Lesson Learned Statement:

Extreme care is essential when handling and storing potentially reactive materials. Proper characterization of waste is essential in determining material compatibility.

Discussion:

Just after midnight on May 22, 1997, at the Fernald Environmental Management Project, a waste shipping container (white metal box) experienced a rapid overpressurization. The box contained four 55-gallon drums of '129 material' (Dirty Prill, Code 5 Derbies, and Plant 1 Titan Mill Clean-out High U), one 55-gallon drum of '069 material' (Wet Sump or Filter Cake, Non-Oily and Non-Halide), eleven drums of '069 material,' 2 drums of '018 material' (Alumina Soda Lime with High Cl Content), and 1 drum of '002 material' (Sump Cake) dumped into the void space of the box.

There was no detectable spread of contamination beyond Building 30 and initial air sample results do not indicate any significant release of airborne contaminants. Airborne radioactivity data and site meteorological data indicate that a temperature inversion was in progress at the time of the event. Therefore, long-lived airborne radioactivity levels cannot be accurately determined due to radon interference.

The area where the rapid overpressurization occurred was not occupied at the time of the event and there were no personnel injuries. Damage to equipment and facilities was limited to the incident container.

Analysis:

Subsequent investigation determined that the root cause of this event was a failure to adequately identify an anomalous drum containing high concentrations of uranium and magnesium metal fines, which allowed it to be commingled with other "normal," drums bearing the same lot number. Procedures that were used to classify waste streams in 1985 were not adequate to identify the high magnesium content of the Titan Mill cleanout waste placed in the drum that reacted.

Contributing to this event was the packaging of chemically incompatible materials into a shipping container. Although wet flowable materials are typically used to fill voids between drums in white metal boxes, in this case the wet material was combined with the drum containing uranium and magnesium metal fines.

Recommended Actions:

Extreme care should be exercised to prevent the mixing of chemically incompatible
materials. Even though materials may be relatively nonhazardous by themselves, potentially reactive conditions may occur when the materials are combined.

Information based upon statistical evidence incorporates a degree of uncertainty. To minimize the impact of this uncertainty, contingency plans for unexpected conditions should be developed.

Ensure that all materials and chemicals are accurately identified prior to mixing, packaging or storage.

Perform process safety analyses for all potentially reactive materials.

Assume all potentially reactive materials are still reactive, even if they have been dormant or in storage for an extended period, and handle accordingly.

**Originator:**

Fluor Daniel Fernald FERNALD

**Validator:**

N/A

**Contact:**

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**Name Of Authorized Derivative Classifier:**

William J. (Joe) Neyer, DOE-FEMP

**Name Of Reviewing Official:**

N/A

**Priority Descriptor:**

Red / Urgent

**Keywords:**

OVERPRESSURIZATION, CONTAINERS, WASTE

**References:**

Occurrence Report OH-FN-FDF-FEMP-1997-0034

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appreciated.

**DOE Function / Work Categories:**

Packaging & Transportation
Waste Remediation

**ISM Category:**

Analyze Hazards

**Hazard:**

Environmental Release
Personal Injury / Exposure - Hazardous Material (General)

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*End of Lesson!*