

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

February 9, 1995

**MEMORANDUM FOR:** G. W. Cunningham, Technical Director

**COPIES:** Board Members

**FROM:** D. J. Grover

**SUBJECT:** Trip Report - Review of Hanford Site Plutonium Vulnerability Assessment Findings, January 24-26, 1995

1. **Purpose:** This trip report documents a review of plutonium vulnerabilities and proposed corrective action plans at the Hanford Site. This review was performed by J. K. Fortenberry, D. Grover, and R. Tontodonato of the Defense Nuclear Facilities Safety Board (DNFSB) technical staff on January 24-26, 1995.
2. **Summary:**
  - a. Several vulnerabilities are associated with plutonium stored at the Plutonium Finishing Plant (PFP) and at the Pacific Northwest Laboratory (PNL). Corrective actions for these vulnerabilities at PFP are to be provided by the Department of Energy's (DOE) Recommendation 94-1 Implementation Plan. However, the three to four kilograms of plutonium with similar vulnerabilities at PNL have not been included in the scope of material to be covered by the implementation plan. PNL's corrective action plans, which DOE has not yet approved or funded, do not define what will be done to stabilize plutonium solutions or recognize that plutonium scrap stored at PNL is potentially reactive.
  - b. Most of the remaining vulnerabilities identified by the DOE plutonium vulnerability assessment are associated with plutonium contamination and holdup in various active and retired facilities at Hanford. Except for evacuating several plutonium processing buildings which had been converted to office space, no new actions will be taken to correct these vulnerabilities until DOE approves corrective action plans and provides funding.
  - c. Conditions observed in the Z-9 Building conflict with those reported in the DOE plutonium vulnerability assessment.
3. **Background:** The Plutonium Working Group Report on Environmental, Safety, and Health Vulnerabilities Associated with the Department's Plutonium Storage, DOE/EH-0415, was issued by DOE in November 1994. This report identified 299 vulnerabilities at 13 major sites,

including 35 at Hanford. In January 1995, DOE issued a draft "Plutonium Vulnerability Management Plan" which will provide corrective actions for the 46 vulnerabilities which DOE considers to pose the greatest risk. Six of these are Hanford Site vulnerabilities:

- Hydrogen generation in solution storage containers which are not vented (PFP)
- Plutonium stored in unstable forms (PFP)
- Deterioration of storage containers (PFP)
- Insufficient knowledge of packaging configuration and characterization of material (PFP)
- Contamination spread resulting from a roof fire (Retired Facilities)
- Potential loss of containment integrity (Retired Facilities)

4. **Discussion:** The DOE plutonium vulnerability assessment identified both material condition and packaging vulnerabilities and facility condition vulnerabilities at the Hanford Site. Material condition and packaging vulnerabilities exist only at PFP and PNL, while facility condition vulnerabilities exist in almost all current and former plutonium facilities. Currently, the only new action being taken as a result of the plutonium vulnerability study is the evacuation of several plutonium processing buildings which had been converted to office space.

a. **PFP:** The material vulnerabilities at PFP are issues which have been recognized and pursued by the technical staff. The packaging vulnerabilities related to metals and oxides were identified by the DNFSB in Recommendation 94-1. The corrective actions for all of these PFP plutonium vulnerabilities are expected to be incorporated into the 94-1 Integrated Program Plan.

While touring the vault a visibly corroded can was noticed. Westinghouse Hanford Company's (WHC) storage requirements state that no surface corrosion is allowed, but containers in instrumented storage are not periodically visually inspected. In response, WHC is inspecting all containers in the vaults, and has found numerous additional containers with surface corrosion. WHC is evaluating which of these containers need repackaging and is considering requiring a visual inspection of all plutonium containers every six months.

b. **PNL:** PNL's plutonium holdings do not appear to be receiving the attention they deserve. Only three to four kilograms of plutonium are stored at PNL, compared to the 3.7 metric tons at PFP. Some items are similar to materials identified as potentially hazardous by Recommendation 94-1. Examples of these materials are:

1. Plutonium scrap including ash and electrorefining (ER) salts which were received from Lawrence Livermore National Laboratory (LLNL) for research projects. These projects were canceled before PNL opened the containers, and as a result, the packaging configuration is unknown. Similar materials have been responsible for recent occurrences at both LLNL, where cans of pulverized ash have become

pressurized, and Rocky Flats, where flammable gas concentrations near the lower flammability limit have been found in 55-gallon drums of ER salts.

2. Plutonium solutions and powders stored inside laboratory fumehoods and gloveboxes. One hood contains gram quantities of Pu-238 in solution. The typical packaging configuration for these solutions consists of a loosely capped glass bottle inside a taped slip lid can.

PNL has prepared corrective action plans for these materials, but the plans have not been approved by DOE. Much of PNL's plutonium holdings could be disposed of as waste, but PNL has not requested DOE to reclassify the material as waste. The plans also do not appear to recognize the hazards presented by some of these materials, in that no near-term safety improvements, such as moving Pu-238 solutions from hoods to gloveboxes or venting scrap containers which could accumulate flammable gases, are being undertaken.

- c. **Facility Condition Vulnerabilities:** The DOE study identified numerous vulnerabilities involving contamination and holdup at Hanford that exist in some form for practically every facility involved in the processing of plutonium. The following observations were made during tours of facilities with these vulnerabilities:

1. The acidic environment in the "White Room" (west end of the pipe and operating gallery) at Purex is resulting in the continual flaking and peeling of the fixative paint, exposing the contaminated surfaces.
2. Conditions observed in the Z-9 Building raised questions regarding the accuracy of data presented in the Hanford Site Assessment Report prepared as part of the DOE vulnerability assessment. This retired facility is reported as being relatively clean with constant air monitoring. In fact, this small building is cluttered with old equipment, garbage, and open receptacles containing used anti-contamination clothing. In addition, the ventilation and Continuous Air Monitors (CAMs) have been deactivated. WHC personnel informed the staff that the CAMs are only activated monthly during facility surveys. These observations raise questions concerning the accuracy in the reported condition of other retired facilities.

Except for the evacuation of offices housed in former plutonium processing buildings, the WHC corrective action plans for the retired facilities mainly outline established schedules where they exist and propose preferred actions or tradeoff studies where there are none. Further scheduling is to be developed when funding is provided.

5. **Future Staff Actions:** The staff will continue to review the adequacy of DOE's plutonium vulnerability assessment and the associated corrective actions as well as the complex-wide implementation of 94-1.