From: Peterson, Alyse L (NYSERDA)
To: Guzman, Richard
Cc: Tifft, Doug
Subject: [External_Sender] IP3 Crane LAR -- additional informal questions
Date: Thursday, October 22, 2020 9:23:43 AM

Good morning Rich,
As we discussed yesterday, below is a second batch of informal questions on the proposed HI-LIFT crane license amendment request (LAR) for Indian Point Unit 3. I understand that your expert reviewers are still in the process of reviewing the LAR themselves and may not be able to answer some of our questions yet. So that we can continue our due diligence review of the proposal, we would greatly appreciate your assistance with as many of the questions as possible now and then we can tackle the remainder when your reviewers are able.

Please note: the questions below have not been posed to Entergy. We have worked with Entergy over the past months to get answers to two previous sets of questions on the proposed crane but found their responses so minimal that the effort was unproductive. As you know, Entergy has designated portions of both the original LAR documentation and their October 2, 2020 response to NRC's RAI as proprietary and withheld the information contained in them from the State. This includes factual information on the proposed design, installation, and operation of the crane that is necessary for the performance of a comprehensive safety review of the proposal. Our direct request to Entergy for the withheld documentation was denied and their responses to our targeted questions have been limited to the information already contained in the non-proprietary documents we already had in hand. Entergy's refusal to provide the State with the withheld documentation constrains the State's ability to comprehensively review the proposal and is in direct conflict with their written statement that: "In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b), a copy of this application, with attachments, is being provided to the designated State Officials." This statement is inaccurate and is misleading to the public and to NRC.

Many thanks again to you and your staff for your assistance.
Alyse

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Informal NY State Questions on the IP Unit 3 March 24, 2020 LAR for Installation & Use of a New Auxiliary Lifting Device

General Questions

1. How much clear space is available between the cask and the crane components and the cask and the SFP wall?
2. How much clear space is available to accommodate load eccentricities under seismic conditions?
3. For certification of the crane as single failure proof, please provide the matrix and Holtec's rationale.
4. Please clarify why the HI-LIFT crane would be qualified as single failure proof whereas the HBPP davit crane was not.
5. What temperature range was considered for the structural analysis?
6. What temperature range is considered acceptable for the hydraulic fluid and how is this temperature monitored by the control system?
7. Do the referenced original analyses for the fuel pool floor and walls bound the cask size, configuration, locations, and lifted heights proposed in the LAR?
8. Is there an Owner or site-specific material handling standard that would specify the minimum design margin for the lifted load at Indian Point 3?
9. Please confirm the fully loaded cask weight. If the weight is 80% or greater than the rating of the Hi-LIFT crane, will the lifts be deemed to be 'critical lifts' and apply the associated plans and safety protocols?

Strand Jack

1. How does the strand jack provide uniformity of load amongst the strands?
2. What is the factor of safety if one strand breaks? Will loss of a strand cause the load to become unbalanced and tilt, potentially leading to cask contact with the crane or SFP wall?
3. How many strand locking wedges (collets) can fail before the system no longer has a sufficient factor of safety? How are strand or collet failures detected?
4. What safety devices other than the counterbalance valves are in place to prevent sudden loss of hydraulic pressure in the strand jack and in the swing arms?
5. What is the design vertical hook travel distance?
6. What measures must be taken to mitigate corrosion and potential failure of the strands and locking wedges?
7. Do the locking wedges teeth have any adverse effects on the strand integrity over time? Is there a design life for the strands (e.g. 100 lifts at full capacity)? Is there a design life for the collets related to this? If there is a useful design life, how will usage of the crane be tracked and recorded, so that usage does not exceed the design limits. What measures will be implemented when the crane reaches its intended design life and what evaluations will be undertaken at that

time if more lifts need to be performed after its useful design life?
8. How will visual inspection of the strand jack, swing arms, hydraulic system, and other critical components be accomplished?
9. Will that same inspection process be implemented at Indian Point as was used at HBPP and how will the inspection process be accomplished given there is no permanent work platform in the area of the strand basket?
10. What allowance is made in analysis for overturning moments?
11. How was prying action in the fasteners between the strand jack and center beam evaluated?
12. Are there any reductions in factor of safety due to the reduced coefficient of friction of wet strands? Are there any requirements to re-lubricate the assembly due to immersion in the SFP or exposure to the SFP borated water environment?

Hydraulics and Controls

1. Are hydraulic controls designed to safely reset to a zero-motion state after an electric power loss? Are hydraulic controls designed hold the load stationary following a loss of hydraulic pump power or pressure?
2. Please provide a list of the hydraulic system failure modes evaluated and proposed mitigations.
3. What force imbalance between the cylinders was considered in design to represent the imbalance that could develop between the time that a failure is observed, and cylinder pressure is equalized?
4. What allowance for mismatch between cylinder forces was allowed for in design? If no allowance for mismatch was made in design, what safety features of the metering system will prevent a force mismatch from developing?
5. Have the consequences of a hydraulic oil spill into the spent fuel pool been evaluated?
6. How are hydraulic lines routed so as to avoid being beneath, near, or in the way of the lifted load?
7. Will any of the strand jack components require routine inspection? If so, how frequently and how will this be accomplished without a permanent work platform from which to inspect?
8. How will operators be trained to address these contingency scenarios related to electronic and hydraulic failures? Is any equipment or hardware required to be immediately available perform these emergency actions? How much time is available for any required operator actions?
9. Will crane functional testing include a two-block test to demonstrate the action of the counterbalance system?

Structural Analysis

1. How will this dimensional change in the outrigger arm be accommodated while providing support for all horizontal loads?
2. Was lateral torsional buckling considered? Were local buckling modes of failure

considered in the calculation?
3. What allowances were made in the analysis of the HI-LIFT to represent the effects of fabrication tolerances? For example, was there any assumption made about out-of-plumbness of the overall assembly in the vertical condition?
4. What components of the HI-LIFT received an additional 15% design margin?
5. Was low cycle fatigue evaluated during HI-LIFT crane design?
6. Has the 200% MCL design and test requirement from NUREG 0554 been implemented in the HI-LIFT design? If not, why?
7. Were the soils and foundations below the spent fuel pool wall evaluated for the increased loading?
8. What were the limits of the analysis model (i.e. how much of the structure was represented)? Did the model consider the effects of the loaded wall on the other SFP walls during a seismic event? Or just the two walls to which the HI-LIFT is connected? If only the two walls supporting the HI-LIFT, how was this modeling simplification justified?
9. A convergence study is required to determine at what level of discretization a finite element model provides accurate results. Was such a study performed?
10. How was the stiffness of concrete represented in the finite element model? What assumption were made as to the condition of the concrete supporting the HI LIFT?
11. Was the truck bay wall factor of safety evaluated under the action of this uplift and moment acting in concert with all other code required loads?
12. When positioning the HI-LIFT crane what allowances have been made in the SFP wall for eccentric vertical loading from the crane? i.e. how far from the geometric center of the wall can the crane center of support be located before induced moments create an unconservative stress state in the wall?
13. Has the SFP liner and bedrock below it been evaluated for the increased loading with the proposed 98 ton cask?
14. Are there any fuel assemblies in the pool that would be damaged by the larger HI TRAC' cask falling onto its side?
15. Were new planes of internal high stress identified and evaluated against code requirements? Did this include an evaluation of the effects of these stresses on the SFP liner?
16. What is the assumed displacement between the truck bay wall and the SFP wall during a seismic event? How will the frictional forces of the torque arm rollers be validated to confirm that the assumed boundary conditions are representative?
17. What testing or inspections of the SFP wall and truck bay wall have been performed to determine their current condition?

<u>Anchors and Attachments</u>

1. Please clarify which code was used to design post-installed anchors.

2. Were factors including the space between individual anchor bolts, the distance from the edge of concrete members, and presence of rebar around the anchors incorporated in the design of post-installed anchors?
3. When the HILIFT baseplate is created based on the field-installed anchor locations, by how much will anchor bolt holes be oversized and will this oversize require plate washers for horizontal and vertical load transfer?
4. When the HILIFT attachment plate is installed on the truck bay wall, by how much will bolt holes be oversized in this attachment plate and will this require the use of plate washers?
5. Please clarify which attachment method is assumed in the design. (The LAR describes attachment to the truck bay wall with "studs" in 2.1.4. This does not match the cross-sectional image which appears to show through bolting with threaded rods.)
6. What limits are placed on the allowable grout pad thickness and were the anchors checked structurally for this thickness?
7. What analysis has been performed to demonstrate the shear and bending capacity of the anchor bolts supporting the HI-LIFT under horizontal seismic loads as this will be the only mechanism of horizontal load transfer?
8. Was relative seismic motion between the SFP wall and truck bay wall determined to fall within the available horizontal travel of the roller support system? If so, how much margin exists at the extreme travel distance before the torque arms crash into the truck bay wall or exit the roller guides?
9. Has consideration been made for the forces that would develop should the truck bay roller support become jammed or otherwise fail to function as intended? Is there any indicator that would identify bearing failure at this location?
10. How do the slide mounts secure the cylinders to the torque arms and what is their margin of safety against failure?
11. Will the HI-LIFT factory load test use an anchorage method and pattern identical to the in-service condition?
Field locating SFP wall anchors might show it necessary to omit one or more anchors due to interferences.
12. How will anchor load testing be equated to the anchor's ability to resist lateral loads (required to resist design seismic loading)?
13. What method was used in the design of the HI-LIFT anchorage? (i.e. rigid base plate or flexible base plate)?

<u>Dose</u>

1. Are there radiological/dose benefits for the proposed HI-LIFT crane? Please provide the actual dose received during the most recent wet transfer. What is the estimated dose for a fuel campaign involving the proposed HI-LIFT crane? Please clarify the dose estimates:

a.Please provide the estimated total dose to be received if the remaining spent fuel is moved to dry cask using the wet-transfer option (in person rem).
b.Please provide the estimated total dose to be received if the remaining spent fuel is moved to dry cask using the proposed IP3 HI-LIFT crane option (in person rem).

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