January 12, 2006

Mr. David Lochbaum
Nuclear Safety Engineer
Union of Concerned Scientists
1707 H Street NW, Suite 600
Washington, D.C. 20006

Dear Mr. Lochbaum:

On behalf of the U.S. Nuclear Regulatory Commission (NRC), I am responding to your June 17, 2005 letter to the Commissioners, in which you raised questions about the adequacy of regulatory requirements to address two issues. The two issues you raised are the potential for a closed-loop system inside containment to become a release pathway for radioactive material and the potential for water leaking inside containment to challenge the environmental qualification of equipment. The NRC staff has reviewed the questions you raised and concluded that existing regulations and guidance sufficiently address these issues.

With regard to the first question, requirements existed at the time of the TMI-2 accident that would have provided for the isolation of the containment chiller system when not in use. Additionally, regulatory actions have been taken since the accident to address periodic testing of isolation valves and leak tightness of closed systems, such as the containment chillers, providing further assurance that such leak pathways will not exist. Specifically, containment isolation design requirements for fluid systems are contained in Title 10 of the *Code of Federal Regulations* Part 50 (10 CFR 50), Appendix A, "General Design Criteria for Nuclear Power Plants." Containments must have two redundant isolation barriers. For the specific case of a closed-loop system inside the containment, the governing general design criterion (GDC) is GDC 57, "Closed System Isolation Valves":

> Each line that penetrates primary reactor containment and is neither part of the reactor coolant pressure boundary nor connected directly to the containment atmosphere shall have at least one containment isolation valve which shall be either automatic, or locked closed, or capable of remote manual operation. This valve shall be outside containment and located as close to the containment as practical. A simple check valve may not be used as the automatic isolation valve.

The two redundant containment isolation barriers are the closed-loop inside containment and the containment isolation valve outside containment. In addition, Regulatory Guide 1.141, "Containment Isolation Provisions for Fluid Systems," dated April 1978, and NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 6.2.4, "Containment Isolation System," Revision 2, dated July 1981, include guidance for the industry and the NRC staff on acceptable detection capabilities for identifying the need to close remote manual containment isolation valves during an accident. Accordingly, licensees should have provisions in place such as radiation detectors and operating procedures so the reactor operators can isolate the appropriate containment isolation valves when necessary.

The NRC believes that these requirements and guidance are sufficient to address the release pathway scenario that you described.

Regarding your second question of whether leakage into containment could challenge the environmental qualification of equipment, the NRC has, as mentioned in your letter, issued generic communications to industry on environmental qualification. These included the communications issued immediately after the Indian Point Unit 2 event in October 1980 and the orders issued industry-wide in 1980 requiring all safety-related electrical equipment to be environmentally qualified by June 30, 1982. Furthermore, the NRC revised its regulations in 1983 to add 10 CFR 50.49, "Environmental qualification of electric equipment important to safety for nuclear power plants." This regulation applies to electrical equipment relied on to remain functional during and after accidents, and requires that the equipment qualification be based on humidity, chemical effects, submergence, and margins among other things, as applicable.

The specific issue that you raised involves equipment that is not qualified for submergence potentially becoming submerged inside containment. The NRC addressed this issue in NUREG-0737, "Clarification of TMI Action Plan Requirements," Item II.F.1.(5), "Accident-monitoring Containment water level monitor," dated November 1980, which required licensees to install wide range containment water level instrumentation.

This instrumentation will inform licensees of the water level inside containment and allow for actions to be taken if the level approaches electrical equipment. The containment water level instrumentation is also included in a plant's Technical Specifications for Post-Accident Monitoring Instrumentation. With respect to the 1980 Indian Point Unit 2 event, note that this corrective action was not in place at the time of the event and that operators at Indian Point Unit 2 did not appropriately respond to alarms indicating high water level in the containment sump.

If you have further questions, please contact Brian Sheron at (301) 415-1274.

Sincerely,

/RA/

J. E. Dyer, Director
Office of Nuclear Reactor Regulation

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J. E. Dyer, Director
Office of Nuclear Reactor Regulation

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