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

Dresden Nuclear Power Station, Units 2 and 3
Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

Subject: Supplement to Response to Request for Additional Information Regarding Heavy Loads Handling

References:
(1) Letter from U. S. NRC to O. D. Kingsley (Exelon Generation Company, LLC), "Dresden Nuclear Power Station, Units 2 and 3 – Request for Additional Information – Heavy Loads Handling," dated February 26, 2002

(2) Letter from K. R. Jury to U. S. NRC, "Response to Request for Additional Information Regarding Heavy Loads Handling," dated April 12, 2002

In Reference 1, the NRC requested information from Exelon Generation Company (Exelon), LLC regarding heavy loads handling at Dresden Nuclear Power Station. Exelon responded to this request in Reference 2. In teleconferences on April 13, 2002, April 18, 2002, May 21, 2002, June 7, 2002, and June 20, 2002, between members of Exelon and members of the NRC, the NRC provided feedback regarding Exelon's response and requested additional supplemental information. The attachment to this letter provides the requested supplemental information.

Should you have any questions concerning this letter, please contact Mr. A. R. Haeger at (630) 657-2807.

Respectfully,

Patrick R. Simpson

Patrick R. Simpson
Manager – Licensing, Dresden and Quad Cities Nuclear Power Stations
Mid-West Regional Operating Group

Attachment

cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector - Dresden Nuclear Power Station

A001

Attachment
Supplement to Response to Request for
Additional Information Regarding Heavy Loads Handling
Dresden Nuclear Power Station

Background
In Reference 1 (see the list of references below), the NRC requested information from Exelon Generation Company (Exelon), LLC, formerly Commonwealth Edison Company (ComEd), regarding heavy loads handling at Dresden Nuclear Power Station (DNPS). Exelon responded to this request in Reference 2. In teleconferences on April 13, 2002, April 18, 2002, May 21, 2002, June 7, 2002, and June 20, 2002, between members of Exelon and members of the NRC, the NRC provided feedback regarding Exelon's response and requested additional information concerning the following topics.

- Design and licensing basis of the reactor building superstructure
- Licensing basis regarding the single failure proof rating of the reactor building crane
- Licensing basis regarding lifting devices
- Load paths for heavy loads handling and any effect on these load paths due to the recent calculation for the reactor building superstructure

The following paragraphs provide the requested information.

Design and Licensing Basis of the Reactor Building Superstructure
In Reference 1, the NRC stated that the DNPS design basis for the reactor building superstructure included consideration of the operating basis earthquake (OBE) and the safe shutdown earthquake (SSE) with a lifted crane load. In Reference 2, Exelon stated that its understanding of the design basis for the reactor building superstructure did not include the load combinations of OBE and SSE with a lifted crane load.

To resolve this issue, Exelon performed a calculation in April 2002 to analyze the reactor building superstructure for the load combination of an OBE with a lifted crane load. This calculation showed that the superstructure was acceptable for this load combination provided certain restrictions on crane travel were maintained. Exelon provided a copy of this calculation to the NRC. This calculation was a revision to a previous calculation (i.e., calculation DRE-98-0020) discussed in Reference 2 showing the reactor building superstructure to be acceptable for the combination of an SSE with a lifted crane load. Thus, the reactor building superstructure is acceptable for the load combinations of OBE and SSE with a lifted crane load. Exelon will update the DNPS UFSAR to describe the results of the revised calculation.

Licensing Basis Regarding the Single Failure Proof Rating of the Reactor Building Crane
Exelon has reviewed the correspondence between DNPS and the NRC regarding heavy loads handling. The principal correspondence regarding this topic is related to NUREG-0612 (Reference 3), "Control of Heavy Loads at Nuclear Power Plants." Additional correspondence is related to NRC Inspection and Enforcement (IE) Bulletin 96-02, "Movement of Heavy Loads Over Spent Fuel, Over Fuel in the Reactor Core, or Over Safety-Related Equipment," (Reference 4), and the NRC safety evaluation (SE) for amendment numbers 22 and 19 to the DNPS Facility Operating License (Reference 5).

NUREG-0612 requested responses from licensees in two phases regarding heavy loads movement. The first phase of responses addressed general requirements for overhead handling systems. The second phase of responses addressed requirements for heavy loads handling in specific plant areas. The second phase requested identification of any

cranes that licensees had identified as having sufficient design features to make the likelihood of a load drop extremely small (i.e., single failure proof cranes).

Table 3.2-1 of NUREG-0612 identified the DNPS Units 2 and 3 reactor building crane as single failure-proof. This table does not list a single failure proof rating for the crane.

ComEd's response to the second phase of the NUREG identified the reactor building crane as single failure proof (Reference 6) in response Section 2.2. While the single failure proof rating is not specifically identified, this rating must be understood in the context of the related correspondence on this matter. This correspondence consistently indicates that the full rated 125-ton crane load was considered in developing the single failure proof rating for the crane, as summarized in the following.

- The ComEd submittals related to amendment 22/19 to the DNPS facility operating license (References 7 and 8) indicate that the analyses for factors of safety were performed for the 125-ton rated load of the crane. For example, the information about the factor of safety of the wire rope was provided in Reference 7. The equation deriving the factor of safety (page 35) is based on a 125-ton load. Additionally, the ComEd submittals and the NRC Safety Evaluation state, "All single element components ... have been designed to a minimum factor of safety of 7.5 based on the ultimate strength of the material." These factors of safety were described as being based on a 125-ton load in Attachment 1, "Component Failure Analysis," of Reference 8. Furthermore, the crane bridge girders were also designed for a lifted load of 125 tons.

  Reference 7 also stated that ComEd would perform a 125% overload test for the 125-ton main hoist. This test was performed with a 160-ton load and was completed in January 1976.

- The fact that the crane would be carrying loads greater than 100 tons as a single failure proof crane was also indicated in several of ComEd's submittals. Reference 7, Section 5.1 indicated that, for cask handling, the crane load would be 110 tons, which included 10 tons for the impact structures and yoke assembly. Reference 9, which is the response to the first phase of NUREG-0612, lists the rating of the crane as 125 tons in Table 2.1-1, and lists the weight of the reactor vessel head as 100 tons and notes the presence of the lifting device in Table 3-1. Although Reference 9 did not specifically address the single-failure proof nature of the crane, later submittals, such as Reference 10 (response Section 2.1.1.c), noted that the crane is single failure proof for handling the loads described in Reference 9.

- The NRC's draft technical evaluation of heavy loads handling for the second phase of NUREG-0612 at DNPS (Reference 11) concluded, in Sections 2.3.3 and 2.4 that, "The Dresden 125 ton main hook and associated lifting devices have been designated as single failure proof."

Thus, the preponderance of correspondence, most notably the NRC's draft technical evaluation for the second phase of NUREG-0612, and the ComEd submittals regarding crane design and overload testing, indicates that the reactor building crane was analyzed and accepted as a single failure proof crane to the full crane rating of 125 tons.

In the teleconferences noted above, the NRC stated that the NRC safety evaluation for DNPS amendments 22 and 19 (Reference 5) states that the DNPS overhead cask handling system is acceptable for handling spent fuel casks weighing up to 100 tons, and thus the crane should only be considered single failure proof for 100 ton loads. Exelon considers this safety evaluation to be specific to spent fuel cask handling, and not to heavy loads handling in general. Further, this statement in the SE is consistent with an understanding that the reactor building crane is single failure proof for loads greater than 100 tons, since as noted above, the total crane load for cask handling was listed in ComEd submittals as 110 tons.

The NRC further stated in teleconferences that the NRC evaluation of licensee responses to IE Bulletin 96-02 states that DNPS was considering upgrading its reactor building crane to be single failure proof (Reference 12). Exelon has searched docketed correspondence from 1976 to 1998 and can find no record of any such statement being made to the NRC. As noted above, the preponderance of correspondence indicates that the reactor building crane was already considered to be single failure proof.

Licensing Basis Regarding Lifting Devices
NUREG-0612, Section 5.1.1(4) (i.e., Guideline 4) provided recommendations for special lifting devices for heavy loads handling. NUREG-0612 did not specifically identify the requirement to designate lifting devices as single failure proof. In References 9, 10, and 13, ComEd provided information concerning the design, testing and inspection of the lifting devices used for heavy loads handling at DNPS.

The NRC's evaluation for the first phase of NUREG-0612 (Reference 14) states the following.

- Section 2.1.5.a: "The reactor head strongback and the moisture separator hook box comply with ANSI N14.6-1978, Section 3.2.1."

- Section 2.1.5.b: "... all lifting devices in use at Dresden Station have been load tested to weights substantially in excess of the maximum load currently lifted and therefore meet the intent of ANSI N14.6-1978 guidelines for acceptance load testing."

- Section 2.1.5.c: "Dresden Station complies with Guideline 4."

The NRC's draft evaluation for the second phase of NUREG-0612 (Reference 11) states, in Sections 2.3.3 and 2.4, "The Dresden 125 ton main hook and associated lifting devices have been designated as single failure proof."

Thus, the DNPS lifting devices have been evaluated as acceptable for heavy loads handling.

Load Paths for Heavy Loads Handling
The NRC position accompanying NUREG-0612 required that safe load paths be defined. This requirement was independent of the single failure proof nature of the handling systems. ComEd's response to the NRC position (Reference 10) committed to refrain

from moving heavy loads over the open reactor vessel and spent fuel pool. The response also provided sketches of the safe load paths. The NRC's evaluation for the first phase of NUREG-0612 (Reference 14) evaluated these load paths and stated, in Section 2.1.2.c, "Dresden Station Units 2 and 3 comply with Guideline 1 of NUREG-0612."

For spent fuel casks, the recent calculations performed for the reactor building superstructure (i.e., the revision to calculation DRE 98-0020, discussed above) used the same restricted load path provided during the correspondence regarding fuel cask handling. This path maintains the constraints regarding movement over the fuel pools and the reactor vessels and keeping loads over structural members. Thus, there is no effect on any previous commitments regarding load paths for spent fuel casks.

For the reactor vessel head, the reactor building superstructure calculation (i.e., DRE 98-0020) load movement restrictions bound the path described in the sketches provided with the response to NUREG-0612. Thus, there is no effect on any previous commitments regarding load paths for the reactor vessel head.

The revision to calculation DRE 98-0020 restricts movement close to the outer reactor building columns for certain loads. For shield plugs, this restriction limits the distance that shield plugs can move along the path described in sketches provided with the response to NUREG-0612. However, this restriction does not alter the path described. Thus there is no effect on any previous commitments regarding load paths for shield plugs.

References

1. Letter from U. S. NRC to O. D. Kingsley (Exelon), "Dresden Nuclear Power Station, Units 2 and 3 – Request for Additional Information – Heavy Loads Handling," dated February 26, 2002
2. Letter from K. R. Jury (Exelon) to U. S. NRC, "Response to Request for Additional Information Regarding Heavy Loads Handling," dated April 12, 2002
3. Letter from U. S. NRC to all licensees, "Control of Heavy Loads," dated December 22, 1980
4. NRC Bulletin 96-02, "Movement of Heavy Loads Over Spent Fuel, Over Fuel in the Reactor Core, or Over Safety-Related Equipment," dated April 11, 1996
5. Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Approval to Facility Modifications to Reduce the Probability of a Fuel Cask Drop Accident to an Acceptably Low Level and Amendment Nos. 22 and 19 To License Nos. DPR-19 And DPR-22, dated June 3, 1976
6. Letter from E. D. Swartz (ComEd) to U. S. NRC, "Response to NUREG-0612 'Control of Heavy Loads at Nuclear Power Plants,' Enclosure 3, Section 2.2, 2.3 and 2.4," dated September 22, 1981
7. Letter from J. S. Abel (ComEd) to U. S. NRC, "Dresden Special Report No. 41, Quad-Cities Special Report No. 16, 'Reactor Building Crane and Cask Yoke Assembly Modifications,'" dated November 8, 1974
8. Letter from J. S. Abel (ComEd) to U. S. NRC, "Dresden Special Report No. 41, Supplement A, Quad-Cities Special Report No. 16, Supplement A, 'Reactor Building Crane and Cask Yoke Assembly Modifications,'" dated June 3, 1975

9. Letter from E. D. Swartz (ComEd) to U. S. NRC, "Response to NUREG-0612 'Control of Heavy Loads at Nuclear Power Plants,' Enclosure 3, Section 2.1," dated June 22, 1981
10. Letter from E. D. Swartz (ComEd) to U. S. NRC, "Response to NUREG-0612 'Control of Heavy Loads at Nuclear Power Plants,'" dated May 4, 1982
11. Letter from U. S. NRC to D. L. Farrar (ComEd), "Control of Heavy Loads – Phase II – NUREG-0612," dated June 28, 1984
12. Letter from U. S. NRC to O. D. Kingsley (ComEd), "Completion of Licensing Action for NRC Bulletin 96-02," dated May 20, 1998
13. Letter from E. D. Swartz (ComEd) to U. S. NRC, "NUREG-0612 Control of Heavy Loads Supplemental Response to Draft TER," dated November 18, 1982
14. Letter from U. S. NRC to D. L. Farrar (ComEd), "NUREG-0612, Control of Heavy Loads at Nuclear Plants," dated July 11, 1983