October 5, 2000

Mr. Oliver D. Kingsley, President
Nuclear Generation Group
Commonwealth Edison Company
Executive Towers West III
1400 Opus Place, Suite 500
Downers Grove, IL 60515

SUBJECT: SUPPLEMENTAL SAFETY EVALUATION RELATED TO THE SPENT FUEL POOL RERACKING, BYRON STATION, UNITS 1 AND 2, AND BRAIDWOOD STATION, UNITS 1 AND 2 (TAC NOS. MA8416, MA8417, MA8414, MA8415, MA5150, MA5149, MA5070 AND MA5071)

Dear Mr. Kingsley:

By letter dated March 1, 2000, we issued license Amendments 112 for Byron Station, Units 1 and 2, and Amendments 105 for Braidwood Station, Units 1 and 2, approving Commonwealth Edison Company's (ComEd's) proposed changes relating to replacing the spent fuel pool (SFP) storage racks. Subsequently, we determined that our safety evaluation supporting the amendments did not specifically address the potential for a SFP storage rack drop accident during installation. On May 10, 2000, ComEd provided supplementary information summarizing its evaluation of the potential accident.

Based on our evaluation of the information provided, we conclude that, if a leak occurred in the SFP as a result of dropped storage rack, the SFP and its contents could be maintained within the acceptable consequence limits set forth in NUREG-0612, "Control of Heavy Loads at Nuclear Plants."

The conclusions and approvals stated in our letter of March 1, 2000, remain unchanged. A copy of the Supplemental Safety Evaluation is enclosed.

Sincerely,

/RA/

George F. Dick, Jr., Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-454, STN 50.455,
STN 50-456, and STN 50-457

Enclosure: As stated

cc w/encl: See next page

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October 5, 2000

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Based on our evaluation of the information provided, we conclude that, if a leak occurred in the SFP as a result of dropped storage rack, the SFP and its contents could be maintained within the acceptable consequence limits set forth in NUREG-0612, "Control of Heavy Loads at Nuclear Plants."

The conclusions and approvals stated in our letter of March 1, 2000, remain unchanged. A copy of the Supplemental Safety Evaluation is enclosed.

Sincerely,

/RA/
George F. Dick, Jr., Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-454, STN 50.455,
STN 50-456, and STN 50-457

Enclosure: As stated

cc w/encl: See next page

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SUPPLEMENTAL SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 112 TO FACILITY OPERATING LICENSE NO. NPF-37,

AMENDMENT NO. 112 TO FACILITY OPERATING LICENSE NO. NPF-66,

AMENDMENT NO. 105 TO FACILITY OPERATING LICENSE NO. NPF-72,

AND AMENDMENT NO. 105 TO FACILITY OPERATING LICENSE NO. NPF-77

COMMONWEALTH EDISON COMPANY

BYRON STATION, UNIT NOS. 1 AND 2

BRAIDWOOD STATION, UNIT NOS. 1 AND 2

DOCKET NOS. STN 50-454, STN 50-455, STN 50-456 AND STN 50-457

1.0 INTRODUCTION

By letter dated March 23, 1999, the Commonwealth Edison Company (ComEd, the licensee), submitted a license amendment request to revise the technical specifications (TSs) to support the installation of new spent fuel storage racks at Byron Station, Units 1 and 2, and Braidwood Station, Units 1 and 2. The requested amendments proposed to change TS sections 3.7.15, "Spent Fuel Pool Boron Concentration"; 3.7.16, "Spent Fuel Assembly Storage"; 4.3.1, "Criticality"; and 4.3.3, "Capacity." The proposed TS changes supported removing all 23 of the existing spent fuel pool storage racks at each station and replacing them with 24 new Holtec Boral high-density spent fuel pool storage racks. Additional information was provided in the licensee's letters of October 21 and December 15, 1999.

On March 1, 2000, NRC issued license Amendments 112 for Byron, Units 1 and 2, and license Amendments 105 for Braidwood, Units 1 and 2, which approved the proposed changes. Corrections to the safety evaluation (SE) were sent to the licensee by letter dated April 21, 2000.

While the staff's SE addressed heavy loads handling, potential load handling accidents, and load paths, it did not specifically address the potential for a rack drop accident during installation of the new spent fuel pool storage racks in which the spent fuel pool (SFP) storage rack would drop onto the SFP floor. Following a telephone discussion of the subject, on May 10, 2000, the licensee provided its analysis of a potential SFP rack drop accident. The results of the staff's evaluation of the licensee's information are documented in this

supplemental SE. The supplemental SE is limited to the considerations for a rack drop accident onto the SFP floor during installation of the SFP storage racks.

2.0 EVALUATION

In addition to the analysis of a dropped spent fuel assembly as included in the previous submittals, the licensee analyzed postulated load drops of spent fuel storage racks onto the SFP floor. The rack drop analysis considered a vertical drop of the heaviest rack (25,889 lbs.) from 40 feet above the SFP floor liner only. It did not consider a rack drop onto fuel stored in the racks because the rack and its associated lifting rig as well as the crane will not be moved over or near fuel. The rack drop analysis indicated that one of the rack support pedestals would pierce a 5-inch diameter hole in the SFP liner causing SFP leakage. Also, the SFP concrete floor slab would be indented approximately 3 inches; however, cracking of the concrete floor slab would be localized and no leakage through the concrete slab would occur.

The licensee stated that the plants' leak chase system is designed and operated to detect and limit leakage from the SFP. Accordingly, a SFP leak would be limited by: (1) the size of the small gap between the bottom of the SFP liner and the top of the concrete slab; (2) the size of the piping (1.5 inches in diameter) between the leak chase system and the leak detection isolation valves; and (3) the capability to close the leak chase isolation valves within approximately 5 minutes following the start of the leak. The leak chase isolation valves are normally open. The licensee committed to cycle the valves monthly during the SFP rerack operation to assure that they will be operable.

The licensee used a conservative maximum SFP leak rate of 716 gpm and estimated that it would take approximately 19.5 minutes for the SFP level to drop one foot. Within the estimated five minutes that is needed to close the leak chase isolation valves, the SFP level would drop about 3-1/8 inches.

In addition to the capability to isolate a leak caused by a rack drop, SFP makeup can be made available from a number of sources to supplement loss of SFP inventory: (1) borated water could be provided during normal SFP makeup from the refueling water storage tank (RWST) via two pumps rated at 150 gpm and 250 gpm, respectively; (2) borated water could also be provided from the chemical volume control system via a hose to the SFP at a flow rate of 75-120 gpm; (3) unborated primary water could be provided from the primary water system at a flow rate of 120 gpm; (4) unborated water could be provided from the demineralized water tank via a hose at approximately 340 gpm; and (5) water from two stations in the fire protection system could be provided at a flow rate of 191 gpm each.

The licensee's method of precluding travel of the SFP storage rack over fuel will avoid any potential impact on fuel due to a rack drop. Also, the results of the licensee's analysis of a potential rack drop indicates that, although the SFP liner would be penetrated, the structural integrity of the SFP concrete slab would be unimpaired. If SFP liner leakage occurred, the licensee could detect and isolate a potential leak through the SFP liner using the plant's design basis leak chase system. This could be done in sufficient time to avoid water leakage sufficient to uncover the fuel. However, if there is an immediate concern of the fuel becoming uncovered, the licensee has more than adequate capabilities to provide SFP makeup to supplement the loss of SFP water resulting from an SFP liner that is penetrated by a dropped rack.

Therefore, due to these capabilities, and because the structural integrity of the concrete slab remained unimpaired after the dropped SFP storage rack, the licensee concluded that the damage is minimal and does not present a significant safety concern.

3.0 CONCLUSION

The analysis of a postulated accident analysis involving a dropped SFP storage rack onto the SFP floor indicated that the spent fuel pool liner could be breached and localized concrete damage could occur. If the rack drop accident resulted in SFP leakage, the licensee could isolate an SFP leak using the leak detection system leak-chase valves to prevent the fuel from becoming uncovered. Furthermore, the licensee has the capability to provide SFP makeup from a number of sources to make up inventory lost during a SFP leak. Based on its review of the information provided, the staff concludes that, if the rack drop accident resulted in a SFP leak, the licensee could maintain the SFP and its contents within the acceptable consequence limits set forth in NUREG-0612, “Control of Heavy Loads at Nuclear Plants,” and that the analysis is acceptable.

The conclusions reached and approvals granted in license Amendments 112 and 105 for Byron and Braidwood respectively remain unchanged.

Principal Contributor: B. Thomas

Date: October 5, 2000