July 28, 2010

David Lochbaum
Director, Nuclear Safety Project
Union of Concerned Scientists
P.O. Box 15316
Chattanooga, TN 37415

Dear Mr. Lochbaum:

On behalf of the Nuclear Regulatory Commission (NRC), I am responding to your letter dated June 23, 2010, where you expressed your views regarding a refueling cavity leak at Indian Point Unit 2, described in a recent NRC inspection report, and potential correlation to operating experience related to the Davis-Besse reactor vessel head. We share your views regarding the importance of ensuring licensees prevent degradation similar to that which occurred at the Davis-Besse plant in the timeframe prior to February 2002. The NRC has required licensees to take actions to monitor and prevent such degradation. Additionally, the agency has strengthened its reactor oversight program to ensure continued focus on licensee performance in monitoring and correcting leaks that could result in boric acid corrosion of carbon steel components. The underlying conditions at Indian Point Unit 2 are not the same as those that led to the reactor vessel degradation at Davis-Besse. While our review of Indian Point Unit 2 continues, the NRC staff has not identified any safety significant impacts resulting from this periodic leakage. Notwithstanding these conditions and as a part of the agency's oversight role, we expect the licensee to continue to pursue appropriate actions to identify, remediate, and permanently correct the source of the leak.

Indian Point Unit 2 refueling cavity leakage occurs for about two weeks every two years during refueling activities, then the refueling cavity is drained, and the leak stops. The leakage rate has varied over time from between two to ten gallons per minute; and, since this leakage is small in relation to the makeup system, it has not adversely impacted the level of water in the refueling cavity. The water is collected in the containment sumps and pumped to the radioactive waste treatment system for processing.

Regarding requirements for the spent fuel pool and refueling cavity water level at Indian Point Unit 2, Technical Specification Section 3.9, "Refueling Operations," requires the refueling cavity water be maintained and periodically verified to be at or above a specified minimum level above the top of the reactor vessel flange. Based on independent reviews and observations during refueling operations, the NRC verified that this requirement was being met.

Regarding the potential for boric acid accumulation as a result of the refueling cavity leakage, the water associated with the leakage averages about 100 degrees F (Fahrenheit) which is not hot enough for it to evaporate quickly, resulting in almost no boric acid deposits accumulating in containment. There is also no evidence of significant corrosion as verified through direct visual inspection by NRC inspectors. In addition, the refueling cavity liner serves no function when the plant is operating at power.

The NRC has reviewed Entergy's actions to correct the subject leakage. As documented in NRC Inspection Report 50-247/2010-02, dated May 13, 2010, NRC inspectors have reviewed the refueling cavity leakage and Entergy's corrective action plans. As you noted in your letter, and as described in our inspection report, Entergy previously attempted to identify the source and repair the leakage by applying coatings on sections of the cavity liner. These repairs have not been fully effective and the exact location of the liner leakage has not been identified to date. However, Entergy has plans to research a new permanent coating material that would be applied during the next three refueling outages. NRC inspectors will continue to follow Entergy's actions to resolve this issue and document the results of our followup reviews in a future inspection report.

In addition, as part of the NRC's review of the Indian Point license renewal applications, the staff required that Entergy provide information on the refueling cavity leakage and its actions to repair the leak. Entergy described its plans in several letters to the NRC. The results of our reviews are described in an NRC license renewal safety evaluation report (NUREG-1930, Volumes 1 and 2) dated November 30, 2009 (ML093170451 and ML093170671, see pages 1-11, 3-125 to 3-134). From our reviews, we determined that Entergy's plans related to repairing the leak and monitoring plant components for age-related degradation are acceptable. As part of the license renewal process, the NRC's independent advisory body, the Advisory Committee on Reactor Safeguards (ACRS), considered this leakage condition in its review of the staff's safety evaluation report (SER) and agreed that the condition is not one which would preclude granting a renewed license for Indian Point Unit 2. The ACRS documented its conclusions in a letter to the NRC Chairman, which is incorporated in the SER. As a part of the staff's review of the license renewal application, and as a result of specific commitments made in response to questions raised during that review, Entergy removed samples of the thick concrete walls behind and beneath the suspected area of the leakage, and is inspecting the samples for degradation. Entergy, and NRC through its independent inspection activities, have not identified any significant concrete or rebar degradation to date. Entergy has also committed to take additional concrete samples before the end of the first ten years of the period of extended operation if the source of the leak has not been identified and the leak stopped.

The conditions at Indian Point Unit 2 are significantly different than those at Davis-Besse, where 600-degree F water was leaking onto the reactor vessel head undetected over an extended period whenever the plant was operating. The high temperature conditions at Davis-Besse led to a significant amount of boiling, evaporation, and boric acid accumulation on exposed carbon steel, resulting in corrosion of the reactor vessel head. NUREG/CR-6875, "Boric Acid Corrosion of Light Water Reactor Pressure Vessel Materials," provides more information on the effects of higher temperatures on boric acid deposition.

In addition to walkdowns performed by Entergy, NRC inspectors perform tours of the containment building as part of the reactor baseline inspection program. These tours are performed at the beginning of each refueling outage and periodically thereafter to independently verify the conditions inside the containment structure. These containment walkdowns are an important part of the NRC inspectors' verification that licensees are aware of conditions in containment and are taking appropriate actions to address abnormal conditions, including boric acid leaks. Also, during each refueling outage, specialist NRC inspectors review Entergy's boric acid corrosion control activities for compliance with NRC regulatory requirements and licensee

procedures and standards. Based on our independent reviews, we have not identified accumulation of boron or abnormal corrosion from this refueling cavity leak on components in containment.

In summary, the NRC has reviewed the refueling cavity leakage issue at Indian Point Unit 2 for some time, and has not identified a safety significant concern. The underlying conditions at Indian Point Unit 2 are not the same as those that led to the reactor vessel degradation at Davis-Besse. Notwithstanding, the NRC inspectors will continue to follow the leakage issue at Indian Point Unit 2 to ensure effective corrective actions are taken and that all regulatory requirements continue to be met. I have confidence that this issue is being properly addressed in accordance with the NRC's regulatory processes. If you have further questions regarding this matter, please contact Richard Barkley of Region I at (610) 337-5065.

Sincerely,

/RA by Martin Virgilio for/

R. W. Borchardt
Executive Director
for Operations

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