

50-245



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

May 26, 1994

Mr. Kevin T.A. McCarthy  
Director, Monitoring and Radiation  
Bureau of Air Management  
Department of Environmental Protection  
79 Elm Street  
Hartford, Connecticut 06106

Dear Mr. McCarthy:

I am responding to your letter of April 18, 1994 in which you relayed concerns regarding cooling of stored spent fuel at Millstone Unit 1. In your letter, you requested NRC technical attention and response to these concerns. The NRC is aware of the issues on spent fuel pool cooling raised by Messrs. Lochbaum and Prevatte and is currently evaluating the safety significance of those concerns. The staff's preliminary review has determined the loss of spent fuel pool cooling issues raised by Messrs. Lochbaum and Prevatte to be of low safety significance. Specifically, the staff considered a loss-of-coolant accident or loss-of-offsite power coupled with the subsequent failure of numerous reactor core cooling systems and the failure of or inability to restore cooling to the spent fuel storage pool to be a low probability sequence. The staff is conducting a thorough, comprehensive evaluation of the issues to confirm the preliminary assessment. As part of the comprehensive review, the staff will evaluate the applicability of the issues raised to other nuclear power plants, including Millstone Unit 1.

To date, the staff has issued an information notice informing all boiling water reactor (BWR) licensees of the loss of spent fuel pool cooling (Information Notice 93-83, "Potential Loss of Spent Fuel Pool Cooling Following a Loss of Coolant Accident (LOCA)"). A copy of Information Notice 93-83 is included as an enclosure. In addition, the staff requested and received a generic assessment, dated March 4, 1994, of the spent fuel pool cooling concerns from the BWR Owners Group. If the staff determines, as a result of its review of the postulated safety hazard at the Susquehanna Steam Electric Station, that further generic action is warranted, it will take appropriate action.

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I trust this letter is responsive to your concerns. If you have further questions regarding this issue, please do not hesitate to contact our staff project manager for this issue, Joseph W. Shea, at (301) 504-1428.

Sincerely,

Original Signed By  
WILLIAM T. RUSSELL

William T. Russell, Director  
Office of Nuclear Reactor Regulation

Enclosure:

Information Notice 93-83,  
"Potential Loss of Spent Fuel  
Pool Cooling Following a Loss of  
Coolant Accident (LOCA)"

cc w/enclosure:  
See next page

\*Tech Editor previously concurred on the body of the letter  
(EDO Control Number 0010053)

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Mr. Kevin T.A. McCarthy

-2-

May 26, 1994

I trust this letter is responsive to your concerns. If you have further questions regarding this issue, please do not hesitate to contact our staff project manager for this issue, Joseph W. Shea, at (301) 504-1428.

Sincerely,



William T. Russell, Director  
Office of Nuclear Reactor Regulation

Enclosure:  
Information Notice 93-83,  
"Potential Loss of Spent Fuel  
Pool Cooling Following a Loss of  
Coolant Accident (LOCA)"

cc w/enclosure:  
See next page

Millstone Nuclear Power Station  
Unit 1

cc:

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Enclosure ① Copy To Pns+PD  
② MAUDETT - Please  
File.

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, D.C. 20555

October 7, 1993

NRC INFORMATION NOTICE NO. 93-83: POTENTIAL LOSS OF SPENT FUEL POOL COOLING  
FOLLOWING A LOSS OF COOLANT ACCIDENT  
(LOCA)

Addressees

All holders of operating licenses or construction permits for boiling water reactors (BWR).

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to an issue the NRC is evaluating concerning the potential loss of spent fuel pool (SFP) cooling following a LOCA. It is expected that recipients will review the information for applicability to their facilities and consider any appropriate actions. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

On November 27, 1992, a 10 CFR Part 21 notification was filed to notify the NRC of concerns regarding the potential effects of a loss of SFP cooling coincident with a LOCA at Susquehanna Steam Electric Station (SSES). Since the initial submittal, additional submittals dated December 14, 1992, and January 2, March 31, August 13, and October 1, 1993, have been made regarding the concerns.

In response to these concerns, Pennsylvania Power and Light Company, the licensee for SSES, has made submittals to the NRC dated May 24, July 6, and August 16, 1993. The licensee met with the NRC on March 18 and July 8, 1993. The NRC is currently evaluating the 10 CFR Part 21 notification and subsequent information.

Discussion

Units 1 and 2 at SSES are BWRs with Mark II containments designed by the General Electric Company. The SFPs for each unit are located above each reactor in a reactor building common area. The two SFPs communicate through a common cask storage pit when the path is not isolated by gates. The SFP cooling systems for Units 1 and 2, as described in the updated final safety

analysis report (UFSAR), are non-seismic Category I, non-Class 1E powered, and Quality Group C systems. The SFP cooling system for each unit consists of three parallel heat exchangers, cooled by non-Class 1E service water, and three pumps. During normal operation, the water temperature of the SFP is maintained below 52°C [125°F]. Makeup water to accommodate for evaporation and small leakage losses from the SFP is normally supplied by the condensate transfer system.

During refueling outages, the residual heat removal (RHR) system is designed to provide supplemental cooling to the SFP. The RHR system is connected to the SFP by manually operating valves in the reactor building. The RHR system cools the SFP using seismic Category I piping and can be isolated from the non-seismic SFP cooling systems. The seismic Category I emergency service water system also is available to provide makeup water for evaporative losses. This system also requires the operation of manual valves in the pool area.

A LOCA coincident with a loss of SFP cooling could potentially limit recovery actions. A LOCA in one unit may restrict access to the reactor building for that unit. The transfer of steam or radioactive materials through the heating, ventilation, and air conditioning systems also may restrict access to the adjacent reactor building. Because entry to the reactor building is necessary to provide a method of SFP cooling or makeup water addition when the normal SFP cooling and make-up systems are inoperable, a delay in accessing the reactor building may result in the SFP water boiling.

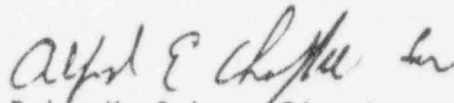
The submitted information identified the following concerns:

- Potential loss of normal SFP cooling and makeup water systems as a result of piping stresses caused by LOCA-induced hydrodynamic effects in the reactor buildings.
- Potential inability to align emergency methods of SFP cooling and makeup water addition under post-LOCA conditions.
- Potential loss of safety-related equipment as a result of the temperature and steam effects of SFP water boiling within the reactor building.
- Potential loss of safety-related equipment as a result of flooding from condensation of water vapor created by boiling the SFP water.
- Adequacy of instrumentation to monitor SFP temperature and level.
- Acceptability of the source term used to predict accessibility to the SFP area and reactor building.
- Consideration of SFP heat loads in the design basis for the ultimate heat sink.

- Consideration that a loss of offsite power may last longer than 24 hours.

The NRC staff is evaluating these concerns and the licensee's actions as they relate to the safe operation of SSES. The NRC staff also is evaluating the safety significance of the concerns and their generic applicability to other BWRs.

This information notice requires no specific action or written response. If you have any questions regarding the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation project manager.



Brian K. Grimes, Director  
Division of Operating Reactor Support  
Office of Nuclear Reactor Regulation

Technical contacts: David H. Shum, NRR  
(301) 504-2860

George Hubbard, NRR  
(301) 504-2870

Attachment:  
List of Recently Issued Information Notices

LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
93-82	Recent Fuel and Core Performance Problems in Operating Reactors	10/12/93	All holders of OLS or CPs for nuclear power reactors and all NRC-approved fuel suppliers.
93-81	Implementation of Engineering Expertise on Shift	10/12/93	All holders of OLS or CPs for nuclear power reactors.
93-80	Implementation of the Revised 10 CFR Part 20	10/08/93	All byproduct, source, and special nuclear material licensees.
93-79	Core Shroud Cracking at Beltline Region Welds in Boiling-Water Reactors	09/30/93	All holders of operating licenses or construction permits for boiling-water reactors (BWRs).
93-78	Inoperable Safety Systems At A Non-Power Reactor	10/04/93	All holders of OLS or CPs for test and research reactors.
93-77	Human Errors that Result in Inadvertent Transfers of Special Nuclear Material at Fuel Cycle Facilities	10/04/93	All nuclear fuel cycle licensees.
93-76	Inadequate Control of Paint and Cleaners for Safety-Related Equipment	09/21/93	All holders of OLS or CPs for nuclear power reactors.
93-75	Spurious Tripping of Low-Voltage Power Circuit Breakers with GE RMS-9 Digital Trip Units	09/17/93	All holders of OLS or CPs for nuclear power reactors.
93-74	High Temperatures Reduce Limitorque AC Motor Operator Torque	09/16/93	All holders of OLS or CPs for nuclear power reactors.

OL = Operating License  
CP = Construction Permit

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NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

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WASHINGTON DC 20555



FROM: ORIGINAL DUE DT: 05/13/94 TICKET NO: 0940095  
DOC DT: 04/18/94  
NRR RCVD DATE: 04/28/94

K. T. A. McCARTHY

TO:

W. T. RUSSELL

FOR SIGNATURE OF : \*\* YEL \*\*

DESC:

ROUTING:

ENCLOSES RECENT CORRESPONDENCE D. A. LOCHBAUM &  
D. C. PREVATTE RE: MILLSTONE UNIT 1

RUSSELL  
MIRAGLIA  
REYES  
THADANI  
CRUTCHFIELD  
GILLESPIE  
BOHRER

ASSIGNED TO:

CONTACT:

DRPE

VARGA

SPECIAL INSTRUCTIONS OR REMARKS:

<u>ACTION</u>
DUE TO NRR DIRECTOR'S OFFICE
BY <i>[Signature]</i> 10/1994

Please review the due date immediately:

If the due date does not allow adequate time, please contact Celeste Smyre on 504-1229, or E-mail(CDS) to request/revise a due date. The NRR mailroom is located in room 12G18.

Please do not hand carry concurrence packages to the Directors office without first going through the NRR mailroom.

*Due date changed to 6/3/94 in phone call with Ken Bohrer on 5/2*

*J-A.*