

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 2, 1994

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: William Shields

SUBJECT: Fire Protection Program and Features, Idaho National Engineering Laboratory, Radioactive Waste Management Complex Report of Site Visit, May 18, 1994

1. Purpose: This memorandum describes the results of the DNFSB Staff visit to the Idaho National Engineering Laboratory (INEL) Radioactive Waste Management Complex (RWMC). The trip included a tour of RWMC facilities, both existing and under construction. Special attention was paid to the air support structures now being used to cover radioactive waste containers pending completion of more permanent storage buildings.
2. Summary: Fire protection levels at the site are generally adequate when compared with the hazards present. The program receives adequate attention, appears well-funded and supported by management. Major improvements will result as radioactive waste now stored in unprotected temporary structures is moved to well-protected permanent buildings. Further staff review is not indicated at this time.
3. Background: The RWMC is a complex of buildings located to the southwest of the main INEL complex. The RWMC was constructed beginning in the 1950's to receive and bury waste shipped from Rocky Flats. Over the ensuing 40 years, hundreds of thousands of barrels and crates of Rocky Flats radioactive waste, both low-level and transuranic, have been shipped to the RWMC and buried. During the early part of the period, characterization and labeling of the waste was poor or non-existent; these practices improved during the 1970's and 1980's.

Much of the waste was destined to be shipped to the Waste Isolation Pilot Plant (WIPP), starting in about 1986, but this waste has necessarily remained at the RWMC. Thousands of barrels and crates remain buried and unexamined, while many thousands of other barrels and crates have been extracted from the ground, characterized, and are ready for shipment. Much of this waste is now stored on concrete pads covered by air domes (called "air support weather structures", or ASWS). Extraction of the waste from burial pits and characterization of that waste is continuing at the site, albeit at a pace that would not complete the job for decades.

4. Discussion:
  - a. Scope of Review: The DNFSB Staff review encompassed the following topics:
    1. Overview of the site, structures, operations, work in progress, future mission and facility modifications planned.
    2. Elements of fire hazards analysis for RWMC facilities, including the following subjects:
      - methodology of analysis
      - physical barriers, fire doors
      - prevention program (e.g. combustibile & ignition source control)
      - installed detection systems

- installed suppression systems
  - electrical systems and ventilation
  - emergency lighting
  - compensatory measures for non-compliance (e.g. fire watches)
  - training and qualifications
3. Current Safety Analysis Report (SAR) approach:
- Identification and evaluation of limiting fires
  - Revisions to the SAR underway
  - Impact of changes in mission or increase of storage
  - Unreviewed Safety Questions determinations involving fire scenarios

Particular attention was paid to the hazards of storing radioactive waste in the air support structures, which lack installed suppression and detection and could easily be damaged by internal or external fires.

The review consisted of discussions with EG&G and Department of Energy (DOE) fire protection engineers, SAR specialists, and a tour of the RWMC.

b. Program Adequacy:

1. The fire protection program at the RWMC is well-staffed; two degreed fire protection engineers are assigned by EG&G to the project (one for existing facilities, one for construction activities), supported by a lead fire protection engineer for Environmental Restoration and Waste Management and by a (senior) Cognizant Fire Protection Engineer for the INEL site as a whole.
2. The site fire department (in transition from DOE to contractor status) has adequate personnel strength, equipment, and training to respond promptly and effectively to fires in the RWMC.
3. Documentation of the RWMC fire protection program is adequate at present. DOE and EG&G are aware that additional work is needed on Fire Hazards Analyses (FHAs) and pre-fire plans, and that DOE approval is needed for several fire safety equivalency studies. Internal audit procedures, frequency, and follow-up are adequate.
4. The RWMC Safety Analysis Report calculates the probability and consequences of limiting-case fires which release radioactive materials into the environment. Without giving weight to the absolute risk numbers generated by such calculations, it does appear that highly unlikely scenarios coupled with conservative estimates of the resulting fires must be postulated to generate significant releases. The size and remoteness of the site also serve to minimize offsite consequences.

c. Storage of Radioactive Waste in Unprotected Structures:

1. Storage of radioactive waste in unprotected temporary structures is not a desirable situation. The ASWSs were intended to house radioactive waste only during the time (probably measured in months) between the waste being dug up from pits and its eventual shipment to WIPP. Delay of WIPP opening year after year has resulted in large amounts of waste being stored in these temporary buildings.

2. The storage of radioactive waste in the ASWSs will gradually be ended as new permanent buildings are completed. These buildings will be fully protected with installed detection and suppression systems, in addition to being of strong concrete/steel construction.
  3. DOE analysis of fires inside the ASWSs shows that such fires would not cause a substantial release of radioactive material. This result is reached because (1) the radioactive waste is stored in metal drums or plywood crates treated with a fire-resistant coating, (2) the concentration of radioactive materials in the drums and crates is low, (3) a fire watch coupled with normal building occupancy can be expected to detect incipient fires, (4) administrative controls prevent large quantities of transient combustible from being brought inside, and (5) prompt and effective fire department response can be expected once a fire is detected.
  4. In light of the construction of permanent, protected buildings to store the radioactive waste and ultimately, the opening of WIPP, no further fire protection measures are warranted in the ASWSs at this time. Fire protection can best be enhanced by completing the permanent storage structures and transferring radioactive waste into them. These structures will be protected by linear beam detectors and full-coverage water suppression systems.
5. Future Staff Reviews:
- Further DNFSB Staff reviews of fire protection at the RWMC are not warranted.

#### ATTACHMENT A

##### Documents Reviewed

1. "Safety Analysis Report for the Radioactive Waste Management Complex at the Idaho National Engineering Laboratory," EGG-WM-10881, May 1994.
2. "Fire Protection Survey, Idaho National Engineering Laboratory," Factory Mutual Research, November 1990.
3. Idaho Operations Building Code, DOE-ID 12044, Chapter 1, "Fire Protection."
4. Idaho Operations Office Standard Operational Safety Requirements, Appendix 0550, Part IV, "Industrial Fire Protection."
5. Idaho Operations Office Architectural Engineering Standards, Section 1530, "Fire Protection." (September 1993)
6. INEL Fire Department, "Overview of Fire Department Operations."
7. EG&G Resource Manual, Section 5, "Environment, Safety and Quality." (January 1994)
8. EG&G Procedures Manual, Section 6, "Fire Protection Procedures." (April 1994)
9. EG&G Safety Manual, Number 11, "Fire Protection." (July 1993).
10. RWMC Pre-Fire Plan, Certified and Segregated (612 SWEPP), September 1993.