

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

November 17, 1999

NRC INFORMATION NOTICE NO. 99-31: OPERATIONAL CONTROLS TO GUARD  
AGAINST INADVERTENT NUCLEAR  
CRITICALITY

Addressees

All NRC licensed fuel cycle conversion, enrichment and fabrication facilities.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this Information Notice (IN) to alert addressees to a recent nuclear criticality accident at a foreign fuel fabrication facility that resulted in a significant radiation exposure to workers and members of the public. Although an evaluation of the impact of this accident is ongoing, the NRC expects that recipients of this IN will review the information for applicability to their facilities and consider actions, as appropriate, to protect against a similar occurrence. However, suggestions contained in this IN are not NRC requirements. Therefore, no specific action nor written response to this notice is required.

Description of Circumstances

On September 30, 1999, a nuclear criticality accident occurred at a facility in Japan that preliminary information indicates resulted in the exposure of three operators to extremely high levels of radiation, the extensive contamination of process areas, exposure of emergency responders and members of the public, and contamination of the environment. Preliminary indications are that the accident involved the dissolution of about 5 times the safe mass of uranium oxide (enriched to about 18%) by nitric acid in an "unfavorable" geometry vessel (i.e., the vessel was not designed to preclude a criticality for the enrichments involved). The 18% enriched process was just restarted after a several year shutdown.

Discussion

The Government of Japan has initiated a formal task force headed by the Prime Minister to thoroughly investigate the causes of the accident and determine any potential criminal liability. As information becomes available from the Government of Japan, NRC plans to conduct an in-depth review of the details surrounding the event to determine whether further improvements in the NRC regulatory program would be prudent. In the interim, a Temporary Instruction has been issued to NRC Resident Inspectors at the two high enriched uranium (HEU) facilities and the two gaseous diffusion plants regulated by NRC to focus inspection resources on criticality safety implementation at these facilities. NRC also plans to review the results of an industry initiative to assess their criticality programs. In view of the above accident, licensees are encouraged to review their policies and procedures and the results of safety assessments to assure that:

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NOTICE 99-031

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1. The possibility of commingling HEU and low enriched uranium (LEU) has been considered, where applicable, and appropriately rigorous controls are established to prevent the inadvertent introduction of HEU material into LEU plant areas and processes.
2. Operators who are authorized to handle special nuclear material (SNM) have received proper training/retraining with regard to the criticality safety rules and postings and that they understand the significance of the operating limits and what their expected response should be if any operating limit is exceeded.
3. Operations are conducted and administrative safety controls are implemented only in accordance with approved operating procedures and postings.
4. New processes and restart of processes that have been shut down for an extended period of time are covered by current safety assessments and an administrative process confirms that all applicable controls are established and implemented and operator training/retraining is completed prior to the introduction of SNM into the process.
5. Emergency plans contain appropriate provisions to ensure that both onsite and offsite emergency response personnel are made aware of criticality safety aspects of the facility, and receive proper health physics coverage and protection when responding to plant events.
6. Management provides an appropriate level of oversight of high risk operations to ensure that plant safety programs are effectively implemented and management expectations are being met.

Any further information developed as a result of the Japanese investigation will be reviewed by NRC to determine whether further action may be warranted.

This IN requires no specific action nor written response. If you have any questions about the information in this notice, please contact the technical contact listed below, or the appropriate NRC regional office.

*Michael T. Weber for*

Elizabeth Ten Eyck, Director  
Division of Fuel Cycle Safety  
and Safeguards  
Office of Nuclear Material Safety  
and Safeguards

Technical contact: William Troskoski, NMSS  
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Attachments:

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

LIST OF RECENTLY ISSUED  
 NMSS INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
99-30	Failure of Double Contingency Based on Administrative Controls Involving Laboratory Sampling and Spectroscopic Analysis of Wet Uranium Waste	11/8/99	All fuel cycle licensees and certificates performing laboratory analysis to determine uranium content, in support of administrative criticality safety controls
99-29	Authorized Contents of Spent Fuel Casks	10/28/99	All power reactor licensees and spent fuel storage licensees and applicants
99-28	Recall of Star Brand Fire Protection Sprinkler Heads	9/30/99	All holders of licenses for nuclear power, research and test reactors, and fuel cycle facilities
99-27	Malfunction of Source Retraction Mechanism in Cobalt-60 Teletherapy Treatment Units	9/2/99	All medical licensees authorized to conduct teletherapy treatments
99-26	Safety and Economic Consequences of Misleading Marketing Information	8/24/99	All Distributors and/or Manufacturers of Generally Licensed Products
99-24	Broad-Scope Licensees' Responsibilities for Reviewing and Approving Unregistered Sealed Sources and Devices	7/12/99	All medical licensees' of broad-scope and master materials licensees
99-23	Safety Concerns Related to Related Control Unit Failures of the Nucletron Classic Model High-Dose-Rate Remote Afterloading Brachytherapy Devices	7/6/99	All U. S. NRC medical licensees authorized to use brachytherapy sources in Nucletron Classic Model high-dose-rate remote afterloaders
99-22	10 CFR 34.43(a)(1); Effective Date for Radiographer Certification and Plans for Enforcement Discretion	6/25/99	Industrial Radiography Licensees
99-20	Contingency Planning for the Year 200 Computer Problem	6/25/99	All material and fuel cycle licensees and certificate holders

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99-25	Year 2000 Contingency Planning Activities	8/10/99	All holders of operating licenses for nuclear power plants and fuel cycle facilities
99-24	Broad-Scope Licensees' Responsibilities for Reviewing and Approving Unregistered Sealed Sources and Devices	7/12/99	All medical licensees of broad-scope and master materials licensees

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OL = Operating License  
CP = Construction Permit