.	Emergency stop buttons are provided on the radio transmitter and back-up pendant station. These buttons will remove power from all crane motors and set all brakes when actuated.	
3.4 Emergency Repairs	A crane that has been immobilized because of malfunction or failure of controls or components while holding a critical load should be able to hold the load or set the load down while repairs or adjustments are made.	The main and auxiliary hoists are provided with redundant brakes to allow portions of the hoist drive train to be repaired while retaining the load. The hydraulic drum brakes on the main and auxiliary hoists can be manually modulated to lower a load in the event of hoisting equipment failure.	No exceptions noted.
	Manual operation of the hoisting system and the bridge and trolley transfer mechanisms to a safe laydown area.	The hydraulic drum brakes on the main and auxiliary hoists can be manually modulated to lower a load in the event of hoisting equipment failure. A hand pump is provided to allow for manual operation of the hydraulic system without electric power. The bridge and trolley are provided with attachment points for manual operation.	
	Crane design and operating area include provisions … cause release of radioactivity during corrective repairs, replacements or adjustments are being made to place the crane handling system back into service after component failure(s).	Provisions (i.e. attachment points) are made to allow the trolley and bridge to be moved to a safe area for component repair or replacement with a suspended load.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
4.1 Reeving System	Protection against excessive wire rope wear … through scheduled inspection and maintenance.	The Operating and Maintenance Manual provided, includes instructions for scheduled inspection and maintenance of the wire ropes consistent with OSHA 1910.179.	No exceptions noted.
	Design of the rope reeving systems(s) should be dual with each system providing separately the load balance … configuration of ropes and rope equalizer(s).	The design of the main and auxiliary hoist reeving systems are dual with each system providing independent load balance on the head and load blocks through configuration of ropes and rope equalizers.	
	Selection of the hoisting rope or running rope … to maintain efficient working of the individual wire strands … during the hoisting operation.	The selection of the wire ropes for the main and auxiliary hoist reeving system is consistent with the wire rope manufacturer's application recommendations for their wire rope.	
	The effects of impact loadings, acceleration and emergency stops should be included in selecting rope reeving systems.	Impact and dynamic loadings, including acceleration, emergency stops, broken rope, two-blocking, load hang-up and seismic are considered in sizing the main and auxiliary hoist wire ropes and reeving system components.	
	Maximum load, including static and inertia forces, on each individual wire rope in the dual reeving system with the MCL attached should not exceed 10% of the manufacturer's published breaking strength.	The maximum load, including the static and inertia forces on each individual wire rope in the dual reeving system with the design MCL attached, does not exceed 10% of the wire rope manufacturer's published breaking strength for both the main and auxiliary hoists.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
	Consider the wire rope yield strength, as well as ultimate strength, when specifying wire rope to ensure the desired margin on rope strength.	The wire rope selection criteria used is based upon the ultimate strength of the rope. The transferred load under a broken rope scenario is limited to 40% of the ultimate strength of the rope in accordance with the requirements of ASME NOG-1 to ensure satisfactory safety margins are maintained, thereby minimizing rope yield strength concerns.	
	Maximum fleet angle from drum to lead sheave in the load block or between individual sheaves should not exceed 3 1/2° at any one point during hoisting except that for the last three (3) feet of maximum lift elevation the fleet angle may increase slightly.	The hoist systems are designed such that the maximum fleet angle in each hoist system does not exceed 3 1/2°.	
4.1 Reeving System (continued)	Reverse bends for running wire ropes should be limited, and the use of larger sheaves considered where a disproportional reduction in wire rope fatigue life would be expected from the use of standard sheave diameters for reverse bends.	The use of reverse bends is limited by the design. The design utilizes larger sheaves with running sheave to wire rope diameters of at least 20:1 for the main and auxiliary hoists, thereby minimizing the stochastic affects of fatigue.	No exceptions noted.
	Equalizer for stretch and load on the rope reeving ... beam or sheave type or combinations thereof.	The design of the main hoist equalizer is a combination of sheave and rocker beam. The design of the auxiliary hoist equalizer is of the rocker beam type.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
	Dual rope reeving system with individual attaching points and means for balancing or distributing the load between the two operating rope reeving systems will permit either rope system to hold the critical load and transfer the critical load without excessive shock in case of failure of the other rope system.	The main hoist design employs an equalizer rocker beam and hydraulic shock absorbers to balance and distribute the forces associated with load transfer. The auxiliary hoist utilizes an equalizer rocker beam to balance and distribute forces associated with the load transfer.	
	Pitch diameter of running sheaves and drums … in accordance with recommendations of CMAA Spec. #70.	The pitch diameter of the drums and running sheaves is greater than 20 times the wire rope diameter as required by Tables 4.5.2-1 and 4.6.4-1, respectively, of CMAA Specification. #70-2004 for class C service and 6 x 37 class rope.	
	Dual reeving system may be a single rope from each end of a drum terminating at one of the blocks or equalizer with provisions … designed for total load. Alternatively, a 2-rope system may be used from each drum or separate drums using a sheave equalizer or beam equalizer or any other combination that provides two separate and complete reeving systems.	The main hoist design uses two drums with two ropes, with a balanced dual reeving system with each rope terminating on the drum it originated on. The auxiliary hoist uses one drum with two ropes with a balanced dual reeving system with each rope terminating at the equalizer assembly. Each rope of the main and auxiliary hoist is capable of carrying the respective rated load with a factor of safety of 5:1 against the manufacturer's published breaking strength.	

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
4.2 Drum Supports	Load hoisting drum … structural and mechanical safety devices to limit the drop of the drum … from disengaging from its holding brake system.	The drum retaining devices are steel structures, which ensure that a shaft or bearing failure will not allow the main or auxiliary hoist drums to disengage from the brakes.	No exceptions noted.
4.3 Head and Load Blocks	Head and load blocks should be designed to maintain a vertical load balance about the center of lift … reeving system of dual design.	The main and auxiliary hoist head and load blocks are designed to use a dual reeving design to maintain a vertical load balanced about the center of the lift. The balanced dual reeving system eliminates tilt of the load block.	No exceptions noted.
	Load-block assembly should be provided with two load-attaching points, … each … able to support a load of three times the load (static and dynamic) … without permanent deformation.	The design provides an equivalent margin of safety by providing a single load path (attachment point) with a 10:1 factor of safety on ultimate strength consistent with NUREG-0612 Appendix C and ASME NOG-1. The main hoist hook MCL is 130 tons and the auxiliary hoist hook MCL is 25 tons.	Design consistent with NUREG-0612 Appendix C and ASME NOG-1.
	Individual component parts of the vertical hoisting system … head block, rope reeving system, load block … dual-load attaching device … designed to support a static load of 200% of the MCL.	Individual component parts of the hoist systems are designed to support a static load of 200% of the MCL of 130 tons for the main hoist and 25 tons for the auxiliary hoist. The single failure point components of the main and auxiliary hoist load and head blocks are designed to support static loads equivalent to their respective MCLs based upon a 10:1 factor of safety on the average ultimate strength of the material consistent with NUREG-0612 Appendix C and ASME NOG-1.	Design consistent with NUREG-0612 Appendix C and ASME NOG-1.

SEC #	NUREG-0554 GUIDANCE	TURKEY POINT CRANE COMPLIANCE	FPL EXCEPTIONS
	200% static load test performed for hook.	All load attaching points of the main hoist sister hook are statically load tested at a minimum of 260 tons (i.e. 2 times the MCL of 130 tons). The auxiliary hoist hook is statically load tested at a minimum of 50 tons (i.e. 2 times the MCL of 25 tons).	No exceptions noted.
	Measurements of the geometric configuration of the hooks … before and after the load test.	All main and auxiliary hoist hook critical dimensions are measured before and after the load test.	
4.3 Head and Load Blocks (continued)	Hook volumetric nondestructive exam, to verify soundness and integrity, before and after load test. Hook surface examination, to verify soundness and integrity, before and after load test.	As required by Table 7200-1 of ASME NOG-1, an ultrasonic examination is performed on the main and auxiliary hoist hooks before the proof load test and a magnetic particle test is performed on the hooks after the proof load test.	No exceptions noted.
	Load block should be non-destructively examined by surface and volumetric techniques.	The main and auxiliary hoist load block hook, hook nut and crosshead components are non-destructively examined by surface and volumetric inspections.	
	Results of examinations documented and recorded.	All test reports are provided to FPL in a quality control document package.	

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4.4 Hoisting Speed	Maximum hoisting speed for the critical load … limited to "slow" column of CMAA Spec. #70.	The maximum main hoist speed for critical load handling is 5 FPM, as given in CMAA Spec. #70-1975, Fig. 70.6 for slow speed and Table 5331.1-1 of ASME NOG-1-2004. The maximum auxiliary hoist speed for critical load handling is 15 FPM, as given in CMAA Spec. #70-1975, Fig. 70.6 for slow speed and Table 5331.1-1 of ASME NOG-1-2004.	No exceptions noted.
	Conservative industry practice limits the rope line speed to 50 FPM at the drum.	By design, the maximum line speed of the main hoist wire ropes is less than 50 FPM at the drums.	
4.5 Design Against Two-Blocking	The reeving system designed to prevent the cutting or crushing of the wire rope if a two-blocking incident were to occur.	The design of the main and auxiliary hoists employ redundant limit switches to prevent two-blocking and for defense in depth purposes, the reeving system is designed to not cut or crush the wire ropes during a two-blocking event.	No exceptions noted.
	The mechanical and structural components of the complete hoisting system …. required strength to resist failure … for two-blocking and load hang-up.	The mechanical and structural components of the main and auxiliary hoisting systems are designed to withstand a two-block and load hang-up event without permanent deformation or damage and hence failure.	
	Means provided within the reeving system located on the head or on the load-block combinations to absorb or control the kinetic energy of rotating machinery during the incident of two-blocking.	A mechanical slip clutch is provided in the main and auxiliary hoist drive trains to absorb the kinetic energy of the rotating machinery during a two-blocking or load hang-up event.	

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4.5 Design Against Two-Blocking (continued)	As an alternative, the protective control system to prevent the hoisting from two-blocking should include, as a minimum, two independent travel-limit devices of different designs, and activated by separate mechanical means. These devices de-energize the hoist drive motor and the main power supply to prevent the hoist from two-blocking.	The design uses the alternative method, as well as the capability to withstand a two-block event for both the main and auxiliary hoist. Primary rotary limit switch on the drum shaft senses both the upper and lower positions of load block travel and stops the motion by de-energizing the hoist controls. The secondary lever-operated power limit switch is tripped by the lower block and directly breaks power to the hoist motor.	No exceptions noted.
	The protective control system for load hang-up should consist of load cell systems in the drive train or motor current sensing devices or mechanical load-limiting devices.	The hoist frequency drive is programmed to only provide a margin of torque above what is required to lift the load, thereby limiting input energy into the system. Torque demand above this value faults the drive and sets the brake. Additionally, overload switches are installed in the main and auxiliary hoist reeving systems. The overload switches sense overloads that result from two-blocking or load hang-up and de-energize the hoist control in the up motion. The above systems are in addition to a mechanical slip clutch installed in the hoist drive trains to absorb the energy associated with two-blocking and load hang-up.	
	Location of the mechanical holding brakes and their controls should provide positive, reliable and capable means to stop and hold the hoisting drum.	The main and auxiliary hoists use two shoe-type holding brakes on the high speed shafting to hold the load during normal operation. The hydraulic drum caliper brakes provide single-failure-proof braking for the design.	

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	This should include capability to withstand the maximum torque of the driving motor if a malfunction occurs and power to the driving motor cannot be shutoff.	The maximum torque of the driving motor is limited by the flux vector frequency drive. The main and auxiliary hoist drive trains are designed to absorb this corresponding maximum motor torque. The hoist holding brakes are designed to stop and hold the load under all specified loading conditions.	
	The auxiliary hoist, if supplied, should be equipped with two independent travel-limit switches to prevent two-blocking.	The auxiliary hoist design uses the alternative method of providing two independent travel-limit switches to prevent two-blocking, as well as the capability to withstand a two-block event.	
4.6 Lifting Devices	Lifting devices attached to the load block such as … designed with a dual or auxiliary device or combinations thereof. Each designed or selected to support a load of 3Xs the load (static and dynamic) being handled without permanent deformation.	Lifting devices and interfacing lift points used for handling heavy loads will meet the associated guidance in NUREG-0612, Section 5.1.6 and the requirements of the FPL site heavy loads program.	No exceptions noted.
4.7 Wire Rope Protection	If side loads cannot be avoided, the reeving system should be equipped with a guard that would keep the wire rope properly located in the grooves on the drum.	The main and auxiliary hoists are equipped with unbalanced load limits. When the unbalanced load limits are reached it will trip and the hoisting motion will be stopped. The main and auxiliary hoists are also equipped with drum wire rope level wind limit switches that would trip when the limits are reached and stop the hoisting motion if the wire rope did not spool properly into the drum grooves.	No exceptions noted.

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4.8 Machinery Alignment	The proper functioning of the hoisting machinery during load handling ensured by providing adequate support strength of the individual component parts and the welds or bolting that bind them together.	Component parts and the welds or bolting are designed in accordance with CMAA Spec. #70-2004 and ASME NOG-1-2004. Deflection calculations are performed under load to confirm frame deflection does not affect machinery alignment.	No exceptions noted.
	Where gear trains are interposed between the holding brakes and the hoisting drum, these gear trains should be single-failure-proof and should be of dual design.	The main and auxiliary hoist designs employ gear trains between the holding brakes and hoisting drums, but additionally employ hydraulic drum brakes to provide single-failure-proof operation. The gear trains are dual and single-failure-proof.	
4.9 Hoist Braking System	Each holding brake should have more than full load stopping capacity but should not have excessive capacity that could cause damage to the hoisting machinery.	Each holding brake of the main and auxiliary hoist is provided with adequate capacity to stop and hold the respective full load, but not excessive to cause damage to hoisting machinery. Main and auxiliary hoisting machinery is evaluated for applied brake torques for all specified loading scenarios including normal operation, load hang-up, broken rope, two-blocking and seismic conditions.	No exceptions noted.
	Each holding brake should have a torque rating not less than 125% of the full-load hoisting torque at the point of application.	Each holding brake of the main and auxiliary hoist is designed with a minimum capacity of 125% of the torque developed during the hoisting operation at the point of brake application.	
	Minimum hoisting braking system should include one power control braking system (not mechanical or drag brake type)...	The main and auxiliary hoist control systems are provided with dynamic braking through the flux vector drive.	

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	Minimum hoisting braking system should include … two holding brakes.	Two (2) shoe or disc type high speed holding brakes are provided on the high speed shafting for each of the main and auxiliary hoist.	
	The holding brakes should be applied when power is off and should be automatically applied on overspeed to the full holding position if a malfunction occurs.	The holding brakes in the main and auxiliary hoisting systems are applied when power is off or when a drum overspeed occurs. The braking systems are fail-safe, i.e. automatically activated when electrical power is removed.	
	Minimum number of braking systems that should be operable for emergency lowering after a single brake failure should be two holding brakes for stopping and controlling drum rotation.	The main and auxiliary hoist emergency hydraulic drum brake systems are provided to allow emergency lowering of a main and auxiliary hoist critical load, respectively.	No exceptions noted. A clarification is provided as follows: Only the Emergency Drum Brake system is required to safely lower the load for the main and auxiliary hoists.

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4.9 Hoist Braking System (continued)	Holding brake system should be single-failure-proof; any component or gear train should be dual if interposed between the holding brakes and hoist drum.	The main and auxiliary hoist designs employ gear trains between the holding brakes and hoisting drums, but additionally employ hydraulic drum brakes to provide single-failure-proof operation. The gear trains are dual and single-failure-proof.	No exceptions noted.
	Dynamic and static alignment of all hoisting machinery components … range of lifted loads … positioned and anchored on the trolley platform.	Component parts, welds, and bolting are designed in accordance with CMAA Spec. #70-2004 and ASME-NOG-1-2004, including seismic design in accordance RG 1.92 and 1.61 to assure machinery alignment during dynamic and static conditions. Deflection calculations are performed under load to confirm frame deflection does not affect machinery alignment.	
	Provisions for manual operation of the hoisting brakes during an emergency condition.	The main and auxiliary hoist drum emergency hydraulic brakes can each be manually modulated for emergency lowering.	
	Adequate heat dissipation from the brakes to preclude damage from excessive lowering velocity.	The main and auxiliary hoist hydraulic brake systems are capable of continuous lowering of the rated load at minimum speed without exceeding the brake temperature limits.	
	Portable instruments to indicate the lowering speed during emergency operations.	The main and auxiliary hoist drums are supplied with remotely powered speed indicators to ensure lowering speeds are not excessive. The speed indicators are located in an area visible from where manual lowering will be performed.	

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	Malfunction of a holding brake during emergency lowering of the load … restore brake to working condition before any lowering is started.	Only the main and auxiliary hoist emergency hydraulic drum brakes are required to safely control the main and auxiliary hoist loads, respectively during emergency lowering operations. Should a malfunction of the braking system occur, it could be restored to operation before lowering is started.	
5.1 Braking Capacity	Bridge and trolley drives provided with control and holding braking systems … applied when power off.	The bridge and trolley scalar frequency drives provide controlled braking. Holding brakes located on each motor are automatically applied when power is off.	No exceptions noted.
	Bridge and trolley drives provided with control and holding braking systems … applied on overload.	The bridge and trolley motor brakes will automatically set when an overload condition is detected by the frequency drive.	
	Bridge and trolley drives provided with control and holding braking systems … applied on failure in the drive system.	The bridge and trolley motor brakes will automatically set in the event of a drive failure.	
	Maximum torque capability of the driving motor and gear reducer … not exceed the capability of the gear train and brakes to stop the trolley and bridge from the maximum speed with DRL attached.	The maximum torque capacity of the driving motor and gear reducer for bridge and trolley motions is selected to not exceed the capacity of the gear train and brakes to stop the motion from the maximum speed with the design rated load attached.	
	Incremental or fractional inch movements should be provided by such items as variable speed controls or inching motor drives.	Subject provision is provided for bridge and trolley via use of scalar frequency drive controls.	

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5.1 Braking Capacity (continued)	Control and holding brakes rated at 100% of maximum torque that can be developed at the point of application.	The bridge and trolley control and holding brakes are capable of applying a counter torque that is 100% of maximum drive torque that can be developed at the point of application.	No exceptions noted.
	If two mechanical brakes, one for control and one for holding … adjusted with one brake leading …	The trolley is provided with the A-4 drive arrangement per CMAA Spec. #70-2004. One mechanical brake is provided for each drive (i.e. 2 total). The bridge is provided with the A-4 drive arrangement per CMAA Spec. #70-2004. One mechanical brake is provided for each drive (i.e. 2 total).	
	Brakes mechanically tripped to the on or holding position in the event of power supply malfunction or an overspeed condition.	The bridge and trolley motors are provided with spring set, electrically released holding brakes that are automatically applied when power is interrupted. For an overspeed situation, the frequency drives would sense an over voltage condition and the traverse brakes would set and prevent further travel.	
	Provisions made for manual emergency operation of the brakes.	The bridge and trolley brakes include a manual release lever to permit manual emergency operation.	
	Holding brake should be designed so that it cannot be used as a foot-operated slowdown brake.	Design of the bridge and trolley holding brakes is such that they cannot be used as a foot-operated slowdown brake.	
	Drag brakes should not be used.	Drag brakes are not used for the bridge or trolley drives.	

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	Opposite driven wheels on bridge or trolley … matched and identical diameters.	The opposite drive wheels of the bridge and trolley are inspected and found to be within the tolerance of ± 0.010 inch.	
	Trolley and bridge slow speed limits of CMAA Spec. #70 for handling MCLs.	The bridge and trolley speeds are in compliance with the slow operating speeds given in CMAA Specification #70-1975 and Tables 5332.1-1 and 5333.1-1 of ASME NOG-1 for 130 ton capacity. The bridge speed is 50 FPM and the trolley speed is 40 FPM.	
5.2 Safety Stops	Mechanical limiting devices provided to control or prevent over travel and overspeed of the trolley and bridge.	Positive mechanical end stops will be installed on the runway for limiting bridge travel and on the bridge girders for limiting trolley travel.	No exceptions noted.
	Electrical limiting devices provided to control or prevent over travel and overspeed of the trolley and bridge.	Travel limit switches are provided for the bridge and trolley to prevent over travel. For an overspeed situation, the frequency drives would sense an over voltage condition and the traverse brakes would set and prevent further travel.	
	Buffers for bridge and trolley travel should be included at the end of the rails.	Compression bumpers, attached to the trolley and bridge, are included for buffering contact with end of travel stops.	
	Safety devices such as limit-type switches provided for malfunction … should be in addition to and separate from the limiting means or control devices provided for operation.	Trolley and bridge limit switches are provided as safety devices, in addition to the end stops and bumpers. The switches are not intended for control of the trolley and bridge during normal crane operations.	

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6.1 Driver Selection	Horsepower rating of the hoist driving motor … matched with the calculated … design load and acceleration to the design hoisting speed.	The design of the individual components of the main and auxiliary hoisting systems are based on the maximum torque capability (when hoisting the respective MCL at maximum acceleration and rated speed) of the hoist motor. The main and auxiliary hoist acceleration rates are controlled via the flux vector drive. Control of acceleration limits strain on the machinery and load-carrying devices.	No exceptions noted.
	To preclude excessive motor torque, the maximum torque capability of the electric motor drive for hoisting should not exceed the rating or capability of the individual components of the hoisting system required to hoist the MCL at the maximum design hoist speed. Over power and overspeed conditions should be considered an operating hazard.	The maximum motor torque is limited by the flux vector frequency drive, preventing excessive motor torque build-up. This rated motor torque is less than the torque capacity of the individual hoist components under all normal operating conditions, ensuring the motor does not overpower the hoist components. The main and auxiliary hoists have an overspeed switch, which causes all brakes to set when tripped.	

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6.1 Driver Selection (continued)	Controls capable of stopping the hoisting movement … maximum hoisting movement of 3 inches an acceptable stopping distance.	The hoisting motion for the main and auxiliary hoist can each be stopped within 3 inches with the respective maximum critical load at maximum design hoist speed with all brakes operating. Additionally, the defense-in-depth design of the main and auxiliary hoist braking systems provides the capability of stopping the maximum critical load at maximum design hoist speed within 5 inches, with each of the three (3) individual brakes, being the two (2) holding brakes and one (1) emergency brake system.	No exceptions noted.
	Prudent to include safety devices in the control system … to ensure the controls will return to or maintain a safe holding position in case of malfunction. Electrical circuit design …	The main and auxiliary hoists are designed to stop and safely hold the load following any of the following fault conditions: overload, overspeed, over travel, wire rope mis-spooling, and unbalanced load. Electrical design includes provisions for the effects of overvoltage, undervoltage, phase reversal, or phase loss in the hoist power supply.	
	For elaborate control systems, radio control … an “emergency stop button” placed at ground level to remove power from the crane independent of the crane controls.	Emergency stop buttons that will remove power from all motors and set all brakes are provided on the radio transmitter and on the back-up pendant station. Additionally, a floor mounted conductor bar disconnect switch is provided to remove all crane power.	

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	For cranes with a DRL rating much higher than the MCL rating … electrical or mechanical resetting of the overload sensing device, away from the operator cab and included in an administrative program.	The DRL and MCL for the main hoist are the same at 130 tons. The DRL and MCL for the auxiliary hoist are the same at 25 tons. The trip points or set points for the main and auxiliary hoist overload sensing devices are based on 130 tons and 25 tons, respectively.	
6.2 Driver Control Systems	Control system provided should include consideration of the hoisting (raising and lowering) of all loads, including the rated load.	Hoisting (raising and lowering) of all loads, including the rated load, is considered in the design of the control systems for the single-failure-proof crane.	No exceptions noted.
	Control system(s) provided should include consideration of … the effects of the inertia of the rotating hoisting machinery, … and drum.	The effects of the inertia of the rotating hoisting machinery such as motor armature, shafting and coupling, gear reducer, and drum are considered in the design of the main and auxiliary hoist control systems.	
	Control system adaptable to include interlocks that will prevent trolley and bridge movements while spent fuel elements are being lifted free of a reactor vessel or storage rack.	The crane will not be used to move individual spent fuel elements. The main hoist will be used predominately to lift spent fuel casks and cask components. The design includes a provision to prevent bridge, trolley and auxiliary hoist operation during main hoist operation. An operator controlled selector switch is provided on the remote radio transmitter and cab to allow the subject feature.	

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6.3 Malfunction Protection	Means provided in the motor control circuits to sense and respond to such items as excessive electric current, excessive motor temperature, overspeed, overload, and over travel.	The main and auxiliary hoist designs employ sensors in the motor control circuits to detect and respond to excessive electrical current, excessive motor temperature via thermostats embedded in the motor windings, over travel via the hoisting limit switches, overspeed via the drum overspeed limit, and overload via the weight sensing switch.	No exceptions noted.
	Controls should be provided to absorb the kinetic energy of the rotating machinery and stop … if one rope or one of the reeving systems should fail.	The main and auxiliary hoist dynamic braking systems are designed to absorb the kinetic energy of the rotating machinery and stop the hoisting motion should one rope fail. These forces are also designed to be absorbed via the mechanical holding brake systems. The kinetic energy released during rope failure will be absorbed in the equalizer system.	
6.4 Slow Speed Drives	Increment drives for hoisting may be provided by step less controls or inching motor drive.	The main hoist speed is variable from 0.25 FPM to 5 FPM for handling a critical load via the flux vector frequency drive. The auxiliary hoist speed is variable from 0.25 FPM to 15 FPM for handling a critical load via the flux vector frequency drive.	No exceptions noted.
	If jogging or plugging is to be used, the control circuit should include features to prevent abrupt change in motion.	The frequency drives provided for crane motions control the acceleration and deceleration of the motor and eliminate abrupt motion changes.	

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	Drift point in the electric power system for bridge or trolley movement should be provided only for the lowest speeds.	Drift points are not provided in the electrical power system for bridge or trolley motion.	
6.5 Safety Devices	Safety devices such as limit-type switches provided for malfunction, inadvertent operator action, or failure should be in addition to and separate from the limiting means or control devices provided for operation.	Bridge and trolley travel limit switches, both slow-down and end of travel, are provided as safety devices, in addition to the end stops and bumpers. The switches are not intended for control of the bridge and trolley during normal crane operations. Main and auxiliary hoist limit switches are provided as safety devices and are not to be tripped during normal hoisting operations.	No exception noted.
6.6 Control Stations	The complete operating control system and provisions for emergency controls for the overhead crane handling system should preferably be located in a cab on the bridge.	A complete control system is provided with the remote radio transmitter. A back-up cab station located on the bridge is utilized for emergency controls.	No exceptions noted.
	When additional operator stations are considered, they should have control systems similar to the main station.	The back-up cab station is provided with controls similar to those on the remote radio transmitter.	
	Manual controls for hoisting and trolley movement provided on the trolley, and for the bridge provided on the bridge.	The manual lowering controls for the main and auxiliary hoist are located on the trolley.	
	Remote control for any of these motions should be identical to those on the bridge cab control panel.	The main hoist, auxiliary hoist, trolley and bridge motions are variable (analog) control from the remote radio transmitter and the back-up cab station.	

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	Cranes that use more than one control station should be provided with electrical interlocks that permit only one control station to be operable at any one time	An electrical interlock is provided between the remote radio transmitter and cab control stations.	
	In the design of control systems, provision for and locations of devices for control during emergency conditions should be provided.	Main and auxiliary hoist manual control is available on the trolley. Manual movement of the bridge and trolley is possible from the runway and bridge endties, respectively. Emergency stop buttons are available on the remote radio transmitter and back-up cab station. A floor mounted conductor bar disconnect switch is provided to remove all crane power.	
7.1 General	Installation instructions should be provided by the manufacturer.	Installation instructions are provided by the crane vendor, will be included in the site installation work order package and utilized by the vendor for the installation of the new crane system.	No exceptions noted.
	Include a full explanation of the crane handling system, its controls and limitations for the system.	The operation and maintenance manual provided includes a full description of the crane control system.	
	Instructions should cover … Requirements for installation, testing, and preparations for operation.	The factory and site test procedures cover all testing requirements while the operation and maintenance manual provided contains crane operating instructions.	

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7.2 Construction and Operating Periods	When the permanent plant crane is used for construction and the requirements for construction are more severe than those for permanent plant service, the construction requirements should be defined separately. At the end of the construction period, the crane shall be modified as needed for permanent plant service.	The replacement crane system including trolley and bridge will not be utilized in the construction of the plant nor for any construction lifts. The usage of the replacement crane system is limited to operational load handling. The replacement crane system does not have a separate construction specification.	No exceptions noted.
	During and after installation of the crane, the proper assembly of electrical and structural components should be verified. The integrity of all control, operating and safety systems should be verified as to satisfaction of installation and design requirement.	After functional testing of the crane system and load testing of the trolley and hoists at the factory, the crane is shipped to the Turkey Point. After installation, the new crane system is inspected and tested to verify the integrity of all control, operating and safety systems.	

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8.1 General	A complete check … Crane's mechanical and electrical systems to verify the proper installation and to prepare the crane for testing.	In order to verify the crane's mechanical and electrical systems are properly installed, the requirements of NOG 7500 "Qualification for Permanent Plant Service," as they apply to the new crane, are used. These requirements include Section 7520 "Inspection Prior to Performance Testing," NOG 7521.2 "Mechanical Inspection," NOG 7521.3 "Electrical Inspection (Visual) While Crane is Immobile," and NOG 7530 which invokes the requirements of NOG 7420 "Pre-operational Testing and Inspection" and NOG 7421 "No Load Test". These requirements exceed those required in ASME B30.2.	No exceptions noted.
	Information concerning proof testing on components and subsystems … performed at the manufacturer's plant … available for the checking and testing performed at the place of installation.	A complete functional and load test report is supplied after testing is complete.	

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8.2 Static and Dynamic Load Tests	The crane system should be static load tested at 125% of MCL, ... including all positions generating maximum strain in the bridge and trolley structures and positions recommended by the designer and manufacturer	The replacement trolley, main hoist and auxiliary hoist are load tested to 125% of their respective MCL/DRL at the factory to verify proper operation. Load testing of the fully assembled crane is completed on site to verify proper operation and structural integrity of replacement bridge and runway support structure, respectively. Site load testing is performed at 125% of the crane MCL/DRL. The hoist, trolley and bridge are positioned during the 125% site load test to the extent possible based on the physical arrangement of the buildings including roof openings and qualification of supporting floors and structures.	Exception - Site Load Testing at 125% of MCL including the transport positions of trolley and bridge producing maximum strain in the bridge and trolley structures are performed to the extent practical based on the operating constraints of the plant. This is in accordance with the practicality clauses of ASME NOG-1 and NUREG-0612.

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	After making required adjustments resulting from 125% static load test, 100% MCL performance test for all speeds and motions for which designed. All safety and limiting control devices will be verified.	Complete 100% and 125% performance and load tests are performed at the manufacturer's facility for the replacement trolley, main hoist and auxiliary hoist. The 100% and 125% performance and load tests of the fully assembled crane are also performed on site to the extent practical based on the physical arrangement of the building including roof openings and qualification of supporting floors and structures. All limits possible are verified during site testing.	No exceptions noted.
	Emergency manual lowering of the load and manual movement of the bridge and trolley should be tested with the MCL attached.	Emergency lowering of the MCL for the main hoist and auxiliary hoist is demonstrated during factory load testing. Manual release of trolley and bridge brakes is demonstrated during factory functional testing and site functional testing.	No exceptions noted.
8.3 Two-Block Test	When equipped with an energy-controlling device between load and head blocks the complete hoisting machinery is allowed to two-block (load block limit and safety devices bypassed). Test, at slow speed and no load, to provide assurance of design, controls and overload protective devices. Demonstrate that the maximum torque developed by the driving system, including inertia of the rotating parts at the over torque condition, will be absorbed or controlled.	A two-block test of the main hoist and auxiliary hoist was performed during factory functional testing at slow speed without load on the respective hooks to verify proper operation of the energy controlling device and controls.	No exceptions noted.

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	The complete hoisting machinery tested for ability to sustain a load hang-up condition … load block attaching points are secure to a fixed anchor or an excessive load. Crane manufacturer … ensure proper functioning of protective overload devices.	The overweight limits on the main hoist and auxiliary hoist are set and tested during factory load testing.	
8.4 Operational Test	Operational tests of crane systems performed to verify the proper functioning of limit switches and other safety devices and the ability to perform as designed.	The crane systems are operated to verify the proper functionality of all limit switches and other safety devices in accordance with the requirements of NOG 7421 "No Load Test," as well as the additional requirements contained in NOG 7421.1.	No exceptions noted.
	Special arrangements may have to be made to test overload and overspeed sensing devices.	The main and auxiliary hoist overload sensors are tested during the 125% load tests. The overspeed sensing devices are tested by reprogramming the frequency drive to cause the motor to overspeed. Actuation of the overspeed detection circuit is verified to occur at 130% of the critical load rated speed.	

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8.5 Maintenance	With good maintenance practice, degradation is not expected to exceed 15% of the design load rating, and periodic inspection coupled with a maintenance program should ensure that the crane is restored to the design condition if such degradation is found.	The manufacturer includes inspection and maintenance procedures in the operation and maintenance manual. The inspections encompass the requirements necessary to assure degradation of the critical wearing components does not affect the crane's MCL rating. FPL's design change process assures that applicable procedures and documents including inspection and maintenance procedures comply with the implemented design change and manufacturer specified inspections and maintenance.	No exceptions noted.
	The MCL rating of the crane should be established as the rated load capacity, and the design rating for the degradable portion of the handling system should be identified to obtain the margin available.	Wearing components in the main and auxiliary hoists including hooks, brakes, reducers and bearings are designed with at least a 15% increase above their respective MCL ratings to account for degradation due to wear and exposure.	
	The MCL should be plainly marked on each side of the crane for each hoisting unit.	The MCL rating will be marked on the bridge and each side of the main and auxiliary hoist lower blocks.	

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9 Operating Manual	Crane designer and manufacturer should provide a manual of information and procedures for use in checking, testing and operating the crane. Manual to describe a preventive maintenance program based on the approved test results and information obtained during testing. Include such items as … Operating requirements for all travel movements … Clearly defined…	The manufacturer provides a manual of information to use for checking, testing, and operating the crane. Information obtained during testing is also provided in the manual. The manual also describes a preventive maintenance program based upon the requirements of OSHA 1910.179, ASME B30.2 and ASME NOG-1. The preventive maintenance program provides the information required to service, repair, and replace all major trolley and hoist components. Additionally, where applicable, visual examinations, equipment diagnostics, and nondestructive examinations are described in the manual. The manual also describes operating features and limitations.	No exceptions noted.
	The designer should establish the MCL rating and the margin for degradation of wear susceptible component parts.	The allowed rope degradation margin is in accordance with ASME B30.2. The allowed hook degradation margin is in accordance with ASME B30.10. The allowed brake degradation is in accordance with the brake manufacturer's recommendations, included with the maintenance manual.	

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10 Quality Assurance	A quality assurance program should be established to include the recommendations of this report for the design, fabrication, installation, testing and operation of crane handling systems for safe handling of critical load.	FPL approved the crane manufacturer's quality plan which establishes the requirements and responsibilities for control of the design, fabrication, installation and testing of the replacement crane. FPL's 10 CFR 50, Appendix B program addresses these requirements as well as testing and operation at the site.	No exceptions noted.
	Applicable procurement documents should require the crane manufacturer to provide a quality assurance program consistent with the pertinent provisions of Regulatory Guide 1.28, to the extent necessary. Program to address NUREG-0554.	The crane manufacturer's quality program was accepted by FPL and met the applicable requirements of 10 CFR 50, Appendix B. The applicable requirements are invoked in the procurement documents.	
	Program should address all recommendations in this report.	The quality assurance plan addresses all areas of concern including the critical components of the crane system.	
	Include qualification requirements for crane operators.	General qualification requirements for crane operators, including the requirements of ASME B30.2, are included in the operation and maintenance manual to assist FPL in developing operator standards. Additionally, operator and maintenance training Is provided by the crane manufacturer on-site.	