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Hazards Assessment for the Hazardous Waste Storage Facility

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ABSTRACT

This report documents the hazards assessment for the Hazardous Waste Storage Facility (HWSF) 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 DOE Idaho Operations Office guidance to comply with DOE Order 5500.3A. The hazards assessment identifies and analyzes hazards that are significant enough to warrant consideration in a facility's operational emergency management program. The area surrounding HWSF, the buildings and structures at HWSF, and the processes used at HWSF are described in this report. All nonradiological hazardous materials at the HWSF were identified (radiological hazardous materials are not stored at HWSF) and screened against threshold quantities according to DOE Order 5500.3A guidance. Two of the identified hazardous materials exceeded their specified threshold quantity. This report discusses the potential release scenarios and consequences associated with an accidental release for each of the two identified hazardous materials. Emergency considerations, such as emergency planning zones, emergency classes, protective actions, and emergency action levels, are also discussed based on the analysis of potential consequences. Evaluation of the potential consequences indicated that the highest emergency class for operational emergencies at the HWSF would be a Site Area Emergency.

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ACRONYMS

CFA	Central Facilities Area
CLRF	Central Laundry/Respiratory Facility
CM	Configuration Management
DCL	Dosimetry Calibration Laboratory
DOE	Department of Energy
DOE-ID	DOE Idaho Operations Office
DOT	Department of Transportation
EALs	emergency action levels
EPA	Environmental Protection Agency
EPZ	emergency planning zone
ERPG	Emergency Response Planning Guide
HWSF	Hazardous Waste Storage Facility
INEL	Idaho National Engineering Laboratory
MSDSs	Material Safety Data Sheets
PAG	Protective Action Guidelines
RCRA	Resource Conservation and Recovery Act
RQ	reportable quantity
RSAC	Radiological Safety Analysis Computer Program
SAR	Safety Analysis Report
SARA	Superfund Amendment and Reauthorization Act
TPQ	threshold planning quantity
TQ	threshold quantity
TSCA	Toxic Substances Control Act

USQ	Unreviewed Safety Question
WO	Waste Operations
WROC	Waste Reduction Operations Complex

Hazards Assessment for the Hazardous Waste Storage Facility

1. INTRODUCTION

This report documents the hazards assessment for the Hazardous Waste Storage Facility (HWSF) 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 the 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. The 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 HWSF, the area surrounding the HWSF, the buildings and structures located within the HWSF boundary, and the processes involved with the operation of the HWSF.

This report identifies the hazardous materials stored at the HWSF and screens them against the criteria specified in DOE Order 5500.3A. Two identified hazardous materials exceeded the screening criteria. These two hazardous materials were characterized and event scenarios that have the potential to result in a release were developed.

From the event scenarios and the quantity of hazardous materials released, dispersion calculations were performed that estimate the consequences of a particular release. The results were then used to establish an emergency planning zone (EPZ), emergency classes, protective actions, and emergency action levels (EALs) for operational emergencies at the HWSF.

The consequence estimates indicated that concentrations at the facility boundary would exceed the protective action criteria for a Site Area Emergency [Emergency Response Planning Guide (ERPG)-2 or equivalent]. Therefore, the highest emergency class for operational emergencies at the HWSF would be a Site Area Emergency.

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 at its broadest point. 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 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 is 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 provides efficient, centralized support services for programmatic and nonprogrammatic efforts at the INEL. One of these CFA facilities is the HWSF. The HWSF mission, location, and description are discussed in the following subsections. A majority of the information presented is from the HWSF Safety Analysis Report (SAR).⁵

2.1 Facility Mission

The current mission of the HWSF is to provide interim storage of nonradioactive hazardous waste generated at the INEL. This mission includes activities associated with receiving, storing, and shipping (to offsite disposal facilities) of nonradioactive hazardous waste.

2.2 Facility Location

The HWSF is located on Quebec Avenue in the northeast part of CFA, which lies in Butte County. Figure 1 shows the HWSF with respect to the other buildings at CFA. The Central Laundry Respiratory Facility (CLRF) and the Dosimetry Calibration Laboratory (DCL) are the two nearest occupied facilities that could be affected by the HWSF. The CLRF is approximately 125 m (410 ft) from the HWSF; one person inspects the facility each day during normal working hours. The DCL is approximately 235 m (770 ft) from the HWSF and normally houses five persons during normal working hours.

The location of CFA on the INEL is shown in Figure 2. Figure 3 shows the location of the INEL and approximate distances to cities and towns in the region. Figures 2 and 3 show the nearest public access points and the transportation network for the INEL and surrounding towns.

Figure 1. Location of HWSF.

Figure 2. Location of CFA.

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

AC1579

Figure 3. Location of the INEL.

2.3 Facility Description

For this hazards assessment, the HWSF includes an office trailer (CFA-655), two cargo containers, a loading/unloading area, and a storage building (CFA-637). The locations are shown in Figure 4.

The office trailer is 4.3 by 6.1 by 2.7 m (14 by 20 by 9 ft), has a conventional mobile home frame construction, and is situated 0.8 m (2-1/2 ft) above ground level. The trailer is currently being used as an office. Three storage lockers inside the trailer are designated for emergency equipment. The trailer is also equipped with a fire extinguisher, a first aid kit, and four Scott Air Packs.

Situated approximately 1.5 m (5 ft) north of CFA-637, the two steel cargo containers measure 2.4 by 6.1 by 2.4 m (8 by 20 by 8 ft). They are used to store miscellaneous emergency and spill containment equipment.

The loading/unloading area is an L-shaped concrete pad located at the main entrance to CFA-637. The area at the main entrance is approximately 4.3 m (14 ft) wide and 3.0 m (10 ft) long. The remainder is approximately 9.1 m (30 ft) wide and 9.1 m (30 ft) long. The entire loading/unloading area is surrounded by a concrete berm that is approximately 0.8 m (2-1/2 ft) wide and 12.7 cm (5 in.) high at the midline and slopes toward the edges. The concrete pad and berm are coated with a sealant and an epoxy paint (VIPoxy 310). The sealant is resistant to many acids, alkalies, oxidizers, solvents, greases, and oils.

Built in 1950, CFA-637 has been upgraded to meet the requirements of 40 CFR 264 for the storage of hazardous waste. It is a half-cylinder bunker approximately 33.5 m (110 ft) long and 7.6 m (25 ft) wide constructed of concrete and covered with earth. The concrete is 0.6 m (2 ft) thick at the base of the east and west walls and tapers to 15.2 cm (6 in.) at the roof. Approximately 0.6 m (2 ft) of earth covers the roof and the east and west walls, which have a slope of 1-1/2:1. A drain system is installed along the exterior walls that collects and removes precipitation that may penetrate the earthen cover of the building. The system prevents water from accumulating at the base of the walls where they join the floor slab and footings.

The interior of the storage building is approximately 31.7 m (104 ft) long by 7.6 m (25 ft) wide with a center height of 3.7 m (12 ft). The building floor is 12.7 cm- (5-in.)-thick reinforced concrete with a rating of 1,465 kg/m² (300 lb/ft²). VIPoxy 310 has been applied to the floor. As shown in Figure 5, the building is divided into two rooms: Room 102 (nonflammable storage), which houses Bays 1, 2, and 3, and Room 101 (ignitable storage), which is Bay 4.

Room 102 (Bays 1, 2, and 3) occupies the northern portion of CFA-637 and is approximately 18.3 m (60 ft) long by 7.6 m (25 ft) wide. Containment curbs 10.2 cm (4 in.) high and 15.2 cm (6 in.) wide separate the room into three bays that are all 7.6 m (25 ft) wide. Bay 1 is 7.3 m (24 ft) long, and Bays 2 and 3 are 5.5 m (18 ft) long. The storage bays are used to segregate incompatible wastes. Signs on the east (labeled "A") and west (labeled "B") walls of each bay designate the type and location of waste currently being stored in the facility. As the waste stored in each bay changes, the signs are changed to reflect the current waste being stored.

Figure 4. HWSF boundary.

Figure 5. HWSF storage bay configuration.

Concrete ramps at each door and containment curb are 1.8 m (6 ft) wide and 1.0 m (3-1/4 ft) long, with a maximum slope of 10%. The exceptions are the ramp between the rooms, which is 1.9 m (6-1/3 ft) wide, and the ramp at the rear personnel exit door in Room 101, which is 1.1 m (3-1/2 ft) wide.

The double steel doors for Room 102 are 0.9 m (3 ft) wide by 3.0 m (10 ft) high and 4.4 cm (1-3/4 in.) thick. The entrance wall and the wall that separates Rooms 101 and 102 are 20.3 cm (8-in.)-thick concrete block with a 3-hour fire rating. The rooms are connected by double steel doors [0.9 m (3 ft) wide by 2.7 m (9 ft) high and 4.4 cm (1-3/4 in.) thick] equipped with electromagnetic door holder releases to automatically close the doors if the fire detection system actuates or electrical power is lost. Trenches [10.2 cm (4 in.) wide by 2.5 to 7.6 cm (1 to 3 in.) deep] on the east and west walls run the length of the room. The trenches are separated between the storage bays. A gravity fed eyewash and a portable eyewash station are located along the west wall.

Room 101 (Bay 4) occupies the southern portion of CFA-637 and is approximately 7.6 m (25 ft) wide by 6.1 m (20 ft) long. The south wall is constructed of 20.3-cm (8-in.)-thick reinforced concrete. A personnel door leads to an entrance tunnel located on the south side of CFA-637. This door and one of the double doors (separating Rooms 101 and 102) are equipped with panic hardware to help personnel leave the rooms. The entrance tunnel is made of reinforced concrete 7.3 m (24 ft) long, 1.5 m (5 ft) wide, 2.1 m (7 ft) high, with 15.2-cm (6-in.)-thick walls. The tunnel entrance from the exterior is open and leads to the personnel door.

The number and size of containers that can be stored in each bay of the HWSF are listed in Table 1. The maximum storage capacity determined from the number and size of containers is also listed in Table 1. These storage capacities are based on information from the HWSF SAR.⁵ All containers used at the HWSF are Department of Transportation (DOT)-approved containers. Containers are accepted for storage only if they are properly closed and labeled, structurally sound, and manifested.

2.4 Support Systems

The HWSF has only two support systems: heating and ventilation and fire protection. No water systems, floor drains within the facility, or restrooms exist at the HWSF.

2.4.1 Ventilation and Heat

The building is ventilated by one roof-mounted ventilator and two exhaust fans, one located in Room 101 and one in Room 102. The roof ventilator provides air to Room 101. The exhaust fan in Room 101 (ignitable storage bay) is a Class I, Division 2, Group D (explosion proof) fan. The fan is driven by a two-speed motor and exhausts approximately 205 cfm, which is about three air changes per hour. The exhaust fan in Room 102 exhausts approximately 420 cfm, which is about two air changes per hour. Both fans are equipped with a backdraft damper, which neither confines nor contains the atmosphere and cannot prevent a release of any hazardous material in the HWSF.

Table 1. Maximum storage capacity of the HWSF.

Facility location	Example container configuration for maximum capacity	Maximum capacity (gal)
Bay 1	96 55-gal containers 16 20-gal containers 32 5-gal containers	5,760
Bay 2	72 55-gal containers 12 20-gal containers 24 5-gal containers	4,320
Bay 3	72 55-gal containers 12 20-gal containers 24 5-gal containers	4,320
Bay 4 (ignitibles)	48 55-gal containers	2,640
Total capacity		17,040

The ventilation system, as currently designed, is inadequate. It does not provide the necessary six air changes required for Room 102 by OSHA 1910.106. Also, air is drawn from the ignitibles room (Room 101) into Room 102. As a result, a new ventilation system is currently being designed. A Class I, Division 2, Group D exhaust fan rated at 505 cfm will be installed in Room 101. The new system will provide approximately seven air changes per hour in Room 101 and two and one-half air changes per hour in Room 102.

In the new system, air will enter the facility through the east wall in Room 102 and be drawn into Room 101 through the fire damper in the wall. Ducting will lead from the damper to the floor at both the northwest and northeast corners of the room, which will allow the air to enter Room 101 at floor level, as required by National Fire Protection Association 30. The air in Room 101 will then be collected by two vents at ceiling level, one each in the southwest and southeast corners of the room.

Heat is provided to the facility by two wall-mounted, 20 kW heaters installed in the northeast and southwest corners of Room 102. The heaters are equipped with blowers to circulate the heat.

2.4.2 Fire

No sprinkler protection is provided in the HWSF buildings. However, rate-compensated, fixed-temperature fire detectors are mounted in Room 101 and each bay of Room 102. The detector in Room 101 has an explosion-proof head. Actuation of the fire detectors activates audible and visible alarms, which are provided in Room 102 and on the outside wall of the main entrance. Actuation also de-energizes the electromagnetic holders on the doors between Rooms 101 and 102, thereby automatically closing the doors (if open) and isolating the two rooms. The doors and the wall between Rooms 101 and 102 are 3-hour rated.

Activation of the fire detectors transmits a fire alarm signal to the CFA Fire Department. The signal also can indicate system trouble, such as a loss of power, an open circuit, or a short circuit. A manual pull fire alarm is also provided on the outside wall of the main entrance. This pull alarm also activates the local audible and visible alarms and sends a fire alarm signal to the CFA Fire Department.

Class ABC fire extinguishers are located in both rooms, outside the building (main entrance) in a fire extinguisher box, and in the office trailer. A "Met-L-X" fire extinguisher (for combustible metals) is also located in the fire extinguisher box outside the building.

2.5 Processes and Operations at the HWSF

The processes at the HWSF consist of required pre-shipment and transportation activities, receipt and unloading of waste containers, storage and aisle spacing, and shipment of the containerized waste. The waste can be liquids, solids, or semisolids (sludges). The wastes are typically corrosives, flammables, reactives, oxidizers, poisons, PCBs, laboratory chemicals, and photographic chemicals. Associated activities, such as overpackaging of leaking containers, spill cleanup, and maintenance, are done as needed.

The facility is occupied approximately 4 to 5 hours every day by the HWSF operator for routine surveillance of the HWSF and administrative duties. The remainder of the time the HWSF is unoccupied unless a shipment of hazardous waste is received or shipped from the facility. The HWSF receives or ships an average of one shipment per week. When shipments are received or shipped offsite, the following personnel occupy the facility: a forklift operator, radiological control technician, HWSF operator, and an extra worker if needed.

2.5.1 Pre-shipment and Transportation Requirements

EG&G Idaho transportation personnel are responsible for transporting containers of nonradioactive hazardous waste from the generating source at the INEL to the HWSF for storage. Before shipment, the generator must receive approval of the waste stream and its packaging and labeling from Waste Reduction Operations Complex (WROC) personnel. The process, the associated data requirements, and the documentation are specified in the Resource Conservation and Recovery Act (RCRA) Permit for the facility. The generator arranges each shipment with the EG&G Idaho Traffic Management personnel and coordinates the shipment with Waste Operations (WO) personnel to ensure that they are present to receive the shipment.

If waste verification is required, it is performed at the generator's site. A WROC-designated person goes to the location to visually inspect the waste, witness waste packaging, collect samples for analysis, and record observations. The WROC-designated person then applies a tamper-proof seal to the container.

A variety of trucks (such as flat-bed trucks, small package delivery trucks, or semi-trailers with protective railings or tie-downs) are used to transport hazardous wastes to the HWSF. The truck driver receives the manifests, shipping papers, and supporting documentation upon arrival at the generator's location. Before accepting containers for transport to the HWSF, the truck driver visually inspects the integrity of the containers for leaks, rust, dents, or swelling. In addition,

facility personnel compare the accompanying identification papers and manifests with the containers and their labels to ensure they match and the containers are labeled properly. Containers that do not meet requirements are not shipped to the HWSF.

The containers are loaded onto the transport truck individually or on pallets. Containers may be secured by metal banding to a standard 1.2 by 1.2 m (4 by 4 ft) pallet. Once secured on the truck, the containers are transported to the HWSF, where the shipment is met by a HWSF operator.

2.5.2 Receipt and Unloading of Waste Containers

Upon arrival at the HWSF, the truck driver reports to the HWSF operator, who reviews the shipping papers and the manifests. Any discrepancies with documentation are resolved with the generator. The containers are unloaded using appropriate equipment such as a forklift or hand truck. If safe to do so, the containers may be unloaded manually.

After the containers are unloaded, the HWSF operator inspects them for damage, leaks, general appearance, and proper labeling and marking. If discrepancies are found, the generator is contacted for resolution. If necessary, the shipment may be rejected and returned to the generator. Upon acceptance, containers are removed from the loading/unloading area and placed into the assigned storage bay.

At no time are regulated containers of waste handled outside the bermed loading/unloading area or the fully contained HWSF container storage building (CFA-637). This practice minimizes the potential for a hazardous waste release to the environment. Any container that is leaking upon arrival or develops a leak during the unloading operation is immediately placed in a drip pan to contain the leaking hazardous waste. The leaking container is then placed in an overpack drum. HWSF personnel ensure that the overpack drum is labeled appropriately. In the event of a spill in the loading/unloading area, the spilled material is removed by a hand pump or cleaned up with absorbents, properly containerized, managed as a hazardous waste, and reported in accordance with the "HWSF/CLRF Emergency Plan/RCRA Contingency Plan." Spill procedures and cleanup equipment are located in the office trailer.

2.5.3 Storage Operations and Aisle Spacing

A primary aisle space 1.8 m (6 ft) wide, in line with the ramps, runs down the center of the entire facility to provide access to all bays. Containers are stored in the bays on either side of the center aisle. The containers are typically arranged on pallets within each bay to allow any leaks to flow away from the containers and into the secondary containment system. The spacing between the rows of pallets and between the pallets and walls is maintained in accordance with the HWSF RCRA Permit. Sufficient aisle space is required to allow unobstructed movement to each area for loading and inspecting containers, fire protection, spill control, and decontamination equipment access. Containers may also be stored directly on the floor of the storage bays or in drip pans.

Pallets of containers are placed two deep in two to four rows on either side of the center aisle. Except in Bay 4 (Room 101), pallets may be stacked two high. Because of the curvature of

the walls, large containers (e.g., 55 or 83 gal) can be stacked two high only on the pallets adjacent to the center aisle. The pallets are inspected before use to ensure that they are in good condition. Base containers (those placed on the pallets) are also inspected to ensure that they can provide a stable base for stacking containers. The strength, size, and weight of containers are considered before stacking.

The inventory in the HWSF is checked periodically by visually verifying the stored containers against a hard copy of the HWSF Inventory Data Base. When a Land Disposal Restricted waste container is found to be approaching its 1-year time limit, a memo field in the HWSF Inventory Data Base is flagged and plans are made to transport the waste to an offsite or onsite treatment facility.

The HWSF and waste containers are inspected according to the requirements given in the HWSF RCRA Permit. The inspections are documented in accordance with the HWSF RCRA Permit.

2.5.4 Waste Shipment

Before waste stored at the HWSF is transported to a treatment or disposal facility, a HWSF operator works with INEL Transportation Management to prepare appropriate manifests, notifications, and certifications, and to arrange the waste shipment with the transporter and receiving facility.

Containers are removed from CFA-637 by appropriate means (forklift, hand truck, etc.) and may be staged on the loading/unloading area until placed on the transport vehicle. The containers are inspected for proper labeling and good condition before they are loaded onto the transport vehicle by a forklift or another approved lifting device. Containers may be loaded manually if it is safe to do so. The HWSF operator provides the manifests, other shipping papers, certifications, and notifications to the transport vehicle driver and INEL Transportation Management before the waste shipment leaves the HWSF.

3. HAZARDS IDENTIFICATION

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

3.1 Chemical Hazards

The chemical or nonradiological hazardous materials stored at the HWSF were identified from an inventory dated June 3, 1993. In addition, a walkdown of the facility was conducted on June 3, 1993, with a cognizant HWSF facility representative to update the inventory and verify that the updated inventory was accurate. The updated inventory is listed in Table 2.

Because the HWSF is used for interim storage of hazardous waste, the hazardous materials and the quantities stored at the HWSF are constantly changing. Therefore, historical shipping records were used to predict potential hazardous materials and the maximum quantities that could be stored at the HWSF. These records are listed in Appendix A. The records list all hazardous materials stored at the HWSF from November 1989 to June 1993. A potential hazardous materials list was derived from the historical shipping records. The criteria used in deriving the potential hazardous materials list included how many times a particular hazardous material was shipped and the shipping dates of the hazardous material. The potential hazardous materials list includes any hazardous material that was shipped more than once and had a shipping date within the last year. The maximum quantity for each potential hazardous material was derived from the maximum quantity of each hazardous material stored in the HWSF at any one time. The potential hazardous materials and their maximum quantities are listed in Table 3.

Material Safety Data Sheets (MSDSs) and shipping records (EG&G Form 669) were reviewed to determine the quantity of each hazardous material of concern listed in Tables 2 and 3. The hazardous materials were then screened according to DOE Order 5500.3A. DOE guidance states that a screening or threshold quantity (TQ) should be used to eliminate the need to analyze insignificant hazards. The guidance documents state that the threshold planning quantity (TPQ) defined by the Environmental Protection Agency (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, TQs were determined for the hazardous materials that were not listed in 40 CFR Part 355, Appendix A, but were listed in SARA Title III Consolidated List of Chemicals, Table 302.4. The TQ for the hazardous materials listed in Table 302.4 were determined based on the requirements in DOE Order 5000.3B, "Occurrence Reporting and Processing of Operations Information."⁶ This order requires that an emergency event classification be made when any hazardous material listed in Table 302.4 is released in a quantity that is five times its reportable quantity (RQ). If five times the RQ exceeded 4,545 kg (10,000 lb), a TQ of 4,545 kg (10,000 lb) was established for that specific hazardous material. The TQs and basis for screening the hazardous materials are listed in Tables 2 and 3. The hazardous materials that exceeded the TQ are listed in Table 4.

Table 2. Current HWSF inventory.

Hazardous waste	Location	Maximum quantity (lb)	Hazardous material of concern	Maximum quantity (lb)	Threshold quantity (lb)	Basis
2-propanol & rose bengal	Room 101	106	2-Propanol (isopropyl alcohol)	85		— ^a
Air filter canisters contaminated with Chromium	Room 102	8	Chromium	0.05	10,000	1
Aqueous waste contaminated with selenium/trace tritium	Room 102	279	Selenium	0.002	500	1 ^b
Hydrochloric acid & nitric acid solution	Room 102	498	Hydrochloric acid	5	10,000 (liq)	1
			Nitric acid	5	1,000	2
Isoparaffinnic solvent	Room 101	107	Isoparaffinnic hydro-carbon solvent	96.3		— ^a
Kodak fixer (spent photochemical wastes) ^c	Room 102	2,700	Hydroquinone	159	10,000	2
			Potassium hydroxide	133	5,000	1
			Ammonium sulfite	133	10,000	1
			Acetic acid	133	10,000	1
			Ammonium acetate	133	10,000	1
			Sodium bisulfite	133	10,000	1
			Cadmium	0.0	50	1 ^b
			Silver	0.03	5,000	1 ^b
Lead contaminated debris	Room 102	70	Lead	0.77	5	1 ^b
Lead contaminated boiler soot	Room 102	274	Lead	3	5	1 ^b
Lead Contaminated Soil	Room 102	168	Lead	0.17	5	1 ^b
Lead contaminated incinerator ash	Room 102	766	Lead	0.051	5	1 ^b
Liquid mercury	Room 102	26	Mercury	26	5	1
Mercuric nitrate solution	Room 102	447	Mercuric nitrate	0.0	50	1
			Hydrogen peroxide	0.018	1,000	2
			Nitric acid	2.44	1,000	2
				0.13		
Mercury contaminated debris	Room 102	47	Mercury	0.235	5	1
Mercury instruments	Room 102	12	Mercury	0.12	5	1
Mercury chloride, mercury sulfide solution	Room 102	8	Mercury	0.08	5	1

Table 2. (continued).

Hazardous waste	Location	Maximum quantity (lb)	Hazardous material of concern	Maximum quantity (lb)	Threshold quantity (lb)	Basis
Mercury, metallic mixture	Room 102	20	Mercury	0.0 2	5	1
Mercury dimethyl, mercury diethyl solution	Room 101	8	Mercury	0.0 08	5	1
Methanol/water rinsate	Room 101	70	Methanol	7	10,000	1
Oil/stoddard solvent/water mixture	Room 101	87	Stoddard solvent	8.7		a
Oil contaminated with 2,4-D & Lead	Room 102	27	2,4-D Lead	0.2 7 0.0 005	500 5	1 1 ^b
Oil sludge/debris from UST clean-up	Room 102	1,992				a
Organic water mixture	Room 101	62	Chlorinated hydrocarbons	12.4	500	1
Paint shop debris	Room 102	635	Lead	0.0 64	5	1 ^b
Paint thinners & paint solid ^c	Room 101	714	Xylene Toluene Lead	90 45 0.0 72	5,000 5,000 5	1 1 1 ^b
Paint thinners & solvents ^c	Room 101	132	Xylene Toluene Butyl Acetate 2-Propanone	33 17 3.3 3.3	5,000 5,000 10,000 10,000	1 1 1 1
Photochemical solution	Room 102	504	(see kodak fixer)			
Potassium chromate & hydrochloric acid solution	Room 102	315	Potassium chromate Hydrochloric acid	1 8.5	50 10,000 (liq)	1 1
Potassium chromate solution	Room 102	2,494	Potassium chromate	7.5	50	1
Potassium chromate debris	Room 102	120	Potassium chromate	0.7 2	50	1
Rags contaminated with 1,1-dichloroethylene	Room 101	27	1,1 dichloroethylene	0.1 35	500	1
Rags contaminated with xylene & toluene	Room 101	122	Xylene Toluene	0.1 22 0.1 22	5,000 5,000	1
Silver nitrate & mercuric nitrate solution	Room 102	1,306	Silver nitrate Mercuric nitrate Hydrogen peroxide	0.3 9 0.0 065 0.2 6	5 50 1,000	1 1 2

Table 2. (continued).

Hazardous waste	Location	Maximum quantity (lb)	Hazardous material of concern	Maximum quantity (lb)	Threshold quantity (lb)	Basis
Silver nitrate solution	Room 102	43	Silver nitrate	0.0 13	5	1
Sodium chlorate, barium peroxide solution	Room 102	285				a
Sodium nitrate solution	Room 102	61				a
Solid debris contaminated with pentachlorophenol	Room 102	888	Pentachlorophenol	6	50	1
Spent safety klean solvent	Room 101	255	Benzene	12	50	1
Stoddard solvent	Room 101	713	Nonane Trimethyl benzene	606 107		a
Waste hydraulic fluid	Room 101	235				a
Water contaminated with pentachlorophenol	Room 102	1,002	Pentachlorophenol	6.7	50	1
Xylene & methanol lab pack	Room 101	294	Xylene Methanol	57 17	5,000 10,000	1 1

a. Not found in *SARA Title III List of Lists*; therefore, it was assumed to be a consumer product, as defined in 29 CFR 1910.1200.

b. No reporting of releases is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 μm (0.004 in).

c. All spent photochemicals were combined to provide a maximum quantity. MSDSs were reviewed and maximum percentage of the hazardous material of concern was used to determine a maximum quantity for that specific hazardous material. Thus the maximum quantity is a conservative quantity.

d. Waste containing paint thinner is composed of 10-25% (by weight) paint thinner. Therefore, assumed 25% of the maximum weight was paint thinner. The paint thinner's primary hazardous materials are xylene ranging from 25-50% and toluene ranging from 10-25%. The maximum percentage was used to determine the maximum hazardous material quantity.

Basis:

1. 40 CFR 302, Table 302.4—List of Hazardous Substances and Reportable Quantities. The TQ listed is five times the RQ, according to DOE Order 5000.3B, or a maximum TQ of 4,545 kg (10,000 lb).

2. 40 CFR 355, Appendix A—List of Extremely Hazardous Substances and their Threshold Planning Quantities.

Table 3. Potential HWSF inventory.

Hazardous waste	Location	Maximum potential quantity (lb)	Hazardous material of concern	Maximum quantity (lb)	Threshold quantity (lb)	Basis
1,1,1-TCE contaminated rags, debris	Room 102	240	1,1,1-TCE	0.24	5,000	1
Alkaline batteries	Room 102	3,600				— ^a
Boiler soot contaminated with lead	Room 102	450	Lead	5	5	1 ^b
Hydrochloric acid and nitric acid solution	Room 102	1,000	Hydrochloric acid	10	10,000 (liq)	1
			Nitric acid	10	1,000	2
Incinerator ash contaminated with lead	Room 102	2,000	Lead	0.2	5	1 ^b
Isoparaffinnic solvent	Room 101	200	Isoparaffinnic	180		— ^a
Kodak fixer (spent photochemical wastes) ^c	Room 102	10,000	Hydroquinone	600	10,000	2
			Potassium hydroxide	500	5,000	1
			Ammonium sulfite	500	10,000	1
			Acetic acid	500	10,000	1
			Ammonium acetate	500	10,000	1
			Sodium bisulfite	500	10,000	1
			Cadmium	0.09	50	1 ^b
			Silver	5	5,000	1 ^b
Lead contaminated debris	Room 102	850	Lead	0.85	5	1 ^b
Mercuric nitrate solution	Room 102	1,200	Mercuric nitrate	0.006	50	1
			Hydrogen peroxide	6.55	1,000	2
			Nitric acid	0.35	1,000	2
Mercury contaminated debris	Room 102	250	Mercury	1.25	5	1
PCB contaminated Ballasts/capacitors ^d	Room 102	10,000	PCB	4	5	1
Potassium chromate and Hydrochloric acid solution	Room 102	330	Potassium chromate	1	50	1
			Hydrochloric acid	8.9	10,000 (liq)	1
Potassium chromate solution	Room 102	6,250	Potassium chromate	19	50	1
Potassium dichromate debris	Room 102	100	Potassium dichromate	0.5	50	1
Silver nitrate & Mercuric nitrate solution	Room 102	3,100	Silver nitrate	0.93	5	1
			Mercuric nitrate	0.016	50	1
			Hydrogen peroxide	0.62	1,000	2
Silver nitrate solution	Room 102	2,300	Silver nitrate	0.69	5	1
Solvent contaminated rags	Room 102	300	1,1,1-TCE	1.5	5,000	1
			Stoddard solvent	1.5		
Spent oxygen breathing apparatus	Room 102	5,350	Potassium hydroxide	107	5,000	1

Table 3. (continued).

Hazardous waste	Location	Maximum potential quantity (lb)	Hazardous material of concern	Maximum quantity (lb)	Threshold quantity (lb)	Basis
Waste paint and thinners ^c	Room 101	6,300	Xylene	785	5,000	1
			Toluene	394	5,000	1
			Lead	0.63	5	1 ^b
Weapons cleaning debris	Room 102	100				— ^a

a. Not found in *SARA Title III List of Lists*; therefore, it was assumed to be a consumer product, as defined in 29 CFR 1910.1200.

b. No reporting of releases is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 μm (0.004 in).

c. All spent photochemicals were combined to provide a maximum quantity. MSDSs were reviewed and maximum percentage of the hazardous material of concern was used to determine a maximum quantity for that specific hazardous material. Thus the maximum quantity is a conservative quantity.

d. Assumed that the PCB-contaminated part weighed 10% of the maximum waste quantity. Also, assumed from review of different EG&G Form 669s that the average concentration of PCB was 4,000 ppm.

e. Waste containing paint thinner is composed of 10-25% (by weight) paint thinner. Therefore, assumed 25% of the maximum weight was paint thinner. The paint thinner's primary hazardous materials are xylene ranging from 25-50% and toluene ranging from 10-25%. The maximum percentage was used to determine the maximum hazardous material quantity.

Basis:

1. 40 CFR 302, Table 302.4—List of Hazardous Substances and Reportable Quantities. The TQ listed is five times the RQ, according to DOE Order 5000.3B, or a maximum TQ of 4,545 kg (10,000 lb).

2. 40 CFR 355, Appendix A—List of Extremely Hazardous Substances and Their Threshold Planning Quantities.

Table 4. Hazardous materials at the HWSF that exceed the threshold quantity.

Hazardous material	Location	Maximum quantity ^a (lb)	Threshold quantity (lb)	Basis
Lead	Room 102	6.68	5	1 ^b
Mercury	Room 102	27.25	5	1

a. Maximum quantity represents the largest quantity of either the identified current inventory or estimated potential inventory.

b. No reporting of releases is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 μm (0.004 in).

Basis:

1. 40 CFR 302, Table 302.4—List of Hazardous Substances and Reportable Quantities. The TQ listed is five times the RQ, according to DOE Order 5000.3B, or a maximum TQ of 4,545 kg (10,000 lb).

2. 40 CFR 355, Appendix A—List of Extremely Hazardous Substances and Their Threshold Planning Quantities.

3.2 Radiological Hazards

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

3.3 External Hazards

The natural hazards that could effect the HWSF include high winds, lightning, earthquakes, tornadoes, floods, range fires, heavy snow, and volcanism. The design criteria for wind loadings on the HWSF are unknown. However, because of structural characteristics, the building is not susceptible to damage from high winds or tornadoes. Lightning could cause short- or long-term power loss, but the loss would not cause a release of the hazardous materials stored at the HWSF. If power were lost at the HWSF, an alarm signal would be sent to the CFA Fire Department alerting them of the problem. Floods could not impact the HWSF because the facility's elevation is 6.1 m (20 ft) higher than the estimated flood crest of the Big Lost River. A substantial range fire cannot impact the HWSF because a 7.6-m (25-ft) fire break surrounds the HWSF. The reoccurrence interval for volcanic activity is estimated to be 100,000 years. Structural damage from snowloading is not expected because the maximum snowfall in the area is only about 114 cm (45 in.).

An earthquake is the only external hazard that could cause major structural damage to the building and cause a release of the hazardous materials. The effects of an earthquake are discussed in Section 5 as a possible release event for the hazardous materials that were above screening quantities.

3.4 Hazards at Nearby Facilities

The Tank Farm is the nearest facility that could impact the HWSF. Located approximately 150 m (492 ft) northeast of HWSF, the Tank Farm contains seven steel cylindrical tanks that range in size from 5,000 to 47,000 gal. The tanks contain fuel oil #2, diesel fuel #2, and unleaded gasoline. However, fire or projectiles from an explosion at the Tank Farm would not affect the hazardous materials at the HWSF because they are stored inside the building. Projectiles from an explosion at the Tank Farm could affect hazardous materials at the facility only if they were outside the facility because of receiving or shipping. This release mechanism is also discussed in Section 5.

4. HAZARD CHARACTERIZATION

The screening process described in the preceding section identified two hazardous materials that exceeded their screening threshold: lead and mercury. The inventory, properties, conditions of storage, and administrative controls for these hazardous materials are discussed in the following sections.

4.1 Lead

Lead stored at the facility is from lead-contaminated debris. The lead is received in DOT-approved drums for storage before being shipped offsite for treatment and disposal.

Inventory. The maximum quantity of lead at the facility depends on the concentration of lead in the contaminated debris. The quantity of lead stored at the facility changes periodically. A potential maximum quantity of lead was calculated to be 6.68 lb, which was estimated from the concentration levels listed on EG&G Form 669s and MSDSs.

Properties of Lead.⁷ Lead is a bluish-grey, soft metal with a boiling point of 1,740°C and a vapor pressure of 1 mm at 973°C. Lead affects the human central nervous system and is a poison if ingested. Lead is moderately irritating, a carcinogen of the lungs and kidneys, and an experimental teratogen. In dust form, lead is flammable and represents a moderate explosion hazard when exposed to heat or flame. Lead emits highly toxic fumes when heated. Lead also can react vigorously with oxidizing materials.

Conditions of Storage. The inventory of lead stored at the facility changes periodically due to shipments on- and off-site. The lead-contaminated debris varies from incinerator ash to soil. The lead contaminated debris is stored in DOT-approved drums, which are stored at room temperature in Room 102 (nonflammable storage room).

Room 102 is equipped with a fire alarm and two 20-kW heaters. There are no significant quantities of flammable or combustible materials in the room. However, oxidizers are stored in Room 102, to keep them separate from flammable or combustible materials in Room 101. Room 102 is divided into three different bays by 10.2-cm (4-in.)-high curbs which separate incompatible wastes.

Administrative Controls. Administrative controls that prevent or mitigate the release of any hazardous material stored at the HWSF are detailed in the *HWSF Operating and Maintenance Manual*.⁸ The significant precautions and limitations prohibit waste handling during adverse weather conditions; smoking inside the HWSF; or open flames, welding, or torch cutting within the HWSF without a safe work permit or applicable work control document. Also, incompatible waste is segregated according to RCRA, Toxic Substances Control Act (TSCA), and DOT regulations.

The *HWSF Operating and Maintenance Manual* also provides prerequisites and procedures for waste handling activities that take place at the HWSF. The prerequisites ensure that proper equipment, personnel, and initial conditions are available before waste is handled. The

procedures ensure that waste is handled correctly to prevent or mitigate a release of hazardous materials.

The HWSF Operating and Maintenance Manual also details required surveillances. Procedures and a checklist are provided for daily, weekly, monthly, semi-annual, and annual inspections at the HWSF. There is also an inspection checklist for receiving and shipping waste at the HWSF.

4.2 Mercury

Mercury is stored at the facility in a pure liquid form or in mercury-contaminated debris. The mercury is received in DOT-approved drums for storage before being shipped offsite for treatment and disposal.

Inventory. The maximum quantity of mercury at the facility depends on the concentration level of mercury in the contaminated debris. The quantity of mercury stored at the facility changes periodically. A potential maximum quantity of mercury was calculated to be 27.25 pounds, which was estimated from the concentration levels listed on EG&G Form 669s and MSDSs.

Properties of Mercury.⁷ Mercury is a silvery, heavy, mobile liquid or a metallic element. The boiling point of mercury is 357°C, and mercury has a vapor pressure of 1 mm at 126°C. Mercury is a poison by inhalation, an experimental carcinogen, tumorigen, teratogen, and has experimental reproductive effects. Mercury is corrosive to the skin, eyes, and mucous membranes. Mercury affects the human gastrointestinal tract and central nervous system.

Mercury may explode on contact with 3-bromopropyne; alkynes + silver perchlorate; ethylene oxide; lithium; methylsilane + oxygen; peroxyformic acid; chlorine dioxide; and tetracarbonylnickel + oxygen. Mercury may react with ammonia to form an explosive product. Mercury reacts violently with acetylenic compounds (e.g., acetylene and sodium acetylide); metals (e.g., aluminum, calcium, potassium, sodium, and rubidium); Cl₂; ClO₂; CH₃N₃; Na₂C₂; and nitromethane. Mercury is also incompatible with methyl azide and oxidants.

Conditions of Storage. The inventory of mercury stored at the facility changes periodically due to shipments on and off-site. Mercury is stored in DOT-approved drums stacked on 1.2 by 1.2 m (4 by 4 ft) wood pallets. The pallets are stored at room temperature in Room 102 (nonflammable waste storage room).

Room 102 is equipped with a fire alarm and two 20-kW heaters. There are no significant quantities of flammable or combustible materials in the room. However, oxidizers are stored in Room 102 to keep them separate from flammable or combustible materials, which are stored in Room 101. The room is divided into three different bays by 10.2 cm (4 in.) high curbs which separate incompatible wastes. However, oxidizers are stored in Room 102 to keep them separate from flammable or combustible materials, which are stored in Room 101.

Administrative Controls. The administrative controls that prevent or mitigate the release of any hazardous material stored at the HWSF are detailed in the *HWSF Operating and Maintenance Manual*.⁸ The administrative controls for mercury are the same as those for lead, which are covered in Section 4.1.

5. EVENT SCENARIOS

The barriers that maintain control over each of the hazardous materials discussed in Section 4 were analyzed, and the event scenarios that could result in a release of these hazardous materials are considered in this section. As required by DOE Order 5500.3A, a broad range of emergency events that could affect the HWSF were considered. These events were developed from the existing barriers, the processes involved, and the initiating events that could affect the barriers. The existing barriers, processes, and initiating events are the same for each of the hazardous materials analyzed. Therefore, a release designator is presented that characterizes the event scenario and the general inventory (number and percentage) of DOT drums involved. The following sections discuss the quantity of each hazardous material released from containment for the different release designators.

Operational history from the HWSF logbook indicates that there has been three events recorded that involved leaking drums. These leaking drums were discovered during daily surveillances. The leaking drums were overpacked, and the minor spills were cleaned up. These types of events were considered in the event scenarios, but the quantity released was assumed to be more than the quantity actually released during these recorded events.

5.1 Failure of Primary Barrier

The hazardous materials listed in Section 4 are stored in DOT-approved drums, and the storage conditions and handling processes are the same for each hazardous material. Therefore, the DOT drum is the primary barrier, and the failure modes are the same for each hazardous material considered. The failure modes of the primary barrier are discussed below.

1. Puncture of a drum caused by an external impact. During a puncture, an external object impacts and penetrates a drum. A drum can be punctured when rammed by forklift tines, struck by projectiles from an explosion, or struck by falling debris from an earthquake or aircraft crash. If a puncture occurs, the entire contents of a drum may be released, depending on the size and location of the puncture.
2. Fracture of a drum caused by an external impact. During a fracture, an external object impacts and breaches a drum (drum is not penetrated by the object). A drum can be fractured when dropped or knocked over during handling or rammed by a forklift. A fracture results in a release that is essentially the same as a puncture. The entire contents may be released, depending on the size and location of the fracture.
3. Corrosion of a drum. Corrosion could be caused by a corrosive material being spilled. A corrosion failure mode is similar to a puncture or fracture. The entire contents could be released, depending on the size and location of the breach caused by the corrosion.
4. Overpressure of drum caused by external heat. The external heat could be from a fire caused by an earthquake, aircraft crash, or delivery truck. Toxic fumes could be

emitted at a rate dependent upon the size of the breach caused by the overpressure. Overpressure from a fire may result in a release of the entire contents as vapor.

5.2 Failure of Other Barriers

The hazardous materials listed in Section 4 are loaded and unloaded on the concrete pad outside CFA-637 and stored in Room 102. The loading/unloading pad has a containment berm that is 12.7 cm (5 in.) high and 0.8 m (2-1/2 ft) wide. This berm serves as a barrier because it may influence the size (depth and surface area) of a hazardous material spill. CFA-637 and Room 102 also serve as barriers that affect hazardous material spills. Room 102 is divided into three storage bays separated by 10.2 cm (4-in.)-high containment curbs. The failure modes of these barriers are discussed below.

1. Puncture of the other barriers. A puncture could result from an impact by a forklift, projectiles from an explosion, or falling debris from an earthquake or aircraft crash. A puncture may result in a larger spill and thus affect the dispersion of the hazardous material.
2. Fracture of the other barriers. A fracture could result from impacts to the barriers or from an earthquake. Essentially the same as a puncture, a fracture will also influence the size of a hazardous material spill.

5.3 Range of Possible Releases

The range of possible releases discussed in this section are based on the number and percentage of DOT drums that are involved in the various event scenarios. The specific quantity release is covered in the next section. The possible releases are estimated by the type of event scenario being considered. Release designators were assigned to the event scenarios that result in a similar release. The event scenarios with similar ranges of release and their associated release designators are summarized below.

- Puncture or fracture resulting in the release of hazardous material from two DOT drums during operations outside the facility. This scenario is assumed to release 100% of the hazardous material from two drums at ambient temperatures in approximately 10 minutes onto the loading/unloading pad outside CFA-637 (would the spill be contained by the containment berm?). The assigned release designation is RD-1.
- Puncture or fracture resulting in the release of hazardous material from two DOT drums during operations inside the facility. This scenario is assumed to release 100% of hazardous material from two drums at ambient temperatures in approximately 10 minutes. The spill would be contained by the containment curbs within CFA-637. The assigned release designation is RD-2.
- Fracture resulting in the release of hazardous material from four DOT drums during operations inside the facility. This scenario is assumed to release 100% of hazardous material from four drums at ambient temperatures in approximately 30 minutes. The

spill is contained by the containment curbs within CFA-637. The assigned release designation is RD-3.

- Puncture or fracture of drums from debris, overpressure from heat, or both, resulting in the release of hazardous materials from all DOT drums. This scenario is assumed to release 100% of the hazardous materials from all the drums in approximately 15 minutes. This release may occur inside or outside the facility and extensive damage is assumed to have occurred to CFA-637. The assigned release designation is RD-4.

5.4 Release Quantities for the Analyzed Hazardous Materials

The event scenarios described above are summarized in Table 5, and each scenario is assigned one of the four possible release designations. These release designations were evaluated, and the maximum quantity involved for each release designation was determined for each of the two hazardous materials discussed in Section 4. The quantities of each hazardous material that could potentially be released from containment for the different release designations are presented in Tables 6 and 7.

Table 5. Event scenarios for the release of the hazardous materials from containment at the HWSF.

Primary barrier	Initiating/Event—event scenario	Failure mode of primary barrier	Failure mode of other barriers	Release from primary barrier (100%)	Release designator
DOT drum	Waste containers punctured—Forklift operator rams into drums outside the facility with the forklift tines	Puncture of drum	None—loading/unloading pad berm contains spill	2 drums	RD-1
DOT drum	Waste containers punctured—Forklift operator rams into drums inside the facility with the forklift tines	Puncture of drum	None—contained by containment curbs in Room 102	2 drums	RD-2
DOT drum	Waste containers dropped—Forklift failure or operator error during loading/unloading operations outside the facility	Fracture of drum	None—loading/unloading pad berm contains spill	2 drums	RD-1
DOT drum	Waste containers dropped—Forklift failure or operator error during handling operations inside the facility	Fracture of drum	None—containment curb contains spill	4 drums	RD-3
DOT drum	Waste containers knocked over—Forklift operator backs into stacked drums during handling operations inside the facility	Fracture of drum	None—containment curb contains spill	2 drums	RD-2
DOT drum	Waste containers rammed—Forklift operator rams into drums during loading/unloading operations outside the facility	Fracture of drum	None—loading/unloading pad berm contains spill	2 drums	RD-1
DOT drum	Waste containers rammed—Forklift operator rams into drums during handling operations inside the facility	Fracture of drum	None—containment curb contains spill	4 drums	RD-3
DOT drum	Corrosive attack—Corrosive attack on drum due to spill of a corrosive material	Corrosion of drum	None—containment curb contains spill	2 drums	RD-2
DOT drum	Forklift propane tank explodes—Leak from forklift propane tank causes an explosion and fire involving the delivery truck outside the facility	Puncture of drum from debris and/or overpressure from heat	Loading/unloading pad berm may be damaged, spill is not contained	all drums	RD-4
DOT drum	Forklift propane tank explodes—Leak from forklift propane tank causes an explosion and fire inside the facility	Puncture of drum from debris and/or overpressure from heat	CFA-637 and containment curbs are damaged, spill is not contained	all drums	RD-4

Table 5. (continued).

Primary barrier	Initiating/Event—event scenario	Failure mode of primary barrier	Failure mode of other barriers	Release from primary barrier (100%)	Release designator
DOT drum	Earthquake—Earthquake causes structural damage and fire inside the facility	Puncture or fracture of drum from debris and/or overpressure from heat	CFA-637 and containment curbs are damaged, spill is not contained	all drums	RD-4
DOT drum	Aircraft crash—An aircraft crashes causing structural damage and a fire	Puncture or fracture of drum from debris and/or overpressure from heat	CFA-637 and containment curbs are damaged, spill is not contained	all drums	RD-4
DOT drum	Sabotage—Bomb or missile attack on facility causing structural damage and a fire	Puncture or fracture of drum from debris and/or overpressure from heat	CFA-637 and containment curbs are damaged, spill is not contained	all drums	RD-4

Table 6. Quantity of lead released from containment for the various release designations.

Release designation	Quantity of lead released (lb)	Lead release designation
RD-1	6	RD-1-L1
RD-2	6	RD-2-L2
RD-3	6.68	RD-3-L3
RD-4	6.68	RD-4-L4

Table 7. Quantity of mercury released from containment for the various release designations.

Release designation	Quantity of mercury released (lb)	Mercury release designation
RD-1	27	RD-1-M1
RD-2	27	RD-2-M2
RD-3	27.25	RD-3-M3
RD-4	27.25	RD-4-M4

6. EVENT CONSEQUENCES

The consequences for the event scenarios identified in Section 5 are presented in this section. The models used to determine the dispersion of hazardous materials, chosen receptor locations, and dispersion results are also presented in this section.

6.1 Calculation Models

Consequences for the events identified in Section 5 were estimated by determining the dispersion concentration levels at various receptor locations. The Radiological Safety Analysis Computer Program (RSAC-5)⁹ and hand calculations were used to determine the concentrations at the various receptor locations. The RSAC-5 model was developed by Westinghouse Idaho Nuclear Company for use in radiological dispersions. Although there are no radiological hazards at the HWSF, RSAC-5 was used to determine the χ/Q value for the nonradiological hazardous materials.

The concentrations at the receptor locations were obtained from the following equation:

$$CL = RF * \left(\frac{I}{RT} \right) * \frac{\chi}{Q} \quad (1)$$

where

CL = concentration level (mg/m³)

RF = release fraction takes into account building effects and chemical properties associated with airborne releases (unitless)

I = inventory released from containment that goes airborne over the release time (mg)

RT = release time is the duration of the event scenario in which the released inventory goes airborne (s)

χ = ground level concentration (mg/m³)

Q = emission rate (mg/s).

The χ/Q value is the ground-level atmospheric diffusion relative to the initial point of release. This value is part of the Gaussian plume model which is commonly used to estimate the ground level concentration of a gaseous effluent from a point source. This model is described by the Pasquill-Gifford equation, which for a ground release is

$$\chi = \frac{Q}{\pi \sigma_y \sigma_z \mu} \quad (2)$$

where

χ = ground level concentration (mg/m³)

Q = emission rate (mg/s)

σ_y = horizontal standard deviation of contaminant concentration in the plume (m)

σ_z = vertical standard deviation of contaminant concentration in the plume (m)

μ = mean wind speed (m/s).

The values for χ/Q were calculated with the RSAC-5 computational model, which uses the Gaussian plume equation and assumed meteorological conditions when calculating a value for χ/Q . In accordance with DOE Order 5500.3A guidance documents, two sets of meteorological conditions for the INEL were considered for the release scenarios: (a) 95% worst-case wind speed and stability for the INEL,¹⁰ and (b) a typical set of meteorological conditions. The following conditions were used for 95% worst-case:

- Weather Class F
- Wind Speed (<2 km) 0.5 m/s
- Wind Speed (>2 km) 2.0 m/s
- Release Type Ground
- Air Density 1.09E-03 g/m³.

The following parameters are typical conditions at four receptor locations:

Facility boundary located 100 m around the HWSF

- Weather Class D
- Wind Speed 2.5 m/s
- Release Type Ground
- Air Density 1.09E-03 g/m³.

CLRF located approximately 125 m to the northeast of the HWSF

- Weather Class D
- Wind Speed 2.5 m/s

- Release Type Ground
- Air Density 1.09E-03 g/m³.

Area surrounding the remote service facilities of CFA, a circle with an approximate radius of 500 m

- Weather Class D
- Wind Speed 2.5 m/s
- Release Type Ground
- Air Density 1.09E-03 g/m³.

U.S. Highway 20 located approximately 1.8 km to the south of the HWSF

- Weather Class D
- Wind Speed 2.5 m/s
- Release Type Ground
- Air Density 1.09E-03 g/m³.

These parameters were entered into RSAC-5 to obtain the χ/Q values at the specified receptor locations. In obtaining the χ/Q values, it was assumed that the release was for a desert terrain, which best describes the INEL, and that the release time was 15 to 60 minutes. The χ/Q values obtained from RSAC-5 at the different receptor locations for the 95% worst-case and typical meteorological conditions are listed in Table 8.

The χ/Q values listed in Table 8 were used in Equation (1) to determine the consequences (chemical concentrations) at the different receptor locations for the various event scenarios. The receptor locations and consequence analysis are discussed in the following sections.

Table 8. χ/Q values at specific receptor locations.

Receptor location (m)	χ/Q values	
	95% worst-case conditions	Typical conditions
100	8.48E-3	1.42E-3
125	6.73E-3	1.03E-3
500	1.36E-3	1.26E-4
1,800	2.85E-4	1.64E-5

6.2 Receptor Locations

For releases of the hazardous materials, receptor locations were selected to determine the concentrations that would occur for the event scenarios. The receptor locations evaluated were the facility boundary, the nearest occupied facility (CLRF), the area surrounding the remote service facilities section of CFA, and the nearest location where the general public has uncontrolled access. These receptor locations are discussed below.

Two facilities are located within the 100-m HWSF boundary. The closest facility (approximately 30 m) is the Recyclable Oil Collection Tank, but this facility is not occupied and is currently not in use. The other facility (approximately 65 m) is the Old Laundry Building, but this facility is currently being decontaminated and decommissioned and will not be used in the future. Because this facility is occupied only occasionally, consequences and protective actions will be based upon the consequences at the HWSF boundary of 100 m.

6.2.1 Facility Boundary

The facility boundary was selected to be 100 m surrounding the HWSF area because the consequence calculation model is not accurate for distances less than 100 m.

6.2.2 Other Onsite Receptors

Other onsite receptor locations near the HWSF include the CLRF, the area surrounding the remote service facilities section of CFA, and U.S. Highway 20. The CLRF was selected because this is the closest occupied facility to the HWSF. The area surrounding the remote service facilities section of CFA was chosen to determine the concentrations within the area surrounding the remote services facilities of CFA. Highway 20 was selected because this is the closest location where the general public has uncontrolled access. Highway 20 is considered an uncontrolled access location because site management does not have direct control over general public access. That is, site management has no knowledge of the exact number or location of people in this area and cannot readily evacuate and establish access control of Highway 20 where it passes through the site. In addition, site management is not authorized to evacuate and establish access control of the highway. Additional information on these onsite receptors is provided below:

- **Central Laundry/Respiratory Facility**—The CLRF is located approximately 125 m to the northeast of the HWSF. The CLRF has daily surveillances performed during normal working hours.
- **Remote Service Facilities Section of CFA**—The area around the remote service facilities section of CFA is a circle with a radius of approximately 500 m. This area is occupied by approximately 25 to 40 personnel during normal working hours.
- **U.S. Highway 20**—Highway 20 is located approximately 1.8 km to the south of the HWSF. Highway 20 can be occupied by an unspecified number of the general public any hour.

6.3 Consequence Analysis

Each release designator for the event scenarios was evaluated to determine the consequences that would result. Specific concentrations for release designators RD-1, RD-2, and RD-3 were not evaluated because these releases will only have local (immediate area) consequences. Toxic fumes would be limited because the hazardous materials are contained in solutions, mixed with nonhazardous materials, or both.

The consequences for release designator RD-4 are summarized in Table 9. RD-4 represents a puncture or fracture of drums from debris, overpressure from heat, or both that result in the release of all DOT drums (i.e., the entire quantity of a particular hazardous material). This release may occur inside or outside the facility with a fire present, and extensive damage to CFA-637 is assumed to have occurred. Fire is the energy source needed to vaporize the mercury or lead. RD-4 is the worst-case operational emergency that could occur at the HWSF. For the consequence calculations, it was assumed that the maximum inventory of mercury and lead could go airborne in one hour.

Table 9 lists the hazardous materials that would be released for release designator RD-4, the quantity of hazardous material released from containment, the release fraction, the concentration at the specified receptor location for both sets of meteorological conditions, the protective action criteria values, and the highest emergency class for release designator RD-4 for the specified hazardous material. The release fractions used in the calculations are based on the release fractions stated in DOE-STD-1027-92.¹¹ The protective action criteria are based on company guidelines for determining event classifications.¹² The following definitions are recommended for event classifications of hazardous material releases at the INEL:

Alert—Any release of hazardous chemical to atmosphere producing actual or predicted peak concentration at or beyond any facility boundary, but not beyond any site boundary, in excess of the ERPG-1, or equivalent (PEL-STEEL, TLV-STEEL, 3*TLV-TWA) value for that chemical.

Site Area Emergency—Any release of hazardous chemical to atmosphere producing actual or predicted peak concentration at or beyond any facility boundary, but not beyond any site boundary, in excess of the ERPG-2, or equivalent (EEGL 60 minutes, LOC, PEL-C, TLV-C, 5*TLV-TWA) value for that chemical.

General Emergency—Any release of hazardous chemical to atmosphere producing actual or predicted peak concentration at or beyond any site boundary, in excess of the ERPG-2, or equivalent (EEGL 60 minutes, LOC, PEL-C, TLV-C, 5*TLV-TWA) value for that chemical.

Based on these emergency classification guidelines and the consequence analysis presented in Table 9, the highest emergency class for operational emergencies at the HWSF is a Site Area Emergency.

Table 9. Summary of event consequences for RD-4.

Hazardous material	Quantity released from container (g)	Release fraction ^a	Concentration at receptors for 95% worst case (mg/m ³)				Concentration at receptors for typical conditions (mg/m ³)				Protective action criteria ^b			Highest emergency class
			100 (m)	125 (m)	500 (m)	1.8 (km)	100 (m)	125 (m)	500 (m)	1.8 (km)	Alert ^c (mg/m ³)	Site area emergency ^d (mg/m ³)	General emergency ^d (mg/m ³)	
Mercury	1.2E+4	1.0E-2	2.9E-1	2.3E-1	4.7E-2	9.8E-3	4.9E-2	3.5E-2	4.3E-3	5.6E-4	1.5E-1	2.5E-1	2.5E-1	Site Area Emergency
Lead	3.0E+4	1.0E-3	7.2E-3	5.7E-3	1.2E-3	2.4E-4	1.2E-3	8.7E-4	1.1E-4	1.4E-5	4.5E-1	7.5E-1	7.5E-1	—

a. Release fractions are based on the release fractions stated in DOE-STD-1027-92.

b. Protective action criteria are based on company guidelines for determining event classification. The following definitions are recommended for event classifications of hazardous material releases at the INEL:

Alert—Any release of hazardous chemical to atmosphere producing actual or predicted peak concentration at or beyond any facility boundary, but not beyond any site boundary, in excess of the ERPG-1, or equivalent (PEL-STEEL, TLV-STEEL, 3*TLV-TWA) value for that chemical.

Site Area Emergency—Any release of hazardous chemical to atmosphere producing actual or predicted peak concentration at or beyond any facility boundary, but not beyond any site boundary, in excess of the ERPG-2, or equivalent (EEGL 60 minutes, LOC, PEL-C, TLV-C, 5*TLV-TWA) value for the chemical.

General Emergency—Any release of hazardous chemical to atmosphere producing actual or predicted peak concentration at or beyond any site boundary in excess of the ERPG-2, or equivalent (EEGL 60 minutes, LOC, PEL-C, TLV-C, 5*TLV-TWA) value for that chemical.

c. The TLV-TWA was the only concentration criterion available for lead and mercury. Therefore, the listed concentrations for an Alert are 3*TLV-TWA.

d. The TLV-TWA was the only concentration criterion available for lead and mercury. Therefore, the listed concentrations for a Site Area Emergency and General Emergency are 5*TLV-TWA.

7. EMERGENCY PLANNING ZONES

In accordance with the DOE guidance document, the results of the consequence analysis should be used to define the EPZ for the HWSF. As demonstrated in Section 6, the consequences exceed the protective action criteria for a Site Area Emergency (ERPG-2 or equivalent) at or beyond the facility boundary, but not beyond any site boundary. Therefore, the highest facility emergency class for the HWSF is a Site Area Emergency.

The proposed minimum EPZ radius for the HWSF is determined from the consequence results presented in Section 6 and the EPZ determination logic diagram provided in the DOE guidance document. Using these results and the EPZ determination logic diagram, the proposed minimum EPZ radius for the HWSF is 500 m.

7.1 Tests of Reasonableness

The DOE guidance document provides five significant considerations in the form of questions that cannot be readily stated as quantitative guidance to be used as tests of reasonableness for the proposed EPZ. The following questions are the tests of reasonableness for the proposed EPZ of 500 m for the HWSF:

1. Are the maximum distances to Protective Action Guidelines (PAG) or ERPG level impacts for *most* of the analyzed accident scenarios equal to or less than the EPZ radius selected?

The results of the consequence calculations summarized in Table 9 indicate that the concentration levels for a maximum release of the hazardous materials at the HWSF do not exceed the protective action criteria (ERPG-1) at the proposed EPZ radius.

2. Is the selected EPZ radius large enough to provide for extending response activities outside the EPZ if conditions warrant?

The selected EPZ radius is large enough to provide for extending response activities outside the EPZ if conditions warrant. The agencies involved in the planning effort for response actions, including INEL security (Protection Technology Idaho), INEL Fire Department, EG&G Idaho Medical, state and local law enforcement, regional and local hospitals, and local fire departments, are identical to those required for an extended response outside the selected EPZ. Lines of communication and decision processes involving each of these entities have been established and practiced. In exercises, the offsite agencies have demonstrated the flexibility to adapt and extend preplanned response actions to different areas, depending on the conditions of a particular scenario.

3. Is the EPZ radius large enough to support an effective response at and near the scene of the emergency?

The EPZ is large enough to support an effective response at and near the scene of the emergency. The 500-m EPZ encompasses the remote service section of CFA and the roads leading to the area. All nonessential people will be evacuated, and they will not complicate or

interfere with the on-scene response. The controlled access will exclude nonessential personnel and ensure that emergency vehicles and personnel will not be impeded by nonemergency traffic.

4. Does the proposed EPZ conform to natural and jurisdictional boundaries where reasonable, and are other expectations and needs of the offsite agencies likely to be met by the selected EPZ?

The remote service facilities section has three main intersections that can be blocked off to ensure that nonessential people do not enter the area or impede emergency personnel or vehicles. Ogden Avenue and Lincoln Boulevard can be used as jurisdictional boundaries for the proposed EPZ. Ogden Avenue is approximately 600 m south and southwest of the HWSF. The road connects with Portland Avenue and Main Street at two intersections where roadblocks can be established to prevent nonessential personnel from entering the area. Lincoln Boulevard is located approximately 700 m west of the HWSF. The road connects with Portland Avenue at an intersection that can be blocked to prevent nonessential personnel from entering the area. The area to the north and east of HWSF is open desert, so there are no access roads in this direction. The 500-m EPZ will encircle all of the remote service facilities section of CFA. Also, the consequences do not exceed protective action criteria that will require the assistance of offsite agencies. However, if offsite agency assistance is necessary, exercises have demonstrated the flexibility of offsite agencies to adapt and extend preplanned response actions to different areas.

5. What enhancement of the facility and site boundary preparedness stature would be achieved by increasing the selected EPZ radius?

The proposed EPZ radius already ensures the involvement and integration of all essential emergency response personnel. No enhancement would be gained by increasing the selected EPZ.

7.2 Minimum EPZ Radius

Based on the results of the reasonableness tests, the proposed EPZ is reasonable and no adjustments are needed. Therefore, the minimum EPZ radius for operational emergencies at the HWSF is 500 m. Figure 6 shows the minimum EPZ radius that encircles the remote service facilities section of CFA.

Figure 6. The minimum EPZ for the HWSF.

8. EMERGENCY CLASSES, PROTECTIVE ACTIONS, AND EMERGENCY ACTION LEVELS

From the results presented in Table 9, the highest emergency class for the HWSF is a Site Area Emergency. The emergency class of Site Area Emergency is based on the consequences calculated in Section 6 for the most severe event scenario. The consequence analysis for the most severe event scenario indicated that the release of mercury poses the highest consequences. Because the HWSF contains many different hazardous materials and the inventory changes periodically, any confirmed release of four or more DOT drums with a fire present must assume that mercury is the hazardous material being released. The EALs and protective action guides for the different release scenarios and emergency classes at the HWSF are discussed below.

8.1 Site Area Emergency

8.1.1 Site Area Emergency EAL

From the analysis in Section 6, the following possible EAL is identified for a Site Area Emergency:

- Puncture, fracture, or rupture of four or more DOT drums *and* a fire at the HWSF cannot be contained in one hour.

Basis: No mitigating barriers exist, and a fire will cause volatilization of the hazardous materials resulting in a release of toxic fumes. The hazardous material whose release results in the highest consequences must be assumed to be involved in the event. This assumption should be made because many different hazardous materials are contained in many different DOT drums at the HWSF and it would be difficult to confirm the specific hazardous materials involved in the event.

8.1.2 Site Area Emergency Protective Actions

Protective actions for a Site Area Emergency should be taken for the event in which a puncture, fracture, or rupture event occurs *and* a fire at the HWSF is not contained within one hour. The fire will cause the hazardous materials to volatilize and toxic fumes of higher consequences will be present. For events resulting in an uncontained fire lasting longer than one hour at the HWSF, protective actions should be taken to evacuate all personnel from the remote service facilities section of CFA to a distance greater than 500 m from HWSF.

8.2 Alert

8.2.1 ALERT EAL

The following possible EAL is identified for an ALERT:

- Puncture, fracture, or rupture of four or more DOT drums *and* a fire at the HWSF is contained in less than one hour.

Basis: A fire or event resulting in a fire has the potential to cause extensive damage to the HWSF, which may release hazardous materials from a puncture, fracture, or rupture of four or more DOT drums. However, hazardous material concentrations will be limited if the fire can be contained within one hour.

8.2.2 ALERT Protective Actions

Protective actions should be taken to protect personnel in the immediate vicinity (within 100 m) of the HWSF for any event in which there is a fire at the HWSF. The fire may cause toxic fumes of mercury to be released. These toxic fumes will be limited if the fire can be contained within one hour. Therefore, only emergency personnel needed to mitigate the fire should be allowed in the area.

8.3 Less Than ALERT

8.3.1 Less Than ALERT EAL

The following possible EAL is identified for Less Than an ALERT:

- Puncture, fracture, or rupture of any DOT drums *and* no fire present.

Basis: The release of any hazardous material stored at the HWSF at ambient temperature does not result in the release of toxic fumes that are of high consequences because the hazardous materials will not vaporize rapidly; the hazardous materials are contained in solutions, mixed with nonhazardous materials, or both.

8.3.2 Less Than ALERT Protective Actions

Actions to protect personnel in the immediate vicinity of the HWSF should be taken for any event in which one or more DOT drums are punctured, fractured, or ruptured. Some toxic fumes will be present, but the consequences will be low because the hazardous materials are contained in solutions, mixed with nonhazardous materials, or both. All nonessential personnel near the spill should be evacuated.

9. MAINTENANCE AND REVIEW OF THIS HAZARDS ASSESSMENT

The WROC Management is responsible for ensuring that the HWSF hazards assessment is regularly reviewed and maintained current. The review requirement and schedule is specified in the Site Emergency Readiness Assurance Plan.

The HWSF 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 HSWF 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 is 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 question¹³ (USQ) process interfaces with CM through documents, which implement the requirement to perform a USQ evaluation as a part of the change control process.

10. 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. *Site Development Plan, Idaho National Engineering Laboratory*, prepared for the U.S. Department of Energy by EG&G Idaho, Inc., November 1990.
5. *Safety Analysis Report for the Hazardous Waste Storage Facility*, (Draft), EG&G Idaho, Inc., May 1993.
6. DOE Order 5000.3B, "Occurrence Reporting and Processing of Operations Information," February 22, 1993.
7. N. I. Sax and R. J. Lewis, *Dangerous Properties of Industrial Materials*, 7th Edition, New York: Van Nostrand Reinhold, 1984.
8. *HWSF Operating and Maintenance Manual*, November 16, 1992.
9. D. R. Wenzel, *The Radiological Safety Analysis Computer Program (RSAC-5), Version 5.1*, Westinghouse Idaho Nuclear Company, Inc., April 1993.
10. Memorandum from G.E. Start, U.S. Department of Commerce National Oceanic and Atmospheric Administration, to Les Finch, Westinghouse Idaho Nuclear Company, "Interim guidance for dispersion calculations at ICPP," March 24, 1989.
11. "Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports," DOE-STD-1027-92, December 1992.
12. W. S. Schum (EG&G Idaho, Inc.) Letter to Distribution, "ERPG/EAL Information," June 25, 1993.
13. DOE Order 5480.21, "Unreviewed Safety Questions," December 24, 1991.

Appendix A

Historical Inventory from the HWSF

Appendix A

Historical Inventory from the HWSF

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
1,1,1 TCE cont Rags/Debris (orm-e)	1	12-22-90	1-3-91
1,1,1 TCE cont Rags/Debris (orm-e)	45	11-7-90	10-30-91
1,1,1-TCE (orm-a)	234	7-15-91	10-30-91
1,1,1-TCE (orm-a)	630	7-15-91	10-30-91
1,1,1-TCE (orm-a)	642	7-15-91	10-30-91
1,1,1-TCE cont rags (orm-e)	10	8-20-91	12-6-91
1,1,1-TCE cont rags (orm-e)	65	11-12-92	2-25-93
1,1,1-TCE cont rags (orm-e)	42	5-14-91	5-30-91
1,1,1-TCE rags (orm-e)	121	7-9-91	10-30-91
2-propanol & rose bengal (3PGIII)	106	5-18-93	—
2% Picric Acid soln in Acetone (fls)	7	5-28-91	6-3-91
AB cont Filt Canisters (orm-e)	40	5-16-90	2-15-91
Acetic acid,NaBr lab pack (cor m)	66	10-30-91	12-18-91
Acetic acid,NaBr lab pack (cor m)	66	10-30-91	12-18-91
Acid spill cleanup/debr (non-reg)	98	12-18-90	1-16-91
Acid spill cleanup/debris (non-reg)	17	3-12-91	4-9-91
Acid Spill cleanup/debris (non-reg)	118	3-12-91	4-9-91
Acid w/hvy metals (cor m)	146	3-12-91	4-9-91
Acid Waste (HNO ₃ w/Hvy Metals)(cor m)	550	11-21-90	1-16-91
Acid Waste (HNO ₃ w/Hvy Metals)(cor m)	550	11-21-90	1-16-91
Acid Waste (HNO ₃ w/Hvy Metals)(cor m)	250	11-21-90	1-16-91
Acid Waste (HNO ₃ w/Hvy Metals)(cor m)	300	11-21-90	1-16-91
Acid Waste (HNO ₃ w/Hvy Metals)(cor m)	550	11-21-90	1-16-91
Acid Waste w/Cd & Cr (cor m)	153	10-4-90	1-16-91
Acid Waste w/ Cr (cor m)	120	5-4-90	1-16-91
Acidic Lab Waste w/ Hg (cor m)	450	5-4-90	1-16-91
Acids w/hvy metals (cor m)	121	6-4-91	10-30-91
Acids w/hvy metals (cor m)	26	6-4-91	10-30-91
Acids w/hvy metals (cor m)	578	2-12-91	3-22-91
Acids w/Hvy Metals (cor m)	300	10-31-90	1-15-91
Air filter canisters cont w/chr(9)	8	4-8-93	—
Alkaline batteries (cor m)	205	12-16-91	12-18-91
Alkaline batteries (cor m)	100	12-17-91	12-18-91
Alkaline Batteries (cor m)	475	6-18-92	7-16-92
Alkaline Batteries (cor m)	509	6-18-92	7-16-92
Alkaline Batteries (cor m)	574	6-18-92	7-16-92
Alkaline Batteries (cor m)	116	6-18-92	7-16-92
Alkaline Batteries (cor m)	497	6-18-92	7-16-92
Alkaline Batteries (cor m)	490	6-18-92	7-16-92
Alkaline Batteries (cor m)	525	6-18-92	7-16-92
Alkaline Batteries (cor m)	485	6-18-92	7-16-92
Al,Zn Sulfide, Cerium Ox, Antimony	4	7-24-91	12-18-91

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Ammonium thiocyanate (orm-e)	10	7-24-91	12-18-91
Antimony 3Cl, anhydrous,solid (cor m)	2	7-24-91	12-17-91
Aque was cont selen/trace H ³ (orm-e)	279	7-21-92	—
Asbestos & Hg cont. Debris(orm-e)	100	3-14-90	5-8-91
Asbestos & Hg cont. Debris(orm-e)	100	3-14-90	5-8-91
Asbestos & Hg cont. Debris(orm-e)	100	3-14-90	5-8-91
Bacterial leaching of ore (orm-e)	520	11-6-91	1-25-93
Bacterial leaching of ore (orm-e)	363	11-6-91	1-25-93
Barium Chloride (pois B)	23	8-19-91	8-17-92
Barium hydroxide, lead oxide (9)	55	1-20-93	2-25-93
Barium hydroxide,Pb#8,Cr#9 (orm-e)	7	7-24-91	12-18-91
Barium Oxide (pois) (6.1)	13	1-20-93	2-25-93
Bead blaster w/ Cadmium (orm-e)	290	12-4-90	1-15-91
Benzyl alcohol,NaOH,pack (fl l)	7	10-30-91	12-18-91
Boiler soot (orm-e)	93	12-11-91	8-27-92
Boiler soot (orm-e)	130	12-11-91	8-27-92
Boiler soot (orm-e)	113	12-11-91	8-27-92
Boiler soot (orm-e)	109	12-11-91	8-27-92
Boiler soot (orm-e)	280	7-15-91	10-30-91
Boiler soot (orm-e)	160	7-15-91	10-30-91
Boiler treatment chemical (cor m)	520	3-12-91	10-30-91
Boiler treatment chemical (cor m)	620	3-12-91	10-30-91
Butyl Cellosolve (cor m)	39	7-25-90	1-15-91
Ca metal,Li metal (fl s)	4	8-30-91	8-17-92
Ca nitrate,ammonium nitrate (5.1)	50	1-20-93	2-25-93
Cad cleanup mat/debris (orm-e)	112	12-18-90	1-16-91
Cad cleanup mat/debris (orm-e)	533	12-18-90	1-16-91
Cad cleanup mat/debris (orm-e)	129	12-18-90	1-16-91
Cadmium & silver cont photochem	560	11-20-91	12-6-91
Cadmium & silver cont photochem	484	11-20-91	12-6-91
Cadmium cont asbestos (orm-e)	131	3-12-91	4-9-91
Cadmium cont asbestos (orm-e)	114	3-12-91	4-9-91
Cadmium cont asbestos (orm-e)	102	3-12-91	4-9-91
Cadmium cont solids (orm-e)	18	12-16-91	4-20-92
Cadmium/Cr cont Asbestos (orm-e)	112	12-18-90	1-16-91
Cadmium/Cr cont Asbestos (orm-e)	123	12-18-90	1-16-91
Cadmium iodine (orm-e)	11	9-30-92	12-7-92
Cadmium nitrate, Barium nitrate (ox)	9	8-19-91	8-17-92
Cadmium Oxide (pois B)	1	7-24-91	12-18-91
Cadmium Sulfate (pois B)	15	5-4-90	12-18-91
Cadmium Sulfate ZnCyanide (pois B)	9	7-9-91	7-9-91
Calcliner Soln Cleanup (orm-e)	200	5-3-90	1-15-91
Calcliner Soln Cleanup (orm-e)	200	5-3-90	1-15-91
Calcomp Replenisher & Toner(comb l)	100	3-21-90	1-15-91
Calcomp Replenisher&C ^o Toner (com l)	100	10-12-90	1-15-91
Capacitor&Ballast cont w/PCB (orm-e)	450	7-16-90	3-22-91
Chloroform (orm-a)	24	4-14-92	4-20-92
Chromated Sludge (orm-e)	400	4-3-90	3-22-91

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Chromium & lead cont debris (orm-e)	61	9-30-92	12-7-92
Chromium chloride,AL oxide (pois B)	6	8-19-91	8-17-92
Chromium cont water (orm-e)	50	6-6-90	7-16-92
Cleanup debr from removal(orm-e)	141	4-10-91	12-7-92
Concrete cont lead shot (orm-e)	450	12-4-90	1-15-91
Contains ethonal & Pot hydroxide (fl l)	200	6-4-91	10-30-91
Contains isoparrafannic solv (orm-e)	113	4-16-91	5-30-91
Contains Mercuric Nitrate (orm-e)	340	3-26-91	4-9-91
Contains paint shop debris (orm-e)	170	4-16-91	5-30-91
Contains paint soiled rags (orm-e)	54	4-16-91	5-30-91
Contains paint solids (orm-e)	279	4-16-91	12-6-91
Contains photochemicals (orm-e)	425	3-26-91	4-9-91
Corr. Clean. Soln (cor m)	450	2-22-90	1-16-91
CPP 637 calciner so wast&debr(orm-e)	251	12-18-90	1-16-91
CPP 637 calciner so wast&debr(orm-e)	556	12-18-90	1-16-91
CPP 637 calciner so wast&debr(orm-e)	199	12-18-90	1-16-91
CPP 637 calciner so wast&debr(orm-e)	535	12-18-90	1-16-91
CPP LP F (fl s)	80	4-26-89	3-8-91
Cyanide dist waste con pyridine orm-e	160	1-14-92	12-7-92
Dichlorobenzene (orm-a)	16	7-9-91	7-9-91
Dichloromethane (orm-a)	13	9-30-92	12-7-92
Discarded Petroleum Prod (fl l)	300	4-12-90	5-30-91
Discarded Petroleum Product (fl l)	400	10-31-90	5-30-91
Discarded Petroleum Product (fl l)	400	10-31-90	5-30-91
Discarded Petroleum Product (orm-a)	180	10-31-90	3-22-91
Discarded Petroleum Product (orm-e)	550	10-31-90	3-22-91
Ethedium Br, Cs Cl (pois B)	30	5-4-90	12-18-91
Fiberglass Latex Paint Chips (n/a)	20	5-4-90	12-18-91
Filter material (orm-e)	200	3-12-91	4-9-91
Flyash (orm-e)	50	12-12-90	1-15-91
Freon con debris (orm-e)	17	3-24-92	7-16-92
Freon TF (n/a)	680	5-7-91	5-30-91
Glycol Ether EE (com l)	60	10-4-90	5-30-91
Glycol Ether EE (com l)	60	10-4-90	5-30-91
H ₂ O cont w/pentachlorophenol (orm-e)	512	8-26-92	—
H ₂ O cont w/pentachlorophenol (orm-e)	490	8-26-92	—
H ₂ SO ₄ & Pot Dichromate (cor m)	100	12-3-90	1-16-91
HCL & nitric acid (cor m)	300	11-4-91	12-6-91
HCL & nitric acid (cor m)	388	11-4-91	12-6-91
HCL & nitric acid (cor m)	48	11-4-91	12-6-91
HCL & nitric acid (cor m)	48	11-4-91	12-6-91
HCL & nitric acid (cor m)	48	11-4-91	12-6-91
HCL & nitric acid soln (cor m)	51	8-12-92	8-27-92
HCL & nitric acid soln (cor m)	51	8-12-92	8-27-92
HCL & nitric acid soln (cor m)	46	8-12-92	8-27-92
HCL & nitric acid soln (cor m)	51	8-12-92	8-27-92
HCL & nitric acid w/hvy met (cor m)	243	8-12-91	10-30-91
HCL & Nitric acid dilute (cor m)	415	4-14-92	8-27-92

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
HCL acid, water lab pack (cor m)	104	10-30-91	12-18-91
HCL acid, water lab pack (cor m)	104	10-30-91	12-18-91
HCL and nitric acids (8PGI)	263	3-9-93	—
HCL and nitric acids (8PGI)	235	3-9-93	—
Hexane & n-butyl alcohol (fl l)	135	5-7-91	5-30-91
Hexane & n-butyl alcohol (fl l)	211	5-7-91	5-30-91
Hexane & n-butyl alcohol (fl l)	218	5-7-91	5-30-91
Hg chloride,Hg sulfide (pois B)	8	8-19-91	—
Hg cont. soil/debris (orm-e)	24	8-7-90	1-15-91
Hg Thermometer (orm-b)	20	5-4-90	12-18-91
Hg vapor bulbs/Hg switches (orm-e)	148	2-3-93	2-23-93
HG Waste Cleanup/Debris(orm-e)	80	2-27-90	6-5-91
Hg-dimethyl,Hg-diethyl (3-PGIII)	8	8-19-91	—
Hydrazine,aqueous soln (cor m)	75	8-12-92	8-17-92
Hydrochloric & Nitric Acid (cor m)	400	5-28-91	10-30-91
Hydrochloric & Nitric Acid (cor m)	197	5-28-91	10-30-91
Hydrochloric & Nitric Acid (cor m)	197	5-28-91	10-30-91
Hydrofluoric acid cont rock (orm-e)	106	3-12-91	4-9-91
Hydrofluoric Acid cont debr (orm-e)	112	12-18-90	1-16-91
Hydrofluoric Acid cont debr (orm-e)	108	12-18-90	1-16-91
Hydroquinone,water,&hvy met (orm-e)	130	12-3-90	1-15-91
Hydroquinone,water,&Hvy Met (orm-e)	130	12-3-90	1-15-91
ICP wast w/met solv(pH2.1)(fl l)	200	5-4-90	1-25-93
Incinerator ash (orm-e)	182	12-11-91	12-18-91
Incinerator ash (orm-e)	161	12-11-91	12-18-91
Incinerator ash (orm-e)	178	12-11-91	12-18-91
Incinerator ash (orm-e)	214	12-11-91	12-18-91
Incinerator ash (orm-e)	160	12-11-91	12-18-91
Incinerator ash (orm-e)	179	12-11-91	12-18-91
Incinerator ash (orm-e)	173	12-11-91	12-18-91
Incinerator ash (orm-e)	170	12-11-91	12-18-91
Incinerator ash (orm-e)	180	12-11-91	12-18-91
Incinerator ash (orm-e)	188	12-11-91	12-18-91
Incinerator ash (orm-e)	177	12-11-91	12-18-91
Incinerator Ash (orm-e)	186	12-18-90	1-16-91
Incinerator Ash (orm-e)	186	12-18-90	1-16-91
Incinerator Ash (orm-e)	164	12-18-90	1-16-91
Incinerator Ash (orm-e)	165	12-18-90	1-16-91
Inorg.Anal.(Dil HNO ₃ &HCL) (cor m)	80	5-23-90	1-16-91
IRC LP#26 (poison B)	250	3-22-89	1-8-91
Isocyanate ()	590	3-7-91	4-9-91
Isocyanate ()	593	3-7-91	4-9-91
Isocyanate ()	344	3-7-91	4-9-91
Isocyanate ()	589	3-7-91	4-9-91
Isocyanate ()	75	3-7-91	4-9-91
Isocyanate ()	377	3-7-91	4-9-91
Isoparaffanic solvent (com l)	115	9-9-91	12-6-91
Isoparaffanic solvent (com l)	110	1-6-92	3-20-92

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Isoparaffanic solvent (com l)	107	12-9-92	—
Isoparaffanic solvent (com l)	125	5-18-92	7-16-92
K chlorate,K permanganate (5.1)	70	1-20-93	2-25-93
K chromate, lead chromate (9)	18	1-20-93	2-25-93
K chromate,HCL acid soln (cor m)	143	2-10-93	—
K dichromate, Na dichromate (9)	17	1-20-93	2-25-93
K-fluoride,stannousCl-hydrate(orm-b)	5	7-24-91	12-18-91
K-nitrite,K-permanganate (ox)	15	7-24-91	12-18-91
K-Oxalate, nickel chloride (orm-b)	22	8-19-91	8-17-92
Kodak developer w/Cadmium (orm-e)	300	12-12-90	1-15-91
Kodak Developer (orm-e)	500	5-29-91	10-30-91
Kodak fixer (orm-e)	300	12-12-90	1-15-91
Kodak fixer (9PGIII)	545	6-2-93	—
Kodak fixer (9PGIII)	545	5-5-93	—
Kodak fixer (9PGIII)	425	3-23-93	—
Kodak fixer (9PGIII)	634	4-14-93	—
Kodak fixer (orm-e)	530	11-12-92	2-25-93
Kodak fixer (orm-e)	530	11-12-92	2-25-93
Kodak fixer (orm-e)	530	9-30-92	12-7-92
Kodak fixer (orm-e)	580	10-13-92	12-7-92
Kodak fixer (orm-e)	600	1-14-93	2-25-93
Lab Debr cont w/Methylene Cl (orm-e)	80	5-23-90	3-22-91
Lab Debr cont w/Methylene Cl (orm-e)	80	5-23-90	3-22-91
Lab Debr Glassware w/Liquids (fl l)	100	6-6-90	1-15-91
Lab Debr Glassware w/Liquids (fl l)	100	6-6-90	1-15-91
Lab Debr Glassware w/Liquids (fl l)	100	6-6-90	1-15-91
Lab debris cont w/solvent (com l)	222	3-12-91	4-9-91
Lab Debris (fl l)	10	2-27-91	4-9-91
Lab Debris (fl l)	140	11-14-90	1-15-91
Lab Debris (orm-e)	25	1-10-91	3-22-91
Lab Debris Plas/Met cont (fl l)	200	5-4-90	5-30-91
Lab Debris Plas/Met cont (fl l) 1	40	5-4-90	5-30-91
Lab Pack (fl s)	150	8-7-90	3-22-91
Lab wastes (fl l)	450	3-22-89	1-8-91
Lab wastes w/metals (cor m)	500	3-22-89	1-16-91
Lab wastes w/poisons (cor m)	550	3-22-89	1-8-91
Large cont PCB capacitors (orm-e)	236	4-16-92	10-6-92
Large cont PCB capacitors (orm-e)	236	4-16-92	10-6-92
Large cont PCB capacitors (orm-e)	259	7-1-92	10-6-92
Large cont PCB capacitors (orm-e)	236	4-16-92	10-6-92
Large cont PCB capacitors (orm-e)	236	4-16-92	10-6-92
Large cont PCB capacitors (orm-e)	236	4-16-92	10-6-92
Large cont PCB capacitors (orm-e)	236	4-16-92	10-6-92
Large cont PCB capacitors (orm-e)	236	4-16-92	10-6-92
Large cont PCB capacitors (orm-e)	236	4-16-92	10-6-92
Large cont PCB capacitors (orm-e)	259	7-1-92	10-6-92
Large cont PCB capacitors (orm-e)	171	4-16-92	10-6-92
Large cont PCB capacitors (orm-e)	259	7-1-92	10-6-92

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Large cont PCB capacitors (orm-e)	259	7-1-92	10-6-92
Large cont PCB capacitors (orm-e)	254	7-1-92	10-6-92
Large cont PCB capacitors (orm-e)	236	4-16-92	10-6-92
Large cont PCB capacitors (orm-e)	259	7-1-92	10-6-92
Large cont PCB capacitors (orm-e)	236	4-16-92	10-6-92
Large cont PCB capacitors (orm-e)	141	4-16-92	10-6-92
Large PCB capacitors (orm-e)	473	5-30-91	3-20-92
Large PCB capacitors (orm-e)	473	5-30-91	3-20-92
Large PCB capacitors (orm-e)	473	5-30-91	3-20-92
Large PCB capacitors (orm-e)	473	5-30-91	3-20-92
Large PCB capacitors (orm-e)	473	5-30-91	3-20-92
Large PCB capacitors (orm-e)	473	5-30-91	3-20-92
Lead & Cad cont debris (orm-e)	75	4-24-91	5-30-91
Lead & Cad cont debris (orm-e)	30	3-5-92	4-20-92
Lead chloride (9)	12	1-20-93	2-25-93
Lead cont boiler soot (9PGIII)	83	2-23-93	—
Lead cont boiler soot (9PGIII)	91	2-23-93	—
Lead cont boiler soot (9PGIII)	100	2-23-93	—
Lead cont clay (9)	32	1-20-93	2-25-93
Lead cont cleanup rags (orm-e)	200	10-15-91	12-6-91
Lead cont cutting fluid (orm-e)	106	2-3-93	2-23-93
Lead cont debris (9PGIII)	70	3-23-93	—
Lead cont debris (orm-e)	16	3-24-92	4-20-92
Lead cont debris (orm-e)	250	1-29-91	3-22-91
Lead cont debris (orm-e)	180	1-29-91	3-22-91
Lead cont debris (orm-e)	195	1-29-91	3-22-91
Lead cont debris (orm-e)	235	1-29-91	3-22-91
Lead cont debris (orm-e)	190	1-29-91	3-22-91
Lead cont debris (orm-e)	175	12-5-90	1-15-91
Lead cont debris (orm-e)	260	1-29-91	3-22-91
Lead cont debris (orm-e)	100	1-28-92	4-20-92
Lead cont debris (orm-e)	756	4-1-92	8-27-92
Lead cont debris (orm-e)	200	1-29-91	3-22-91
Lead cont debris (orm-e)	16	3-24-92	4-20-92
Lead cont debris (orm-e)	156	8-21-91	10-30-91
Lead cont debris (orm-e)	136	8-21-91	10-30-91
Lead cont debris (orm-e)	350	1-29-91	3-22-91
Lead cont debris & grease (orm-e)	239	3-24-92	7-16-92
Lead cont debris & grease (orm-e)	183	3-24-92	7-16-92
Lead cont debris & grease (orm-e)	197	3-24-92	7-16-92
Lead cont Debris (orm-e)	200	9-26-90	1-15-91
Lead cont Debris (orm-e)	490	10-15-90	1-15-91
Lead cont Debris (orm-e)	277	9-26-90	1-15-91
Lead cont Debris (orm-e)	142	9-26-90	1-15-91
Lead cont incinerator ash (9PGIII)	178	2-23-93	—
Lead cont incinerator ash (9PGIII)	193	2-23-93	—
Lead cont incinerator ash (9PGIII)	205	2-23-93	—
Lead cont incinerator ash (9PGIII)	190	2-23-93	—

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Lead cont Rags/Gloves/Dust (orm-e)	60	10-12-90	1-15-91
Lead cont Sludge (orm-e)	400	10-24-90	1-16-91
Lead cont soil (orm-e)	168	1-27-93	—
Lead Cont Debris (orm-e)	390	10-15-90	1-15-91
Lead powder (orm-e)	110	8-26-91	10-30-91
Lead putty from pipe joint (orm-e)	120	9-12-91	10-30-91
Lead shielding & Prot equip (orm-e)	138	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	291	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	321	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	174	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	181	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	279	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	199	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	182	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	394	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	278	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	289	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	187	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	315	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	240	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	188	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	308	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	118	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	351	12-18-90	1-16-91
Lead shielding & Prot equip (orm-e)	203	12-18-90	1-16-91
Lead shielding and equip (orm-e)	135	3-12-91	4-9-91
Lead shielding and equip (orm-e)	131	3-12-91	4-9-91
Lead shielding and equip (orm-e)	207	3-12-91	4-9-91
Lead shielding and equip (orm-e)	173	3-12-91	4-9-91
Lead shielding and equip (orm-e)	309	3-12-91	4-9-91
Lead shielding and equip (orm-e)	173	3-12-91	4-9-91
Lead shielding and equip (orm-e)	174	3-12-91	4-9-91
Lead shielding and equip (orm-e)	188	3-12-91	4-9-91
Lead shielding and equip (orm-e)	231	3-12-91	4-9-91
Lead shielding and equip (orm-e)	143	3-12-91	4-9-91
Lead shielding and equip (orm-e)	211	3-12-91	4-9-91
Lead shielding and equip (orm-e)	244	3-12-91	4-9-91
Lead shielding and equip (orm-e)	154	3-12-91	4-9-91
Lead shielding and equip (orm-e)	204	3-12-91	4-9-91
Lead shielding and equip (orm-e)	190	3-12-91	4-9-91
Lead shielding and equip (orm-e)	266	3-12-91	4-9-91
Lead shielding and equip (orm-e)	133	3-12-91	4-9-91
Lead shielding and equip (orm-e)	159	3-12-91	4-9-91
Lead shielding and equip (orm-e)	265	3-12-91	4-9-91
Lead shielding and equip (orm-e)	232	3-12-91	4-9-91
Lead shielding and equip (orm-e)	302	3-12-91	4-9-91
Lead shielding and equip (orm-e)	157	3-12-91	4-9-91
Lead shielding and equip (orm-e)	197	3-12-91	4-9-91

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Lead shielding cable (orm-e)	280	2-13-91	3-22-91
Lead shop debris (orm-e)	170	3-5-91	3-22-91
Lead sulfide,lead chloride(orm-b)	8	8-19-91	1-25-93
Liquid mercury (rom-b)	26	8-7-90	—
Liquid paint waste (fl l)	335	9-9-91	4-20-92
Lithium hydroxide (cor m)	8	7-24-91	12-18-91
LP (ox)	75	6-6-90	7-24-91
LP Materials (ox)	100	6-12-90	7-24-91
Magnesium Powder (fl s)	25	11-14-90	3-8-91
Magnesium Powder (fl s)	50	7-17-90	3-8-91
Make up Soln (orm-e)	225	7-25-90	1-15-91
Make up Soln (orm-e)	225	7-25-90	1-15-91
Makeup soln cont w/ hvy met (orm-e)	489	12-18-90	1-16-91
Makeup soln cont w/ hvy met (orm-e)	569	12-18-90	1-16-91
Mercury cont debr & instrum (pois B)	120	9-26-90	1-15-91
Mercury cont sold (orm-e)	400	10-2-91	10-30-91
Mercuric nitrate (orm-e)	165	9-9-91	12-6-91
Mercuric nitrate (orm-e)	148	9-9-91	12-6-91
Mercuric nitrate (orm-e)	505	9-9-91	12-6-91
Mercuric nitrate soln (orm-e)	375	4-16-91	5-30-91
Mercuric nitrate soln (orm-e)	447	10-13-92	—
Mercuric Nitrate (ox)	183	3-12-91	4-9-91
Mercuric Nitrate cont Debris(orm-e)	200	2-21-90	3-22-91
Mercuric Nitrate Mixture (orm-e)	550	10-24-90	1-16-91
Mercuric Nitrate Mixture(orm-e)	550	10-24-90	1-16-91
Mercuric Nitrate soln (orm-e)	162	7-25-91	12-6-91
Mercuric Nitrate soln (orm-e)	179	7-25-91	12-6-91
Mercury batteries (cor m)	60	12-20-91	1-25-93
Mercury batteries (cor m)	11	6-18-92	1-25-93
Mercury Batteries (pois B)	20	5-4-90	10-1-91
Mercury cont debris (orm-b)	47	4-8-93	—
Mercury cont equip (orm-e)	78	11-20-91	12-6-91
Mercury cont solids (orm-e)	65	12-16-91	4-20-92
Mercury cont solids (orm-e)	90	3-12-91	4-9-91
Mercury Cont Instruments (pois B)	70	5-29-90	1-15-91
Mercury instruments (orm-b)	12	5-3-93	—
Mercury instruments & debris (orm-b)	70	11-16-92	2-25-93
Mercury lab pack (orm-b)	9	9-30-92	12-7-92
Mercury switches (orm-e)	15	8-26-91	10-30-91
Mercury thermometer (pois B)	9	7-9-91	7-9-91
Mercury,metallic mixture (orm-b)	20	4-13-93	—
Metals cont w/Hg (orm-e)	29	6-4-91	10-30-91
Methanol/water rinsate (orm-e)	35	6-22-92	—
Methanol/water rinsate (orm-e)	35	6-22-92	—
Methanol,methylene cl, acetone (fl l)	18	1-28-92	7-16-92
Methanol,methylene cl, acetone (fl l)	18	1-28-92	7-16-92
Methyl alcohol,methylene chl (fl l)	75	9-30-92	12-7-92
Methylene Chloride&3chloroben(orm-a)	152	7-9-91	7-9-91

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Mineral oil cont w/PCB (n/a)	450 (44ppm)	10-15-91	10-30-91
Mineral oil cont w/PCB (n/a)	65 (44ppm)	10-15-91	10-30-91
Mixed photochemicals (fixer)(orm-e)	575	4-16-92	8-27-92
Mixed photochemicals (orm-e)	515	3-24-92	12-7-92
Mixed photochemicals (orm-e)	112	6-4-91	10-30-91
Mixed photochemicals (orm-e)	489	1-6-92	12-7-92
Mixed photochemicals (orm-e)	480	5-18-92	12-7-92
Mixed photochemicals (orm-e)	501	9-2-92	12-7-92
Mixed photochemicals (orm-e)	473	3-24-92	12-7-92
Mixed photochemicals (orm-e)	130	6-4-91	10-30-91
Mixed photochemicals (orm-e)	536	9-9-91	12-6-91
Mixed photochemicals (orm-e)	517	9-2-92	12-7-92
Mixed photochemicals (orm-e)	130	6-4-91	10-30-91
Mixed photochemicals (orm-e)	495	7-14-92	12-7-92
Mixed Photochemicals (orm-e)	125	10-12-90	1-15-91
Mixed Photochemicals (orm-e)	125	10-12-90	1-15-91
Mixed Photochemicals (orm-e)	125	10-12-90	1-15-91
Mixed solvents and debris (fl mat)	147	3-12-91	4-9-91
Mixed Solvents(liq & so debris)(fl l)	100	10-4-89	1-15-91
Na Azide soln (pois B)	14	6-3-91	4-15-92
Na metal (fl s)	21	8-30-91	8-17-92
Na nitrate,Chromium nitrate (5.1)	93	1-20-93	2-25-93
NaBichromate,NaOH lab pack (cor m)	8	1-14-93	1-25-93
NaChlorate,BaPeroxide (OBacan)(ox)	285	12-9-92	—
NaNitrat,H ₂ O,silver Cl,Iodide (ox)	18	12-6-91	12-6-91
Napthalene (4.1)	12	1-20-93	2-25-93
Neutralized acids w/hvy met (orm-e)	280	8-19-91	10-30-91
Nickel cadmium batteries (cor m)	171	12-16-91	12-18-91
Nickel Cadmium batteries (cor m)	400	12-17-91	12-18-91
Nickel-cadmium batteries (cor m)	113	6-18-92	7-16-92
Nitric Acid w/silver & chrom(cor m)	60	1-22-91	3-22-91
Nitric Acid w/silver & chrom(cor m)	60	1-22-91	3-22-91
Nitric Acid w/silver & chrom(cor m)	60	1-22-91	3-22-91
Nitric soln w/trace tritium (cor m)	43	7-21-92	12-7-92
OBA (ox)	450	12-5-90	12-6-91
OBA canisters,Na chlorate, Ba peroxide	271	11-4-91	7-16-92
OBA canisters,Na chlorate, Ba peroxide	67	11-4-91	7-16-92
Oil & Solvents (fl l)	113	2-12-91	3-22-91
Oil cont w/2,4-D & lead (9PGIII)	27	4-1-93	—
Oil rags cont w/lead (orm-e)	35	8-26-91	10-30-91
Oil sludge/debris UST cle-up(orm-e)	332	4-16-91	—
Oil sludge/debris UST cle-up(orm-e)	332	4-16-91	—
Oil sludge/debris UST cle-up(orm-e)	332	4-16-91	—
Oil sludge/debris UST cle-up(orm-e)	332	4-16-91	—
Oil sludge/debris UST cle-up(orm-e)	332	4-16-91	—
Oil Soaked Soil & Fl Dry "(orm-e)	400	4-12-90	3-22-91
Oil Soaked Soil & Fl Dry "(orm-e)	400	4-12-90	3-22-91

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Oil Soaked Soil & Fl Dry *(orm-e)	400	4-12-90	3-22-91
Oil, solvent, & debris (fl l)	100	12-12-90	1-15-91
Oil/stoddard solv/H ₂ O mixture(3PGIII)	87	6-2-93	—
Oil Waste Material (comb l)	215	8-15-90	1-15-91
Oil,solvent,& debris (fl l)	209	2-12-90	4-9-91
Oil,solvent,& debris (fl l)	190	2-12-90	4-9-91
Organic Effluent (fl l)	150	11-14-90	1-15-91
Organic Effluent (fl l)	350	5-4-90	1-15-91
Organic Effluent (fl l)	60	12-19-90	1-16-91
Organic Effluent (fl l)	200	11-14-90	1-15-91
Organic Effluent (fl l)	120	1-10-91	4-9-91
Organic Effluent (fl l)	350	5-4-90	1-15-91
Organic Effluent (fl m)	400	5-4-90	4-9-91
Organic H ₂ O mixture (3PGIII)	62	6-2-93	—
Organic solvent mixture (fl l)	304	3-12-91	4-9-91
Oxygen Breathing Appar (ox)	450	11-7-90	12-6-91
Oxygen Breathing Appar (ox)	450	11-7-90	12-6-91
Oxygen Breathing Appar (ox)	450	11-7-90	12-6-91
Oxygen Breathing Appar (ox)	450	11-7-90	12-6-91
Oxygen Breathing Apparatus (ox)	225	8-21-90	12-6-91
Oxygen Breathing Apparatus (ox)	225	8-21-90	12-6-91
Paint and thinners (fl l)	185	3-5-91	3-22-91
Paint booth overspray (orm-e)	376	11-4-91	12-7-92
Paint booth overspray (orm-e)	605	11-4-91	12-7-92
Paint booth overspray (orm-e)	585	11-4-91	12-7-92
Paint booth overspray (orm-e)	654	11-4-91	12-7-92
Paint chips (orm-e)	32	8-26-91	10-30-91
Paint cont material (orm-e)	460	7-9-91	12-6-91
Paint cont material (orm-e)	460	7-9-91	12-6-91
Paint cont rags (orm-e)	57	11-4-91	12-6-91
Paint cont rags (orm-e)	149	1-6-92	3-20-92
Paint cont solids (orm-e)	111	3-12-91	4-9-91
Paint cont solids/debris (orm-e)	121	12-18-90	1-16-91
Paint filters (orm-e)	120	8-26-91	10-30-91
Paint rags (orm-e)	24	9-9-91	10-30-91
Paint shop debris (9PGIII)	114	5-18-93	—
Paint shop debris (9PGIII)	165	5-18-93	—
Paint shop debris (9PGIII)	104	3-23-93	—
Paint shop debris (orm-e)	147	12-9-92	—
Paint shop debris (orm-e)	105	12-9-92	—
Paint shop debris (orm-e)	94	10-13-92	12-7-92
Paint thinner (fl l)	325	12-4-90	1-15-91
Paint thinners & pai solid (fl l)	405	12-9-92	—
Paint thinners & solvents (3PGII)	132	3-23-93	—
Paints cont lead & chromium (fl l)	525	12-4-90	1-15-91
Paper Cont. w/Silver Nitrate (ox)	15	5-4-90	12-18-91
PCB ballast, small cap (orm-e)	560	2-20-91	3-22-91
PCB cleanup debris (orm-e)	100	12-4-90	3-22-91

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
PCB cleanup debris (orm-e)	100	2-20-91	3-22-91
PCB cont ball/cap clean debr(orm-e)	68	7-1-92	12-7-92
PCB cont ballast (orm-e)	720	6-11-91	10-30-91
PCB cont ballast (orm-e)	720	6-11-91	10-30-91
PCB cont ballast (orm-e)	344	7-17-91	10-30-91
PCB cont ballast (orm-e)	285	10-20-92	12-7-92
PCB cont ballast (orm-e)	285	10-20-92	12-7-92
PCB cont ballast (orm-e)	748	7-17-91	10-30-91
PCB cont ballast (orm-e)	290	2-20-92	3-20-92
PCB cont ballast (orm-e)	218	2-20-92	3-20-92
PCB cont ballast (orm-e)	346	2-3-93	2-25-93
PCB cont ballast (orm-e)	62	12-11-91	3-20-92
PCB cont ballast (orm-e)	249	7-17-91	10-30-91
PCB cont ballast (orm-e)	51	10-16-91	10-30-91
PCB cont ballast (orm-e)	346	2-3-93	2-25-93
PCB cont ballast/capacitor (orm-e)	10	12-18-90	3-22-91
PCB cont ballast/capacitor (orm-e)	110	10-2-91	10-30-91
PCB cont ballast/capacitor (orm-e)	445	10-2-91	10-30-91
PCB cont ballast/capacitor (orm-e)	449	10-2-91	10-30-91
PCB cont ballast/capacitor (orm-e)	800	5-7-91	3-20-92
PCB cont ballast/capacitor (orm-e)	475	10-2-91	10-30-91
PCB cont ballast/capacitor (orm-e)	200	7-9-91	10-30-91
PCB cont ballast/capacitors (orm-e)	792	3-28-91	3-20-92
PCB cont ballast/capacitors (orm-e)	121	5-16-91	12-6-91
PCB cont ballast/capacitors (orm-e)	750	3-14-91	3-20-92
PCB cont ballast/capacitors (orm-e)	139	5-16-91	12-6-91
PCB cont ballast&Capacitors (orm-e)	600	12-4-90	3-22-91
PCB cont ballasts (orm-e)	114	8-12-92	12-7-92
PCB cont ballasts (orm-e)	60	8-12-92	12-7-92
PCB cont ballasts (orm-e)	427	11-4-91	12-6-91
PCB cont capacitors (orm-e)	230	12-9-92	2-25-93
PCB cont debris (orm-e)	109	4-1-92	12-7-92
PCB cont hydraulic oil (orm-e)	390	5-29-91	3-20-92
PCB cont hydraulic oil (orm-e)	410	5-29-91	3-20-92
PCB cont Oil (n/a)	300	7-22-91	10-30-91
PCB cont vacuum/debris (orm-e)	79 (98ppm)	6-26-91	10-30-91
Persulfate	20	5-4-90	12-18-91
Petr Naptha,Perchlorethylene (com l)	30	11-20-91	12-6-91
Petr Naptha,Perchlorethylene (com l)	46	11-20-91	12-6-91
Petroleum Naptha (com l)	100	10-23-91	3-20-92
Phenol, Chloroform (pois B)	20	5-4-90	12-18-91
Phenol,benzoquinone	15	1-20-93	2-25-93
Phosphonitrilic Cl formic acid pois	40	5-8-91	10-30-91
PhotBleach/H ₂ O/Sulf.acid/KdiCr(corm)	125	10-12-90	1-15-91
Photograph chem w/chr/silver (orm-e)	430	10-16-91	12-6-91
Photo Fixer (orm-e)	530	3-5-91	3-22-91
Photochem w/silver (com l)	435	5-4-90	1-25-93
Photochem Waste (Ag&Cr) (orm-e)	600	10-24-90	1-16-91

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Photochemical & Fixer (orm-e)	540	2-20-91	3-22-91
Photochemical & Fixer (orm-e)	530	2-20-91	3-22-91
Photochemical & Fixer (orm-e)	465	2-20-91	3-22-91
Photochemical soln (9PGIII)	504	3-23-93	—
Photochemicals (orm-e)	565	3-5-92	8-27-92
Photographic chem (fixers)(orm-e)	171	5-5-92	8-27-92
Photographic chemicals (cor m)	286	3-6-91	3-22-91
Photographic chemicals (orm-e)	440	10-2-91	8-27-92
Photographic chemicals (orm-e)	550	5-7-91	5-30-91
Photographic chemicals (orm-e)	520	9-9-91	8-27-92
Photographic chemicals (orm-e)	540	5-7-91	5-30-91
Photographical chem (fixer) (orm-e)	510	4-1-92	8-27-92
Photographical chem (fixer) (orm-e)	510	1-21-92	8-27-92
Photographical chem (fixer) (orm-e)	525	3-24-92	8-27-92
Photographical chem (fixer) (orm-e)	490	3-5-92	8-27-92
Photographical chem (fixer) (orm-e)	510	1-21-92	8-27-92
Photographical chem (fixer) (orm-e)	560	5-18-92	8-27-92
Photographical chem (fixer) (orm-e)	620	7-1-92	8-27-92
Photographical chem (fixer)(orm-e)	550	9-2-92	12-7-92
Photographical chem (fixer)(orm-e)	580	7-14-92	8-27-92
Photographical chemicals (orm-e)	405	10-2-91	10-30-91
Polymethylene polyphenylisocyanate	183	3-7-91	4-9-91
Polymethylene polyphenylisocyanate	196	3-7-91	4-9-91
Polymethylene polyphenylisocyanate	359	3-7-91	4-9-91
Polymethylene polyphenylisocyanate	544	3-7-91	4-9-91
Polymethylene polyphenylisocyanate	577	3-7-91	4-9-91
Polymethylene polyphenylisocyanate	591	3-7-91	4-9-91
Potassium bromide soln (pois B)	23	8-19-91	8-17-92
Potassium chromate & HCL acid(cor m)	157	10-13-92	1-25-93
Potassium chromate & HCL acid(cor m)	172	12-9-92	—
Potassium chromate debris (9PGIII)	42	3-23-93	—
Potassium chromate debris (orm-e)	86	8-12-92	8-27-92
Potassium chromate liquid (orm-e)	475	1-6-92	8-27-92
Potassium chromate liquid (orm-e)	480	1-6-92	8-27-92
Potassium chromate liquid (orm-e)	415	1-6-92	8-27-92
Potassium chromate soln (9PGIII)	465	3-23-93	—
Potassium chromate soln (9PGIII)	454	3-23-93	—
Potassium chromate soln (orm-e)	525	2-10-93	—
Potassium chromate soln (orm-e)	525	2-10-93	—
Potassium chromate soln (orm-e)	525	2-10-93	—
Potassium Chromate (orm-e)	450	12-5-90	1-15-91
Potassium Chromate (orm-e)	508	7-14-92	8-27-92
Potassium Chromate (orm-e)	352	7-14-92	8-27-92
Potassium Chromate (orm-e)	559	7-14-92	8-27-92
Potassium Chromate (orm-e)	468	7-14-92	8-27-92
Potassium Chromate (orm-e)	503	7-14-92	8-27-92
Potassium Chromate (orm-e)	350	7-14-92	8-27-92
Potassium Chromate (orm-e)	468	7-14-92	8-27-92

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Potassium Chromate (orm-e)	450	12-5-90	1-15-91
Potassium Chromate (orm-e)	450	12-5-90	1-15-91
Potassium Chromate (orm-e)	450	12-5-90	1-15-91
Potassium Chromate (orm-e)	450	12-5-90	1-15-91
Potassium Chromate (orm-e)	450	12-5-90	1-15-91
Potassium Chromate (orm-e)	450	12-5-90	1-15-91
Potassium Chromate (orm-e)	526	7-14-92	8-27-92
Potassium Chromate cont debr (orm-e)	25	2-26-91	3-22-91
Potassium Chromate cont debr (orm-e)	55	2-26-91	3-22-91
Potassium Chromate debris (orm-e)	39	5-16-91	5-30-91
Potassium Chromate debris (orm-e)	39	12-9-92	—
Potassium Chromate debris (orm-e)	39	2-10-93	—
Potassium Chromate Solid (orm-e)	50	8-21-90	1-15-91
Potassium Chromate Solids (orm-e)	150	10-24-90	3-22-91
Potassium Chromate soln (orm-e)	398	8-12-92	8-27-92
Potassium Chromate soln (orm-e)	515	10-13-92	12-7-92
Potassium Chromate soln (orm-e)	525	8-12-92	8-27-92
Potassium Chromate soln (orm-e)	520	10-13-92	12-7-92
Potassium Chromate soln (orm-e)	533	10-13-92	12-7-92
Potassium Chromate soln (orm-e)	525	10-13-92	12-7-92
Potassium Chromate soln (orm-e)	213	8-12-92	8-27-92
Potassium Chromate Soln (orm-e)	450	3-26-91	4-9-91
Potassium Chromate Soln (orm-e)	450	3-26-91	4-9-91
Potassium Chromate Soln (orm-e)	450	3-26-91	4-9-91
Potassium Chromate Soln (orm-e)	450	3-26-91	4-9-91
Potassium Chromate Soln (orm-e)	291	4-16-91	5-30-91
Potassium Chromate Soln (orm-e)	450	3-26-91	4-9-91
Potassium Chromate Soln (orm-e)	450	3-26-91	4-9-91
Potassium dichromate (orm-a)	2	7-24-91	12-18-91
Potassium dichromate debris (orm-e)	41	11-4-91	12-6-91
Potassium dichromate debris (orm-e)	47	3-24-92	4-20-92
Potassium Dichromate (orm-e)	84	12-18-90	1-16-91
Potassium Dichromate debris (orm-e)	100	7-24-90	1-15-91
Potassium permanganate (ox)	17	9-30-92	12-7-92
Pyridine & methylene chloride (fl l)	230	1-10-91	4-9-91
Pyridine & methylene chloride (fl l)	230	1-10-91	4-9-91
Quick copy cleanup rags (orm-e)	26	5-16-91	5-30-91
Rags & Paint residue (orm-e)	80	12-11-90	1-15-91
Rags cont w/xylene & toluene (9)	122	1-27-93	—
Rags contw/1,1-dichlorethylene(orm-e)	27	2-10-93	—
Sample Debris (fl l)	75	5-4-90	9-26-91
Sampling Debris (orm-e)	140	3-12-91	4-9-91
Sampling Debris (orm-e)	100	3-12-91	4-9-91
Sandblast grit (orm-e)	361	1-6-92	8-27-92
Sandblast grit (orm-e)	311	1-6-92	8-27-92
Sandblast grit (orm-e)	682	1-6-92	8-27-92
Sandblast grit (orm-e)	653	1-6-92	8-27-92
Sandblast grit (orm-e)	689	1-6-92	8-27-92

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Sandblast grit (orm-e)	311	1-6-92	8-27-92
Sandblast grit (orm-e)	747	1-6-92	8-27-92
Savin Copier Fluid (comb I)	20	1-10-90	1-15-91
Savin Copier Fluid (comb I)	70	4-25-90	1-15-91
Selenium cont waste water (orm-e)	320	3-12-91	4-9-91
Silica samples w/chromium (orm-e)	12	9-30-92	12-7-92
Silica samples w/lead (orm-e)	12	9-30-92	12-7-92
Silv & mercuric nitrate soln (orm-e)	130	2-10-93	2-25-93
Silv & mercuric nitrate soln (orm-e)	136	2-10-93	2-25-93
Silv & mercuric nitrate soln (orm-e)	147	3-23-93	—
Silv & mercuric nitrate soln (orm-e)	147	3-23-93	—
Silv & mercuric nitrate soln (orm-e)	271	2-10-93	2-25-93
Silv & mercuric nitrate soln (orm-e)	271	2-10-93	2-25-93
Silv & mercuric nitrate soln (orm-e)	304	2-10-93	2-25-93
Silv & mercuric nitrate soln (orm-e)	310	3-23-93	—
Silv & mercuric nitrate soln(orm)	300	7-14-92	7-16-92
Silv & mercuric nitrate soln(orm-e)	295	10-13-92	12-7-92
Silv & mercuric nitrate soln(orm-e)	156	10-13-92	12-7-92
Silv & mercuric nitrate soln(orm-e)	149	10-13-92	12-7-92
Silv & mercuric nitrate soln(orm-e)	297	10-13-92	12-7-92
Silv & mercuric nitrate soln(orm-e)	271	7-14-92	7-16-92
Silv & Mercuric nitrate soln (orm-e)	254	1-21-92	7-16-92
Silv & Mercuric nitrate soln (orm-e)	114	1-6-92	7-16-92
Silv & Mercuric nitrate soln (orm-e)	140	12-9-92	2-25-93
Silv & Mercuric nitrate soln (orm-e)	150	1-6-92	7-16-92
Silv & Mercuric nitrate soln (orm-e)	150	1-6-92	7-16-92
Silv & Mercuric nitrate soln (orm-e)	152	11-4-91	7-16-92
Silv & Mercuric nitrate soln (orm-e)	165	12-9-92	2-25-93
Silv & Mercuric nitrate soln (orm-e)	280	1-6-92	7-16-92
Silv & Mercuric nitrate soln (orm-e)	280	11-4-91	7-16-92
Silv & Mercuric nitrate soln (orm-e)	285	11-4-91	7-16-92
Silv & Mercuric nitrate soln (orm-e)	310	12-9-92	2-25-93
Silv & Mercuric nitrate soln (orm-e)	315	11-4-91	7-16-92
Silv & Mercuric nitrate soln (orm-e)	464	11-4-91	7-16-92
Silver Chromium Mixture (orm-e)	500	12-5-90	1-16-91
Silver nitrate (orm-e)	147	9-9-91	12-6-91
Silver nitrate soln (orm-e)	140	5-18-92	7-16-92
Silver nitrate soln (orm-e)	292	4-16-91	5-30-91
Silver nitrate soln (orm-e)	310	5-18-92	7-16-92
Silver nitrate soln (orm-e)	450	2-26-91	3-22-91
Silver nitrate soln (orm-e)	140	5-18-92	7-16-92
Silver nitrate soln (orm-e)	144	7-25-91	12-6-91
Silver nitrate soln (orm-e)	150	7-25-91	12-6-91
Silver nitrate soln (orm-e)	140	5-18-92	7-16-92
Silver nitrate soln (orm-e)	165	7-25-91	12-6-91
Silver nitrate soln (orm-e)	280	3-24-92	7-16-92
Silver nitrate soln (orm-e)	43	12-9-92	—
Silver nitrate soln (orm-e)	153	8-12-92	8-27-92

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Silver nitrate soln (orm-e)	45	11-4-91	12-6-91
Silver nitrate soln (orm-e)	140	5-18-92	7-16-92
Silver nitrate soln (orm-e)	43	5-18-92	1-25-93
Silver nitrate soln (orm-e)	447	7-9-91	12-6-91
Silver nitrate soln (orm-e)	131	7-25-91	12-6-91
Silver nitrate soln (orm-e)	143	3-24-92	7-16-92
Silver nitrate soln (orm-e)	133	8-12-92	8-27-92
Silver nitrate soln (orm-e)	266	3-24-92	7-16-92
Silver nitrate soln (orm-e)	316	3-24-92	7-16-92
Silver nitrate soln (orm-e)	132	8-12-92	8-27-92
Silver nitrate soln (orm-e)	450	2-26-91	3-22-91
Silver nitrate soln (orm-e)	164	7-25-91	12-6-91
Silver Nitrate (orm-e)	515	5-16-91	5-30-91
Silver Nitrate Mixture (orm-e)	550	10-24-90	1-16-91
Silver Nitrate Mixture(orm-e)	500	12-5-90	1-16-91
Silv,mercuric nitrate soln (9PGIII)	300	5-18-93	—
Silv,mercuric nitrate soln (9PGIII)	151	5-18-93	—
Silv,mercuric nitrate soln (9PGIII)	136	5-18-93	—
Silv,mercuric nitrate soln (9PGIII)	115	5-18-93	—
So debr *w/pentachlorophenol (orm-e)	284	8-26-92	—
So debr *w/pentachlorophenol (orm-e)	604	8-26-92	—
Sodium arsenite (6.1)	16	1-20-93	2-25-93
Sodium Azide (pois B)	7	5-28-91	6-3-91
Sodium Azide w/phosphate buffers pois	7	5-28-91	6-3-91
Sodium Cyanide (pois B)	20	5-4-90	12-18-91
Sodium Hydroxide (cor m)	650	7-24-90	4-25-91
Sodium Hydroxide dry,so (cor m)	200	6-28-90	4-18-91
Sodium hypophosphite (9)	15	1-20-93	2-25-93
Sodium Metal (fl s)	50	6-12-90	3-8-91
Sodium nitrate (ox)	144	7-9-91	7 9-91
Sodium nitrate (ox)	22	8-7-90	—
Sodium nitrate (ox)	13	8-7-90	—
Sodium nitrate (ox)	12	8-7-90	—
Sodium nitrate (ox)	14	8-7-90	—
Solidified Paint & Rags (orm-e)	90	7-17-90	3-8-91
Soln w/hvy met(Selenium) (pois B)	350	12-12-90	5-30-91
Soln w/hvy met(Selenium) (pois B)	400	12-12-90	5-30-91
Soln w/hvy met(Selenium) (pois B)	350	12-12-90	5-30-91
Solv cont rags (1,1,1-TCE)(orm-e)	40	8-12-92	8-27-92
Solvent cont lab debris (fl l)	500	12-12-90	1-15-91
Solvent cont lab debris (fl l)	100	12-12-90	1-15-91
Solvent cont lab debris (fl l)	100	12-12-90	1-15-91
Solvent cont Lab debris (com l)	112	2-12-91	3-22-91
Solvent cont print shop rags (orm-e)	75	6-21-91	3-20-92
Solvent cont print shop rags (orm-e)	75	6-21-91	3-20-92
Solvent cont rags (orm-e)	95	2-20-92	3-20-92
Solvent cont rags (orm-e)	19	6-26-91	12-6-91
Solvent cont rags (orm-e)	57	11-14-91	12-6-91

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Solvent cont rags (orm-e)	22	1-6-92	3-20-92
Solvent cont rags (orm-e)	40	3-5-92	3-20-92
Solvent cont rags (orm-e)	100	11-21-92	12-7-92
Solvent cont rags (orm-e)	22	3-3-92	12-7-92
Solvent cont rags (xylene,tol)orm-e	85	12-11-91	3-20-92
Solvent cont Rags (orm-e)	107	2-12-91	3-22-91
Solvent cont Rags (orm-e)	43	1-23-91	4-9-91
Solvent cont Rags (orm-e)	30	2-27-91	4-9-91
Solvent cont Rags (orm-e)	100	2-20-91	4-9-91
Solvent cont Rags (orm-e)	50	2-27-91	3-22-91
Solvent contaminate rags (orm-e)	62	4-16-91	5-30-91
Solvent T cont rags/petr naptha	207	8-12-91	10-30-91
Spent Acids (cor m)	180	5-4-90	1-16-91
Spent Acids (cor m)	300	5-4-90	1-16-91
Spent Acids (cor m)	450	5-4-90	1-16-91
Spent Acids (cor m)	500	5-4-90	1-16-91
Spent Acids w Hvy Metals (cor m)	300	5-4-90	1-16-91
Spent alkaline batteries (cor m)	10	4-24-91	5-30-91
Spent Alkaline batteries (cor m)	250	12-6-91	12-18-91
Spent Alkaline batteries (cor m)	99	5-8-91	5-30-91
Spent Alkaline batteries (cor m)	250	12-6-91	12-18-91
Spent Alkaline batteries (cor m)	111	5-8-91	5-30-91
Spent Alkaline batteries (cor m)	92	5-8-91	5-30-91
Spent Di(2-ethylhexyl)phthalate(orme)	100	10-21-92	12-7-92
Spent Di(2-ethylhexyl)phthalate(orme)	100	10-21-92	12-7-92
Spent di-octyl phthalate (n/a)	50	7-25-91	12-6-91
Spent di-octyl phthalate (n/a)	35	7-25-91	12-6-91
Spent Gelbatts F/emerg.lights(orm-e)	100	3-1-90	6-5-91
Spent lab pack cyanides used (pois B)	5	12-9-91	3-20-92
Spent Motor Oil & Mach. Lube (cor m)	150	4-12-90	3-22-91
Spent Motor Oil & Mach. Lube(cor m)	150	4-12-90	3-22-91
Spent Nicad batteries (cor m)	50	12-6-91	12-6-91
Spent nickel-cadmium batt (cor m)	400	7-16-92	7-16-92
Spent OBA (ox)	300	1-22-91	12-6-91
Spent OBA canisters (ox)	362	3-24-92	7-16-92
Spent OBA canisters (ox)	365	5-18-92	7-16-92
Spent OBA canisters (ox)	365	5-18-92	7-16-92
Spent OBA canisters (ox)	204	8-12-92	8-27-92
Spent OBA canisters (ox)	189	5-18-92	7-16-92
Spent OBA canisters (ox)	377	8-12-92	8-27-92
Spent OBA canisters (ox)	362	3-24-92	7-16-92
Spent OBA canisters (ox)	378	1-6-92	3-20-92
Spent OBA canisters (ox)	182	7-25-91	12-6-91
Spent OBA canisters (ox)	380	11-4-91	12-6-91
Spent OBA canisters (ox)	373	1-6-92	3-20-92
Spent OBA canisters (ox)	350	3-26-91	12-6-91
Spent OBA canisters (ox)	271	1-21-92	3-20-92
Spent OBA canisters (ox)	372	9-9-91	12-6-91

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Spent OBA canisters (ox)	356	9-9-91	12-6-91
Spent OBA canisters (ox)	371	7-25-91	12-6-91
Spent paint & thinners (3PGII)	124	5-18-93	—
Spent paint & thinners (3PGII)	185	5-18-93	—
Spent paint and solvents (fl l)	198	9-2-92	12-7-92
Spent paint and thinners (fl l)	162	1-6-92	3-20-92
Spent paint related liquids (fl l)	320	12-11-91	3-20-92
Spent paint shop debris (orm-e)	180	9-2-92	12-7-92
Spent paint stripper(pH13.8)(cor m)	300	5-4-90	2-23-93
Spent paint thinners (fl l)	450	1-22-91	3-22-91
Spent photochem/kodak fixer (orm-e)	560	12-16-92	2-25-93
Spent photochemicals (orm-e)	525	5-16-91	5-30-91
Spent photochemicals (orm-e)	510	12-11-91	12-18-91
Spent photochemicals (orm-e)	480	6-21-91	10-30-91
Spent photochemicals (orm-e)	520	6-11-91	8-27-92
Spent photochemicals (orm-e)	480	12-11-91	12-18-91
Spent photochemicals (orm-e)	565	5-16-91	5-30-91
Spent photochemicals (orm-e)	550	6-21-91	10-30-91
Spent photochemicals (orm-e)	482	5-16-91	5-30-91
Spent photographic chemicals (orm-e)	106	3-12-91	4-9-91
Spent photographic chemicals (orm-e)	268	3-12-91	4-9-91
Spent photographic chemicals (orm-e)	279	3-12-91	4-9-91
Spent photographic chemicals (orm-e)	470	4-10-91	5-30-91
Spent photographic chemicals (orm-e)	470	7-25-91	10-30-91
Spent photographic chemicals (orm-e)	486	3-12-91	4-9-91
Spent photographic chemicals (orm-e)	513	3-12-91	4-9-91
Spent photographic chemicals (orm-e)	525	3-12-91	4-9-91
Spent photographic chemicals (orm-e)	570	4-10-91	5-30-91
Spent Photographic chemicals (orm-e)	50	12-12-90	1-15-91
Spent Powder Clean w/ink (com l)	150	10-31-90	1-15-91
Spent safety kleen solvent (3PGIII)	255	5-5-93	—
Spent solvent cont w/lead (fl l)	200	2-26-91	3-20-92
Spent Solvent (com l)	450	2-26-91	3-22-91
Spent Solvent (com l)	450	2-26-91	3-22-91
Spent Solvent w/ Hvy Metals (cor m)	150	5-4-90	1-16-91
Spent Solvents (fl l)	120	5-4-90	1-15-91
Spent Solvents (fl l)	550	10-24-90	1-15-91
Spent Solvents (fl l)	550	10-24-90	1-15-91
Spent stoddard solvent (com l)	133	11-4-91	12-6-91
Spent Stoddard solv (com l)	511	5-16-91	5-30-91
Spent Stoddard Solvent (com l)	350	7-25-90	1-15-91
Spent Stoddard Solvent (com l)	300	1-22-91	3-22-91
Spent Stoddard Solvent (com l)	400	5-16-90	4-18-91
Stoddard solv & mineral oil(com l)	150	11-12-92	—
Stoddard solvent (3PGI)	130	5-18-93	—
Stoddard solvent (com l)	38	3-3-92	3-20-92
Stoddard solvent (com l)	133	2-10-93	—
Stoddard solvent (com l)	450	12-9-92	—

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Stoddard solvent & methanol (fl l)	355	3-3-92	8-27-92
Stoddard solvent w/Hg (com l)	38	7-21-92	1-25-93
Stoddard Solvent (com l)	40	8-21-90	1-15-91
Sulfuric acid lab pack (cor m)	6	1-14-93	1-25-93
Sulfuric Acid Sludge in Pipe (cor m)	250	6-1-89	2-15-91
Tarlike subs./sampling debr (orm-e)	360	11-29-90	3-22-91
Tarlike Subs./sampling debr (orm-e)	360	11-29-90	3-22-91
Tertbutylamine Borane lab pack(fl s)	1	10-30-91	12-18-91
Tetraethylammonium perchlorate (fl s)	64	5-28-91	3-20-92
Tetrahydrofuran hexane (fl l)	137	11-6-91	12-6-91
Titanous Chloride in water (cor m)	3 20% soln	8-12-91	12-18-91
TRA LP#1(chloroform/benzene)(fl l)	192	5-7-91	5-30-91
TRA LP#10(ethanol/isopropanol)(fl l)	25	5-7-91	5-30-91
TRA LP#11(AmmoniumOxilate/Napthalen)	179	5-7-91	5-30-91
TRA LP#2(n-butylALC/o-dichlorben)(fl l)	170	5-7-91	5-30-91
TRA LP#3(nitrobenzene) (fl l)	216	5-7-91	5-30-91
TRA LP#4(pyridine) (fl l)	105	5-7-91	5-30-91
TRA LP#5(nitroben/chloroben) (fl l)	193	5-7-91	5-30-91
TRA LP#6(toluene/benzene) (fl l)	175	5-7-91	5-30-91
TRA LP#7(n-butylALC/tetrahydrfuron)"	192	5-7-91	5-30-91
TRA LP#8(dichloromethane/methanol)"	142	5-7-91	5-30-91
TRA LP#9(K-cyanide/Zn-cyanide)(fl l)	44	5-7-91	5-30-91
Triethyl Alu,tolu,Li-Triethyl Boro (fl l)	10	8-30-91	8-17-92
Turco Alkaline rust remover (cor m)	150	4-2-91	5-30-91
Turco Alkaline rust remover (cor m)	225	4-2-91	5-30-91
Unknown (but characterized) (orm-e)	125	9-9-91	3-20-92
Unused Butyl Cellosolve Det (cor m)	600	8-7-90	1-15-91
Used oil (com l)	486	1-22-91	3-22-91
Used oil (com l)	386	1-22-91	3-22-91
Used oil w/halogenated org comp "	450	5-7-91	3-20-92
Used oil w/halogenated org comp "	440	5-7-91	3-20-92
Used paints and thinners (fl l)	375	2-7-91	3-22-91
Used sodium hydroxide (cor m)	280	2-12-91	3-22-91
Used Sulfuric Acid w/hvy met (cor m)	60	2-7-91	3-22-91
Used Sulfuric Acid w/hvy met (cor m)	65	2-7-91	3-22-91
UST sludge in absorbers (orm-e)	300	1-14-92	1-25-93
UST Tank sludge (n/a)	474	3-24-92	8-27-92
UST Tank sludge (n/a)	474	3-24-92	8-27-92
UST Tank sludge (n/a)	474	3-24-92	8-27-92
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UST Tank sludge (n/a)	474	3-24-92	8-27-92

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
UST Tank sludge (n/a)	474	3-24-92	8-27-92
V80 toner/isoparaffanic solv(com l)	200	12-5-90	1-15-91
V80 toner/isoparaffanic solv (com l)	20	12-4-90	1-15-91
Versatech Toner (comb l)	100	3-7-90	3-22-91
Waste 1,1,1-TCE (orm-e)	99	3-12-91	4-9-91
Waste 1,1,1-Trichloroethane (orm-a)	300	2-27-91	3-22-91
Waste ammonium hydroxide (cor m)	61	6-4-91	12-18-91
Waste Av Fuel (fl l)	350	7-10-90	1-8-91
Waste cyclohexylamine (fl l)	150	4-24-91	1-25-93
Waste elect dip tank varnish (fl l)	323	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	539	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	548	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	540	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	552	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	547	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	553	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	350	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	530	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	586	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	545	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	492	9-2-92	12-7-92
Waste elect dip tank varnish (fl l)	630	9-2-92	12-7-92
Waste Ferric Chloride (cor m)	250	5-4-90	3-22-91
Waste fuel aviation (fl l)	450	10-9-89	1-8-91
Waste hydraulic oil (fl l)	235	5-5-92	—
Waste Jet Fuel (fl l)	400	3-20-90	1-8-91
Waste oil (orm-e)	235	5-5-92	8-27-92
Waste oil w/ Heptachlor (orm-e)	480	9-26-90	3-20-92
Waste oil,diesel, gas (orm-e)	350	8-22-91	10-30-91
Waste oil,diesel, gas (orm-e)	325	8-22-91	10-30-91
Waste oil,diesel, gas (orm-e)	400	8-22-91	10-30-91
Waste oil,diesel, gas (orm-e)	300	8-22-91	10-30-91
Waste oil,diesel,gas (orm-e)	300	8-22-91	3-20-92
Waste paint (orm-e)	100	9-9-91	10-30-91
Waste paint and thinners (fl l)	492	4-16-91	5-30-91
Waste paint and thinners (fl l)	167	3-12-91	4-9-91
Waste paint and thinners (fl l)	252	12-18-90	1-16-91
Waste paint and thinners (fl l)	300	12-12-90	1-15-91
Waste paint cont rags (orm-e)	200	5-18-92	7-16-92
Waste paint cont rags (orm-e)	144	5-18-92	7-16-92
Waste paint related material (orm-e)	153	3-24-92	4-20-92
Waste paint related material (orm-e)	153	3-24-92	4-20-92
Waste paint related material (orm-e)	71	3-24-92	4-20-92
Waste paint so & thinners (fl l)	270	2-3-93	2-23-93
Waste paint thinner w/pai so(fl l)	460	11-4-91	12-6-91
Waste paint thinner w/pai so(fl l)	460	11-4-91	12-6-91
Waste paint thinners w/pai s (fl l)	177	5-18-92	7-16-92
Waste paint thinners w/pai s (fl l)	141	5-18-92	7-16-92

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Waste paint thinners w/pai so(fl l)	460	7-9-91	12-6-91
Waste paint thinners w/pai so(fl l)	460	7-9-91	12-6-91
Waste paint thinners w/pai so(fl l)	460	7-9-91	12-6-91
Waste paint thinners w/pai so(fl l)	460	7-9-91	12-6-91
Waste paint thinners w/pai so(fl l)	460	7-9-91	12-6-91
Waste Paint & Thinners (fl l)	339	10-16-91	1-15-91
Waste Paint & Thinners (fl l)	535	10-16-90	1-15-91
Waste Paint rags (orm-e)	30	6-21-91	10-30-91
Waste paints & solvent (fl l)	75	7-28-90	3-20-92
Waste paints & solvent (fl l)	50	7-28-90	3-20-92
Waste paints & thinners (fl l)	525	5-7-91	5-30-91
Waste paints & thinners (fl l)	498	5-7-91	5-30-91
Waste paints & thinners (fl l)	495	5-7-91	5-30-91
Waste paints & thinners (fl l)	126	10-13-92	12-7-92
Waste paints & thinners (fl l)	554	1-17-91	3-22-91
Waste paints & thinners (fl l)	141	10-13-92	12-7-92
Waste paints & thinners (fl l)	525	5-7-91	5-30-91
Waste paints and thinners (fl l)	670	5-16-91	5-30-91
Waste paints and thinners (fl l)	557	5-16-91	5-30-91
Waste paints and thinners (fl l)	575	3-28-91	5-30-91
Waste paints and thinners (fl l)	685	5-16-91	5-30-91
Waste paints and thinners (fl l)	605	3-28-91	5-30-91
Waste paints and thinners (fl l)	513	5-16-91	5-30-91
Waste paints and thinners (fl l)	310	2-20-91	3-22-91
Waste paints and thinners (fl l)	315	3-6-91	3-22-91
Waste paints and thinners (fl l)	275	12-11-90	1-15-91
Waste Paints and Thinners (fl l)	700	12-5-90	1-15-91
Waste Photochem w/Silver (orm-e)	400	5-16-90	1-16-91
Waste Photochem w/Silver (orm-e)	400	5-16-90	1-16-91
Waste Photochem w/Silver (orm-e)	400	5-16-90	1-16-91
Waste potassium chromate l (orm-e)	231	11-4-91	12-6-91
Waste potassium chromate l (orm-e)	386	11-4-91	12-6-91
Waste potassium chromate l (orm-e)	36	11-4-91	12-6-91
Waste potassium perchlorate (ox)	50	5-28-91	4-15-92
Waste Solvents for painting (fl l)	350	8-22-91	10-30-91
Waste thinners (fl l)	550	12-5-90	3-20-92
Waste Xylene lab pack (fl l)	32	10-30-91	12-18-91
Water soluble coolant (orm-e)	500	3-26-91	5-30-91
Weapons cleaning debris (orm-e)	90	11-20-91	4-20-92
Weapons cleaning debris (orm-e)	24	9-30-92	12-7-92
Xylene & methanol lab pack (fl l)	98	10-14-92	—
Xylene & methanol lab pack (fl l)	98	10-14-92	—
Xylene & methanol lab pack (fl l)	98	10-14-92	—
Xylene & nitric acid mixt (fl l)	12	9-30-92	12-7-92
Zinc Bromide Soln (cor m)	22	8-7-90	1-16-91
Zinc nitrate (ox)	29	8-19-91	8-17-92
Zinc Powder (fl s)	20	5-4-90	12-18-91
Zirc & Beryl Powder (fl & pois)	30	8-1-90	3-8-91

<u>Hazardous Material</u>	<u>Quantity</u>	<u>Date Received</u>	<u>Date Shipped</u>
Zirconium & Beryllium (fl s)	6	6-3-91	12-18-91
Zirconium Hydride (fl s)	24	7-2-90	3-8-91
Zn chloride, anhydrous (cor m)	19	8-19-91	8-17-92
Zn sulfide, Cu sulfide (orm-b)	8	8-19-91	8-17-92

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8/24/94

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