

**Department of Energy**

Washington, DC 20585

October 3, 1996

RECEIVED

1996 OCT -4 PM 2:25

DNF SAFETY BOARD

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, D.C. 20004

Dear Mr. Chairman:

This letter is in response to your letter of July 15, 1996, regarding the venting of transuranic (TRU) waste drums to mitigate the potential for generation of flammable gases resulting from radiolytic decomposition at the Rocky Flats Environmental Technology Site (RFETS). The Department agrees with the Defense Nuclear Facilities Safety Board's observation on this issue.

TRU waste drum venting in Building 776 was temporarily discontinued for the past several months because this facility has been repeatedly unavailable for nuclear operations due to Operational Safety Requirements violations. There remained 500 TRU waste drums to be vented. RFETS resumed TRU waste drum venting on August 19, 1996. Although this activity had been rescheduled to be completed by the end of this fiscal year, it is currently about eight weeks behind schedule due to unanticipated restrictions on access to Building 776. Approximately 40 percent of the 500 remaining drums were vented by September 30, 1996, and the balance to be completed by December 31, 1996.

Enclosed is a memorandum from the Rocky Flats Field Office that provides a more detailed response on this issue. Their response briefly summarized the analysis of the safety considerations concerning these drums.

Should you have any questions, please contact me or have a member of your staff contact Mr. Joe Daly at 301-903-8460.

Sincerely,

A handwritten signature in cursive script that reads "Alvin L. Alm".

Alvin L. Alm
Assistant Secretary for
Environmental Management

Enclosure

United States Government

Department of Energy
Rocky Flats Field Office**memorandum**

DATE: **SEP 03 1996**

REPLY TO
ATTN OF: **PCD:MOE:09387**

SUBJECT: **Defense Nuclear Facilities Safety Board Memo Dated July 15, 1996 - Status of Venting of Transuranic Waste Drums at the Rocky Flats Environmental Technology Site**

TO: **James Turi, Director, Office of Western Operations, Office of Waste Management and Environmental Management, EM-36, HQ**

References: Memo, Turi to Olinger, dated 8/2/96, subject: Defense Nuclear Facilities Safety Board Safety and Authorization Basis Review at the Rocky Flats Environmental Technology Site.

The attached provides the status and commitment by the Rocky Flats Field Office (RFFO) to address the concerns related to venting of the remaining Transuranic (TRU) waste drums at the Rocky Flats Environmental Technology Site (Site). I would like to clarify RFFO's position and commitment to ensure the monitoring and completion of the required risk management activities. The Site agrees with the Defense Nuclear Facility Safety Board's (DNFBS) concern for the venting of TRU drums and has made it a top priority. Rocky Flats Field Office approved a baseline change proposal about a month ago to complete the venting of TRU drums this Fiscal Year. The review of the status and commitment has been coordinated with the Site DNFBS representative.

Questions concerning this memorandum can be directed to Mike Erickson, of my staff, at 303-966-4622.


Shirley J. Olinger
Acting Assistant Manager
Program, Planning & Integration

Attachment

cc: w/Att:

J. Owendorf, EM-40, HQ
S. Cowen, , HQ
K. Juroff, EM-64, HQ
J. Roberson, OOM, RFFO
K. Klein, OOM, RFFO
D. Sargent, OOM, RFFO
S. Olinger, PPI, RFFO
J. Legare, EC, RFFO
H. Dalton, MSD, RFFO
M. Weis, PA, RFFO
P. McEahern, ABG, RFFO
B. Card, Kaiser-Hill
J. Hill, Kaiser-Hill
V. Mani, Kaiser-Hill
G. Voorheis, Kaiser-Hill
D. Snyder, Kaiser-Hill
F. Gibbs, Kaiser-Hill
J. McAnally, RMRS
J. McKibbin, SSOC

Background:

On July 15, 1996, the Defense Nuclear Facilities Safety Board (DNFSB) transmitted their concerns for the progress in the venting of transuranic (TRU) waste drums stored in plutonium buildings and waste management storage facilities at RFETS. The primary concern is "the Site had scheduled all these (TRU) drums to be vented by the end of fiscal year 1995 as part of the site risk reduction program. Although more than 500 drums remain unvented, venting of the drums was discontinued last year. The Board believes that venting of TRU waste drums, especially those containing ion exchange resins or cemented sludge, warrant a priority higher than the one currently assigned by the Department of Energy."

Discussion:

Venting of TRU drums was unfunded in FY96, but funding was made available to complete the venting of the higher risk solidified sludge (IDC800). This venting was complete in March, 1996. RFFO has made the venting of TRU drums a high priority and has approved a baseline change proposal complete the venting of TRU drums. Several lower priority activities were delayed to facilitate venting drums.

TRU contaminated waste may consists of the following (or a combination/composite): solid form such as cellulose, plastics rubber, composite organic matrix, glass, tool, equipment, and concrete-TRU ash or sludge or liquids resulting from chemical recovery processes. Most TRU waste exists in a solid form. The wastes are stored in 55 gallon steel drums or waste boxes.

The generation of gases within TRU waste drums may result from radiolytic, thermal decomposition and dewatering, chemical corrosion, bacterial mechanisms, and alpha decay of the TRU matrix in container. The primary gas generated are H₂, CO₂, CO, H₂O, CH₄, O₂, NO_x, and He. In summary, radiolysis yields primary H₂ (approximately 60% of total gases from cellulose, 95% from polyethylene, 90% from PVC, and 100% from concrete-ash) and CO₂ and CO. Oxygen is depleted during the radiolysis; Thermal degradation of cellulose and composite yields about CO₂ (80%) and CO with release of water vapor from sorbed sludge or moist cellulose material; Bacterial degradation of organic matrix yield CO₂ in an aerobic and anaerobic environment, with potential generation of methane under anaerobic environment. Bacteria has the greatest potential to generate a significant quantity of gas from organic waste or the waste packaging; Corrosion yield hydrogen in anaerobic or wet environment; and Alpha Decay yield He in an insignificant quantity.

The concern of gas generation are: pressurization of the waste container during long-term storage and flammable or explosive concentration of gases, potential fuel for fire (with an initiating energy source), and contamination during routine waste management operations. Pressurization of the drum may lead to drum failure resulting in spread of contamination or injury to workers. Ignition of the hydrogen would lead to an explosion and/or fire.

Drums are inspected for pressurization during routine surveillance's and prior to movement. Historical data shows that if hydrogen levels are elevated to 5% or greater that oxygen levels are too low (<1%) to support combustion. If an explosion were to happen, the maximum pressure would be 15.5 psig which is below the Rocky Flats standard for 55 gallon drums of 20 psig. Testing at Savannah River showed the drums did not fail under hydrogen combustion until 105 psig. Therefore, the drum would contain any explosion. The drum is placed in a press to hold the lid during venting and sampling operations and brass tools are used to prevent sparking and igniting hydrogen venting from the drum. The drum is also grounded by a strap while venting and sampling. Therefore, it is concluded that drum movements and venting is safe.

Actions/Recommendations:

Venting of TRU waste drums is currently the number one priority at Rocky Flats for Building 776. It has been funded and is scheduled to be complete by the end of this fiscal year. If venting is not completed this fiscal year, it will continue on as the top priority until complete. Venting has been stopped for the last several months due to the shutdown of Building 776 for Operational Safety Requirements violations. Venting was restarted the week of 19 August, 1996. The contractor is investigating options such as working a second shift to complete the venting of TRU waste drums this fiscal year, if necessary, due to lack of Building 776 availability.