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NUCLEAR REGULATORY COMMISSION

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MEMORANDUM FOR:

Docket File

FROM:

Peter S. Tam, Senior Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT:

CATAWBA AND MCGUIRE NUCLEAR STATIONS --
DOCUMENT ON MIXED OXIDE FUEL RECEIVED FROM
TOM CLEMENTS OF THE NUCLEAR CONTROL INSTITUTE
(TAC MA5205, MA5206, MA5422 AND MA5423)

The attached single-page document was given to G. Belisle of Region II by Tom Clements of the Nuclear Control Institute. By copy of this memorandum NRC personnel listed below are provided a copy of Clements' document for their information and consideration.

Docket Numbers 50-413, 50-414,
50-369, 50-370

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Duke Power, MOX and Ice Condensers
July 20, 1999

The Catawba and McGuire plants have containment structures that are significantly less robust than most other U.S. pressurized-water reactors. The Chairman of the NRC Advisory Committee on Reactor Safeguards (ACRS) recently referred to them as "weak containments." These plants depend on ice condenser systems --- annular chambers containing tiers of baskets carrying millions of pounds of ice --- to condense steam generated during loss-of-coolant accidents (LOCAs) in order to relieve the pressure on the containment walls. Ice condenser systems cannot mitigate other accident conditions that could challenge the containment, such as hydrogen explosions, which require additional equipment to control.

In order for the ice condensers to work properly, steam produced during a LOCA must be able to flow without resistance through the ice chambers. This requires that the main and intermediate bay doors always be able to open freely and that steam flow passageways remain unobstructed. In the past, ice condenser functioning has been challenged by sticking of the bay doors due to ice buildup or warping of the floor underneath the doors. Other serious issues include the accumulation of debris in the ice and ice baskets, which could clog reactor drains and affect the flow of recirculating cooling water from the containment sump. This debris includes trash which falls into ice baskets during maintenance and broken ice basket screws resulting from manufacturing flaws.

NRC's July 12 notice of the Catawba enforcement conference cites these problems and others. In fact, the similarities between the problems cited at Catawba and those experienced by another ice condenser plant, D.C. Cook, are striking. The two D.C. Cook units have been off line since September 1997, and restart is not planned before next year. The degraded condition of the ice condenser system at D.C. Cook was one of the primary issues that led to the extended shutdown. Ultimately, D.C. Cook management had to melt the ice in both units and undertake a complete rebuilding of the ice condenser system.

As the Department of Energy (DOE), via a contract to Duke Cogema Stone and Webster (DCS), is considering use of plutonium fuel (mixed uranium-plutonium oxide, MOX) made from "surplus" weapons-grade plutonium in the Catawba and McGuire reactors, the question of operability of ice condensers in the event of a severe accident becomes even more critical. Because the consequence of a severe, loss-of-containment accident can be substantially greater for MOX cores than for low-enriched uranium (LEU) cores (as a result of the greater inventory of plutonium and minor actinides), the potential inoperability of the ice condenser systems at Catawba and McGuire must be considered an even more serious safety issue when MOX is involved. (1) The Nuclear Control Institute, which is concerned about the safety and non-proliferation impacts of the DOE's weapons-grade plutonium "disposition" program, will remain vigilant in respect to the problems with ice condensers at Duke Power reactors and calls on the NRC to aggressively and comprehensively address this problem.

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(1) The summary of a report on severe accident consequences using MOX, by Dr. Ed Lyman, NCI Scientific Director, can be found on the NCI web site at www.nci.org/moxsum.htm.