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Hazards Assessment for the INEL Landfill Complex

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ABSTRACT

This report documents the hazards assessment for the INEL Landfill Complex (LC) located at the Idaho National Engineering Laboratory, which is operated by EG&G Idaho, Inc., for the U.S. Department of Energy (DOE). The hazards assessment was performed to ensure that this facility complies with DOE and company requirements pertaining to emergency planning and preparedness for operational emergencies. DOE Order 5500.3A requires that a facility-specific hazards assessment be performed to provide the technical basis for facility emergency planning efforts. This hazards assessment was conducted in accordance with DOE Headquarters and the DOE Idaho Operations Office (DOE-ID) guidance to comply with DOE Order 5500.3A. The hazards assessment identifies and analyzes the hazards that are significant enough to warrant consideration in a facility's operational emergency management program. The area surrounding the LC, the buildings and structures at the LC, and the processes that are used at the LC are described in this report. All hazardous materials, both radiological and nonradiological, at the LC were identified and screened against threshold quantities according to DOE Order 5500.3A guidance. Asbestos at the Asbestos Pit was the only hazardous material that exceeded its specified threshold quantity. However, the type of asbestos received and the packaging practices used are believed to limit the potential for an airborne release of asbestos fibers. Therefore, in accordance with DOE Order 5500.3A guidance, no further hazardous material characterization or analysis was required for this hazards assessment.

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Hazards Assessment for the INEL Landfill Complex

1. INTRODUCTION

This report documents the hazards assessment for the INEL Landfill Complex (LC) located at the Idaho National Engineering Laboratory (INEL), which is operated by EG&G Idaho, Inc., for the Department of Energy (DOE). The hazards assessment was conducted in accordance with guidance from DOE Headquarters¹ and DOE Idaho Operations Office (DOE-ID)² to comply with DOE Order 5500.3A, "Planning and Preparedness for Operational Emergencies,"³ which requires a facility-specific hazards assessment to provide the technical basis for facility emergency planning efforts. This hazards assessment identifies and analyzes the hazards that are significant enough to warrant consideration in a facility's operational emergency management program.

This report describes the LC, the area surrounding the LC, the buildings and structures located within the LC boundary, and the processes involved with the operation of the LC. Also, all hazardous materials stored, used, or produced at the LC are identified in this report. The hazards were screened in accordance with DOE Order 5500.3A guidance. The results of the screening are presented.

2. FACILITY AND SITE DESCRIPTION

As stated in the *INEL Site Development Plan*,⁴ the INEL encompasses 2,300 km² (890 mi²) of the northwestern portion of the Eastern Snake River Plain in southeastern Idaho. The INEL is nearly 63 km (39 mi) long from north to south and about 58 km (36 mi) wide in its broadest portion. The INEL includes portions of five Idaho counties (Bingham, Bonneville, Butte, Clark, and Jefferson). The INEL was established in 1949 by the U.S. Government to build, test, and operate developmental nuclear reactors and related facilities. New facilities have since been built and original buildings have been modified to accommodate testing and data gathering for reactor safety experiments, fuel studies, boiling water reactors, breeder reactors, aircraft nuclear propulsion, naval reactors, waste management programs, geothermal research, and environmental research.

The INEL is a limited access area about 72 km (45 mi) west of Idaho Falls, Idaho. The INEL was divided into distinct and geographically separate functional areas for programmatic necessity and operational efficiency. One of these areas is the Central Facilities Area (CFA). CFA consists of facilities that provide centralized support services for programmatic and nonprogrammatic efforts for the INEL. One of the support services is the LC. The LC consists of several areas at CFA that are used for the disposal of clean waste generated at the INEL; the LC also provides support for the INEL recycling program.

2.1 Facility Mission

Figure 1 shows the different areas used as landfills at the INEL. The dates of operation and mission for each one of these landfills are as follows:

- Landfill I was operated from the late 1940s to the late 1960s. This landfill was used to dispose municipal solid sanitary waste, as regulated by 40 CFR 257 and 258, that was generated at the INEL. This landfill has been covered with the required amount of fill material and is inspected yearly.
- Landfill II was operated from the late 1960s to approximately 1977. This landfill was also used to dispose municipal solid sanitary waste, as regulated by 40 CFR 257 and 258, that was generated at the INEL. This landfill has also been covered with the required amount of fill material and is inspected yearly.
- Landfill III was operated from approximately 1977 to 1985. This landfill was also used to dispose municipal solid sanitary waste, as regulated by 40 CFR 257 and 258, that was generated at the INEL. This landfill has also been covered with the required amount of fill material and is inspected yearly.
- Landfill III Extension was opened in approximately 1985 and is still being used. This landfill is used to dispose of industrial/commercial solid sanitary waste, as regulated by 40 CFR 258, that is generated at the INEL.

Figure 1. INEL Landfill Complex boundary.

- The Asbestos Pit was opened in approximately 1978 and is still in operation. The Asbestos Pit is used to dispose of asbestos and asbestos-bearing materials that were used at the INEL.
- The Bulky Waste Pit was opened in 1987 and is still in operation. The Bulky Waste Pit is used to dispose of clean nonradioactive/noncontaminated earth materials and industrial/commercial solid sanitary waste, as regulated by 40 CFR 258, that is generated at the INEL.

2.2 Facility Location

All of the landfills in the LC are located northwest of CFA. Figure 2 shows the location of the LC with respect to the other buildings at CFA. The location of CFA on the INEL is shown in Figure 3. Figure 4 shows the location of the INEL and approximate distances to cities and towns in the region. Figures 3 and 4 show the public access points, and roadways for transportation to and from the site and while traveling in the site boundary, and other facilities located within the site boundary. The LC is located in Butte County.

2.3 Facility Description

For this hazards assessment, the LC consists of six landfill pits, two trailers, three cargo containers, and one building. The landfills are shown in Figure 1. (Structures are not shown)

Landfill I is adjacent to West Portland, approximately 0.5 km (0.3 mi) west of the Portland and Lincoln Boulevard intersection.

Landfill II is adjacent to Lincoln Boulevard, approximately 0.24 km (0.15 mi) northeast of the Portland and Lincoln Boulevard intersection.

The Bulky Waste Pit is located adjacent to Lincoln Boulevard, approximately 0.5 km (0.3 mi) northeast of the West Portland and Lincoln Boulevard intersection. The Bulky Waste Pit is 732 m (2,400 ft) long and 46 m (150 ft) wide. A trench at the Bulky Waste Pit has been excavated to approximately 6 to 7.5 m (20 to 25 ft) deep.

Landfill III, Landfill III Extension, and the Asbestos Pit are all located in the same area. This entire landfill area is located adjacent to West Portland, approximately 0.7 km (0.45 mi) west of the Portland and Lincoln Boulevard intersection. This landfill area is approximately 732 m (2,400 ft) long by 152 m (500 ft) wide and has a 1.8 m (6 ft) high chain link fence around its perimeter. This area has grid markings to identify the location of disposed waste. The grid consists of posts spaced 30.5 m (100 ft) apart south to north marked with the letters A through X and post spaced 15.2 m (50 ft) apart east to west marked with the numbers 10 through 19. Landfill III is approximately 700 m (2,300 ft) long by 61 m (200 ft) wide. Landfill III Extension is approximately 700 m (2,300 ft) long by 91 m (300 ft) wide. Landfill III Extension consists of six trenches, each 15.2 m (50 ft) wide by 700 m (2,300 ft) long and excavated to approximately 7.5 to 9.2 m (25 to 30 ft) deep. The Asbestos Pit is located at the north end of the landfill and is positioned between grid markings W and X, and extends across the ends of trenches 10 through 19. The Asbestos Pit is

Figure 2. Location of the INEL Landfill Complex.

ARA Auxiliary Reactor Area
 ANL-W Argonne National Laboratory-West
 CFA Central Facilities Area
 CTF Contained Test Facility
 EBR-I Experimental Breeder Reactor I
 EBR-II Experimental Breeder Reactor II
 ICPP Idaho Chemical Processing Plant
 IET Initial Engine Test
 NRF Naval Reactor Facility
 PBF Power Burst Facility
 RWMC Radioactive Waste Management Complex
 STF Security Training Facility
 TAN Test Area North
 TRA Test Reactor Area
 TREAT Transient Reactor Test (Facility)
 TSF Technical Support Facility
 WRRTF Water Reactor Research Test Facility
 ZPPR Zero Power Plutonium Reactor

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Figure 3. Location of the CFA.

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— — — — 10, 25, 50 mi
from Central Facilities Area

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Figure 4. Location of the INEL.

approximately 30.5 m (100 ft) long by 152 m (500 ft) wide. This pit is excavated to approximately 6 m (20 ft) deep.

A trailer and a cargo container are located south of the landfill. Also, located to the west of the landfill is a small building, a trailer, and two cargo containers.

The two trailers are 2.4 by 6 m (8 by 20 ft) and have a conventional mobile home frame construction. The trailers are currently being used as offices. There is a 757 L (200 gal) propane tank located approximately 9.2 m (30 ft) west of the trailer that is adjacent to Landfill III Extension.

The three steel cargo containers are 2.7 m (9 ft) wide by 9.2 m (30 ft) long by 2.4 m (8 ft) high. One cargo container (west of Landfill III Extension) is used as a mechanical shop while the other two are used for storage. Four fire proof cabinets are located outside the two cargo containers by the Landfill III Extension.

The building is 3 by 3 m (10 by 10 ft) and is constructed of wood. An eye wash station, a fire proof cabinet, and two self-contained breathing apparatus are located inside this building.

2.4 Processes and Operations for the INEL Landfill Complex

The processes at each of the three landfills still in use are slightly different. The staffing for the three landfills is approximately 15 to 20 personnel during normal working hours.

The process at the Landfill III Extension is to receive and dispose of clean nonradioactive/noncontaminated and nonhazardous solid waste. Solid waste is delivered in either dumpmaster trucks, chain truck, or other trucks and/or trailers. Compactable waste (e.g., paper and boxes) are typically delivered on the dumpmaster trucks. Chain trucks are used to deliver noncompactable waste [e.g., scrap metal less than 2.4 m (8 ft) long]. All waste is dumped at the lip of the trench, spread, inspected, compacted, and covered with fill material (dirt and gravel) daily. Waste is spread with a bulldozer if it is not already spread by off-loading. A visual inspection is performed to identify and remove prohibited items. Items prohibited from disposal at the landfill are listed in Appendix A. Also, the LC health physicist performs radiological surveys of the waste to ensure that the waste is less than 100 counts above background.

The process at the Asbestos Pit is to receive and dispose of asbestos and asbestos-bearing materials. Asbestos and asbestos-bearing materials are typically received in pre-packaged 1.2 by 1.2 by 2.4 m (4 by 4 by 8 ft) plywood boxes. Generators of the asbestos waste load plywood boxes with asbestos and asbestos-bearing material that has been sealed in double or triple polyethylene bags. Filled plywood boxes are sealed, nailed, and banded (with three metal bands) before being shipped to the landfill. Occasionally, small shipments of asbestos-bearing material is received at the LC in double or triple polyethylene bags. These small shipments are placed into a plywood box which is then sealed, nailed, and banded (with three metal bands) once filled.

Plywood boxes received at the Asbestos Pit are delivered on flatbed trucks or trailers. The plywood boxes are off-loaded with a forklift or crane, depending on the weight. The plywood boxes are stacked two high in the pit. Once six plywood boxes have been placed in the pit (three

rows of one deep and two high), the plywood boxes are covered with 0.6 m (2 ft) of earthen material. Before being landfilled, the asbestos waste is visually inspected and radiologically surveyed.

The process at the Bulky Waste Pit is to receive and dispose of solid waste [e.g., concrete and scrap metal longer than 2.4 m (8 ft)]. All waste is dumped or off-loaded at the lip of the pit, inspected, radiologically surveyed, pushed into the pit, and covered with fill material.

Abnormal operating procedures are conducted upon receipt of prohibited items at the landfill. When prohibited items are found in a load of waste, operations are curtailed. The generator is notified of such items and shall respond to collect these items and clean up any nonconformance before normal operations are resumed.

The LC is also in charge of recycling mixed paper products and cardboard at the CFA. Recycling bins are placed at CFA facilities for collecting mixed paper products and cardboard. The recycling bins are periodically checked by LC personnel to determine if the bins need to be emptied. Filled recycling bins are inspected, surveyed for radiological hazards, and emptied into dumpmaster trucks. The mixed paper products and cardboard are then hauled offsite to a local recycling vendor.

3. HAZARDOUS MATERIAL IDENTIFICATION

The chemical, radiological, external, and nearby facility hazards associated with the LC have been identified and are discussed in this section.

3.1 Chemical Hazards

The hazardous materials stored, used, and produced at the LC have been identified from the LC Hazardous Agent Inventory (inventory dated March 29, 1993). In addition, a walkdown of the facility was conducted on April 19, 1993, with a cognizant LC facility representative to update the inventory and verify that the updated inventory was complete and accurate. The updated inventory is listed in Table 1.

3.2 Radiological Hazards

There are no radiological hazards stored, used, or produced at the LC.

3.3 External Hazards

Natural phenomena hazards associated with the LC are earthquakes, floods, winds, tornadoes, lightning strikes, volcanism, range fires, and heavy snow. These natural phenomena have the potential to impact the operations that take place at the LC. The only hazardous material that might be released due to any of these natural phenomena is asbestos. The hazards associated with the type of asbestos received at the LC are discussed in a following section.

3.4 Hazards at Nearby Facilities

The Idaho Chemical Processing Plant (ICPP), Advanced Test Reactor (ATR), and some facilities at CFA contain hazardous materials (radiological and nonradiological) that if released may cause an evacuation of personnel at the LC. However, hazards at these nearby facilities do not have the potential to cause a release of any hazardous materials contained at the LC.

Table 1. INEL Landfill Complex hazardous materials inventory.

Hazardous agent	Quantity	Location of the hazardous agent
Asbestos	Unknown ^a	Asbestos pit
Acetylene	1 cylinder	Service truck
Ammonium phosphate (ABC fire ext.)	6 hand-held cylinders	Trailers, eye wash building, cargo container, two extinguisher stations
Automatic transmission fluid Dexron II	45 qt (max)	Fireproof cabinet in the cargo container
Battery acid	10 batteries (max)	Vehicles on site
Chevron Declo 400 motor oil SAE 30	10 gal (max)	Fireproof cabinet in the cargo container
Compublend II glass cleaner	6 qt (max)	Trailer at main entrance
Diesel fuel #2	500 gal (max)	Aboveground tank west of Pit III Extension
Diesel fuel	20 gal (max)	Fireproof cabinet in the cargo container
Dyco Snow & Ice Buster	40 lb (max)	Trailer at main entrance
Envy cleaner	3 gal (max)	Janitor's vehicle
Ethylene glycol	10 gal (max)	Fireproof cabinet in the cargo container
Fire extinguisher, BC	6 hand-held cylinders	Trailers, eye wash building, cargo container, and two extinguisher stations
Floor Dry	200 lb (max)	Fireproof cabinet in the cargo container
Gasoline, auto, unleaded	100 gal (max)	Vehicles on site
Gasoline, leaded	25 gal (max)	Fireproof cabinet in the cargo container
Hand cream	32 oz (max)	Both trailers
Hand cream, Sani-Fresh	100 oz (max)	Both trailers
Hydraulic brake fluid	10 gal (max)	Service truck
Lead acid batteries	10 batteries (max)	Vehicles on site

Table 1. (continued).

Hazardous agent	Quantity	Location of the hazardous agent
Lemon Shine-up	1 gal (max)	Janitor's vehicle
Multi-purpose grease	350 oz (max)	Fireproof cabinet in the cargo container
Oxygen, compressed gas	2 cylinders	Eye wash building, used for SCBA
Portland cement	90 lb (max)	Cargo container
Propane	200 gal (max)	West of Pit III Extension trailer
Propane	5 gal (max)	Fireproof cabinet in the cargo container
Renuzit air freshener	96 oz (max)	Trailer at main entrance
Rislone concentrate	3 qt (max)	Service truck
Rust-Oleum	180 oz (max)	Fireproof cabinet in the cargo container
Rust-Oleum paint	1/2 gal (max)	Fireproof cabinet in the cargo container
Sodium bicarbonate (baking soda)	16 oz (max)	Service truck
Starting fluid	108 oz (max)	Fireproof cabinet in the cargo container
Super Blue II	6 oz	Fireproof cabinet in the cargo container
Tap-All	6 oz (max)	Service truck
Thrust Quick starting fluid	120 oz (max)	Fireproof cabinet in eye wash building
Unocal Guardol motor oil 15W/40	10 gal (max)	Fireproof cabinet in the cargo container
Unocal MP gear lube	55 gal (max)	Cargo container
Unocal multipurpose ATF Dextron	12 qt (max)	Fireproof cabinet in the cargo container
Unocal UNAX AW 32	55 gal (max)	Service truck
WD-40	1 qt (max)	Fireproof cabinet in the cargo container
Windex glass cleaner	64 oz (max)	Trailer at main entrance

Table 1. (continued).

Hazardous agent	Quantity	Location of the hazardous agent
Windshield washer solvent	10 gal (max)	Cargo container
3M brand A-101 spray cleaner	64 oz (max)	Janitor's vehicle
300 Flow Plus	15 qt (max)	Fireproof cabinet in the cargo container

a. Specific quantity of asbestos is not known. Shipping records indicate only gross weight of disposed plywood boxes.

4. HAZARDOUS MATERIAL SCREENING

The hazardous materials were screened according to DOE Order 5500.3A guidance. DOE guidance states that a screening or threshold quantity (TQ) should be used to eliminate the need to analyze insignificant hazards. The guidance states that the threshold planning quantity (TPQ) defined by the EPA Superfund Amendment and Reauthorization Act (SARA) Title III, 40 CFR Part 355, Appendix A, may be used as TQs for those chemicals listed. In addition, the reportable quantity (RQ) from SARA Title III Consolidated List of Chemicals, 40 CFR Part 302, Table 302.4, was also used as a TQ in the screening process. The TQ screening criteria for radioactive materials was from 10 CFR 30.72, Schedule C.

Of the hazardous materials identified at the LC, the only hazardous material that may exceed its TQ is asbestos. 40 CFR 302 states that the RQ for friable asbestos is 0.45 kg (1 lb). Friable asbestos is any material containing more than one percent asbestos that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Disposal records for the Asbestos Pit were reviewed to determine if a quantity of friable asbestos could be estimated.

Asbestos and asbestos-bearing materials have been disposed of in the Asbestos Pit since approximately 1978. Before 1991, disposal records for all the landfill pits at the LC were kept in one log book. After 1991, disposal records were kept in separate log books for the various landfill pits. The disposal records after 1991 were reviewed. The disposal records indicate the type of asbestos-bearing material (i.e., tiles, piping, and backing material) and the gross quantity of waste contained in each plywood box. The disposal records do not indicate the quantity or percentage of asbestos contained in the disposed materials. Also, the disposal records do not indicate whether the disposed waste contained friable or nonfriable asbestos. However, cognizant LC representatives concurred that a majority of the asbestos waste is nonfriable asbestos.

Cognizant LC representatives also indicated that the asbestos waste is thoroughly packaged and sealed to prevent any type of airborne release of asbestos fibers. Asbestos and asbestos-bearing materials are wetted, wrapped in double or triple polyethylene bags, and then placed in plywood boxes that are sealed, nailed, and banded with three metal bands. The plywood boxes are then stacked in the Asbestos Pit and landfilled with 0.6 m (2 ft) of earthen material. LC representatives strongly felt that because of the type of asbestos waste and the packaging of the waste, a release of friable asbestos is highly unlikely. Therefore, asbestos will be screened from further characterization and analysis.

5. CONCLUSIONS

Upon completion of hazards identification and screening, it was determined that asbestos was the only material that may exceed its TQ. The quantity of friable asbestos at the LC is not known. However, cognizant LC representatives concurred that a majority of the asbestos waste is nonfriable asbestos. In addition, LC representatives indicated that the asbestos waste is thoroughly packaged and sealed to prevent any type of airborne release of asbestos fibers. The asbestos waste is wetted, wrapped in double or triple polyethylene bags, and placed inside plywood boxes that are sealed, nailed, and banded with three metal bands. The plywood boxes are then stacked in the Asbestos Pit and landfilled with 0.6 m (2 ft) of earthen material. LC representatives strongly felt that because of the type of asbestos waste and the packaging of the waste, a release of friable asbestos is highly unlikely. Therefore, no further characterization or analysis will be performed.

However, LC personnel should be fully aware of the hazards associated with asbestos. Personnel should be very cautious following any event that causes a breach of the plywood boxes. All nonessential personnel should be evacuated from the area if a plywood box is breached.

6. MAINTENANCE AND REVIEW OF THIS HAZARDS ASSESSMENT

The Waste Reduction Operation Complex (WROC) Management is responsible for ensuring that the LC hazards assessment is regularly reviewed and maintained current. The review requirement and schedule is specified in the Site Emergency Readiness Assurance Plan.

The LC hazards assessment is a controlled document and is subject to Configuration Control. Configuration Control is the process of managing documents to ensure that they are adequately defined, evaluated, reviewed, and approved. At WROC, a Configuration Management (CM) coordinator has been assigned to coordinate the disciplined implementation of configuration management. The CM coordinator knows LC systems, components, and documents and ensures that changes are managed in accordance with approved procedures. The CM coordinator identifies the change that needs to be made, ensures that proper review and approval are obtained, ensures that other affected documentation is identified, and follows up to ensure that the change has been implemented. Changes to facility documentation and equipment are documented in drawing revision requests, document change notices, and facility change forms. The Unreviewed Safety Question⁵ (USQ) process interfaces with CM through these documents, which implement the requirement to perform a USQ evaluation as a part of the change control process.

7. REFERENCES

1. U.S. Department of Energy, Office of Emergency Preparedness and Response and Office of Emergency Planning and Operations, "Emergency Management Guidance," memorandum to Distribution, June 29, 1992.
2. J. A. Jones, Chief Occupational Safety and Emergency Management Branch DOE-ID, To Contractor Distribution, Subject: "Issuance of Hazards Assessment Guidance - AM/SES-OEM-92-206," October 7, 1992.
3. DOE Order 5500.3A, "Planning and Preparedness for Operational Emergencies," April 30, 1991.
4. EG&G Idaho, Inc., *Site Development Plan, Idaho National Engineering Laboratory*, prepared for the U.S. Department of Energy, November 1990.
5. DOE Order 5480.21, "Unreviewed Safety Questions," December 24, 1991.

Appendix A

Prohibited Items at the INEL Landfills

Appendix A

Prohibited Items at the INEL Landfills

The following items are prohibited from disposal at the landfill:

- Free liquids exceeding one gallon per container or any quantity of any unknown liquid. No free liquids is the goal.
- No free liquid quantities of volatile organic compounds.
- Radioactive/contaminated items that exceed the limits outlined in DOE-ID Order 5400.5, "Radiation Protection of the Public and the Environment," Chapter II, Section 5.c. This includes any material enhanced by a DOE Operation.
- "Mixed waste," as defined by DOE 5820.2A, "Radioactive Waste Management"
- Hazardous wastes, "listed" or "characteristic," as defined by 40 CFR 261
- Rubber tires (auto, truck)
- All batteries
- Printed circuit boards
- Mercury and sodium vapor lights
- Polychlorinated biphenyls above 25 ppm
- Lead
- Lead- and chrome-based paints
- Solder
- Scrap wood or metal, longer than 2.4 m (8 ft)
- Telephone cable
- Pesticides, herbicides, insecticides, and rodenticides
- Medical wastes consisting of medical sharps (anything sharp used to cut or scrape tissue, inject medicine, or draw blood, such as needles and scalpels)
- Liquid absorbed into an absorbent material such as kitty litter and floor dry.

NOTE: Liquids (in excess of one gallon) must be solidified using cement or similar product to produce a solid form such as concrete.

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