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

December 28, 1988

NRC INFORMATION NOTICE NO. 88-101: SHIPMENT OF CONTAMINATED EQUIPMENT BETWEEN NUCLEAR POWER STATIONS

Addressees:

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose:

This information notice is being provided to remind addressees of their responsibilities to properly package, prepare for transport, and describe on shipping paper documents, packages containing contaminated equipment being offered for transportation between different stations. It is particularly applicable to transfers of leased equipment which is used consecutively by several licensees. It is expected that recipients will review this information for applicability to their facilities and consider actions, as appropriate, to preclude violations of transportation safety requirements. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Two past events are described below, each of which involved the shipment of contaminated equipment between operating power stations. In each case, violations of the Department of Transportation (DOT) regulations occurred:

- In October 1985, a contaminated control-rod blade cutter was delivered by the Oyster Creek Nuclear Generating Station in New Jersey to a common carrier for transport to the Quadrex Corporation facility in Oak Ridge, Tennessee. This cutting equipment, which is leased consecutively to different plants, was being returned for servicing. Upon arrival at the receiver's facility, a radiation survey of the vehicle indicated that the radiation limit, at two meters from the outer edges of the vehicle, had exceeded the 10 millirem/hour (mrem/h) limit at several points by as much as 50 percent. Upon disassembly of the equipment, a small segment (2.5" long x 3/16" diameter) of a boron tube from a control-rod blade was unexpectedly found to be present, having a contact dose rate of 40 roentgen/hour (R/h). The shipper's survey records indicated that the maximum dose rate at two meters from the edges of the vehicle had been slightly below

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the 10 mrem/h limit at the time of the shipment. It was subsequently determined that the small segment of boron tube had shifted from its original position (at the time of survey) within the internals of the blade cutter, resulting in the elevated radiation levels. The licensee was subsequently issued a Notice of Violation for failure to maintain radiation levels on the vehicle below the DOT regulatory limit of 49 CFR Subsection 173.441(b).

- In May 1987, during a receipt inspection and survey of two packages of low specific activity (LSA) material received by the Brunswick Steam Electric Plant in North Carolina, external radiation levels of 1500 mrem/h and 1800 mrem/h, respectively, were discovered on contact beneath the packages. The shipment, from Nine Mile Point Unit 1 in New York, consisted of two boxes; one containing a contaminated control-rod blade-shearing machine and its associated equipment/hoses, and the other, a support platform used in the underwater operation of the shearing equipment in the fuel pool. The equipment is used consecutively by several different licensees to shear highly activated stellite rollers from boiling water reactor (BWR) control-rod blades, and thus is transferred frequently from one power reactor to another. The shipping records associated with the shipment listed cobalt-60 as the only radionuclide present. Other material control records of the licensee, however, indicated that at least one other nuclide (iron-55) was also present in comparable quantities. Review of the circumstances surrounding the radiation level problem indicated that the licensee had not properly removed hot particles and chips from the internals of the equipment (causing an increase in radiation levels when the particles became dislodged and shifted position during transit). The licensee had also assumed, without further assessment, that only cobalt-60 was present in an amount required to be reported on shipping documents. The shipper licensee was subsequently assessed with a $2500 civil penalty for violation of 49 CFR Subsection 173.441(a).

Discussion:

Each of the above cases is a prime example of the importance of making careful evaluations before packaging and shipment of items which may potentially contain internal radioactivity. In each case, the absence of such activity was not apparent in the preshipment surveys. Each of the above shipments was made by the licensee after making assumptions that the measured dose rates were from fixed activity on the surfaces of the equipment. Each case, however, clearly indicates a potential for small sources of irradiated material to inadvertently remain within the internals of such equipment, with the higher radiation levels being masked by intrinsic shielding, later to produce elevated radiation levels when the material shifts during transport.

It is important that each licensee shipper make a "reasonable effort" to determine the identities and activities of the radionuclides present in any radioactive materials shipment. The DOT regulations require that the identity (49 CFR Subsection 172.203(d)(i)) and radioactivity (49 CFR Subsection 172.203(d)(iii)) of the contained radionuclides be included in shipping papers. In meeting these requirements, DOT has issued guidance indicating that radionuclides accounting for one percent or more of the total activity shipped are to be indicated and quantified in the shipping papers. Determination of the identities and activities of each contaminated article in a shipment will not only involve direct measurements, but also inferential information based on the use of the contaminated equipment in the licensee's plant and plant historical data (including 10 CFR Part 61 radiochemical analyses).

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

Charles E. Rossi

Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: A. W. Grella, NMSS
(301) 492-3381

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
88-100	Memorandum of Understanding between NRC and OSHA Relating to NRC-licensed Facilities (53 FR 43950, October 31, 1988)	12/23/88	All major nuclear materials licensees and utilities holding CPs and OLs.
88-99	Detection and Monitoring of Sudden and/or Rapidly Increasing Primary-to-Secondary Leakage	12/20/88	All holders of OLs or CPs for PWRs.
88-98	Electrical Relay Degradation Caused by Oxidation of Contact Surfaces	12/19/88	All holders of OLs or CPs for nuclear power reactors.
88-97	Potentially Substandard Valve Replacement Parts	12/16/88	All holders of OLs or CPs for nuclear power reactors.
88-96	Electrical Shock Fatalities at Nuclear Power Plants	12/14/88	All holders of OLs or CPs for nuclear power reactors.
88-95	Inadequate Procurement Requirements Imposed by Licensees on Vendors	12/8/88	All holders of OLs or CPs for nuclear power reactors.
88-94	Potentially Undersized Valve Actuators	12/2/88	All holders of OLs or CPs for nuclear power reactors.
88-93	Teletherapy Events	12/2/88	All NRC medical licensees.
88-92	Potential for Spent Fuel Pool Draindown	11/22/88	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

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(*see previous concurrence)
Technical Editor: E. Kraus 11/17/88 *

OFC	:SGTR*	:SGTR*	:SGTR*	:SGTR*	:NRR*	:NRR
NAME	:AGrella	:DKasun	:GMcCorkle	:RBurnett	:CBeringer	:CRossi
DATE	:12/19/88sr	:11/22/88	:11/25/88	:11/29/88	:12/21/88	:12/22/88

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Changes in the final draft were discussed with and concurred in by A. Grella.

Peter C. Wen

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CHB with the correction.

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