

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

January 17, 2002

NRC INFORMATION NOTICE 2002-05: FOREIGN MATERIAL IN STANDBY LIQUID
CONTROL STORAGE TANKS

Addressees

All holders of licenses for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to inform addressees of equipment and design issues identified recently at the River Bend Nuclear Power Plant concerning debris found in the standby liquid control system storage tank. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. The aspect of this event considered of particular interest is the evident potential for systems initially filled with a combination of dry chemicals and water to have the wrapper material for the chemicals left in the system and to remain there undetected for an extended period. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific actions or written response is required.

Description of Circumstances

During monthly sampling of the standby liquid control (SLC) system storage tank in September 2000, part of a plastic bag was found in the SLC tank. Both trains of SLC were declared inoperable while the licensee inspected the tank, removed several pieces of plastic, and performed an evaluation. This event was discussed in NRC Inspection Report 50-458/00-14, ADAMS Accession No. ML003774888 and Licensee Event Report 50-458/00-013-00, ADAMS Accession No. ML003769869.

Discussion

On September 14, 2000, while drawing a routine monthly sample from the SLC tank at River Bend, Unit 1, chemistry personnel retrieved a 10-inch square piece of plastic along with the sampling equipment. The SLC tank manway cover was removed and several additional pieces of plastic were observed floating on the surface. Approximately 20 pieces of plastic which ranged in size from 2 square feet to one-half square inch were identified and removed. Further inspection of the tank with an underwater camera identified additional pieces of plastic on the sparger supports and the mixing heater located at the bottom of the SLC tank.

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Because of the potential for the plastic to be sucked into the SLC pump suction piping, both SLC subsystems were declared inoperable. The plastic material was removed and further inspections of the SLC tank were performed with an underwater camera. No additional foreign material was identified. Additionally, a boroscope inspection of the horizontal suction piping from the tank outlet to the downward elbow was performed. No material was identified during the inspection. Based on the inspection and the buoyancy of the plastic material, the licensee concluded that the remaining SLC pump suction piping would not contain any significant amount of plastic material.

The licensee evaluated the effect that 1 square inch pieces of plastic would have on system performance. The evaluation determined that pieces of plastic less than 1 square inch which might be introduced into the SLC pump suction would not preclude the system from injecting sodium pentaborate into the reactor. The licensee believed that any remaining plastic material would be less than 1 square inch. At 8:59 p.m. that same day, both SLC subsystems were declared operable due to the inspections of the SLC system, the removal of the plastic material, and the engineering evaluation.

The licensee established a significant event review team to investigate the event and evaluate the safety significance of the plastic material in the SLC tank. The licensee determined that the incremental risk from this event, assuming that the SLC system was out of service for a one year time frame, was $3.0E-8$. Since the upper limit for non risk-significant changes in conditional core damage probability was $1.0E-6$, the licensee concluded the event was not risk significant.

Due to low flow velocities and the buoyancy of the plastic, the licensee believed that the SLC system would have been able to perform its function even with the plastic in the tank, provided the SLC storage tank was in a steady state condition. The only time the licensee believed that the SLC system's behavior could not be predicted and operability demonstrated was during the 10-minute air agitation before the monthly chemistry sampling of the SLC tank contents. During and immediately following the air sparger, the location of the plastic material in the SLC tank could not be predicted. Therefore, the licensee concluded that the SLC system may not have been able to provide its intended safety function during periods in which the tank was being agitated with air.

On September 25, 2000, NRC inspectors conducted a walkdown of the alternate SLC injection emergency operating procedure. They determined that the sodium borate and boric acid chemicals to be used were not available in the warehouse or onsite for alternate SLC. The inspectors notified the licensee and replacement chemicals were shipped from the Grand Gulf Nuclear Station and arrived onsite at approximately 4 a.m., on September 26, 2000.

Further investigation by the licensee revealed that the alternate SLC injection chemicals had been removed from the site. On March 3, 1999, a quality assurance chemistry audit had identified chemical storage discrepancies (i.e., deteriorated packaging) with chemicals stored in the onsite warehouse. On July 14, 1999, warehouse personnel removed the identified chemicals from inventory as a corrective action for the deteriorated packaging problems identified during the quality assurance audit. On July 28, 1999, the chemicals that had been removed from inventory were transported to the environmental storage yard and subsequently

shipped offsite. Warehouse personnel had not recognized that these chemicals were required for an emergency operating procedure and adequate controls were not in place to identify them as such. As a result, the chemicals were never replaced.

The licensee's guidance document on procedural control, "Authors Guide/Control and Use of Emergency Operating and Severe Accident Procedures," required that operations personnel perform yearly walkdowns of each emergency operating procedure enclosure. On October 2, 2000, in response to the inspectors' identification of the missing chemicals, operations personnel completed a review of their documentation of emergency operating procedure enclosure audits and yearly walkdowns. The review determined that the yearly walkdowns of each emergency operating procedure enclosure had not been performed since November 26, 1996.

As a result of this event, the Cooper Nuclear Station, also identified plastic material in their SLC storage tank in the fall of 2001. Because of the small quantity of plastic found, the system was not considered to be rendered inoperable.

This event points out the importance of effective foreign material exclusion controls to prevent the introduction into the SLC storage tank or other similar systems of wrapper material which could impair the system's operability. In this instance, the buoyancy of the plastic material reduced the potential consequences. The event also pointed out the need for effective periodic walkdowns of emergency operating procedure attachments to ensure that all required equipment and materials are available to perform the emergency procedures.

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.

/RA/

William D. Beckner, Program Director
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Technical contacts: Stephen Max Schneider, Region IV
225-635-3193
E-mail: sms2@nrc.gov

Ron Kopriva, Region IV
817-860-8104
E-mail: rak1@nrc.gov

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Information Notice No.	Subject	Date of Issuance	Issued to
2002-04	Wire Degradation at Breaker Cubicle Door Hinges	1/10/02	All holders of operating licenses for nuclear power reactors.
2002-03	Highly Radioactive Particle Control Problems During Spent Fuel Pool Cleanout	1/10/2002	All holders of operating licenses for nuclear power reactors, holders of licenses for permanently shutdown facilities with fuel onsite, and holders of licenses for non-power reactors.
2002-02	Recent Experience with Plugged Steam Generator Tubes	01/08/2002	All holders of operating licenses for pressurized-water reactors (PWRs), except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor.
2002-01	Metalclad Switchgear Failures and Consequent Losses of Offsite Power	01/08/2002	All holders of licenses for nuclear power reactors.
2001-19	Improper Maintenance and Reassembly of Automatic Oil Bubblers	12/17/2001	All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.
2001-18	Degraded or Failed Automated Electronic Monitoring, Control, Alarming, Response, and Communications Needed for Safety and/or Safeguards	12/14/2001	All uranium fuel conversion, enrichment, and fabrication licensees and certificate holders authorized to receive safeguards information. Information notice is not available to the public because it contains safeguards information.