

EDO Principal Correspondence Control

FROM: DUE: 11/02/00

EDO CONTROL: G20000500
DOC DT: 10/19/00
FINAL REPLY:

Edwin S. Lyman
Nuclear Control Institute

TO:

Chairman Meserve

FOR SIGNATURE OF :

** GRN **

CRC NO: 00-0648

Collins, NRR

DESC:

Safety Issues Relating to Ice Condenser
Containments and Impacts of MOX Use in Plants

ROUTING:

Travers
Paperiello
Miraglia
Norry
Craig
Burns/Cyr
Thadani, RES
Kane, NMSS

DATE: 10/20/00

ASSIGNED TO:

CONTACT:

NRR

Collins

SPECIAL INSTRUCTIONS OR REMARKS:

OFFICE OF THE SECRETARY
CORRESPONDENCE CONTROL TICKET

Date Printed: Oct 19, 2000 15:35

PAPER NUMBER: LTR-00-0648 **LOGGING DATE:** 10/19/2000
ACTION OFFICE: EDO

AUTHOR: EDWIN LYMAN
AFFILIATION: NCI
ADDRESSEE: RICHARD MESERVE
SUBJECT: SAFETY OF PRESSURIZED WATER REACTORS (PWRs) WITH ICE CONDENSER
CONTAINMENTS

ACTION: Direct Reply
DISTRIBUTION: RF---SECY TO ACK

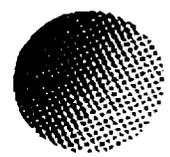
LETTER DATE: 10/19/2000
ACKNOWLEDGED: No
SPECIAL HANDLING:

NOTES: OCM #4290---
FILE LOCATION: ADAMS

DATE DUE: 11/02/2000 **DATE SIGNED:**

EDO --G20000500

4290



NUCLEAR CONTROL
INSTITUTE

1000 CONNECTICUT AVE NW SUITE 804 WASHINGTON DC 20036 202-822-8444 FAX 202-452-0892
E-mail nci@access.digex.net Web http://www.nci.org

October 19, 2000

The Honorable Richard A. Meserve
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Chairman Meserve:

We are writing to you in reference to a serious issue concerning the safety of pressurized-water reactors (PWRs) with ice condenser containments.

This issue, the high susceptibility of ice condenser containments to early failure from hydrogen combustion during a severe accident, has come to our attention through documents released by the NRC in the last few months. In particular, a new technical study conducted for the NRC by Sandia National Laboratories (SNL), *Assessment of the DCH Issue for Plants with Ice Condenser Containments* (NUREG/CR-6427), finds that "ice condenser plants are at least two orders of magnitude more vulnerable to early containment failure than other types of PWRs."¹ In view of these alarming new findings, which call into question the ability of ice condenser containments to provide adequate protection of the public health and safety, we urge the Commission to take immediate action to mitigate the risk of catastrophic, loss-of-containment accidents at the nine U.S. ice condenser units.

The vulnerability of ice condenser plants to early containment failure in a severe accident is of particular concern in view of the impending use of mixed plutonium-uranium (MOX) fuel at the McGuire and Catawba plants, operated by Duke Energy. A study by the Nuclear Control Institute (NCI), released last year and scheduled for publication in a peer-reviewed journal, calculates that implementation of Duke Energy's MOX plan would significantly increase (by 25%) the number of latent cancer fatalities resulting from a severe accident with early containment failure at McGuire or Catawba, because of the greater quantities of plutonium and other actinides that would be released into the environment. In addition, many issues remain to be resolved regarding the potential for MOX fuel use to increase the probability of a severe accident. Given these additional risks and uncertainties, the use of MOX in the type of PWR that is most

¹ M. Pilch, K. Bergeron and J. Gregory, *Assessment of the DCH Issue for Plants with Ice Condenser Containments*, NUREG/CR-6427, SAND99-2553 (Albuquerque, NM: Sandia National Laboratories, April 2000).

Strategies for stopping the spread and reversing the growth of nuclear arms.

Paul L. Leventhal, President, Peter A. Bradford, David Cohen, Julian Koenig, Sharon Tanser, Roger Richter, Dr. Theodore B. Taylor
BOARD OF DIRECTORS

REC'D BY

20 OCT 0

REC'D BY

vulnerable to early containment failure will make an already risky situation even worse and should no longer be considered.

The report NUREG/CR-6427 finds that the lower volume and strength of ice condenser containments render them less resistant than other types of PWR containments to the overpressures that would be generated by credible hydrogen combustion events. While the presence of hydrogen control systems (glow plug igniters) can mitigate this risk, they require AC power supplies and thus would be inoperable in station blackouts (SBOs). Consequently, the calculations presented in NUREG/CR-6427 (Tables 4.21, 4.24 and 7.4) indicate that if an SBO occurs, the early containment failure probability ranges from 27% to 97% for U.S. ice condenser plants. For Catawba and McGuire, the probabilities are 34% and 59%, respectively. If an SBO occurs and the vessel ruptures at high pressure, the failure probabilities are 100% and 98%, respectively. These results indicate that defense-in-depth is seriously compromised at ice condenser plants.

We are aware that the Commission has recently received an NRC staff paper that recommends that, as part of a "risk-informed" revision to the NRC's rule on combustible gas control (10 CFR 50.44), a requirement should be added for ice condenser plants to maintain a capability for hydrogen control during all risk-significant core-melt accidents, including SBOs.² However, since such a requirement would be voluntary on the part of licensees, we would go further than this recommendation and urge the NRC to transfer this issue to the generic safety issues (GSI) program for determining on a high-priority basis the need for imposition of mandatory backfits at ice condenser plants. There should be a separate determination of this need for Catawba and McGuire, comprehensively taking into account the additional safety risks associated with the planned use of MOX fuel at these plants.

It is highly unlikely that the unacceptably large risk of early containment failure at ice condenser plants can be mitigated merely by an attempt by licensees to show that the SBO frequency is low, a possibility that the NRC staff has suggested. SBOs can result from a wide range of external events, such as seismic events, that are hard to predict accurately. Moreover, an important precursor to an SBO, a loss of off-site power, can be caused by a sabotage attack outside the protected areas of the plant. Such attacks cannot be prevented with high assurance, and their likelihood cannot be quantified. In this scenario, a robust containment is the major line of defense.

Even if the NRC takes action to reduce the risk of early containment failure at ice condenser plants during SBOs, it remains to be seen whether the resulting plant risk will be small enough to offset the increased risk associated with MOX use. The fact will remain that ice condenser containment buildings are only half as pressure-resistant as other types of PWR containments. Moreover, the assumption made by NUREG/CR-6427 that the ice condensers themselves will function properly to mitigate the threat of steam explosions is itself open to question. In our view, these plants will never be safe

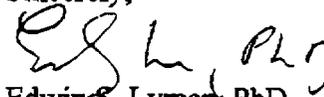
² U.S. Nuclear Regulatory Commission, *Status Report on Study of Risk-Informed Changes to the Technical Requirements of 10 CFR Part 50 (Option 3) and Recommendations on Risk-Informed Changes to 10 CFR 50.44 (Combustible Gas Control)*, SECY-00-0198, September 14, 2000.

enough to accommodate MOX, and we are hopeful that the NRC will eventually reach a similar conclusion when it faces the challenge of approving license amendments to permit the use of MOX at Catawba and McGuire.

Since the results of NUREG/CR-6427 clearly constitute significant new information pertaining to the safety of using MOX fuel in Catawba and McGuire, we have requested that the Department of Energy (DOE) prepare a supplement to its November 1999 *Surplus Plutonium Disposition Final Environmental Impact Statement* (EIS) to take the new findings into account. The reactor safety analysis in the Final EIS was based on the Catawba and McGuire Individual Plant Examinations, the results of which are called into question by the new SNL analysis. While DOE would be the lead agency in preparing such a supplement, we expect that the NRC will play a key role in providing DOE with the most recent technical information necessary for the analysis.

We urge the NRC to act in a timely manner to address the critical safety issues posed by the inadequacies of ice condenser containments and the synergistic impacts of MOX use in such plants. In the event that the NRC fails to do so, we are reviewing our options for action under the applicable regulations. We look forward to receiving your prompt reply.

Sincerely,



Edwin S. Lyman, PhD
Scientific Director



**NUCLEAR CONTROL
INSTITUTE**

1000 CONNECTICUT AVE NW SUITE 804 WASHINGTON DC 20036 202-822-8444 FAX 202-452-0892
E-mail nci@access.digex.net Web http://www.nci.org/nci/

FAX TRANSMISSION

FAX NUMBER: () - -

TO: Chairman Messers

FROM: Nuclear Control Institute

3 PAGES FOLLOW

MESSAGE:

Hard copy to follow by mail.