

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT  
WASHINGTON, DC 20555

December 21, 1984

IE INFORMATION NOTICE NO. 84-94: RECONCENTRATION OF RADIONUCLIDES INVOLVING  
DISCHARGES INTO SANITARY SEWAGE SYSTEMS  
PERMITTED UNDER 10 CFR 20.303

Addressees:

All NRC materials licensees other than licensees that use sealed sources only.

Purpose:

This information notice is provided to alert recipients of a potentially significant problem involving reconcentration of radionuclides released to sanitary sewage systems. It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Three recent occurrences have pointed out the need to focus attention on the possible reconcentration of radionuclides that are discharged into sanitary sewage systems under the provisions of 10 CFR 20.303. In these occurrences, radioactive contamination was found in sewer lines and in the municipal sewage treatment facility.

During a routine radiation survey, Oak Ridge Associated Universities found radioactive contamination in the sludge from the sewage treatment facility in Oak Ridge, Tennessee. The principal contaminant was cobalt-60 (Co-60). The State of Tennessee traced the apparent source of the contamination to a State licensee who occasionally discharged a few thousand gallons per day of liquid into the sanitary system at concentrations of 66-110 dpm/ml of Co-60. Although the discharge from the licensee's facility was mixed with 4 to 5 million gallons of liquid from other sources in the city, concentrations of 20,000-200,000 dpm/Kg were measured in the sludge from the treatment facility. Sludge had been used to fertilize a Department of Energy reforested area with the result that radiation levels 2 to 3 times background were measured there (about 10  $\mu$ R/hr). As a result of the discovery of the problem, the licensee has installed an improved filtration and ion exchange system.

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In the second occurrence, americium-241 (Am-241) contamination was found in ash that remained in an incinerator used as a final treatment step at the Tonawanda, New York sewage treatment plant and in ash disposed of at the Tonawanda landfill. About 10,000 tons of ash containing about 500 picocuries per gram of ash has been disposed of at the landfill. About 30 tons of contaminated ash currently remain in the sewage treatment plant incinerator and in ancillary equipment.

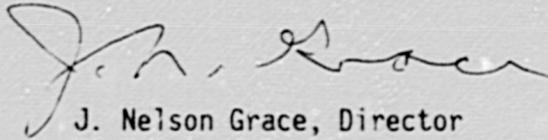
The contamination resulted from liquid releases made to the sanitary sewage system by a New York Agreement State licensee who formerly manufactured Am-241 foils at its Tonawanda facility. The licensee has since relocated its foil manufacturing operation to Mexico. Some decontamination of the licensee's Tonawanda facility was undertaken following the move.

The homes, clothes, or cars of four former licensee employees were found to be contaminated. Because of exposure to airborne dust at the sewage treatment plant, six plant workers received whole-body counting to examine the potential for internal deposition. Two of the six were among 58 plant workers who received lung scans. No uptake of Am-241 was detected. Several issues remain to be resolved. These involve disposal of the contaminated ash at the sewage treatment plant, dealing with contaminated ash disposed to the landfill before identification of the contamination problem, decontamination of the sewer lines, and decontamination of the licensee's facility.

In a third occurrence, Am-241 contamination also was found in sludge at a sewage treatment plant in Grand Island, New York. The contamination resulted from liquid releases made to the sanitary sewage system by another New York Agreement State licensee also engaged in the manufacture of Am-241 foils. The measured concentration in the sludge was about 100 picocuries per gram of sludge dry weight. (For purposes of comparison, if this sludge were incinerated, concentrations of about 500 picocuries per gram would result in the ash produced.) In this case, however, the sludge is disposed directly to a local sanitary landfill.

The NRC regulation 10 CFR 20.303 permits discharges of small quantities of radionuclides into sanitary sewage systems within the limits specified in that section provided that the materials "are readily soluble or dispersible in water." Licensees who rely on this section have the burden of demonstrating that the materials they are discharging are indeed readily soluble or dispersible. The term "dispersible" may have caused introduction of substances into sanitary sewerage systems that do not qualify as readily dispersible, such as liquid scintillation media and ash. Ash is a special case, which may or may not be "readily dispersible" depending on its degree of comminution and tendency to agglomeration. In order to detect and correct any reconcentration problems involving NRC licensees, inspectors will pay particular attention to the possibility of reconcentration of radionuclides during their inspections of licensees who discharge materials into sanitary sewage systems.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate NRC regional office, or this office.



J. Nelson Grace, Director  
Division of Quality Assurance, Safeguards,  
and Inspection Programs  
Office of Inspection and Enforcement

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Attachment:  
List of Recently Issued IE Information Notices

Attachment  
IN 84-94  
December 21, 1984

LIST OF RECENTLY ISSUED  
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
84-93	Potential for Loss of Water from the Refueling Cavity	12/17/84	All power reactor facilities holding an OL or CP
84-92	Cracking of Flywheel on Cummins Fire Pump Diesel Engines	12/17/84	All power reactor facilities holding an OL or CP
84-91	Quality Control Problem of Meteorological Measurements Problems	12/10/84	All power reactor facilities holding an OL or CP
84-90	Main Steam Line Break Effect on Environmental Qualification of Equipment	12/7/84	All pressurized water reactor and gas cooled power facilities holding an OL or CP
84-89	Stress Corrosion Cracking in Nonsensitized 316 Stainless Steel	12/7/84	All boiling water reactor facilities holding an OL or CP
84-88	Standby Gas Treatment System Problems	12/3/84	All boiling water reactor facilities holding an OL or CP
84-87	Piping Thermal Deflection Induced by Stratified Flow	12/3/84	All power reactor facilities holding an OL or CP
84-86	Isolation Between Signals of the Protection System and Non-Safety-Related Equipment	11/30/84	All power reactor facilities holding an OL or CP
84-85	Molybdenum Breakthrough from Technetium-99m Generators	11/30/84	All NRC licensed medical institutions and radiopharmaceutical suppliers
84-84	Deficiencies In Ferro-Resonant Transformers	11/27/84	All power reactor facilities holding an OL or CP

OL = Operating License  
CP = Construction Permit

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