

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT  
WASHINGTON, D.C. 20555

July 23, 1982

IE INFORMATION NOTICE NO. 82-28: HYDROGEN EXPLOSION WHILE GRINDING IN THE  
VICINITY OF DRAINED AND OPEN REACTOR COOLANT  
SYSTEM

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or construction permit (CP).

Purpose:

This information notice is provided as a notification of an event that may have safety significance. It is expected that recipients will review the information for applicability to their facilities. No specific action or response is required at this time.

Description of Circumstances:

On April 10, 1982, a hydrogen explosion occurred at Unit 1 of Arkansas Nuclear One while maintenance personnel were grinding a recently cut high-pressure injection (HPI) pipe, approximately 18 inches from the nozzle connecting the HPI pipe to the reactor coolant system (RCS) piping. At the time of the explosion, the RCS was partially drained and the water level in the reactor coolant piping was just below the HPI nozzle to permit radiography of the nozzle and subsequent repair. (IE Information Notice No. 82-09 provides details concerning the cracking problem in HPI piping at Babcock & Wilcox plants.) The reactor coolant temperature was being maintained at approximately 100°F by the decay heat removal system, and nitrogen cover gas was being maintained in the reactor coolant piping. These conditions existed since the RCS was depressurized and partially drained on March 29, 1982.

At approximately 1240 hours on April 10, 1982, the craftsmen, who were grinding on the HPI pipe in preparation for welding, observed a bright flash at the outlet of the HPI line and heard a loud "bang". The craftsman actually performing the grinding was physically blown away from the HPI pipe a distance of about three feet. Personnel in other areas of the Unit 1 containment building heard the explosion and felt the resulting concussion and mechanical vibration. Additionally, some personnel outside of the containment building, including operators in the Unit 1 control room reported that they heard the explosion and felt varying degrees of vibration. Although there were no physical injuries as a result of this event, it should be mentioned that the craftsman's life was endangered as he was working on a scaffold that was over 30 feet high.

The most recent RCS measurement of dissolved gas in reactor coolant had been taken on March 26, 1982, just before commencing the plant cooldown and shutdown. It indicated 39 standard cc of total gas/liter of coolant. The hydrogen

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concentration was 43% of this total. Because the total gas concentration exceeded the maximum allowed by plant procedures (30 cc/liter) for RCS depressurization, the RCS was degassed for approximately 14 hours as cooldown progressed. The total gas concentration was not measured after degassing had been terminated because the RCS had been depressurized and the sampling method is effective only when the RCS pressure is greater than several hundred psig. Atmospheric samples had not been taken to measure hydrogen and oxygen concentrations in the vicinity of the open HPI pipe. (This had been done at other Babcock and Wilcox plants which were undergoing nozzle repair.)

The reason for the presence of an explosive concentration of hydrogen is unknown. It could have been caused by (a) inadequate degassing, (b) failure to purge the HPI pipe with nitrogen, or (c) failure to temporarily plug the open HPI pipe.

Subsequent inspection of the affected HPI line, the first upstream check valve in the HPI line, and the corresponding nozzle and safe-end on the RCS cold leg indicated no signs of damage as a result of the explosion.

No written response to this information is required. If you need more information about this matter, please contact the Regional Administrator of the appropriate NRC Regional Office or this office.

Edward L. Jordan, Director  
Division of Engineering and  
Quality Assurance

Technical Contact: W. Marinelli  
301-492-9654

Attachment:  
List of Recently Issued IE Information Notices

WPU: JD	DEQA: IE	DEQA: IE	DEQA: IE	DEQA: IE	<i>FA</i> D: DEQA: IE
7/20/82	WMarinelli	RWoodruff	JCunningham	RBaer	EJordan
5520	7/ /82	7/ /82	7/ /82	7/ /82	7/20/82

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Sincerely,

Edward L. Jordan, Director  
Division of Engineering and  
Quality Assurance  
Office of Inspection and Enforcement

Technical Contact: W. Marinelli  
301-492-9654

Attachment:  
Recently issued IE Information Notices

mkm DEQA:IE  
6/17/82 WMarinelli  
5520 6/24/82  
*W. Marinelli*

DEQA:IE  
RWoodruff  
6/21/82  
*R. Woodruff*

DEQA:IE  
JCunningham  
6/27/82  
*J. Cunningham*

DEQA:IE  
RBaer  
6/23/82  
*R. Baer*

D:DEQA:IE  
EJordan  
7/13/82  
*E. Jordan*

LIST OF RECENTLY ISSUED  
 IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
82-27	Control of Radiation Levels in Unrestricted Areas Adjacent to Brachytherapy Patients	7/23/82	All medical institutions
82-26	RCIC and HPCI Turbine Exhaust Check Valve Failures	7/23/82	All BWR power reactor facilities holding and OL or CP
82-25	Failures of Hiller Actuators upon Gradual Loss of Air Pressure	7/22/82	All power reactor facilities holding an OL or CP
82-24	Water Leaking from Uranium Hexafluoride Overpacks	7/20/82	All NRC licensed enriched uranium fuel fabrication plants
81-26, Part 3, Sup. No. 1	Clarification of Placement of Personnel Monitoring Devices for External Radiation	7/20/82	All power reactor facilities holding an OL or CP
82-23	Main Steam Isolation Valve (MSIV) Leakage	7/16/82	All BWR power reactor facilities holding an OL or CP
82-22	Failures in Turbine Exhaust Lines	7/9/82	All power reactor facilities holding an OL or CP
82-21	Buildup of Enriched Uranium in Effluent Treatment Tanks	6/30/82	All uranium and plutonium fuel fabrication licensees
82-20	Check Valve Problems	6/28/82	All power reactor facilities holding an OL or CP

OL = Operating License  
 CP = Construction Permit