

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, D.C. 20555

March 6, 1991

NRC INFORMATION NOTICE NO. 91-16: UNMONITORED RELEASE PATHWAYS FROM
SLIGHTLY CONTAMINATED RECYCLE AND
RECIRCULATION WATER SYSTEMS AT A FUEL
FACILITY

Addressees:

All fuel cycle facilities.

Purpose:

This Information Notice is intended to alert addressees to potential problems resulting from using runoff water and process effluents, both contaminated with radioactive materials, in non-nuclear processes. At one fuel facility, the use of these liquids resulted in a concentration and/or release of radioactive material, without an evaluation, to unrestricted areas. 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 do not constitute U.S. Nuclear Regulatory Commission (NRC) requirements; therefore, no specific action or written response is required.

Description of Circumstances:

A fuel facility's recycle water system was used to provide water for non-contact cooling of plant systems, the fire protection system, sanitary facilities, a grit blaster, and gaseous effluent scrubbers. Makeup water for the system was partially obtained by collecting rain water from roof and storm sewer drains. The makeup water became contaminated by particulate fallout from effluent discharges onto the buildings and the nearby ground areas. As a result, the recycle water system became contaminated.

The licensee had routinely analyzed the recycle system water for gross alpha radioactivity. However, the licensee failed to evaluate either the processes which used recycle water and could concentrate the uranium or the release pathways from the recycle water system which released excess water during heavy rain storms. The pathways included overflows from the system reservoir, the cooling tower, and the roof and storm sewer drains. The runoff eventually drained to a nearby river without an analysis for radioactivity. As a result, unmonitored release pathways existed for low levels of radioactivity.

Another unmonitored release pathway for the recycle system was from the facility's fire protection system, which used recycle water as the supply source. When the fire protection system's booster pumps were tested, the pumps discharged onto the open ground. No samples were analyzed for radioactivity before these

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releases. Additionally, recycle water was periodically provided to a local fire department to refill the water-storage tanks in its fire truck, without analysis for radioactivity. The licensee was aware that the recycle system was slightly contaminated but thought that the transfers of radioactively contaminated water were allowed because the concentrations were below the 10 CFR Part 20 release limits.

Another example of an unmonitored release pathway from the recycle system was from gaseous effluent scrubbers that used the slightly contaminated recycle water for particulate removal. The gaseous exhaust from the scrubbers had been routinely sampled for nitrous oxide but not for radioactivity. Additionally, contaminated scrubber water from two fume scrubbers had been discharged to a nonradioactive holding pond. The pond was part of the licensee's nonradioactive liquid waste treatment facility, and the introduction of the contaminated water may have caused radioactive contamination of the pond.

Recycle water was also used in the licensee's zirconium and copper recovery processes. The recycle water was used in the zirconium recovery process as part of the cleaning process. After recovery, the zirconium was then packaged and sold to various offsite vendors without testing for radioactive contamination. In the copper recovery process, the recycle water was used in the associated scrubber for gaseous effluents. Since contaminated recycle water was used in the scrubber, the transfer of water to the recovery system could have contaminated the copper recovery system and the final copper oxide product. Without testing for radioactive contamination, the product was sold to offsite vendors for use in various products.

Another water system used for the scrubber water was the recirculation water system. During 1984, the licensee installed the recirculation water system which diverted a portion of the final effluent for use in the liquid waste treatment facility. This effluent contained low concentrations of radioactive isotopes that were below 10 CFR Part 20 release limits. The recirculation water was used in the liquid waste treatment facility to prepare the lime slurry for use in both the radioactive and the nonradioactive waste treatment operations to neutralize the acidic solutions and to precipitate fluorides and metals such as aluminum, chromium, zirconium, and uranium. The precipitated sludge from the radioactive waste treatment was shipped offsite for disposal as low-level radioactive waste. The precipitated sludge from the assumed nonradioactive water treatment system was buried onsite in a State-permitted landfill. However, this sludge contained radioactive contaminants from the recirculation water lime slurry, and the State-permitted landfill was not authorized to receive radioactive material.

The licensee has initiated and/or completed corrective actions for both the recycle and the recirculation water systems to eliminate the sources of radioactive contamination and to evaluate all release points. The licensee has eliminated the use of radioactively contaminated recirculation water in the recovery operations and ceased onsite burial of the radioactively contaminated sludge. Further corrective actions will include characterization of the onsite burial areas.

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Discussion:

Licensees are reminded that they must make surveys to assure compliance with 10 CFR 20.301 which describes authorized means of disposal of licensed material in waste and must make surveys to assure compliance with 10 CFR 20.106 which limits the yearly average concentration of radioactive material in air or water discharged to unrestricted areas. Furthermore, licensees are reminded that changes in plant design must be evaluated to determine whether the changes will result in the unmonitored release of radioactive material to unrestricted areas.

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(s) listed below or the appropriate NRR project manager.

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Attachments:

1. List of Recently Issued NMSS Information Notices
2. List of Recently Issued NRC Information Notices