UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555-0001

October 6, 1995

NRC INFORMATION NOTICE 95-46: UNPLANNED, UNDETECTED RELEASE OF RADIOACTIVITY FROM THE EXHAUST VENTILATION SYSTEM OF A BOILING WATER REACTOR

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 inform addressees of an undetected release of radioactive material, from a liquid radwaste evaporator. The vapor from this evaporator is normally released directly to the environment. 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.

Description of Circumstances

On April 5, 1995, the licensee for the Hope Creek Nuclear Station, the Public Service Electric & Gas Company, was using the decontamination solution evaporator to process liquid waste from the chemical waste tank. The evaporator was equipped with a demister and an exhaust vent piped directly to the south plant vent. On two occasions, alarms caused by high differential pressure across the demister prompted the operator to spray the demister. The spraying, combined with a continuous supply of heating steam to the evaporator, caused a buildup of steam in the vapor body and an increase in evaporator pressure, which was suddenly relieved when the operator stopped spraying.

Unknown to the operator, these two depressurizations caused two momentary high steam flows in the 15-cm-diameter [6-in-diameter] effluent exhaust pipe from the evaporator, ejecting 227 L [60 gal] of approximately 26 MBq/L [0.7 μCi/mL] radioactive water and steam mixture to the south plant vent upstream of the effluent radiation monitor. About half this liquid, containing an estimated 3,100 MBq [85 mCi] of mixed corrosion products, was released to the environment and blown downwind, thus contaminating a large area within the site protected area as well as onsite buildings and vehicles. The remainder of the mixture was deposited as radioactive liquid in the south plant vent ducting, thus causing radiation alarms in the nearby reactor building ventilation system exhaust and radwaste area exhaust systems. However, the south plant vent effluent monitor did not indicate any ongoing or previous

release to the environment, even though the mixture passed isokinetic sampling probes in the exhaust duct. These releases occurred between midnight and 1:00 a.m.

The licensee initiated abnormal operating procedures and an investigation. after observing a hot spot in the south plant vent duct (approximately 1.2 mSv/hr [120 mrem/hr] on contact and 0.15 mSv/hr [15 mrem/hr] at 30 cm [1 ft]) and a radioactive reddish-brown liquid dripping from the duct into a previously installed drip bag. Despite these indications, the licensee believed no release had occurred because a sample of the evaporator effluent indicated no unusual conditions and because the south plant vent effluent monitor did not indicate any abnormal radioactivity on an effluent sample. The licensee assumed the reddish liquid drip to be a preexisting condition and that the hot spot was caused by a piece of solid material (possibly a piece of a filter) that had been deposited in the duct. The licensee focused on preventing a release of radioactivity from occurring once the radioactive liquid drips subsequently dried. The licensee also attempted to locate the source and the extent of contamination.

While questioning plant staff during the afternoon shift turnover, the licensee also surveyed the turbine building roof and found elevated levels of removable contamination. The licensee then surveyed the yard areas and found radioactive contamination in the protected area at approximately 4:00 p.m. Vehicles that had left the site the day of the release were identified, located, and surveyed.

Discussion

The NRC review of the event is documented in NRC Inspection Report No. 50-354/95-05, dated May 30, 1995. The release of radioactive contamination did not have a significant radiological impact on the public, onsite workers, or the environment. However, several significant weaknesses were revealed: insufficient understanding and review of the design basis and operation of the decontamination solution evaporator and the south plant vent effluent monitoring system, inadequate communications and integrated assessment of incoming information, operation of the evaporator neither in accordance with its design basis nor with commitments in the Final Safety Analysis Report, an erroneous belief, unchallenged by several 10 CFR 50.59 safety evaluations, that the evaporator could not cause a radioactive release, and untimely notification of workers of the release and onsite contamination.

Although radwaste systems typically are not safety related, proper operation of such systems is essential for controlling onsite and offsite personnel exposures within the limits of Parts 20 and 50 of Title 10 of the *Code of Federal Regulations*.

This event and an event at the James A. FitzPatrick Nuclear Power Plant, which was discussed in a previous information notice 91-40 (referenced below), have common root causes: weaknesses in design review or implementation, operating procedures, and management oversight of radwaste system operations.

Related Generic Communications

Information Notice 91-40, "Contamination of Nonradioactive System and Resulting Possibility for Unmonitored, Uncontrolled Release to the Environment," June 19, 1991.

Circular No. 80-18, "10 CFR 50.59 Safety Evaluations for Changes to Radioactive Waste Treatment Systems," August 22, 1980.

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

Dennis M. Crutchfield, Director
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Office of Nuclear Reactor Regulation

Technical contacts: Ronald L. Nimitz, RI
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John White, RI
(610) 337-5114

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LIST OF RECENTLY ISSUED NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
95-12, Supp. 1	Potentially Nonconforming Fasteners Supplied by A&G Engineering II, Inc.	10/05/95	All holders of OLs or CPs for nuclear power reactors.
95-45	American Power Service Falsification of American Society for Nondestructive Testing (ASNT) Certificates	10/04/95	All holders of OLs or CPs for nuclear power reactors.
95-44	Ensuring Compatible Use of Drive Cables Incorporating Industrial Nuclear Company Ball-Type Male Connectors	09/25/95	All Radiography Licensees.
95-43	Failure of the Bolt-Locking Device on the Reactor Coolant Pump Turning Vane	09/28/95	All holders of OLs or CPs for nuclear power reactors designed by Westinghouse Electric Corporation (W).
95-42	Commission Decision on the Resolution of Generic Issue 23, "Reactor Coolant Pump Seal Failure"	09/22/95	All holders of OLs or CPs for nuclear power reactors.
95-41	Degradation of Ventilation System Charcoal Resulting from Chemical Cleaning of Steam Generators	09/22/95	All holders of OLs or CPs for nuclear power reactors.
95-40	Supplemental Information to Generic Letter 95-03, "Circumferential Cracking of Steam Generator Tubes"	09/20/95	All holders of OLs or CPs for nuclear power reactors.
95-39	Brachytherapy Incidents Involving Treatment Planning Errors	09/19/95	All U.S. Nuclear Regulatory Commission Medical Licensees.
95-38	Degradation of Boraflex Neutron Absorber in Spent Fuel Storage Racks	09/08/95	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

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orig /s/'d by DMCrutchfield

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DATE	09/14/95		08/15/95		08/14/95		08/16/95		08/18/95	

OFFICE	SC:PECB*		PECB*		C:PECB*		D:DRPM/NRR	
NAME	RLDennig		RJKiessel		AEChaffee		DMCrutchfield	
DATE	09/08/95		09/14/95		09/18/95		10/2/95	

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Susan Shankman for by email

the 1st ¶ of the discussion section should be clarified

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