

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

August 11, 1993

NRC INFORMATION NOTICE 93-63: IMPROPER USE OF SOLUBLE WELD PURGE DAM MATERIAL

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the potential consequences of improper use of soluble weld purge dam material inside piping to prevent water from reaching a weld location. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Background

On February 21, 1985, the NRC staff issued Information Notice 85-13, "Consequences of Using Soluble Dams." Before that, the NRC staff had issued Information Notice 81-07, "Potential Problem With Water-Soluble Purge Dam Materials Used During Inert Gas Welding," on March 16, 1981. These information notices described problems with two types of soluble dam material.

Description of Circumstances

On May 1, 1993, personnel at the Edwin I. Hatch Nuclear Plant, Unit 1 were increasing reactor temperature and pressure at the end of a refueling outage to conduct a Class 1 system leakage test in accordance with Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. All control rods were fully inserted, reactor coolant temperature was about 63° C [145 °F], and reactor pressure was about 800 kilopascal (kPa) [115 pounds per square inch absolute (psia)]. A low reactor water level full reactor protection system actuation signal and a partial Group II isolation actuation occurred unexpectedly because the "B" channel reactor water level instruments were indicating erroneously low reactor water levels. The "A" channel instruments and instruments supplied by other reference legs indicated "upscale" and high levels as expected since the reactor vessel had been flooded for the leakage test. The control room recorders for the "B" channel indications initially indicated "onscale" and decreasing.

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After some time, the "B" channel reactor water level indications slowly returned to the "upscale" readings and the reactor protection signals were reset. The heatup was stopped, the "B" channel reactor water level instrumentation was declared inoperable, and an investigation was conducted. Operators made several unsuccessful attempts to correct the problem. During backfilling of the "B" channel reference leg with a hydrostatic test pump, pressure increased to about 2500 kPa [365 psia] and then suddenly decreased to below 800 kPa [115 psia]. This decrease was attributed to the clearing of some type of blockage from the reference leg.

Discussion

The investigation showed that the most likely cause of the blockage was soluble weld purge dam material that had not been used properly during a modification of the piping associated with the "B" channel condensing chamber. The modification required cutting out and then rewelding sections of the reference-leg piping. To complete this work, a temporary plug had been installed in the associated reactor vessel penetration, but did not provide a completely watertight seal. To perform a dry weld on the reference leg, the soluble weld purge dam material was used to plug the reference leg near the weld location. The welders rolled the material into a plug several inches long and forced it into the 2.5 centimeter [1-inch] diameter reference-leg piping.

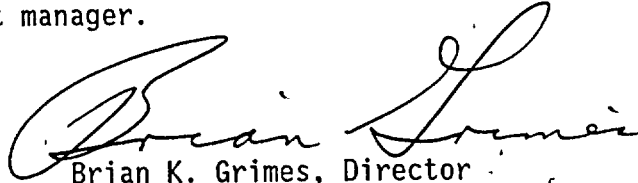
The soluble weld purge dam material is Dissolvo WLD-35, but is frequently called rice paper. It is intended to contain or dam weld purge gas inside piping at a weld location. Once the weld is completed, the piping is filled with water and the paper is supposed to dissolve completely. Plant managers at Hatch consider the use of the material to absorb small quantities of water an acceptable welding practice.

A licensee event review team concluded that the rice paper had not dissolved completely because air was trapped on the downstream side of the roll, which prevented the paper from becoming saturated. Testing with models of similar piping arrangements and material showed that significant periods of time could elapse before the material dissolved completely. Dissolution of the paper is dependent on sufficient exposure to water, and large accumulations of tightly packed rice paper could prevent the paper from dissolving completely. Testing suggests that the length of a plug of the material should be limited to less than 2.5 centimeters [1 inch]. When contacted, the vendor for the material confirmed that the length of the material should not be more than one pipe diameter to ensure that it dissolves completely.

The licensee initiated corrective actions, including requirements for post-maintenance functional testing to ensure that the material has dissolved completely whenever it is used to plug piping. Training will be conducted to provide guidance on the appropriate quantity of material to use in such applications. This issue is discussed in Licensee Event Report 50-321/93-006 and in NRC Inspection Report 50-321,366/93-06.

The event described above serves to highlight the potential consequences of improper use of soluble weld purge dam material. Failure to provide adequate instructions to workers and inadequate post-maintenance functional testing can result in blockage of piping and inoperability of systems.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact 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 contact: Len Wert, RII
(912) 367-9881

Attachment:
List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
93-62	Thermal Stratification of Water in BWR Reactor Vessels	08/10/93	All holders of OLs or CPs for boiling water reactors.
93-61	Excessive Reactor Coolant Leakage Following A Seal Failure in A Reactor Coolant Pump or Reactor Recirculation Pump	08/09/93	All holders of OLs or CPs for nuclear power reactors.
93-60	Reporting Fuel Cycle and Materials Events to the NRC Operations Center	08/04/93	All fuel cycle and materials licensees.
93-59	Unexpected Opening of Both Doors in An Airlock	07/26/93	All holders of OLs or CPs for nuclear power reactors.
93-58	Nonconservatism in Low-Temperature Overpressure Protection for Pressurized-Water Reactors	07/26/93	All holders of OLs or CPs for pressurized-water reactors.
93-57	Software Problems Involving Digital Control Console Systems at Non-Power Reactors	07/23/93	All holders of OLs or CPs for test and research reactors and nuclear power reactors.
93-56	Weakness in Emergency Operating Procedures Found as Result of Steam Generator Tube Rupture	07/22/93	All holders of OLs or CPs for pressurized water reactors.
93-55	Potential Problem with Main Steamline Break Analysis for Main Steam Vaults/Tunnels	07/21/93	All holders of OLs or CPs for pressurized water reactors.

OL = Operating License
 CP = Construction Permit

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Original signed by

Brian K. Grimes

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Division of Operating Reactor Support
Office of Nuclear Reactor Regulation

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(912) 367-9881

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- * See previous concurrence
- + PSkinner conc'd by telephone, 7/26/93 for himself & LWert.
- + AHerdt conc'd by telephone, 7/26/93 for EMerschhoff.

OFC	OGCB:DORS	PUB:ADM	RGN-II/R	RGN-II/R	RGN-II/R
NAME	*MHarper	*Tech Ed	+LWert	+PSkinner	+EMerschhoff
DATE	07/22/93	07/23/93	07/26/93	07/26/93	07/26/93
OFC	C/RPEB	D/DRIL	C/OGCB	D/DORS	
NAME	*GZech	*CERossi	*GMarcus	BKGrimes	
DATE	07/26/93	07/26/93	07/27/93	08/4/93	

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* See previous concurrence

*Skinner
 conc'd for
 called 7/26/93*
*conc'd
 telephone*
*conc'd
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 7/26/93*

OFC	OGCB:DORS	PUB:ADM	RGN-II/R	RGN-II/R	RGN-II/R
NAME	*MHarper	*Tech Ed	LWert	PSkinner	EMerschhoff
DATE	07/22/93	07/23/93	07/ /93	07/ /93	07/ /93

OFC	<i>g3</i> RPEB	D/DRIL	C/OGCB	D/DORS
NAME	GZech	<i>[Signature]</i> GROSS	GMarcus <i>GM</i>	BKGrimes <i>[Signature]</i>
DATE	07/26/93	07/21/93	07/27/93	07/ /93

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OFC	OGCB:DORS	PUB:ADM	RGN-II/R	RGN-II/R	RGN-II/R
NAME	MHarper ^{MA}	Tech Ed ^{MM}	LWert	PSkinner	EMerschhoff
DATE	07/22/93	07/23/93	07/ /93	07/ /93	07/ /93

OFC	C/OGCB	D/DORS
NAME	GMarcus	BKGrimes
DATE	07/ /93	07/ /93

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