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Hazards Assessment for the Waste Experimental Reduction Facility

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ABSTRACT

This report documents the hazards assessment for the Waste Experimental Reduction Facility (WERF) 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 (DOE-ID) 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. This hazards assessment describes the WERF, the area surrounding WERF, associated buildings and structures at WERF, and the processes performed at WERF. All radiological and nonradiological hazardous materials stored, used, or produced at WERF were identified and screened. Even though the screening process indicated that the hazardous materials could be screened from further analysis because the inventory of radiological and nonradiological hazardous materials were below the screening thresholds specified by DOE and DOE-ID guidance for DOE Order 5500.3A, the nonradiological hazardous materials were analyzed further because it was felt that the nonradiological hazardous material screening thresholds were too high. The nonradiological hazardous material screening thresholds were felt to be too high because there is no correlation between the screening thresholds and the protective action criteria concentration limits specified by DOE Order 5500.3A guidance. The consequence results for the analysis of the nonradiological hazardous materials are presented. Emergency considerations such as an emergency planning zone, emergency classes, protective actions, and emergency action levels based on the consequence results are also presented. This hazards assessment concludes by outlining the requirements for the maintenance and review of this hazards assessment.

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NOTE *Reviews and approval signatures appear on DRR WR-2264.*

Released By: J K Hathaway Date: 9/19/94
WERF Document Control

ACRONYMS

ANL-W	Argonne National Laboratory-West
CAS	Chemical Abstract Service
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CM	Configuration Management
DOE	Department of Energy
DOE-ID	DOE Idaho Operations Office
DOT	Department of Transportation
EALs	Emergency Action Levels
EEGL	Emergency Exposure Guidance Level
EPA	Environmental Protection Agency
EPI	Emergency Prediction Information
EPZ	Emergency Planning Zone
ERPG	Emergency Response Planning Guide
ERQ	Estimated Release Quantity
ER&WM	Environmental Restoration and Waste Management
ESHE	Early Severe Health Effects
HW	Hazardous Waste
HWSF	Hazardous Waste Storage Facility
ICPP	Idaho Chemical Processing Plant
IDLH	Immediately Dangerous to Life and Health
INEL	Idaho National Engineering Laboratory
LLW	Low-Level Waste
LOC	Level of Concern

MLLW	Mixed Low-Level Waste
MWSF	Mixed Waste Storage Facility
PAG	Protective Action Guidelines
PBF	Power Burst Facility
PEL	Permissible Exposure Limit
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
RQ	Reportable Quantity
RSAC	Radiological Safety Analysis Computer Program
RWMC	Radioactive Waste Management Complex
RWP	Radiation Work Permit
SAR	Safety Analysis Report
SARA	Superfund Amendment and Reauthorization Act
STEL	Short Term Exposure Limit
SWP	Safe Work Permit
TAA	Temporary Accumulation Area
TCLP	Toxicity Characteristic Leaching Procedure
TLV	Threshold Limit Value
TPQ	Threshold Planning Quantity
TQ	Threshold Quantity
TRA	Test Reactor Area
TWA	Time Weighted Average
USQ	Unreviewed Safety Question
WEDF	Waste Engineering Development Facility
WERF	Waste Experimental Reduction Facility

WWSB	WERF Waste Storage Building
WROC	Waste Reduction Operations Complex

HAZARDS ASSESSMENT FOR THE WASTE EXPERIMENTAL REDUCTION FACILITY

1. INTRODUCTION

This report documents the hazards assessment for the Waste Experimental Reduction Facility (WERF) 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 Headquarters[1] 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 WERF, the area surrounding the WERF, the buildings and structures located within the WERF boundary, and the processes involved with the operation of WERF.

This report identifies the radiological and nonradiological hazardous materials stored, used, or produced at WERF and screens them against the screening threshold criteria specified in DOE Order 5500.3A guidance. The screening process indicated that the inventory of radiological and nonradiological hazardous materials were below the recommended screening thresholds. Therefore, in accordance with DOE Order 5500.3A, all the hazardous materials were screened from further analysis.

However, the nonradiological hazardous material screening thresholds were felt to be too high because there is no correlation between the screening thresholds and the protective action criteria concentration limits specified by DOE Order 5500.3A guidance. Therefore, the nonradiological hazardous materials were evaluated for several conservative types of releases. The nonradiological hazardous material evaluation and the consequence results obtained from the evaluation are presented in this hazards assessment.

Emergency considerations, such as an emergency planning zone (EPZ), emergency classes, protective actions, and emergency action levels (EALs) based on the consequence results are also presented. The consequence results indicate 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 WERF would be a Site Area Emergency.

This hazards assessment concludes with information outlining the individuals responsible for the maintenance and review of this hazards assessment.

2. FACILITY AND SITE DESCRIPTION

As stated in the *INEL Site Development Plan*,[4] the INEL encompasses 2,300 km^2 (890 mi^2) 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 Waste Reduction Operations Complex/Waste Experimental Reduction Facility/Power Burst Facility (WROC/WERF/PBF) area. One of the facilities at the WROC/WERF/PBF area is the WERF. The WERF mission, location, and description are discussed in the following subsections. A majority of the information presented is from the WERF Safety Analysis Report (SAR).[5]

2.1 Facility Mission

The current mission of WERF is to support Environmental Restoration and Waste Management (ER&WM) Department priorities within DOE and the INEL. Specifically, WERF provides volume reduction of low-level waste (LLW), treatment of hazardous waste (HW) and mixed low-level waste (MLLW), temporary storage while awaiting processing of LLW and MLLW, and repackaging of LLW, MLLW, and HW. Volume reduction of solid LLW is provided through compaction, incineration, and sizing operations. Also, WERF provides treatment of solid and liquid MLLW and HW through incineration or stabilization. HW is generally shipped off-site for commercial treatment and is only treated at WERF on a case-by-case basis.

Operation of the metal melting activity for LLW that was part of the original design and operation basis for WERF has been discontinued. Therefore, this activity is not included as part of this hazards assessment.

2.2 Facility Location and Demography

WERF is located in the eastern part of the WROC/WERF/PBF area at the INEL. The WROC/WERF/PBF area is a limited access area of about 4,000 acres located approximately 34 km (21 mi) east of Arco and 68 km (42 mi) west of Idaho Falls. The location of WERF with respect to other WROC/WERF/PBF facilities is shown in Figure 1. The location of the WROC/WERF/PBF facilities and other facilities at the INEL are shown in Figure 2. The location of the INEL and approximate distances to cities and towns in the region are shown in Figure 3. Figures 2 and 3 also show the nearest public access points and the transportation network for the INEL and surrounding towns.

There are no permanent residents at the INEL. The communities near the INEL and their 1990 populations include Idaho Falls with 43,929; Blackfoot with 9,646; Pocatello with 46,080; Arco with 1,016; and Atomic City with 25. Atomic City is the nearest community to WERF and is located approximately 13 km (8 mi) to the south of WERF. The population density in Butte, Bonneville,

Bingham, Jefferson, and Clark counties are 0.5 (1.3), 15.1 (39.2), 6.9 (17.9), 5.8 (15.0), and 0.2 persons/km^2 (0.5 persons/mi^2), respectively.

The work force at the INEL varies depending on the levels of construction and the research being conducted at each of the facilities. In June 1992, the INEL employed approximately 12,531 employees. Approximately 8,383 employees work at the site facilities and approximately 4,148 employees work at facilities in Idaho Falls. Of the employees at the site, approximately 36 work at WERF, 142 work at PBF, 1,299 work at Central Facilities Area (CFA), and 2,095 work at the Idaho Chemical Processing Plant (ICPP).

Co-located facilities include the Waste Engineering Development Facility (WEDF), the Mixed Waste Storage Facility (MWSF), and the PBF reactor. The WEDF is an experimental facility used for the development of treatment methods for hazardous or mixed wastes so that the waste may be appropriately disposed of following treatment. The MWSF is housed in the former SPERT IV reactor building. Activities associated with the MWSF consist of operations associated with receiving and storage of MLLW. The PBF reactor was constructed in 1970 and was initially used to perform safety studies on light-water moderated enriched-fuel systems. Subsequently, the fuel has been unloaded from the reactor and is stored in the canal adjacent to the reactor cavity. The facility is in a shutdown condition pending initiation of decommissioning and decontamination (D&D).

2.3 Facility Description

For this hazards assessment, the facility description for the WERF complex will be considered to consist of the following primary structures:

- PER-609, Incinerator Building. The main WERF building is composed of a Highbay and a Lowbay. The Highbay is a two-story (above and below grade) structure with a concrete and steel frame. The basement walls are reinforced concrete and have integral reinforced concrete columns that are part of the structural frame. The above grade walls are masonry (pumice block). A braced steel frame is located just inside the exterior masonry walls. The roof is a braced steel frame with sheet metal roofing panels.

  The Lowbay, which houses office areas, utilities, and restrooms, is a single story structure abutting the west wall of the Highbay. The original building has been extended six times to accommodate equipment, power supply, and offices. Building extensions are described in the WERF SAR.

- PER-635, Auxiliary Building. PER-635 is currently scheduled for removal. It has no active processes or operations. This building is a metal building located northeast of PER-609. The building is divided into three separate areas and has a reinforced concrete pad to the south and to the north.

- PER-622, Compaction and Sizing Reduction Facility. PER-622 is a one-story metal building located directly east of PER-609. The building has a concrete floor painted with epoxy paint for ease of decontamination. The building contains a self-contained enclosure for performing sizing operations. The enclosure has two main sections with the north section used for opening waste boxes and preparing the waste for sizing operations and the south section used for performing size reduction of waste. The north section includes a motorized rollup door that separates the enclosure from PER-622, an airlock room for entry and exit into the enclosure, and a sorting and stripping room.

The south section is separated from the sorting and stripping room by bifold doors. The sizing room contains stainless steel wall panels for ease of decontamination.

The south end of PER-622 is used to house the compactor operations and includes a 200-ton compactor that is filtered and exhausted into the PER-622 ventilation system.

- PER-623, WERF Waste Storage Building (WWSB). The WWSB is a metal building with a rigid frame. A central wall divides the building into two main sections. The north section consists of three waste storage areas plus an electrical equipment room. The south section consists of three waste storage areas. The building has a concrete floor that is finished with an epoxy enamel to render it impervious to liquids.

- PER-641, WERF Operations Support Building. PER-641 is used as an office space for administrative and support personnel. The building is a one-story prefabricated metal sided building.

These buildings and their locations are shown in Figure 4. Detailed descriptions of these and other buildings at WERF are provided in the WERF SAR.

2.4 Processes and Operations

The following major processes and operations have been identified for WERF. The specific location, equipment, and detailed descriptions of these processes and operations are provided in the WERF SAR.

2.4.1 Incineration

The purpose of the WERF incinerator is to achieve effective volume reduction of low-level combustible waste prior to disposal at the Radioactive Waste Management Complex (RWMC).

The incinerator is normally operated in 24-hour-per-day campaigns of varying lengths of time depending on the type and amount of waste to be processed. Hazardous or mixed waste is incinerated intermittently on a case-by-case basis. Characteristic[6] hazardous or mixed waste may be burned as part of a LLW burn, but listed[6] hazardous or mixed waste is burned separately in dedicated campaigns. This allows the segregation of the ash which must be stored until a Resource Conservation and Recovery Act (RCRA)[6] permitted disposal facility is available. (Samples of the bottom ash are drawn and analyzed. If the bottom ash samples exhibit characteristics of mixed waste criteria, then the ash from a LLW and MLLW burn is stabilized and, after passing Environmental Protection Agency (EPA) toxicity characteristic leaching procedure (TCLP)[7] testing, is disposed of as LLW at the RWMC. If the bottom ash samples do not exhibit characteristics of mixed waste criteria, stabilization is not performed.)

2.4.2 Sizing

Sizing operations are conducted for the purpose of reducing the volume of large metallic LLW components prior to disposal. Sizing is performed on LLW only and includes the sizing of metallic (ferrous and nonferrous) and wood structures. For sizing operations, principal equipment utilized includes manually operated torches such as plasma-arc and oxy-acetylene torches, various mechanical cutting devices such as saws and shears, and various saws for cutting wood waste.

Materials such as pipes, tanks and machinery to be size reduced are introduced into the sizing building and placed in the sorting area where material having thermal insulation, wiring, or coverings is stripped to the maximum extent possible. The removed material may be either packaged for disposal or sent to the compactor or incinerator for further volume reduction. The remaining material is then transferred to the sizing area and cut into smaller, manageable pieces. This processed waste is then boxed for disposal. Personnel performing waste reduction operations in the sizing area are dressed in full personal protective equipment (PPE) including anticontamination clothing, thermal suits, and breathing air hoods or respirators as necessary for the sizing process being performed.

2.4.3 Stabilization

Stabilization operations are conducted to stabilize incinerator flyash, bottom ash, and sizing dust-collector dust. Stabilization is accomplished using cement which renders the hazardous constituents in a nonhazardous form. Stabilization operations have expanded to include other types of waste forms, including soils and aqueous waste forms.

2.4.4 Compaction

Compaction of LLW provides volume reduction of compactible waste that includes noncombustible materials (e.g., light gauge metals and glass) and acid gas producing combustible materials (e.g., plastics containing polyvinyl chloride).

Compactible waste is segregated and packaged in plastic bags by the generators at the generator site. Prior to shipment to WERF, compactible waste is certified by the generator as meeting the waste acceptance criteria (WAC) for compactible LLW. The compactible waste is placed in metal containers, shipped to WERF, and stored on the asphalt pad outside WERF prior to compaction operations.

Compaction operations consists of utilizing a forklift to place an empty metal container in the compaction chamber. The metal container is then manually loaded by operators with compactible LLW through the upper door on the compactor. Once the metal container is full, the compactor upper door is closed and the hydraulic system is engaged to operate the compaction ram. This loading and compacting process is repeated until the container is full. Anti-spring-back retainers are installed once the container is full and a lid is placed on the container. The container is then weighed and removed from the compaction chamber. A radiation and contamination survey is performed on the container and any needed actions, such as decontaminating the outside of the container, are performed. The loaded container is marked to identify the radiation level and radionuclide content. The container is then removed from the compactor room and stored for shipment to RWMC for disposal.

2.4.5 Waste Storage

The processes and operations associated with LLW and MLLW storage are discussed in the following sections.

2.4.5.1 LLW Storage. Solid LLW is stored at WERF on asphalt pads surrounding the facility. Combustible and compactible waste is shipped to WERF in weatherproof cargo containers which are used to store the waste until it is ready for treatment. Metallic waste is shipped to WERF in metal or plywood containers. Some oversized contaminated metallic waste is shipped and stored at WERF prior to treatment. If it is not feasible to place the oversized waste component into a container, the

component is wrapped to contain the contaminated portions and to exclude moisture. Pad storage is normally organized to segregate compactible, combustible, and metallic waste into individual storage areas for ease of management of the waste.

Prior to shipment of LLW to WERF, the waste generator notifies WERF of the intended shipment date and obtains shipment approval from the WERF operations manager or designated alternate. This notification allows WERF to make the necessary preparations for hoisting and rigging equipment preparation and to ensure the waste shipment is properly documented and certified for treatment.

Upon arrival at WERF and prior to unloading the waste shipment, the documentation is examined to ensure it is properly completed. The radionuclide content quantities are noted and compared with appropriate storage inventory to verify the reported quantities do not exceed the allowed inventory. If paperwork discrepancies cannot be resolved, the shipment may not be accepted and may be returned to the waste generator. The storage inventory is updated with the reported inventory from the shipping papers. The waste shipment is visually inspected to verify that the shipment is properly packaged and not damaged. A radiation and contamination survey is performed to verify that the shipment is contamination free and that the radiation levels of the containers meet the WAC.

If no discrepancies are noted, or as soon as any discrepancies are corrected, the shipment is accepted and scheduled for off-loading. Once off-loading is completed, a radiation survey and contamination survey is performed and any radiation barriers are setup as necessary. Periodic surveillances and surveys of the outside storage areas are performed to verify container integrity and ensure control of any potential contamination spread.

2.4.5.2 MLLW Storage. Storage of MLLW at WERF is performed in accordance with RCRA requirements. Designated storage locations for MLLW at WERF include the temporary accumulation area (TAA) located in the basement of the main WERF building (PER-609) and in the WWSB (PER-623). The WWSB is operating under RCRA Part A interim status.

The TAA is used as a 90-day storage facility for waste generated at WERF. The room provides a temporary storage location for MLLW or HW that is either awaiting sampling for characterization or the return of characterization data. When the characterization is completed and before the 90 days are up, the waste is either disposed of as LLW, treated, or moved to the WWSB, Hazardous Waste Storage Facility (HWSF), or the MWSF for long-term storage.

The WWSB provides long-term storage of MLLW awaiting treatment or final disposition. MLLW stored at the WWSB is packaged in approved containers and includes flammable liquid wastes, combustible liquid wastes, liquid wastes, and solid wastes. Activities performed at WWSB include waste handling, storage, shipment, and inspection of the waste containers. Other activities at WWSB include container overpacking of leaking drums or packages, associated cleanups, and general maintenance. Initial waste receipt and inspection are performed by WROC personnel. Waste container handling between WWSB and WERF is performed by WERF operations personnel.

MLLW is transported from various generators and stored at the WWSB until treatment or a disposal option becomes available. Acceptance of waste at the WWSB is provisional upon meeting the WWSB WAC. Before waste can be shipped to the WWSB, the generator notifies WERF of the waste to be shipped for storage, fills out, and submits a Generator's Hazardous Waste Material Profile Sheet (Form EG&G 669A) profiling the waste. Waste profile data must be based on

verifiable process knowledge or chemical analysis of the waste. Based on the waste profile data, the generator is informed if sampling is required and if there is any special packaging or shipping requirements. All mixed waste received at the WWSB must be packaged in accordance with Department of Transportation (DOT) and RCRA regulations. The generator makes arrangements with WERF for the receipt of the waste and originates a Uniform Hazardous Waste Manifest (EPA Form 8700-22).

Upon arrival at WERF and prior to unloading the waste, the documentation is examined to ensure it is complete. The radionuclide and nonradiological hazardous material content quantities are compared with the appropriate storage inventory to verify that the reported quantities do not exceed the allowed inventory. The inventory is updated using the reported inventory amounts from the shipping papers. The WERF inventory control program is updated prior to unloading the waste.

Before acceptance at the WWSB, containers or packages are inspected by WROC personnel for leaks or any damage. A radiation and contamination survey is performed to verify that the shipment is contamination free and that the radiation levels of the containers meet the WAC. Documentation, markings, radiation levels, and labeling must be in compliance with the WAC requirements and Form EG&G 669A. WROC Technical Programs personnel are responsible for accepting the waste into the WWSB.

Once all inspections are complete and the waste is accepted, the waste is ready to be moved to a storage location. WROC personnel specify the storage location based on drum labels or any special requirements established by the generator and a storage compatibility evaluation. WERF personnel unload and move the waste into the appropriate storage bays.

WERF operations personnel perform walk-through inspections of the facility at least weekly or before any material is moved in or out of the facility. Inspectors look for any signs of facility deterioration, damage, or malfunction as well as any signs of container breaches or leaks. The inspector visually inspects all safety and emergency equipment to ensure that there is an adequate supply and that the equipment is within the current test date. Radiation monitoring instruments and ventilation systems are also checked to ensure proper operation.

2.4.6 Waste Repackaging

The purpose of waste repacking is to repackage waste in a suitable container for subsequent treatment. Some hazardous or mixed wastes are packaged in containers not suitable for incineration (i.e., metal drums) or are in a waste form or concentration not permitted for direct incineration. This waste is repackaged in cardboard boxes that are lined with a polyethylene bag. Other liner material may be substituted for polyethylene to ensure chemical resistance to the materials being repackaged.

Repackaging of non-flammable MLLW takes place in the drum feed/blending unit, the furnace room (B101 for Furnace Room No. 1 and B102 for Furnace Room No. 2), or the stabilization room (B108). Repackaging/blending of flammable liquids is only permitted in the drum feed/blending unit because the other rooms are not designed to meet the safety requirements for handling these materials.

Prior to any repackaging of MLLW, a repackaging plan is prepared that identifies the amount of waste to be placed in each box and the need for adsorbents. Personnel performing the repackaging operations are dressed and equipped with the appropriate PPE. The PPE requirements are addressed on a case-by-case basis in the Radiation Work Permit (RWP) or Safe Work Permit (SWP) for a specific job. Typically, waste material is manually extracted from 19 to 314 L (5 to 83 gal)

containers and repackaged into an appropriate incinerable container and with absorbent material if necessary. Scoops, shovels, or hand pumps are utilized to extract the waste from the original container. Following repackaging, the new containers are marked with appropriate content information including identification number, contents, radiation levels, radionuclide content, and chemical concentration levels of the waste. Prior to removing the box from the repackaging area, a radiation and contamination survey is performed to ensure that the container is contamination free.

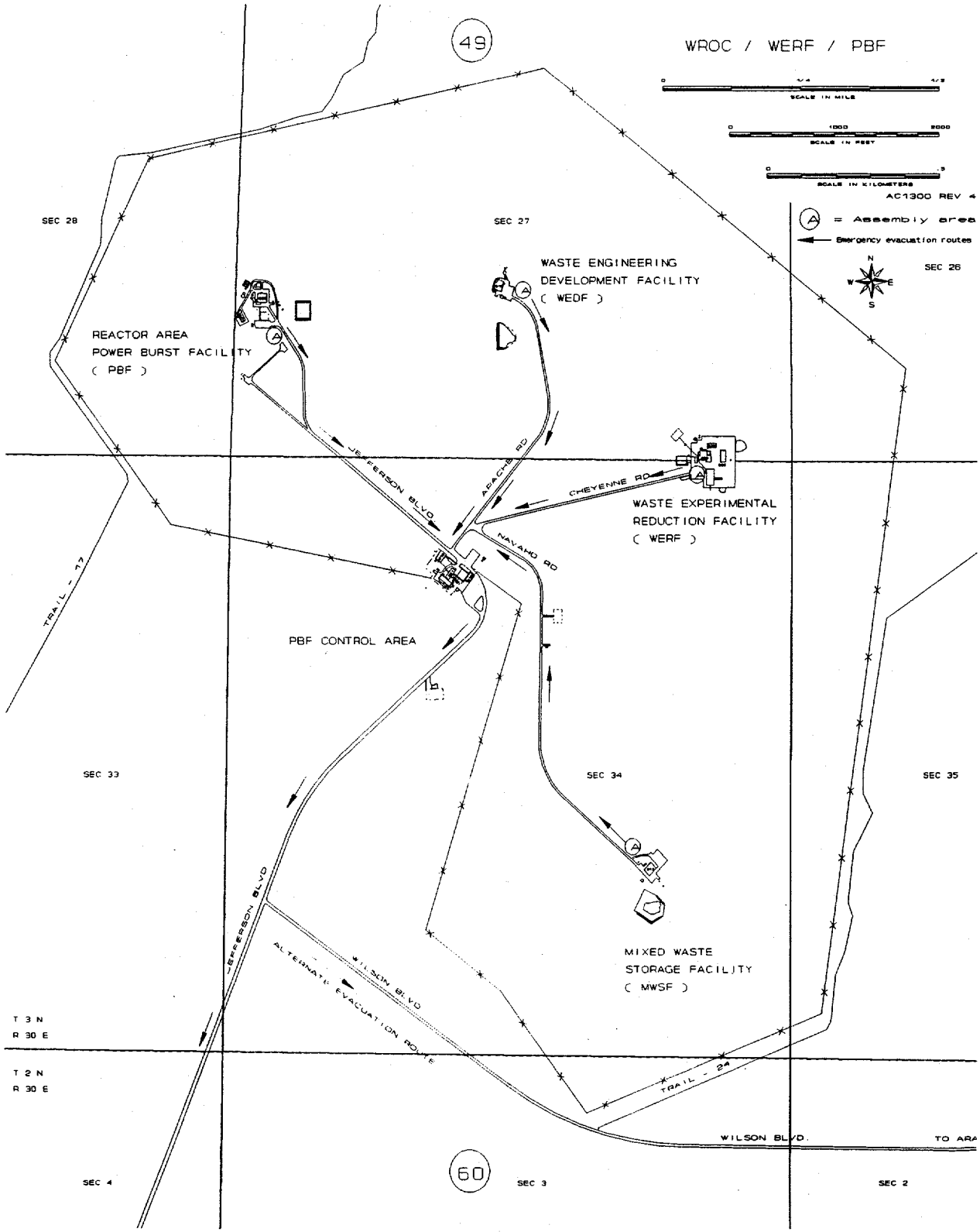

Figure 1. Location of WERF with respect to other WROC/WERE/PBF facilities.

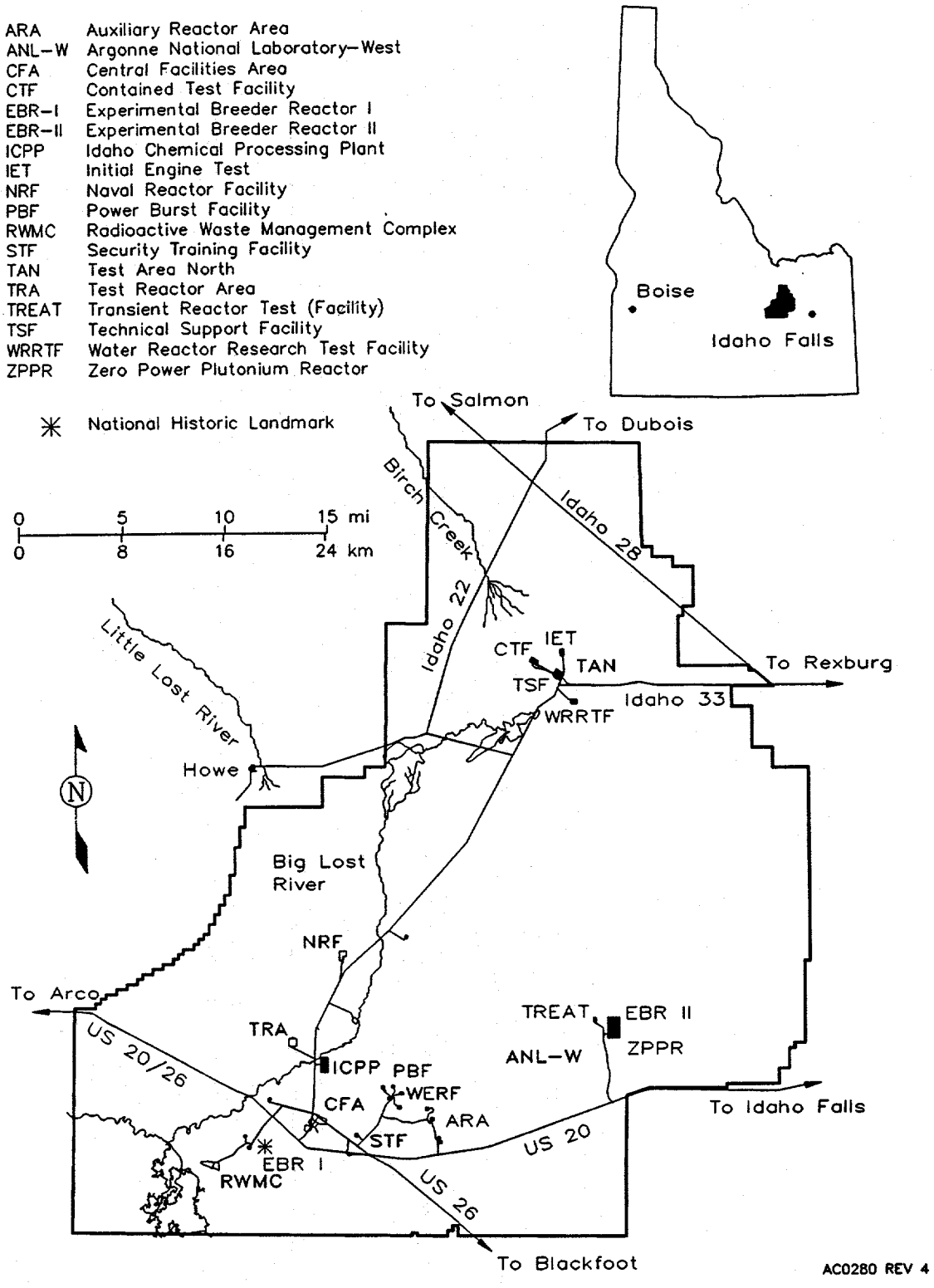

Figure 2. Location of the WROC/WERF/PBF facilities.

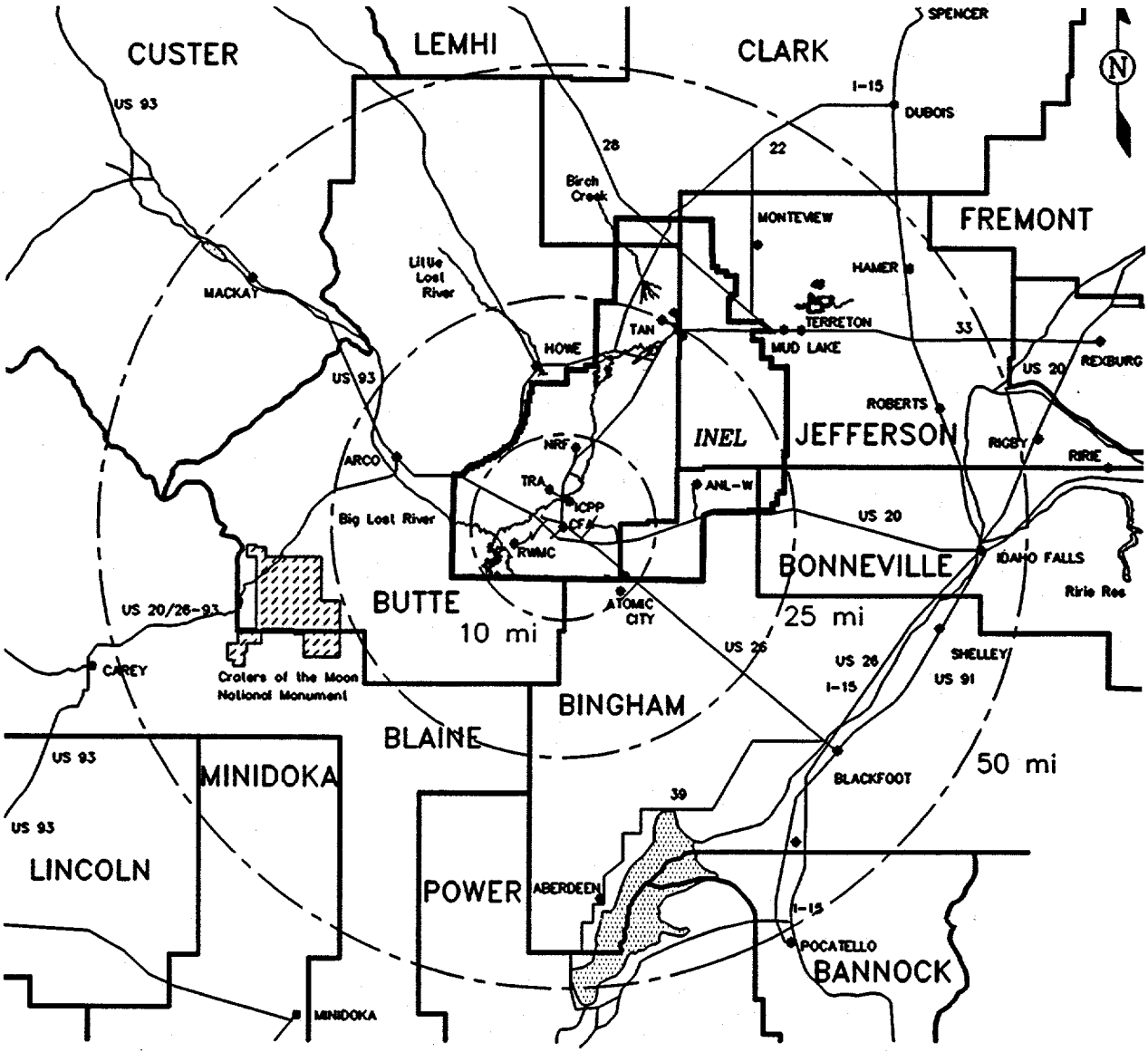

Figure 3. Location of the INEL.

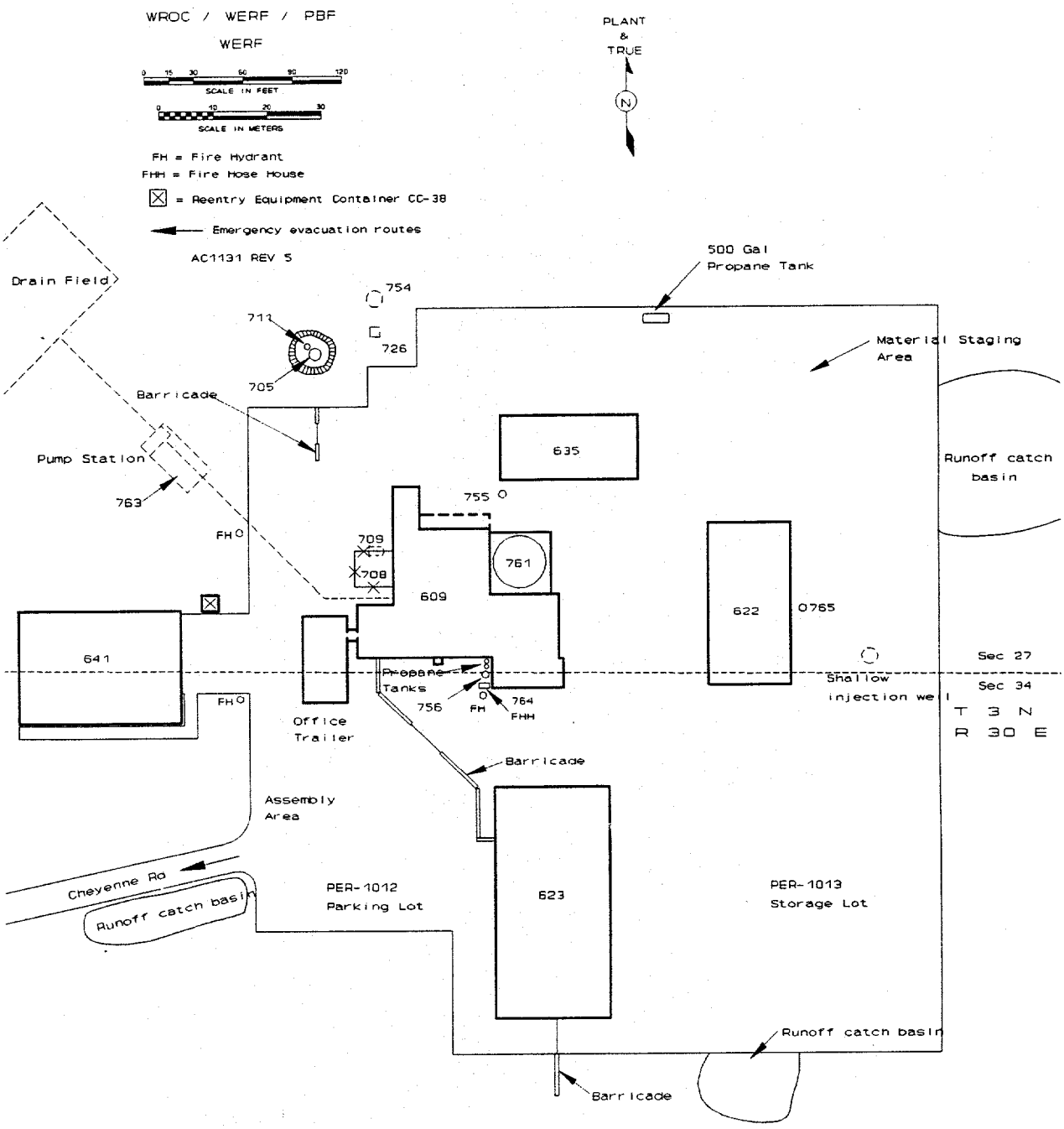

Figure 4. The WERF Complex.

3. HAZARDS IDENTIFICATION AND SCREENING

The hazards such as chemical, radiological, external, and hazards at nearby facilities have been identified for WERF. These hazards are discussed in this section. For waste located at WERF, the waste may contain both radiological and nonradiological hazardous material constituents. The radiological and nonradiological constituents will be addressed separately for this hazards assessment.

3.1 Radiological Hazards

3.1.1 Radiological Hazards Identification

The radiological hazardous materials contained in the waste located at WERF were identified from the WERF SAR. Table 1 summarizes the radiological material, location, and quantity that was identified. In addition, a walkdown of WERF was conducted on January 19, 1993 to verify that the identified inventory is complete and accurate.

3.1.2 Radiological Hazards Screening

The identified radiological hazardous materials were screened in accordance with DOE Order 5500.3A guidance. DOE Order 5500.3A guidance states that the quantities listed in 10 CFR Part 30.72, Schedule C, may be used as screening threshold quantities (TQs) for radiological hazardous materials. Screening of the radiological hazardous materials identified at WERF is shown in Table 1. Emergency planning TQs were not exceeded for the identified radiological hazardous materials. Therefore, in accordance with DOE order 5500.3A guidance, no further characterization or analysis is required for the radiological hazardous materials identified at WERF.

3.2 Nonradiological Hazards

3.2.1 Nonradiological Hazards Identification

The nonradiological hazardous materials that may be stored at WERF have been identified from the WERF SAR. These hazardous materials may or may not be contained in the waste located at WERF. The potential hazardous material inventory is listed in Table 2. This is a potential inventory because it is not a typical inventory, but rather it is the inventory that may be stored at the WERF WWSB. The inventory in Table 2 provides the hazardous material and pertinent information such as the hazardous material's associated Chemical Abstract Service (CAS) number; physical properties; applicable threshold planning quantity (TPQ), reportable quantity (RQ), or estimated release quantity (ERQ); release fraction; and facility limit. Information that was not available or that was not relevant has been left blank in the table. The facility limit is the hazardous material quantity administratively controlled at WERF. The facility limit quantity for hazardous materials at WERF is based on the hazardous material's TPQ, RQ, or ERQ. Determination of the facility limit quantity is discussed in Section 3.2.2. Nonradiological hazardous commercial products were also identified and the inventory for these materials are listed in Appendix A. The nonradiological hazardous material inventory was verified to be complete and accurate during the walkdown of WERF that was conducted on January 19, 1993. The inventory of nonradiological hazardous commercial products listed in Appendix A was also updated with the inventory as of June 16, 1994.

Table 1. WERF radionuclide inventory and threshold quantities.

Material	Location	Max. Quantity (Curies)	Threshold Quantity (Curies)	Source
Mixed radioactive waste, beta-gamma	PER-609 Highbay	9.8E-01	1,000	1
	Outside Storage	2.1E+02	1,000	1
	PER-609 Incinerator	2.1E+01	1,000	1
	PER-609 Offgas	1.2E+01	1,000	1
	Baghouse	8.4E+00		
	HEPA	3.8E+00		
	PER-609 Ash Handling Room	2.4E-01	1,000	1
	PER-609 Stabilization	1.4E+00	1,000	1
	PER-609 TAA	1.1E+00	1,000	1
	PER-609 Furnace Room	4.2E-01	1,000	1
	PER-609 Liquid Feed Station	1.9E-01	1,000	1
	PER-622	1.1E+01	1,000	1
	Compactor	3.7E+00		
	Baghouse	7.2E+00		
	HEPA	7.3E-02		
	WWSB All Bays	7.5E+01	1,000	1
	Bays 1, 2, 3	3.9E+01		
	Bays 4, 5, 6	3.6E+01		

1. Screening threshold established on basis of 10 CFR 30.72, Schedule C, value of 1,000 Curies for mixed radioactive waste. Mixed radioactive waste, alpha limit is 20 Curies (limit for packaged waste). The alpha quantities are less than 1% of the inventory, therefore, alpha contamination is not reported.

Table 2. Potential hazardous material inventory for the WWSB.

Material	CAS number	Properties[a]	TPQ[b] (kg)	RQ[c] (kg)	ERQ[d] (kg)	Release fraction[e]	Facility limit[f] (kg)
Acenapthene	83-32-9	S1IC		45.4		0.01	4,540
Acetic acid	64-19-7	L2SC		2,270		0.01	4,540
Acetone	67-64-1	L3PF		2,270		0.5	4,540
Acetophenone	98-86-2	L2PC		2,270		0.01	4,540
Acrylonitrile	107-13-1	L3PF	4,540				<4,540
Antimony[g]	7440-36-0	S0IN		2,270		0.001	4,540
Arsenic[g]	7440-38-2	S1IF		0.454		0.5	0.9
Asbestos (friable)	1332-21-4	S0IN		0.454		0.001	454
Barium	7440-39-3	S3RF			1.7	0.5	3.4
Benzene	71-43-2	L3IF		4.54		0.5	9.1
Benzoic acid	65-85-0	S1PC		2,270		0.01	4,540
Benzo[a]anthracene	56-55-3	S0PN		4.54		0.001	4,540
Benzo[a]pyrene	50-32-8	S0IN		0.454		0.001	454
Benzo[b]fluoranthene	205-99-2	S0IN		0.454		0.001	454
Benzo[g,h,i]perylene	191-24-2	S0IN		2,270		0.001	4,540
Beryllium[g]	7440-41-7	S1IF		4.54		0.5	9.1
Bis(2-ethylhexyl) phthalate	117-81-7	S0IN		45.4		0.001	4,540
Bismuth	7440-69-9	S2IF			0.2	0.5	0.4
Boron	7440-42-8	S1PF			60.5	0.5	121
Butanone-2	78-93-3	L3SF		2,270		0.5	4,540
Butoxy ethanol-2	111-76-2	L2SF			112.8	0.5	225.6
Butyl/benzylphthalate	85-68-7	L1IC		45.4		0.01	4,540
Cadmium[g]	7440-43-9	S1IF		4.54		0.5	9.1
Calcium	7440-70-2	S1RF			0.7	0.5	1.4
Carbon tetrachloride	56-23-5	L0IN		4.54		0.001	4,540
Chlordane	57-74-9	L0IN	454				<454
Chlorine	7782-50-5	G0IN	45.4				<45.4
Chlorobenzene	108-90-7	L3IF		45.4		0.5	90.7
Chloroform	67-66-3	L0IN	4,540				<4,540
Chromium[g]	7440-47-3	S2IF		2,270		0.5	4,540
Chrysene	218-01-9	S0IN		45.4		0.001	4,540
Cobalt	7440-48-4	S1IF			0.2	0.5	0.4
Copper[g]	7440-50-8	S0IN		2,270		0.001	4,540

Table 2. (continued).

Material	CAS number	Properties[a]	TPQ[b] (kg)	RQ[c] (kg)	ERQ[d] (kg)	Release fraction[e]	Facility limit[f] (kg)
Cresol-p	106-44-5	S2IC		454		0.01	4,540
Cresol (mixed isomers)	1319-77-3	L2IC		454		0.01	4,540
Cresol-m	108-39-4	L2IC		454		0.01	4,540
Cresol-o[h]	95-48-7	L2IC	454				<454
Cresol-o	95-48-7	L2IC	4,540				<4,540
Cyanides (soluble salts and complexes)	57-12-5	S0SN		4.54		0.001	4,540
D-2,4	94-75-7	S0SN		45.4			
Di-n-octyphthalate	117-84-0	L0IN		2,270		0.001	4,540
Di-n-butylphthalate	84-74-2	L2IC		4.54		0.01	454
Dichlorobenzene-1,3	541-73-1	L2IC		45.4		0.01	4,540
Dichlorobenzene-1,2	95-50-1	L2IC		45.4		0.01	4,540
Dichlorobenzene-1,4	106-46-7	L2IC		45.4		0.01	4,540
Dichlorodifluoromethane	75-71-8	G0IN		2,270		1	2,270
Dichloroethane-1,1	75-34-3	L3PF		454		0.5	907.2
Dichloroethane-1,2	107-06-2	L3IF		45.4		0.5	90.7
Dichloroethene-1,1	75-35-4	L4IF		45.4		0.5	90.7
Dichloroethene-1,2	156-60-5	L3IF		454		0.5	907.
Dichloroethylene-1,1	75-35-4	L4IF		45.4		0.5	90.7
Diethyl phthalate	84-66-2	L1IC		454		0.01	4,540
Dinitrotoluene-2,4	121-14-2	S1IC		4.54		0.01	454
Endrin[h]	72-20-8	S0IN	227				<227
Endrin	72-20-8	S0IN	4,540				<4,540
Ester		L2SC			16.9	0.01	1,694
Ethanol amine	141-43-5	L2IC					
Ether							
Ethyl alcohol	64-17-5	L3SF			6,438	0.5	4,540
Ethylbenzene	100-41-4	L3IF		454		0.5	907.2
Ethylene diamine	107-15-3	L2SC	4,540				<4,540
Ethylene diamine tetraacetic acid (EDTA)	60-00-4	S0SN		2,270		0.001	4,540
Fluoranthene	206-44-0	S2IC		45.4		0.01	4,540
Fluorene	86-73-7	S0IN		2,270		0.001	4,540

Table 2. (continued).

Material	CAS number	Properties[a]	TPQ[b] (kg)	RQ[c] (kg)	ERQ[d] (kg)	Release fraction[e]	Facility limit[f] (kg)
Formic acid	64-18-6	L2SC		2,270		0.01	4,540
Freon-113	76-13-1	L3SF			25,751	0.5	4,540
Gold monocyanide	506-65-0	S0IN			4.5	0.001	4,540
Gold	7440-57-5	S0IN			4,540	0.001	4,540
Heptachlor	76-44-8	S0IN		0.454		0.001	454
Hexachlorobenzene	118-74-1	S2IC		4.54		0.01	454
Hexachlorobutadiene	87-68-3	L1IC		0.454		0.01	45.4
Hexachloroethane	67-72-1	S3IF		45.4		0.5	90.7
Hexane	110-54-3	L3IF			6,099	0.5	4,540
Hexone (methyl isobutyl ketone)	108-10-1	L3PF		2,270		0.5	4,540
Iron	7439-89-6	S0IN			33.9	0.001	4,540
Lead[g]	7439-92-1	S0IN		0.454		0.001	454
Lindane[h]	58-89-9	S0IN	454				<454
Lindane	58-89-9	S0IN	4,540				<4,540
Magnesium	7439-95-4	S1IF			33.9	0.5	67.8
Manganese	7439-96-5	S2RC			3.4	0.01	338.8
Mercury	7439-97-6	L0IN		0.454		0.01	45.4
Methanol (methyl alcohol)	67-56-1	L3SF		2,270		0.5	4,540
Methoxychlor	72-43-5	S0IN		0.454		0.001	454
Methyl ethyl ketone (MEK)	78-93-3	L3SF		2,270		0.5	4,540
Methylene chloride	75-09-2	L1IC		454		0.01	4,540
Methylnaphthalene-2	91-57-6	L2IC			8.5	0.01	847.1
Mineral oil	8020-83-5	L1IC			16.9	0.01	1,694
Molybdenum	7439-98-7	S1IC			16.9	0.01	1,694
Naphthalene	91-20-3	S2IC		45.4		0.01	4,540
Nickel	7440-02-0	S2IC					
Nitric acid	7697-37-2	L0SN	454				<454
Nitrobenzene	98-95-3	L2IC	4,540				<4,540
Oxalic acid	6153-56-6	S1PC			169.4	0.01	4,540
PCBs[i]	1336-36-3	L1IC		0.454		0.01	45.4
Pentachlorophenol	87-86-5	S0IN		4.54		0.001	4,540
Perchlorates		L3IF			0.3	0.5	0.6

Table 2. (continued).

Material	CAS number	Properties[a]	TPQ[b] (kg)	RQ[c] (kg)	ERQ[d] (kg)	Release fraction[e]	Facility limit[f] (kg)
Petroleum naphtha	8030-30-6	L4IF			13,553	0.5	4,540
Phenanthrene	85-01-8	S1IC		2,270		0.01	4,540
Phenol[h]	108-95-2	S2SC	227				<227
Phenol	108-95-2	S2SC	4,540				<4,540
Polytetrafluoroethylene	9002-84-0	S0IN			4.2	0.001	4,235
Potassium permanganate	7722-64-7	S3SF		45.4		0.5	90.7
Potassium hydroxide	1310-58-3	S0SN		454		0.001	4,540
Potassium chromate	7789-00-6	S0SN		4.54		0.001	4,540
Potassium	7440-09-7	S3RF			0.2	0.5	0.4
Pyrene	129-00-0	S0IN	454				<454
Pyridine	110-86-1	L3SF		454		0.5	907.2
Selenium[g]	7782-49-2	S0IN		45.4		0.001	4,540
Silver[g]	7440-22-4	S1IF		454		0.5	907.2
Silvex (2,4,5-TP)	93-72-1	L3SF		45.4		0.5	90.7
Sodium fluoride	7681-49-4	S0IN		454		0.001	4,540
Sodium nitrate							
Sodium	7440-23-5	S3RF		4.54		0.5	9.1
Sodium chloride	7647-14-5	S0SN			2.1	0.001	2,118
Sodium sulfate	7757-82-6	S0IN			4.2	0.001	4,235
Strontium		S1RF			0.7	0.5	1.4
Sulfide		S2IF			0.1	0.5	0.2
Sulfuric acid	7664-93-9	L0SN	454				<454
Tetrachloroethene	127-18-4	L0IN		45.4		0.001	4,540
Tetrachloroethylene	127-18-4	L0IN		45.4		0.001	4,540
Thallium[g]	7440-28-0	S0IN		454		0.001	4,540
Thorium	7440-29-1	S2IC			18,500	0.01	4,540
Tin	7440-31-5	S0IN			135.5	0.001	4,540
Toluene	108-88-3	L3IF		454		0.5	907.2
Toxaphene[h]	8001-35-2	S0IN	227				<227
Toxaphene	8001-35-2	S0IN	4,540				<4,540
Trans-1,2-dichloroethane	107-06-2	L3IF		4.54		0.5	9.1
TriButyl phosphate	126-73-8	L1IC			461.1	0.01	4,540
Trichlorobenzene-1,2,4	120-82-1	L1IC		45.4		0.01	4,540

Table 2. (continued).

Material	CAS number	Properties[a]	TPQ[b] (kg)	RQ[c] (kg)	ERQ[d] (kg)	Release fraction[e]	Facility limit[f] (kg)
Trichlorobenzene-1,2,3		L1IC			15.7	0.01	1,567
Trichloroethane-1,1,1	71-55-6	L1IC		454		0.01	4,540
Trichloroethene	79-01-6	L2IC		45.4		0.01	4,540
Trichloroethylene	79-01-6	L2IC		45.4		0.01	4,540
Trichlorophenol-2,4,5	95-95-4	S3IF		4.54		0.5	9.1
Trichlorophenol-2,4,6	88-06-2	S3SF		4.54		0.5	9.1
Trimethylbenzene-1,2,4	95-63-6	L2IC			406.6	0.01	4,540
Vanadium	7440-62-2	S1IC			1.7	0.01	169.4
Vinyl chloride	75-01-4	G4IF		0.454		1	0.454
Xylene (mixed isomers)	1330-20-7	L3IF		454		0.5	907.2
Zinc[g]	7440-66-6	S2IF		454		0.5	907.2

a. The Properties column has a four-character identifier "ABCD." These characters are defined as follows:

A—This position denotes the physical state of the hazardous material.
- S—Denotes that the substance is a solid at normal temperatures
- L—Denotes that the substance is a liquid at normal temperatures
- G—Denotes that the substance is a gas at normal temperatures

B—This position denotes the "Fire Hazard" from the National Fire Protection Association (NFPA: NFPA 325M "Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids," 1991) codes.
- 0—Will not burn
- 1—Will burn at temperatures above 200°F
- 2—Will burn at temperatures above 100°F
- 3—Fire and explosion hazard at normal temperatures
- 4—Extremely dangerous fire and explosion hazard

C—This position denotes the solubility of the substance relative to water.
- I—Substance is not soluble in water
- P—Substance is partially soluble in water
- R—Substance reacts readily in water or air
- S—Substance is soluble in water

D—This position denotes the ease with which the substance burns.
- F—Denotes a flammable and volatile substance
- C—Denotes a substance that is combustible
- N—Denotes a substance that is non combustible

b. This column is the TPQ listed in 40 CFR 355, Appendix A, The List of Extremely Hazardous Substances and their Threshold Planning Quantities.

c. This column is the RQ listed in 40 CFR 302, Table 302.4, List of Hazardous Substances and Reportable Quantities.

d. This column is the estimated release quantity (ERQ). The ERQ is determined based on air concentration limits or other properties associated with the specified hazardous material. The determination of an ERQ is discussed in Appendix B.

e. Release fraction from U.S. Department of Energy (DOE), "Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports," DOE-STD-1027-92, December 1992.

f. This column is the hazardous material facility limit that will be administratively maintained at WERF. The facility limit is based on the following criteria in the specified order:

1. Less than the TPQ stated in 40 CFR 355
2. Equal to the RQ from 40 CFR 302 divided by the release fraction or a maximum of 4,540.0 kg
3. Equal to the ERQ divided by the release fraction or a maximum of 4,540.0 kg.

Table 2. (continued).

Material	CAS number	Properties[a]	TPQ[b] (kg)	RQ[c] (kg)	ERQ[d] (kg)	Release fraction[e]	Facility limit[f] (kg)

g. No reporting of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 μm (0.004 in.).

h. For extremely hazardous substances (listed in 40 CFR 355) that are solids, there may be two TPQs given. In these cases, the lower quantity applies only if the solid exists in powdered form and has a particle size less than 100 μm (0.004 in.) or is handled in solution or in molten form. Otherwise, the higher limit applies.

i. The WERF SAR states that PCBs are not allowed to be treated at WERF in concentrations greater than or equal to 5 ppm.

3.2.2 Nonradiological Hazards Screening

For the hazards assessment, the hazardous materials were screened in accordance with DOE Order 5500.3A guidance. DOE Order 5500.3A guidance states that screening TQs should be used to eliminate the need to analyze insignificant hazards. The guidance documents state that the TPQ defined by the EPA Superfund Amendment and Reauthorization Act (SARA) Title III, 40 CFR Part 355, Appendix A, may be used as TQs for those chemicals listed. 40 CFR Part 355 requires that emergency planning be performed for those hazardous materials that are stored, used, or produced in an amount equal to or in excess of its TPQ. The facility limit for a hazardous material with a TPQ is a quantity less than the TPQ. Thus, the screening TQ is not exceeded for these hazardous materials.

Screening TQs were also determined for those hazardous materials that were not listed in 40 CFR 355 but were listed in the SARA Title III Consolidated List of Chemicals, 40 CFR Part 302, Table 302.4. 40 CFR Part 302 requires notification if the quantity of hazardous material released is equal to or exceeds the stated RQ. The TQs for these hazardous materials are determined by dividing the RQ listed in 40 CFR 302 by the appropriate release fraction, with the maximum TQ being limited to 4,540 kg (10,000 lb). The facility limit for these hazardous materials is equal to the determined TQ. Thus, the screening TQ is not exceeded for these hazardous materials.

For hazardous materials not listed in 40 CFR 355 or 40 CFR 302, a TQ was determined by dividing an ERQ by the appropriate release fraction, with the maximum TQ being limited to 4,540 kg (10,000 lb). The ERQ for these hazardous materials were determined based on air concentration limits or other properties associated with a particular hazardous material. Determination of the ERQ for the hazardous materials indicated in Table 2 is discussed in Appendix B. The facility limit for these hazardous materials is equal to the determined TQ. Thus, the screening TQ is not exceeded for these hazardous materials.

The facility limit, which is the hazardous material quantity that is administratively maintained at WERF, for each hazardous material listed in Table 2 does not exceed the screening TQ. Therefore, in accordance with DOE order 5500.3A guidance, no further characterization or analysis is required for the nonradiological hazardous materials. However, it is felt that the TQs for the hazardous materials listed in 40 CFR 355 and 40 CFR 302 may be too high because there is no correlation between the screening TQs and the protective action criteria concentration limits specified in DOE Order 5500.3A guidance. Therefore, the nonradiological hazardous materials identified at WERF that are listed in 40 CFR 355 and 40 CFR 302 will be analyzed further in Section 4 and 5.

3.3 Commercial Energy Source Hazards

Flammable gases and liquids at WERF are limited to fuel gases (e.g., propane cylinders), fuel oils (e.g., diesel fuel oil), and flammable constituents of other commercial products used at WERF. These items are listed in Appendix A. Appendix A indicates that over 17,000 L (4,500 gal) of No. 2-D diesel fuel oil and 2,230 L (590 gal) of propane are located at WERF. These energy sources have the potential to enhance the consequences of possible fire scenarios at WERF.

3.4 Occupational Hazards

Occupational hazards such as high voltage and high noise levels are identified and addressed in the WERF SAR.

3.5 Hazards at Nearby Facilities

The WEDF, MWSF, PBF, and two water treatment facilities (PER-602 and PER-614) are facilities that contain hazardous materials that are located at the WROC/WERF/PBF area. WEDF is currently not being used, and no processes are taking place at this facility. Radiological and nonradiological hazardous materials are located at WEDF, but the WEDF Hazards Assessment[8] indicates that there is no potential for hazardous material releases to impact WERF. The MWSF is currently being used for the storage of MLLW. The MWSF Hazards Assessment[9] indicates that WERF personnel would be required to evacuate the WROC/WERF/PBF Area if an extensive fire occurred at the MWSF. PBF is a reactor facility that contains radiological and nonradiological hazards. The PBF Hazards Assessment[10] indicates that WERF personnel would be required to evacuate the WROC/WERF/PBF Area if a large explosion occurred at the PBF. The two water treatment facilities contain cylinders of chlorine. The Water Treatment Facilities Hazards Assessment[11] indicates that immediate protective action for WERF personnel should be to shelter within a facility if a chlorine release is detected or imminent. Evacuation should only occur if it can be done safely. WERF personnel will be evacuated in accordance with the ER&WM Emergency Plan/RCRA Contingency Plan.[12]

3.6 External Hazards

External hazards originating outside the WROC/WERF/PBF area on the INEL site and offsite that could potentially impact the health and safety of WERF personnel were also investigated. Other facilities onsite but outside the WROC/WERF/PBF area [e.g., facilities at CFA, ICPP, Test Reactor Area (TRA), and Argonne National Laboratory-West (ANL-W)] and offsite were identified and their hazards analysis were reviewed. Based on hazard analysis results at this time, WERF would not be encompassed by an EPZ for facilities outside the WROC/WERF/PBF area.

Natural phenomena hazards, such as earthquakes, floods, winds, tornadoes, lightning strikes, volcanism, range fires, and heavy snow loads, were considered. Exposure to these events is covered in the WERF SAR.

3.7 Hazardous Material Transportation Hazards

Transportation of hazardous materials to and from WERF would be in quantities less than those stated in the identification and screening section. Therefore, in accordance with DOE Order 5500.3A guidance, no further analysis is required.

4. EVENT SCENARIOS

Determining a bounding set of event scenarios was the first step taken in evaluating the consequences of potential releases of nonradiological hazardous materials. This bounding set of event scenarios would provide an initial assessment and a bounding set of consequences for the nonradiological hazardous materials that could be located at WERF. The bounding set of event scenarios was determined from discussions with WERF personnel, review of the hazardous materials and operations at WERF, and information contained in the WERF SAR.

In determining the bounding set of event scenarios, it was assumed that any one of the nonradiological hazardous materials identified for WERF could be involved and that the facility limit quantity for a particular hazardous material would be involved during the event. The event scenarios do not consider interactions between the hazardous materials. Interactions were not considered because the inventory presented is the facility limit inventory for each individual hazardous material and there may be numerous combinations of hazardous material inventory. However, the facility limit for each hazardous material is evaluated for the bounding set of event scenarios and therefore the results are conservative.

Operational history for WERF was also reviewed to identify any events that may be of concern for the bounding set of event scenarios. There has been contamination events at WERF, however these events were very minor and do not provide any additional insights to the bounding set of event scenarios.

A fire that occurs in the WWSB and lasts for 8 hours was the worst-case event scenario determined. This event was considered to be the worst case because it could impact the entire facility limit quantity for the hazardous materials stored in the WWSB. This event has the potential to cause a release of a hazardous material regardless of whether the hazardous material is stored in the WWSB as a solid, liquid, or gas. For details concerning this event, the WERF SAR discusses the initiating events that may lead to a fire and the extent of damage that may result. Assumptions in modeling the hazardous material dispersion are discussed in the following section.

A spill of a liquid hazardous material was also determined to be a bounding event scenario. Although hazardous materials that are liquids may be contained throughout the waste stored in the WWSB, it was assumed for this event that the entire facility limit quantity of the liquid hazardous material was spilled at once. Assumptions in modeling the hazardous material dispersion are discussed in the following section.

For hazardous materials that are gases, the only type of release modeled was a direct release of the facility limit quantity over the 8 hours of the assumed fire in the WWSB. This type of release assumes that the facility limit quantity is contained in waste throughout the facility. For example, there may be a total of 100 waste containers that each contain a small quantity of chlorine-contaminated waste, but the total quantity of chlorine is equal to the facility limit for chlorine. An instantaneous release of gas from a gas cylinder was not modeled because WERF personnel indicated that cylinders of gaseous hazardous materials are not stored at WERF. If gas cylinders are stored at WERF in the future, a hazardous material release from a gas cylinder would need to be modeled.

5. EVENT CONSEQUENCES

The consequences for the event scenarios identified in Section 4 are presented in this section. The calculational models, model assumptions, and receptor locations are also presented in this section.

5.1 Calculation Models

Consequences for the event scenarios identified in Section 4 were estimated by determining the peak concentration levels at various receptor locations. The term peak concentration is consistent with the terminology used in the DOE Order 5500.3A guidance documents; however, the peak concentration presented in this analysis is the maximum concentration averaged over the shortest time allowed by the dispersion codes (typically, the shortest averaging time is 10 minutes). The dispersion codes used to determine the peak concentration levels at various receptor locations were either Areal Locations of Hazardous Atmospheres (ALOHA)[13] Version 5.0 or Emergency Prediction Information (EPI)[14] Version 5.0. ALOHA is the dispersion code in the Computer-Aided Management of Emergency Operations (CAMEO)[15] code. CAMEO is the computer program used by INEL, DOE-ID, and state representatives for hazardous material emergency planning and response.

For this analysis, ALOHA was the primary code used to estimate the peak concentration levels. If a chemical was not listed in the ALOHA chemical library, the dispersion was preformed with the EPI code. If a chemical was not listed in either the ALOHA or EPI chemical library, chemical properties were researched and added to the ALOHA chemical library. The consequences of the added chemicals were then estimated with ALOHA.

5.2 Calculation Assumptions

The assumptions made to define the hazardous material releases that may occur for the bounding set of event scenarios are presented below. The bounding set of event scenarios includes a fire in the WWSB and a liquid hazardous material spill.

5.2.1 Assumptions for a Fire in the WWSB

A fire in the WWSB has the potential to affect hazardous materials at WERF whether the hazardous material is stored as a solid, liquid, or gas. For this event, a direct release was assumed for the dispersion models. The source strength for a direct release was assumed to be the TPQ or RQ (if a TPQ did not exist) for the hazardous material divided by 8 hours (the fire is assumed to burn for 8 hours).

For a fire in the WWSB, a second release type was also modeled for hazardous materials that are stored as liquids. This release type assumed that a liquid hazardous material was spilled and exposed to fire. For this release, the hazardous material puddle temperature was assumed to be equal to a ground temperature of 80°C, which is the highest ground temperature allowed by ALOHA. If the boiling point of the hazardous material was below 80°C, the puddle temperature was then assumed to be equal to the boiling point of the hazardous material. It was also assumed that the puddle area for the spilled liquid was equal to the maximum puddle area possible in the WWSB because a maximum puddle area provides the maximum consequences for a spilled liquid. The maximum puddle area in the WWSB is 8.6 m^2. The quantity released was assumed to be equal to the TPQ, or to the RQ if no TPQ was available for the specific hazardous material.

5.2.2 Assumptions for a Liquid Hazardous Material Spill

For hazardous materials that are stored as liquids at WERF, a release type of a spill (with no fire present) was assumed. The puddle temperature for a spill was assumed to be equal to a ground temperature of 20°C. It was also assumed that the puddle area for the spilled liquid was equal to the maximum puddle area possible in the WWSB because a maximum puddle area provides the maximum consequences for a spilled liquid. The maximum puddle area in the WWSB is 8.6 m^2. The quantity released was assumed to be equal to the TPQ, or to the RQ if no TPQ was available for the specific hazardous material.

5.3 Meteorological Conditions Modeled

Two sets of meteorological conditions were modeled for the event consequences to be consistent with the requirements in DOE Order 5500.3A guidance. The two sets of meteorological conditions included the 95% worst-case wind speed and stability for the INEL[16] and a typical set of meteorological conditions at WERF.[17] The 95% worst-case conditions include

- Weather Class F
- Wind Speed 0.5 m/s (limited to 1 m/s by dispersion codes)
- Relative Humidity 5%
- Cloud Cover Clear
- Air Temperature 20°C
- Ground Roughness Open country.

The typical set of meteorological conditions include

- Weather Class D
- Wind Speed 2.5 m/s
- Relative Humidity 25%
- Cloud Cover Cloudy
- Air Temperature 20°C
- Ground Roughness Open country.

5.4 Receptor Locations

Receptor locations were selected to determine the concentrations that could occur if the hazardous materials were released in the potential event scenarios. The receptor locations evaluated included the facility boundary (100 m), the WROC/WERF/PBF control area (756 m), and the nearest location where the general public has uncontrolled access (5.2 km). These receptor locations are discussed in the following sections.

5.4.1 Facility Boundary

The facility boundary was selected to be a circle 100-m around WERF. A facility boundary of 100 m was selected because the consequence models are not accurate for distances less than 100 m.

5.4.2 Other Onsite Receptors

Other selected onsite receptor locations near WERF include the WROC/WERF/PBF control area (756 m) and U.S. Highway 20 (5.2 km). The WROC/WERF/PBF control area was selected because

it is the closest facility to the WERF area. Highway 20 was selected because it 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, which passes through the site. In addition, site management does not have the authorization to evacuate and establish access control of the highway. The following information concerns these onsite receptor locations:

- WROC/WERF/PBF Control Area—The WROC/WERF/PBF control area is approximately 756 m to the southwest of the WERF area. The WROC/WERF/PBF control area is occupied by approximately 90 people during normal working hours.

- U.S. Highway 20—Highway 20 is approximately 5.2 km to the south of the WERF area. Highway 20 can be occupied by an unspecified number of the general public at any hour.

5.5 Distances to ERPG Concentrations

Several other receptor locations were also evaluated, but these receptor locations are not fixed receptor locations like those presented above. Rather, these locations are the distances to the specific ERPG for each hazardous material evaluated. ERPGs are airborne concentration levels of hazardous materials that are compared with estimated hazardous material release concentrations to determine appropriate emergency classifications and EPZs. In accordance with DOE Order 5500.3A guidance, ERPG values are defined as follows:

ERPG-1—is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor.

ERPG-2—is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action.

ERPG-3—is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

Emergency classifications are determined by comparing the hazardous material release concentrations to the protective action criteria. The following are definitions of company guidelines for event classifications of hazardous material releases at the INEL:[18]

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

Site Area Emergency—Any release of a hazardous chemical to the atmosphere producing actual or predicted peak concentrations 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 a hazardous chemical to the atmosphere producing actual or predicted peak concentrations 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.

An EPZ for a facility is determined by comparing the hazardous material release concentration to the early severe health effect (ESHE) threshold. Based on DOE Order 5500.3A guidance and company guidelines for ERPG concentrations,[18] the ESHE threshold for determining the EPZ corresponds to the ERPG-3, or equivalent (EEGL 30 minutes or the IDLH) value for a particular hazardous material.

The protective action criteria and ESHE threshold for each hazardous material evaluated are presented in the consequence results in Appendix C. These consequence results indicate the ERPGs or equivalent values used in determining the emergency class and distance to ESHE for the EPZ for each hazardous material evaluated.

5.6 Consequence Calculation Results

The consequence results for each hazardous material analyzed are presented in Appendix C. A summary of the consequence results for the modeled event scenarios are discussed below.

5.6.1 Consequence Results for a Fire in the WWSB

As previously stated, a fire in the WWSB has the potential to affect solid, liquid, or gaseous hazardous materials at WERF. For this event, a direct release was assumed for the dispersion models. Also, a spill of a liquid hazardous material with exposure to a fire was modeled. A summary of the consequences for a fire in the WWSB is presented in Table 3. The consequences are presented as the distances to the ERPG limits for each hazardous material that may be released due to a fire in the WWSB.

The consequence results indicate that the highest emergency class for a fire in the WWSB is a Site Area Emergency. In accordance with company guidelines, a Site Area Emergency is a hazardous material release that produces actual or predicted peak concentrations at or beyond any facility boundary, but not beyond any site boundary, in excess of the ERPG-2 or equivalent.

The consequence results also indicate that the greatest potential distance to ESHE is approximately 600 m for a fire in the WWSB. The distance to the ESHE is used to determine the EPZ for operational emergencies at WERF. This distance corresponds to the distance at which any release of a hazardous chemical to the atmosphere produces actual or predicted peak concentrations equal to an ERPG-3, or equivalent value.

5.6.2 Consequence Results for a Liquid Hazardous Material Spill

A release type of a spill was modeled for hazardous materials that are stored as liquids at WERF. A summary of the consequences for liquid hazardous material spills is presented in Table 4. The consequences presented in this table are applicable only for liquid hazardous materials that are released in a quantity equal to the TPQ, or to the RQ if no TPQ was available for the specific hazardous material.

The consequence results indicate that the highest emergency class is a Site Area Emergency for a liquid hazardous material spill. In accordance with company guidelines, a Site Area Emergency is a

hazardous material release that produces actual or predicted peak concentrations at or beyond any facility boundary, but not beyond any site boundary, in excess of the ERPG-2 or equivalent.

The consequence results also indicate that the estimated airborne concentration would not exceed the ERPG-3 or equivalent concentration limit at a distance equal to or greater than 100 m for a liquid hazardous material spill. Therefore, a distance to ESHE was not determined for liquid hazardous materials spills. Concentrations within 100 m were not determined because of calculation limitations of the dispersion codes.

Table 3. Summary of consequence results for a fire in the WWSB.

Material	CAS number	Attributes[a]	TPQ[b] (kg)	RQ[c] (kg)	Direct release distance to			Spill with a fire[d] distance to		
					ERPG-1 or equivalent (m)	ERPG-2 or equivalent (m)	ERPG-3 or equivalent (m)	ERPG-1 or equivalent (m)	ERPG-2 or equivalent (m)	ERPG-3 or equivalent (m)
Acenapthene	83-32-9	3BS1IC		45.4	NSC[e]	NLA[f]	NLA	—	—	—
Acetic acid	64-19-7	1BL2SC		2,270	430	315	NSC	562	410	NSC
Acetone	67-64-1	1BL3PF		2,270	NSC	NSC	NSC	NSC	NSC	NSC
Acetophenone	98-86-2	3BL2PC		2,270	1,200	834	NLA	—	—	—
Acrylonitrile	107-13-1	1AL3PF	4,540		1,900	1,400	119	1,800	1,400	120
Arsenic[g]	7440-38-2	2BS1IF		0.454	240	190	NLA	—	—	—
Asbestos (friable)	1332-21-4	2BS0IN		0.454	250	250	NLA	—	—	—
Benzene	71-43-2	1BL3IF		4.54	NSC	NSC	NSC	490	490	NSC
Benzoic acid	65-85-0	3BS1PC		2,270	260	193	NLA	—	—	—
Benzo[a]anthracene	56-55-3	3BS0PN		4.54	385	295	NLA	—	—	—
Benzo[a]pyrene	50-32-8	2BS0IN		0.454	NLA	NLA	NLA	—	—	—
Benzo[b]fluoranthene	205-99-2	3BS0IN		0.454	NSC	NSC	NLA	—	—	—
Benzo[g,h,i]perylene	191-24-2	3BS0IN		2,270	519	396	NLA	—	—	—
Beryllium[g]	7440-41-7	2BS1IF		4.54	NLA	NSC	NSC			
Bis(2-ethylhexyl) phthalate	117-81-7	2BS0IN		45.4	260	160	NLA	—	—	—
Butanone-2 (methyl ethyl ketone)	78-93-3	2BL3SF		2,270	NSC	NSC	NSC	NSC	NSC	NSC
Butyl/benzylphthalate (1,2 benzene dicarboxylic acid)	85-68-7	3BL1IC		45.4	1,300	711	NLA	—	—	—
Cadmium[g]	7440-43-9	2BS1IF		4.54	602	496	NSC	—	—	—
Carbon tetrachloride	56-23-5	1BL0IN		4.54	NSC	NSC	NSC	110	NSC	NSC
Chlordane	57-74-9	2AL0IN	454		810	650	NSC	—	—	—
Chlorine	7782-50-5	1AG0IN	45.4		756	400	120	—	—	—
Chlorobenzene	108-90-7	1BL3IF		45.4	NSC	NSC	NSC	220	158	NSC
Chloroform	67-66-3	1AL0IN	4,540		181	NSC	NSC	232	NSC	NSC

Table 3. (continued).

Material	CAS number	Attributes[a]	TPQ[b] (kg)	RQ[c] (kg)	Direct release distance to			Spill with a fire[d] distance to		
					ERPG-1 or equivalent (m)	ERPG-2 or equivalent (m)	ERPG-3 or equivalent (m)	ERPG-1 or equivalent (m)	ERPG-2 or equivalent (m)	ERPG-3 or equivalent (m)
Chromium[g]	7440-47-3	2BS2IF		2,270	1,600	1,300	NLA	—	—	—
Chrysene	218-01-9	2BS0IN		45.4	460	360	NLA	—	—	—
Copper[g]	7440-50-8	2BS0IN		2,270	1,900	1,900	NLA	—	—	—
Cresol-p	106-44-5	1BS2IC		454	200	150	NSC	—	—	—
Cresol (mixed isomers)	1319-77-3	1BL2IC		454	363	280	NSC	—	—	—
Cresol-m	108-39-4	1BL2IC		454	205	146	NSC	385	280	NSC
Cresol-o[h]	95-48-7	1AL2IC	454		200	145	NSC	—	—	—
Cresol-o	95-48-7	1AL2IC	4,540		630	450	113	—	—	—
Di-n-octyphthalate	117-84-0	3BL0IN		2,270	746	409	NLA	—	—	—
Di-n-butylphthalate	84-74-2	2BL2IC		4.54	NSC	NSC	NSC	NSC	NSC	NSC
Dichlorobenzene-1,3	541-73-1	3BL2IC		45.4	NSC	NSC	NLA	NSC	NSC	NLA
Dichlorobenzene-1,2	95-50-1	2BL2IC		45.4	NSC	NSC	NSC	NSC	NSC	NSC
Dichlorobenzene-1,4	106-46-7	2BL2IC		45.4	NSC	NSC	NSC	—	—	—
Dichlorodifluoromethane	75-71-8	1BG0IN		2,270						
Dichloroethane-1,1	75-34-3	1BL3PF		454	NSC	NSC	NSC	125	NSC	NSC
Dichloroethane-1,2	107-06-2	2BL3IF		45.4	NSC	NSC	NSC	220	160	NSC
Dichloroethene-1,2	156-60-5	3BL3IF		454	NSC	NSC	NLA	NSC	NSC	NLA
Dichloroethylene-1,1	75-35-4	2BL4IF		45.4	NSC	NSC	NLA	160	150	NLA
Diethyl phthalate	84-66-2	2BL1IC		454	720	550	NLA	NSC	NSC	NLA
Dinitrotoluene-2,4	121-14-2	2BS1IC		4.54	200	160	NSC	—	—	—
Endrin[h]	72-20-8	2AS0IN	227		1,200	975	NSC	—	—	—
Endrin	72-20-8	2AS0IN	4,540		5,800	4,100	280	—	—	—
Ethylbenzene	100-41-4	1BL3IF		454	NSC	NSC	NSC	NSC	NSC	NSC
Ethylene diamine	107-15-3	1AL2SC	4,540		620	436	NSC	600	425	NSC

Table 3. (continued).

Material	CAS number	Attributes[a]	TPQ[b] (kg)	RQ[c] (kg)	Direct release distance to			Spill with a fire[d] distance to		
					ERPG-1 or equivalent (m)	ERPG-2 or equivalent (m)	ERPG-3 or equivalent (m)	ERPG-1 or equivalent (m)	ERPG-2 or equivalent (m)	ERPG-3 or equivalent (m)
Ethylene diamine Tetraacetic acid (EDTA)	60-00-4	3BS0SN		2,270	348	266	NLA	—	—	—
Fluoranthene	206-44-0	3BS2IC		45.4	NSC	NSC	NLA	—	—	—
Formic acid	64-18-6	1BL2SC		2,270	1,100	603	530	1,200	680	598
Heptachlor	76-44-8	2BS0IN		0.454	NSC	NSC	NSC	—	—	—
Hexachlorobenzene	118-74-1	3BS2IC		4.54	NSC	NSC	NLA	—	—	—
Hexachlorobutadiene	87-68-3	2BL1IC		0.454	NSC	NSC	NSC	NSC	NSC	NSC
Hexachloroethane	67-72-1	1BS3IF		45.4	168	130	NSC	—	—	—
Hexone (methyl isobutyl ketone)	108-10-1	1BL3PF		2,270	175	NSC	NSC	107	NSC	NSC
Lead[g]	7439-92-1	2BS0IN		0.454	NSC	NSC	NSC	—	—	—
Lindane[h]	58-89-9	2AS0IN	454		820	650	NSC	—	—	—
Lindane	58-89-9	2AS0IN	4,540		2,100	1,720	150	—	—	—
Mercury	7439-97-6	2BL0IN		0.454	500	180	NSC	NSC	NSC	NSC
Methanol (methyl alcohol)	67-56-1	1BL3SF		2,270	225	NSC	NSC	250	NSC	NSC
Methoxychlor	72-43-5	2BS0IN		0.454	NSC	NSC	NLA	—	—	—
Methyl ethyl ketone (MEK)	78-93-3	1BL3SF		2,270	NSC	NSC	NSC	155	NSC	NSC
Methylene chloride	75-09-2	2BL1IC		454	125	NSC	NSC	175	NSC	NSC
Naphthalene	91-20-3	1BS2IC		45.4	NSC	NSC	NSC	—	—	—
Nitric acid	7697-37-2	1AL0SN	454		1,100	300	200	2,200	700	462
Nitrobenzene	98-95-3	1AL2IC	4,540		1,600	1,100	119	1,700	1,200	127
Pentachlorophenol	87-86-5	2BS0IN		4.54	130	100	NSC	—	—	—
Phenanthrene	85-01-8	3BS1IC		2,270	150	NSC	NLA	—	—	—
Phenol[h]	108-95-2	1AS2SC	227		208	NSC	NSC	—	—	—
Phenol	108-95-2	1AS2SC	4,540		900	325	123	—	—	—

Table 3. (continued).

Material	CAS number	Attributes[a]	TPQ[b] (kg)	RQ[c] (kg)	Direct release distance to			Spill with a fire[d] distance to		
					ERPG-1 or equivalent (m)	ERPG-2 or equivalent (m)	ERPG-3 or equivalent (m)	ERPG-1 or equivalent (m)	ERPG-2 or equivalent (m)	ERPG-3 or equivalent (m)
Potassium permanganate	7722-64-7	3BS3SF		45.4	238	183	NLA	—	—	—
Potassium hydroxide	1310-58-3	2BS0SN		454	NLA	756	NLA	—	—	—
Potassium chromate	7789-00-6	3BS0SN		4.54	560	424	NLA	—	—	—
Pyrene	129-00-0	3AS0IN	454		3,200	2,900	NLA	—	—	—
Pyridine	110-86-1	1BL3SF		454	260	185	NSC	600	440	NSC
Selenium[g]	7782-49-2	2BS0IN		45.4	460	370	NLA	—	—	—
Silver[g]	7440-22-4	2BS1IF		454	5,800	4,100	NLA	—	—	—
Silvex (2,4,5-TP)	93-72-1	3BL3SF		45.4	526	400	NLA	—	—	—
Sodium fluoride	7681-49-4	3BS0IN		454	940	700	NLA	—	—	—
Sodium	7440-23-5	3BS3RF		4.54	NSC	NSC	NLA	—	—	—
Sulfuric acid	7664-93-9	2AL0SN	454		2,300	900	500	NSC	NSC	NSC
Tetrachloroethene	127-18-4	2BL0IN		45.4	NSC	NSC	NSC	NSC	NSC	NSC
Tetrachloroethylene	127-18-4	1BL0IN		45.4	NSC	NSC	NSC	120	NSC	NSC
Toluene	108-88-3	1BL3IF		454	NSC	NSC	NSC	162	123	NSC
Toxaphene[h]	8001-35-2	2AS0IN	227		920	700	NLA	—	—	—
Toxaphene	8001-35-2	2AS0IN	4,540		2,500	1,700	NLA	—	—	—
Trans-1,2-dichloroethane	107-06-2	2BL3IF		4.54	NSC	NSC	NSC	650	410	NSC
Trichlorobenzene-1,2,4	120-82-1	2BL1IC		45.4	NLA	434	NLA	—	—	—
Trichloroethane-1,1,1	71-55-6	2BL1IC		454	NSC	NSC	NSC	NSC	NSC	NSC
Trichloroethene	79-01-6	2BL2IC		45.4	NSC	NSC	NSC	160	NSC	NSC
Trichloroethylene	79-01-6	1BL2IC		45.4	NSC	NSC	NSC	150	NSC	NSC
Trichlorophenol-2,4,5	95-95-4	3BS3IF		4.54	NSC	NSC	NLA	—	—	—
Trichlorophenol-2,4,6	88-06-2	3BS3SF		4.54	NSC	NSC	NLA	—	—	—
Vinyl chloride	75-01-4	1BG4IF		0.454	NSC	NSC	NLA	—	—	—

Table 3. (continued).

Material	CAS number	Attributes[a]	TPQ[b] (kg)	RQ[c] (kg)	Direct release distance to ERPG-1 or equivalent (m)	Direct release distance to ERPG-2 or equivalent (m)	Direct release distance to ERPG-3 or equivalent (m)	Spill with a fire[d] distance to ERPG-1 or equivalent (m)	Spill with a fire[d] distance to ERPG-2 or equivalent (m)	Spill with a fire[d] distance to ERPG-3 or equivalent (m)
Xylene (mixed isomers)	1330-20-7	1BL3IF		454	NSC	NSC	NSC	150	NSC	NSC
Zinc[g]	7440-66-6	3BS2IF		454	576	407	NLA	—	—	—

a. The Attributes column has a six character identifier "ABCDEF." These characters are defined as follows:

A—This position denotes if the hazardous material is
- 1—in ALOHA chemical library, modeled with ALOHA
- 2—not in ALOHA chemical library, in EPI chemical library, modeled with EPI
- 3—not in ALOHA or EPI chemical library, chemical properties added to ALOHA chemical library, modeled with ALOHA

B—This position denotes if the
- A—TPQ was the quantity used for the dispersion calculations
- B—RQ was the quantity used for the dispersion calculations

C—This position denotes the physical state of the hazardous material.
- S—Denotes that the substance is a solid at normal temperatures
- L—Denotes that the substance is a liquid at normal temperatures
- G—Denotes that the substance is a gas at normal temperatures

D—This position denotes the fire hazard from the National Fire Protection Association (NFPA: NFPA 325M "Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids," 1991) codes.
- 0—Will not burn
- 1—Will burn at temperatures above 200°F
- 2—Will burn at temperatures above 100°F
- 3—Fire and explosion hazard at normal temperatures
- 4—Extremely dangerous fire and explosion hazard

E—This position denotes the solubility of the substance relative to water.
- I—Substance is not soluble in water
- P—Substance is partially soluble in water
- R—Substance reacts readily in water or air
- S—Substance is soluble in water

F—This position denotes the ease with which the substance burns.
- F—Denotes a flammable and volatile substance
- C—Denotes a substance that is combustible
- N—Denotes a substance that is non combustible

Table 3. (continued).

Material	CAS number	Attributes[a]	TPQ[b] (kg)	RQ[c] (kg)	Direct release distance to ERPG-1 or equivalent (m)	Direct release distance to ERPG-2 or equivalent (m)	Direct release distance to ERPG-3 or equivalent (m)	Spill with a fire[d] distance to ERPG-1 or equivalent (m)	Spill with a fire[d] distance to ERPG-2 or equivalent (m)	Spill with a fire[d] distance to ERPG-3 or equivalent (m)

b. This column is the TPQ listed in 40 CFR 355, Appendix A, The List of Extremely Hazardous Substances and their Threshold Planning Quantities.

c. This column is the RQ listed in 40 CFR 302, Table 302.4, List of Hazardous Substances and Reportable Quantities.

d. A spill with a fire was modelled for liquid hazardous materials if enough chemical properties were available.

e. NSC stands for No Significant Consequences. The estimated airborne concentrations were considered not significant if the ERPG or equivalent concentration limit was not exceeded at a distance equal to or greater than 100 m because of calculation limitations of the dispersion codes.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

g. No reporting of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 μm (0.004 in.).

h. For extremely hazardous substances (listed in 40 CFR 355) that are solids, there may be two TPQs given. In these cases, the lower quantity applies only if the solid exists in powdered form and has a particle size less than 100 μm (0.004 in.) or is handled in solution or in molten form. Otherwise, the higher limit applies.

Table 4. Summary of consequence results for liquid hazardous material spills.

Material	CAS number	Attributes[a]	TPQ[b] (kg)	RQ[c] (kg)	Spill (no fire present) distance to ERPG-1 or equivalent (m)	ERPG-2 or equivalent (m)	ERPG-3 or equivalent (m)
Acetic acid	64-19-7	1BL2SC		2,270	NSC[e]	NSC	NSC
Acetone	67-64-1	1BL3PF		2,270	NSC	NSC	NSC
Acrylonitrile	107-13-1	1AL3PF	4,540		425	298	NSC
Benzene	71-43-2	1BL3IF		4.54	160	160	NSC
Butanone-2 (methyl ethyl ketone)	78-93-3	2BL3SF		2,270	NSC	NSC	NSC
Carbon tetrachloride	56-23-5	1BL0IN		4.54	NSC	NSC	NSC
Chlorobenzene	108-90-7	1BL3IF		45.4	NSC	NSC	NSC
Chloroform	67-66-3	1AL0IN	4,540		NSC	NSC	NSC
Cresol-m	108-39-4	1BL2IC		454	NSC	NSC	NSC
Di-n-butylphthalate	84-74-2	2BL2IC		4.54	NSC	NSC	NSC
Dichlorobenzene-1,3	541-73-1	3BL2IC		45.4	NSC	NSC	NLA[f]
Dichlorobenzene-1,2	95-50-1	2BL2IC		45.4	NSC	NSC	NSC
Dichloroethane-1,1	75-34-3	1BL3PF		454	NSC	NSC	NSC
Dichloroethane-1,2	107-06-2	2BL3IF		45.4	NSC	NSC	NSC
Dichloroethene-1,2	156-60-5	3BL3IF		454	NSC	NSC	NLA
Dichloroethylene-1,1	75-35-4	2BL4IF		45.4	410	360	NLA
Diethyl phthalate	84-66-2	2BL1IC		454	NSC	NSC	NLA
Ethylbenzene	100-41-4	1BL3IF		454	NSC	NSC	NSC
Ethylene diamine	107-15-3	1AL2SC	4,540		NSC	NSC	NSC
Formic acid	64-18-6	1BL2SC		2,270	187	116	NSC
Hexachlorobutadiene	87-68-3	2BL1IC		0.454	NSC	NSC	NSC
Hexone (methyl isobutyl ketone)	108-10-1	1BL3PF		2,270	NSC	NSC	NSC
Mercury	7439-97-6	2BL0IN		0.454	NSC	NSC	NSC
Methanol (methyl alcohol)	67-56-1	1BL3SF		2,270	NSC	NSC	NSC
Methyl ethyl ketone (MEK)	78-93-3	1BL3SF		2,270	NSC	NSC	NSC
Methylene chloride	75-09-2	2BL1IC		454	125	NSC	NSC
Nitric acid	7697-37-2	1AL0SN	454		458	135	NSC
Nitrobenzene	98-95-3	1AL2IC	4,540		NSC	NSC	NSC
Pyridine	110-86-1	1BL3SF		454	141	108	NSC
Sulfuric acid	7664-93-9	2AL0SN	454		NSC	NSC	NSC
Tetrachloroethene	127-18-4	2BL0IN		45.4	NSC	NSC	NSC
Tetrachloroethylene	127-18-4	1BL0IN		45.4	NSC	NSC	NSC
Toluene	108-88-3	1BL3IF		454	NSC	NSC	NSC
Trans-1,2-dichloroethane	107-06-2	2BL3IF		4.54	320	190	NSC
Trichloroethane-1,1,1	71-55-6	2BL1IC		454	NSC	NSC	NSC
Trichloroethene	79-01-6	2BL2IC		45.4	NSC	NSC	NSC

Table 4. (continued).

Material	CAS number	Attributes[a]	TPQ[b] (kg)	RQ[c] (kg)	Spill (no fire present) distance to ERPG-1 or equivalent (m)	ERPG-2 or equivalent (m)	ERPG-3 or equivalent (m)
Trichloroethylene	79-01-06	1BL2IC		45.4	NSC	NSC	NSC
Xylene (mixed isomers)	1330-20-7	1BL3IF		454	NSC	NSC	NSC

a. The Attributes column has a six character identifier "ABCDEF." These characters are defined as follows:

A—This position denotes if the hazardous material is
- 1—in ALOHA chemical library, modeled with ALOHA
- 2—not in ALOHA chemical library, in EPI chemical library, modeled with EPI
- 3—not in ALOHA or EPI chemical library, chemical properties added to ALOHA chemical library, modeled with ALOHA

B—This position denotes if the
- A—TPQ was the quantity used for the dispersion calculations
- B—RQ was the quantity used for the dispersion calculations

C—This position denotes the physical state of the hazardous material.
- S—Denotes that the substance is a solid at normal temperatures
- L—Denotes that the substance is a liquid at normal temperatures
- G—Denotes that the substance is a gas at normal temperatures

D—This position denotes the fire hazard from the National Fire Protection Association (NFPA: NFPA 325M "Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids," 1991) codes.
- 0—Will not burn
- 1—Will burn at temperatures above 200°F
- 2—Will burn at temperatures above 100°F
- 3—Fire and explosion hazard at normal temperatures
- 4—Extremely dangerous fire and explosion hazard

E—This position denotes the solubility of the substance relative to water.
- I—Substance is not soluble in water
- P—Substance is partially soluble in water
- R—Substance reacts readily in water or air
- S—Substance is soluble in water

F—This position denotes the ease with which the substance burns.
- F—Denotes a flammable and volatile substance
- C—Denotes a substance that is combustible
- N—Denotes a substance that is non combustible

b. This column is the TPQ listed in 40 CFR 355, Appendix A, The List of Extremely Hazardous Substances and their Threshold Planning Quantities.

c. This column is the RQ listed in 40 CFR 302, Table 302.4, List of Hazardous Substances and Reportable Quantities.

d. A spill was modeled for liquid hazardous materials if enough chemical properties were available.

e. NSC stands for No Significant Consequences. The estimated airborne concentrations were considered not significant if the ERPG or equivalent concentration limit was not exceeded at a distance equal to or greater than 100 m because of calculation limitations of the dispersion codes.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

6. EMERGENCY PLANNING ZONES

The DOE Order 5500.3A guidance documents state that the results of the consequence analysis should be used to define the facility EPZ. In accordance with the guidance, the results of the consequence analysis presented in Section 5 were used to define the EPZ for WERF. The EPZ for WERF is presented in this section.

6.1 Proposed Minimum EPZ Radius

The proposed minimum EPZ radius for WERF was determined using the consequence results in Section 5 and the EPZ determination logic diagram provided in the DOE Order 5500.3A guidance document. As demonstrated in Section 5, the highest emergency class for operational emergencies at WERF is a Site Area Emergency. From the consequence results in Section 5, the worst-case event scenario has the potential to exceed the ESHE concentration limit (ERPG-3 or equivalent) to a distance of approximately 600 m. Therefore, using these results and the EPZ determination logic diagram, the proposed minimum EPZ radius for WERF is 2 km.

6.2 Tests of Reasonableness

Other factors should also be considered, and the size and shape of the proposed EPZ should be adjusted accordingly so that (a) the EPZ conforms to the physical and jurisdictional realities of the site and surrounding area and (b) the EPZ gives confidence that planning and preparedness will be sufficiently flexible and detailed to deal with all types and magnitudes of emergency conditions. Five significant considerations that cannot be readily stated as quantitative guidance are provided in the DOE Order 5500.3A guidance document. These five significant considerations are in the form of questions to be used as "tests of reasonableness" for the proposed EPZ size. The following five tests of reasonableness are addressed for the proposed EPZ of 2 km for WERF:

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

   Yes, the maximum distances to ERPG level impacts (protective action criteria ERPG-2) for almost all of the analyzed accident scenarios are equal to or less than the proposed EPZ radius. In fact, only three hazardous materials had estimated consequences that exceeded the ERPG-2 or equivalent level at a distance greater than 2 km.

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

   Yes, 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?

   Yes, the EPZ radius is large enough to support an effective response at and near the scene of the emergency. The 2-km EPZ encompasses all WROC/WERF/PBF facilities and all roads leading to them. All nonessential people will be evacuated; they will not complicate or interfere with response at the scene. The control 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?

   There are no specific natural or jurisdictional boundaries with which to align the EPZ. However, a natural boundary may be established by using the roads that lead to the WROC/WERF/PBF facilities. 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.

6.3 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 WERF is 2 km, as shown in Figure 5.

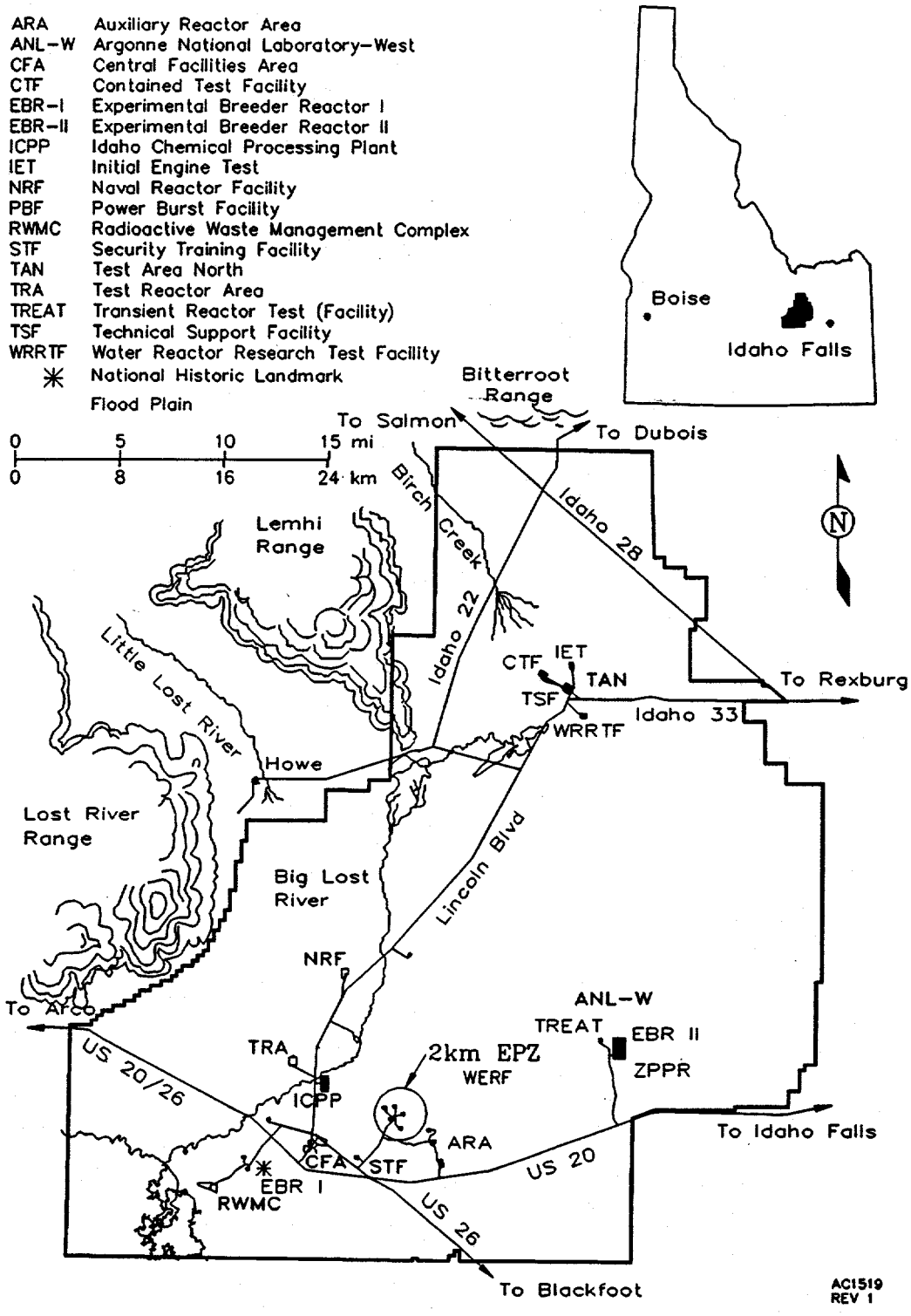

Figure 5. The Minimum EPZ for WERF.

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

Because the specific type of hazardous material involved in an event scenario may not be readily known, it must be assumed that the material having the highest consequences is involved for a particular event scenario. For the two event scenarios analyzed, the consequence results indicated that the highest emergency class for both event scenarios is a Site Area Emergency. The EALs and protective actions for both event scenarios are presented by severity of the analyzed event scenarios.

7.1 Site Area Emergency EALs

From the analysis in Section 5, the following possible EALs are identified for a Site Area Emergency:

- A fire in the WWSB that is not mitigated within a 10 minutes of detection.

  Basis: A fire in the WWSB has the potential to release hazardous materials that are stored as solids, liquids, or gases. If the fire is mitigated quickly, the release of hazardous materials will be limited. If the fire cannot be mitigated rapidly, the facility limit of liquid hazardous materials could be volatized. If the fire persists, there is the potential to release the facility limit of any of the hazardous materials stored in the WWSB.

- Puncture, fracture, or rupture of a container that contains a liquid hazardous material.

  Basis: There may be no means to identify the specific liquid hazardous material spilled. Therefore, it must be assumed that the facility limit quantity of the most hazardous material was released.

7.2 Site Area Emergency Protective Actions

Protective actions must to be taken for both types of event scenarios analyzed: (a) a fire in the WWSB or (b) a liquid hazardous material spill. The protective actions for the analyzed event scenarios are discussed below.

7.2.1 Protective Actions for a Fire in the WWSB

Protective actions to protect personnel at the WROC/WERF/PBF area will be required if a fire occurs at the WWSB. If a fire occurs at the WWSB and it cannot be mitigated within 10 minutes, actions should be taken to evacuate all personnel to a distance greater than 2 km from WERF. This means that all personnel at the WROC/WERF/PBF area should be evacuated.

All personnel should be evacuated because a fire at the WWSB has the potential to release significant quantities of hazardous materials stored at the facility. The hazardous materials released in a fire may produce ERPG-3 or equivalent concentrations out to a distance of approximately 600 m.

7.2.2 Protective Actions for a Liquid Hazardous Material Spill

Protective actions to protect personnel in the immediate vicinity of WERF will be required if liquid hazardous materials are spilled at the WWSB. If possible, protective actions for treatment of

the spill should be initiated immediately to limit the amount of hazardous material released. All personnel at WERF should be evacuated to a distance greater than 500 m away from WERF. Personnel at other facilities located at the WROC/WERF/PBF area will not be affected by this event.

8. MAINTENANCE AND REVIEW OF THIS HAZARDS ASSESSMENT

The WERF Management is responsible for ensuring the WERF hazards assessment is regularly reviewed and maintained current. The review requirement and schedule is specified in the Site Emergency Readiness Assurance Plan. The current schedule requires the hazards assessment to be reviewed annually.

The WERF HA is a controlled document and is subject to Configuration Control. Configuration Control is the process of managing and controlling changes to baseline configuration items to ensure that changes are adequately defined, evaluated, reviewed, and approved. At WERF, a Configuration Management (CM) coordinator has been assigned to coordinate the disciplined implementation of configuration management. The CM coordinator is knowledgeable of WERF 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 Question[19] (USQ) process interfaces with CM through Drawing Revision Requests, Document Change Notices, and Facility Change Forms. These items implement the requirement to perform a USQ evaluation as a part of the change control process.

9. REFERENCES

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17. P. R. Leonard, *Formal Documentation of 1987-1991 INEL Wind Files Used in CAP-88*, EG&G Idaho, Inc., EDF-CAP-PROT-91-011, February 12, 1992.

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Appendix A

WERF Hazardous Commercial Material List

Appendix A

WERF Hazardous Commercial Material List

The nonradiological hazardous materials that are commercial products have been identified at WERF. This appendix contains an inventory of the products located at WERF as of June 16, 1994.

Table A-1. WERF hazardous commercial product list.

Chemical	Trade Name	Manufacturer	Location[a]	Description	Typical Quantity	MSDS Y/N	Shelf Life	EXP. Date	SARA Y/N
02001 Electrical Cleaner (aerosol)		Sherwin Williams	Per 609 FSC RM109	Compounded Product	160 oz	Y	N/A	N/A	
15w40 Engine Oil		Cummins Engine Co.	Per 609 RMB102	Compounded Product	9 gal	Y	N/A	N/A	
2-Propanol		Fisher Chem/various	Per 609 FSC RM109	Propanol	2 pts	Y	N/A	N/A	
230 Latex/Silicone	Sealant	Dap	Per 609 NFPS RMB107	Compounded Product	93 oz	Y	N/A	N/A	
300 Flow Plus		Schaffers Mfg.	Per 609 FSC RM109	Compounded Product	4 qt	Y	N/A	N/A	N
321 Dry Film Lubricant		Dow Corning	Per 609 RM109	Compounded Product	1 gal	Y	N/A	N/A	
4 Compound (Insulating Paste/Compound		Dow Corning Corp.	Per 609 RMB102	Compounded Product	6 oz	Y	N/A	N/A	Y
736 Heat Resistant Silicone	RTV Sealant	Dow Corning	Per 609 FSC RM109	Compounded Product	124 oz	Y	N/A	N/A	
999-A Silicone	RTV Sealant	Dow Corning	Per 609 RM109	Compounded Product	371 oz	Y	N/A	N/A	
A.W. Hydraulic 220		Chevron	Per 609 RMB102	Compounded Product	5 gal	Y	N/A	N/A	N
A.W. Machine Oil 220		Chevron	Per 609 RMB102	Compounded Product	5 gal	Y	N/A	N/A	N
Acetylene		Various	Per 635	100% Acetylene	250 lbs	Y	N/A	N/A	N
Aerodag G (aerosol)		Various	Per 609 FSC RM109	Compounded Product	156 oz	Y	N/A	N/A	Y
Air tool ludricant		Hilti Fastening Systems	Per 609 FSC RM109	Compounded Product	12 oz	Y	N/A	N/A	
Ajax		Colgate palmolive	Per 609 CCS & RM116	Compounded Product	546 oz	Y	N/A	N/A	N
Ammonium Phosphate	ABC extinguisher	Various	Various	100% Ammonium Phosphate	300 lbs	Y	N/A	N/A	N
Anti-Static Spray 6625 (aerosol)		Inmas Corp.	Per 609 RMB102	Compounded Product	14 oz	Y	N/A	N/A	N
Anti-Static Spray 9040 (aerosol)		Crown Industrial Products Co. Inc.	Per 609 RMB102	Compounded Product	15 oz	Y	N/A	N/A	N

Table A-1. (continued).

Chemical	Trade Name	Manufacturer	Location[a]	Description	Typical Quantity	MSDS Y/N	Shelf Life	EXP. Date	SARA Y/N
Backing Soda		Arm & Hammer	Per 609 CCS	Compounded Product	240 oz	Y	N/A	N/A	
Baking Soda		Arm & Hammer	CCS & RMB102	Compounded Product	320 oz	Y	N/A	N/A	N
Body Shampoo		Santi Fresh	Per 609 RM116	Compounded Product	486 oz	Y	N/A	N/A	
Body Shampoo		Johnson Wax	Per 609 RM116	Compounded Product	92 oz	Y	N/A	N/A	
Bounce Back		Spartan	Per 609 RM104	Compounded Product	3 gal	Y	N/A	N/A	
Bounce Back		Spartan	Per 609 CCS	Compounded Product	7 gal	Y	N/A	N/A	
Brasso		Airwick Indusrties	Per 609 CS RM116	Compounded Product	8 oz	Y	N/A	N/A	N
Cam 2 EP 80w90		Cam 2 oil Products	Per 609 RMB102	Compounded Product	5 gal	Y	N/A	N/A	
Carbon Monoxide		Various	Per 609 RM101	Compounded Product	500 lbs	Y	N/A	N/A	Y
Carbon Zinc Batteries		Various	Various	Compounded Product	Various	Y	N/A	N/A	N
Carbon Dioxide		Various	Various	100% Carbon dioxide	30 lbs	Y	N/A	N/A	N
Carpet Protector		3M Center	Per 609 CS RM116	Compounded Product	6 gal	Y	N/A	N/A	Y
Citro-Shield (aerosol)	Furniture polish	Spartan Chemical Co.	Per 609 CS RM104	Compounded Product	18 oz	Y	N/A	N/A	N
Clean Gear 747		Georgia Steel & Chemical Co.	Per 609 RMB102	Compounded Product	96 oz	Y	N/A	N/A	Y
Coating-Clear Water Repellent	WaterSeal	Thompson& Formby Inc.	Per 609 FSC RM109	90% Mineral Spirits	1 qt	Y	N/A	N/A	N
Columbia 07-785-CC		Columbia Paint Co.	Per 609 FSC RM109	Compounded Product	1 gal	Y	3yrs.	3/95	N
Columbia 07-590-NT		Columbia Paint Co.	Per 609 FSC RM109	Compounded Product	1 gal	Y	N/A	N/A	N
Complete Floor Wax		S.C. Johnson Wax	Per 609 CCS	Compounded Product	5 gal	Y	N/A	N/A	Y
Compublend 11 Heavy Duty Cleaner		3M Center	Per 609 CS RM116	Compounded Product	5 gal	Y	N/A	N/A	Y

Table A-1. (continued).

Chemical	Trade Name	Manufacturer	Location[a]	Description	Typical Quantity	MSDS Y/N	Shelf Life	EXP. Date	SARA Y/N
Compublend 11 Disinfectant (pre mixed)		3M Center	Per 609 CS RM116	Compounded Product	5 gal	Y	N/A	N/A	Y
Compublend 11 Disinfectant		3M Center	Per 609 CS RM116	Compounded Product	1 gal	Y	N/A	N/A	Y
Compublend 2 Spot & Stain Remover		3M Center	Per 609 RM116	Compounded Product	5 gal	Y	N/A	N/A	
Compublend 2 Shampoo Spray Clearner		3M Center	Per 609 RM116	Compounded Product	5 gal	Y	N/A	N/A	
Compublend 11 Neutral Cleaner		3M Center	Per 609 CS RM116	Compounded Product	5 gal	Y	N/A	N/A	Y
Compublend 11 Glass Cleaner		3M Center	Per 609 CS RM116	Compounded Product	5 gal	Y	N/A	N/A	Y
Conoco Motor oil (in hand pump cans)	20-20	Conoco	Per 609 FSC RM116	Compounded Product	32 oz	Y	N/A	N/A	N
Conqu-R-Dust		S.C. Johnson Wax	Per 609 FSC RM109	Compounded Product	1 gal	Y	N/A	N/A	Y
Cutting Oil #208		Sprayon	Per 609 FSC RM109	Compounded Product	60 oz	Y	N/A	N/A	N
Defoamer		Spartan	Per 609 RM116	Compounded Product	2 gal	Y	N/A	N/A	
Diesel Fuel Oil No.2-D		Various	Per 705	Compounded Product	4,000 gal	Y	N/A	N/A	N
Diesel Fuel Oil No.2-D		Various	Per 711	Compounded Product	500 gal	Y	N/A	N/A	N
Dow Corning 111 Compound	Silicone Grease	Dow Corning	Per 609 RMB102	Amorphous Silica	11 oz	Y	N/A	N/A	N
Dy Chek Penetrant (aerosol)		Turco Products	Per 609 FSC RM109	Compounded Product	12 oz	Y	N/A	N/A	
Dy Chek Remover #3 (aerosol)		Turco Products	Per 609 FSC RM109	Compounded Product	7 oz	Y	N/A	N/A	
Dy Chek Developer (aerosol)		Turco Products	Per 609 FSC RM109	Compounded Product	13 oz	Y	N/A	N/A	
Dyco	ice melter	Dyco Chemical	Per 609 CCS	Compounded Product	75 lbs	Y	N/A	N/A	N

Table A-1. (continued).

Chemical	Trade Name	Manufacturer	Location[a]	Description	Typical Quantity	MSDS Y/N	Shelf Life	EXP. Date	SARA Y/N
Eletrical Cleaner aerosol		Sprayon Products	Per 609	Compounded Product	160 oz	Y	N/A	N/A	N
Enhance Lotionized Hand Soap		S.C. Johnson Wax	Per 609 CS RM116	Compounded Product	166 oz	Y	N/A	N/A	N
Envy (Aerosol)		S.C.Johonson Wax	Per 609 CS RM116	Compounded Product	60 oz	Y	N/A	N/A	N
EP Polyurea Grease 1		Chevron	Per 609 RMB102	Compounded Product	5 gal	Y	N/A	N/A	N
Ethyl Alcohol		Various	Per 609 FSC RM109	Ethyl alcohol, Anhydrous water	1 qt	Y	N/A	N/A	Y
Ethylene Glycol		Texaco	Per 609 CCS	Compounded Product	2 gal	Y	N/A	N/A	
Ethylene Glycol		Various	Per 609 RMB102	Ethylene Glycol	10 gal	Y	N/A	N/A	Y
Expo White Board Cleaner		Sanford	Various	Compounded Product	Various	Y	N/A	N/A	N
F-matic P-type	Air freshener	Eikosha Co. Ltd.	Per 609 CS RM116	Compounded Product	20 oz	Y	N/A	N/A	Y
Fel-Pro C5-A	Antiseize	Fel-Pro Inc.	Per 609 RMB102	Compounded Product	16 oz	Y	N/A	N/A	N
Fire Clay Plastic Refactory		A.P.Green	Per 609 CCS	Compounded Product	20 lbs	Y	N/A	N/A	
Flame Control Coating Reducer		Flame Control Coating Inc.	Per 609 FSC RM109	Compounded Product	0.5 gal	Y	N/A	N/A	Y
Fox Valley Traffic Paint (aerosol)		Fox Valley System Inc.	Per 609 FSC RM109	Compounded Product	234 oz	Y	N/A	N/A	Y
Fuller O'Brien 214-10		The O'Brien Corp.	Per 609 NFPS RMB107	Compounded Product	3 gal	Y	3yrs.	4/94	N
Fuller O'Brien 214-10		Fuller O'Brien	Per 609 NFPS RMB107	Compounded Product	4 gal	Y	N/A	N/A	
Fun Dish Soap		Eco	Per 609 RM116	Compounded Product	4 qt	Y	N/A	N/A	
Gasoila	Pipe fitting seal	Fedral Process Co.	Per609 RMB107	Compounded Product	8 oz	Y	N/A	N/A	N
Gasoline Unleaded		Various	Per 609 RM109 (5 gal can)	Compounded Product	1 gal	Y	N/A	N/A	N

Table A-1. (continued).

Chemical	Trade Name	Manufacturer	Location[a]	Description	Typical Quantity	MSDS Y/N	Shelf Life	EXP. Date	SARA Y/N
GC Bond (rubber Cement)		GC Electronics	Per 609 FSC RM109	Compounded Product	24 oz	Y	N/A	N/A	N
Gear Compounded EP		Texaco	Per 609 RM109	Compounded Product	5 gal	Y	N/A	N/A	
Gear Compound 320 ISU EP		Chevron	Per 609 RM109	Compounded Product	5 gal	Y	N/A	N/A	
Gear Compound EP ISO 460		Chevron	Per 609 RMB102	Compounded Product	5 gal	Y	N/A	N/A	
Genuine Sullair 24KT		Sullair	Per 609 FSC RM109	Compounded Product	10 gal	Y	N/A	N/A	
Halon 1301		Various	Per 609 RM101	Trifluoromonobromomethane	200 lbs	Y	N/A	N/A	Y
Hand Cream		Santi Fresh	Per 609 RM116	Compounded Product	55 oz	Y	N/A	N/A	
Hand Cream		Sani-Fresh	Per 609 CS RM116	Compounded Product	Various	Y	N/A	N/A	N
Heavy Duty Cleaner		Santi Fresh	Per 609 RM116	Compounded Product	432 oz	Y	N/A	N/A	
Houghto-Safe 620	Hydraulic Fluid	E.F.Houghton & Co.	Per 609 RMB102 & Various	Compounded Product	60 gal 255 gal plant system	Y	N/A	N/A	Y
Hydrogen Chloride Gas		Various	Per 609 RM101 & RM109	Compounded Product	500 lbs	Y	N/A	N/A	Y
Hydrosep		Encon Saftey Products	Per 609 RM109	Compounded Product	40 pts	Y	N/A	N/A	Y
Ice Melter		Brody Chem.	Per 609 CCS	Compounded Product	Various	Y	N/A	N/A	
Ingotcote K (Ceramcote)		Ashland Chemical Inc.	Per 609 RMB102	Compounded Product	35 gal	Y	N/A	N/A	Y
Jade Set Super	Refactory Mortar	A.P.Green Refactories Co.	Per 609 RMB102	Compounded Product	10 gal	Y	N/A	N/A	Y
Joint Compound (ready mixed)		U.S.Gypsum Co.	Per 609 NFPS RMB107	Compounded Product	4 gal	Y	N/A	N/A	N
k-Lens-M		The Wilkens Co.	Per 609 RM109	Compounded Product	80 oz	Y	N/A	N/A	Y
K-47 Roebic		Roebic Inc.	Per 609 RMB102	Compounded Product	5 qt	Y	N/A	N/A	N

Table A-1. (continued).

Chemical	Trade Name	Manufacturer	Location[a]	Description	Typical Quantity	MSDS Y/N	Shelf Life	EXP. Date	SARA Y/N
Klenn Stip Paint Thinner	Minerial Spirits	Klenn Strip	Per 609 FSC RM109	Compounded Product	1 qt	Y	N/A	N/A	
Krylon Primer 1371		Borben	Per 609 RM109	Compounded Product	12 oz	Y	N/A	N/A	N
Lacquer Thinner		Klean Strip	Per 609 FSC RM109	Compounded Product	5 gal	Y	N/A	N/A	
Lattner Boiler Compound		P.M. Lattner Mfg. Co.	Per 609 RMB102	Trisodium Phosphate	1 pt	Y	N/A	N/A	Y
LEC-36 (6V Battery)		Exide Electronics	Per 609 RMB102	Compounded Product	4	Y	N/A	N/A	N
Lightguard Q6		Exide Electronics	Per 609 RMB102	Compounded Product	Various	Y	N/A	N/A	
Lithonia Emergency Lighting		Lithonia	Per 609 RMB102	Compounded Product	Various	Y	N/A	N/A	
Lysol Institutional (Aerosol)		National Laboratories	Per 609 CS RM116	Compounded Product	252 oz	Y	N/A	N/A	Y
Master Bond Part B		Master Bond Inc.	Per 609 RM109	Compounded Product	1 gal	Y	N/A	N/A	
Master Bond Part A		Master Bond Inc.	Per 609 FSC RM109	Compounded Product	1 gal	Y	N/A	N/A	
Mercontainer		EPS Chemical	CC-38	Compounded Product	150 lbs	Y	N/A	N/A	Y
Mg Absorb		Lab Safety	CC-38 & Per 623	Compounded Product	100 lbs	Y	N/A	N/A	Y
Moldcote 2		Huron Industries	Per 609 FSC RM109	Compounded Product	1 gal	Y	N/A	N/A	Y
Muriatic Acid		Reagent Chemical & Research Co.	Per 609 RMB102	31.5 - 36% Hydrochloric Acid	1 gal	Y	N/A	N/A	N
NCP-2		Norco Co.	Per 609 RMB102	Compounded Product	1 pt	Y	N/A	N/A	
NL Gear Compound 220		Chevron	Per 609 RMB102	Compounded Product	5 gal	Y	N/A	N/A	Y
No.T-36 Refactory Cement	Refactory Mortar	A.P.Green Industries Inc.	Per 609 RMB102	Compounded Product	5 gal	Y	N/A	N/A	Y
Noalox Joint Compound		Noalox	Per 609 RM109	Compounded Product	8 oz	Y	N/A	N/A	
Over & Under		Johnson Wax	Per 609 CCS	Compounded Product	10 gal	Y	N/A	N/A	

Table A-1. (continued).

Chemical	Trade Name	Manufacturer	Location[a]	Description	Typical Quantity	MSDS Y/N	Shelf Life	EXP. Date	SARA Y/N
P-10 (nuclear counter Mixture)		Various	Various	Compounded Product	16200 lbs	Y	N/A	N/A	Y
Paulmolive Gold Hand Soap		ColgatePaulmolive Co.	Per 609 CS RM116	Compounded Product	95 oz	Y	N/A	N/A	N
PL-400	Subfloor Adesive	Contect	Per 609 FSC RM109	Compounded Product	670 oz	Y	N/A	N/A	
Polarvis Multi Hydraulic Oil		Alantic Richfield	Per 609 RMB102	Compounded Product	5 gal	Y	N/A	N/A	N
Polyurea EP Grease 1		Chevron	Per 609 RMB102	Compounded Product	5 gal	Y	N/A	N/A	Y
Propane		Various	Per 609 RM109	Aliphatic Hydrocarbon	70 oz	Y	N/A	N/A	N
Propane		Various	North Pad	Aliphatic Hydrocarbon	500 gal	Y	N/A	N/A	N
Propane		Various	South wall of Per 609 (exterior)	Aliphatic Hydrocarbon	20 gal	Y	N/A	N/A	N
Propylene Glycol		Union Carbide	Per 609 RMB102	Propylene Glycol	60 gal	Y	N/A	N/A	Y
PSQ Cleaner		Spartan	Per 609 RM104	Compounded Product	1 gal	Y	N/A	N/A	
Quick View Cleaner		Johnson Wax	Per 609 CCS	Compounded Product	5 gal	Y	N/A	N/A	
Quitolubric 822-220		Quaker State	Per 609 RMB102	Compounded Product	55 gal	Y	N/A	N/A	Y
Ramik Green	Rodenticide	Haco Inc.	Various	Compounded Product	4 lbs	Y	N/A	N/A	N
Real Cool Snoop	Snoop	Nupro Co.	Per 609 RM113 & RMB103	Compounded Product	8 oz	Y	N/A	N/A	N
Rechargeable Battery # ELB0604 (6v)		Lithonia Lighting	Per 609 RMB102	Compounded Product	1	Y	N/A	N/A	Y
Rectorseek		Rectorseal Corp.	Per 609 RMB102	Compounded Product	12 oz	Y	N/A	N/A	
Regal Oil R & O 100		Texaco	Per 609 RMB102	Compounded Product	5 gal	Y	N/A	N/A	
Renuzit air freshener		Drackett Products Co.	Per 609 CCS	Compounded Product	120 oz	Y	N/A	N/A	N
Rugbee Heavy Duty Spot & Stain Remover		S.C.Johnson Wax	Per 609 FSC RM109	Compounded Product	1 gal	Y	N/A	N/A	Y
RustOleum Traffic Paint (aerosol)		RustOleum Corp.	Per 609 FSC RM109	Compounded Product	320 oz	Y	5yrs.	5/98	

Table A-1. (continued).

Chemical	Trade Name	Manufacturer	Location[a]	Description	Typical Quantity	MSDS Y/N	Shelf Life	EXP. Date	SARA Y/N
RustOleum 944		RustOleum	Per 609 FSC RM109	Compounded Product	1 gal	Y	5yrs.	2/96	
RustOleum 5818		RustOleum Corp.	Per 609 NFPS RMB107	Compounded Product	2 gal	Y	5yrs.	7/96	
RustOleum 5269		RustOleum Corp.	Per 609 NFPS RMB107	Compounded Product	1 gal	Y	5yrs.	7/96	N
RustOleum 108		Rustoleum Corp.	Per 609 FSC RM109	25% Phosphoric Acid	1 qt	Y	N/A	N/A	N
RustOleum 5343		RustOleum Corp.	Per 609 FSC RM109	Compounded Product	2 gal	Y	5yrs.	5/95	N
RustOleum 5895		RustOleum Corp.	Per 609 NFPS RMB107	Compounded Product	2 gal	Y	5yrs.	9/95	N
RustOleum 4286		RustOleum Corp.	Per 609 FSC RM109	Compounded Product	1 gal	Y	5yrs.	1/98	N
RustOleum 5301		RustOleum Corp.	Per 609 FSC RM109	Compounded Product	2 pt	Y	5yrs.	3/98	N
RustOleum 933		RustOleum Corp.	Per 609 FSC RM109	Compounded Product	1 gal	Y	5yrs.	4/95	N
RustOleum Aerosol	Hard Hat Spray	RustOleum Cop.	Per 609 FSC RM109	Compounded Product	285 oz	Y	5yrs.	5/98	N
RustOleum 964		RustOleum Corp.	Per 609 FSC RM109	Compounded Product	1 gal	Y	5yrs.	5/95	N
RustOleum 5292		RustOleum Corp.	Per 609 NFPS RMB107	Compounded Product	2 gal	Y	5yrs	5/98	N
RustOleum 5243		RustOleum Corp.	Per 609 NFPS RMB107	Compounded Product	2 gal	Y	5yrs.	5/95	N
RustOleum 200		RustOleum Corp.	Per 609 NFPS RMB107	Mineral Oxide	1 pt	Y	N/A	N/A	N
RustOleum 7086		RustOleum Corp.	Per 609 FSC RM109	Compounded Product	2 gal	Y	5yrs.	9/95	N

Table A-1. (continued).

Chemical	Trade Name	Manufacturer	Location[a]	Description	Typical Quantity	MSDS Y/N	Shelf Life	EXP. Date	SARA Y/N
RustOleum 5800 (Tinting Colorants)		RustOleum Corp.	Per 609 NFPS RMB107	Compounded Product	96 oz	Y	5yrs.	4/97	N
RustOleum 925		RustOleum Corp.	Per 609 FSC RM109	Compounded Product	1 gal	Y	5yrs.	5/95	N
RustOleum 5222		RustOleum Corp.	Per 609 NFPS RMB107	Compounded Product	2 gal	Y	5yrs.	2/95	N
RX-14 Refactory Coating		R.X.Chemical Co. Inc.	Per 609 RMB102	Compounded Product	2 gal	Y	N/A	N/A	Y
RX-36 Refactory Coating		R.X. Chemical Co. Inc.	Per 609 RMB102	Compounded Product	2 gal	Y	N/A	N/A	Y
Shred Pax		Fiske Brothers Co.	Per 609 RMB102	Compounded Product	15 gal	Y	N/A	N/A	
Silicate Catalyst		Delta Resin & Refactories	Per 609 RMB102	Compounded Product	20 gal	Y	N/A	N/A	Y
Silicone Spray Lubricant		Radiator Specialty Co. (aerosol)	Per 609 FSC RM109	Compounded Product	14 oz	Y	N/A	N/A	
Sodium Bicarbonate	BC extinguisher	Various	Various	Sodium Bicardonate	Various	Y	N/A	N/A	N
SOS Soap Pads		Miles Inc.	Per 609 CCS	Compounded Product	234 pads	Y	N/A	N/A	
Sparkling		Spartan Chemical Co.	Per 609 CS RM116 & RM104	9.5% Hydrochloric Acid	1 qt	Y	N/A	N/A	Y
Spic & Span		Proctor & Gamble	Per 609 RM116	Compounded Product	75	Y	N/A	N/A	
Spray Buff Cleaner & Polish		3M Center	Per 609 RM116	Compounded Product	1 gal	Y	N/A	N/A	Y
SSR Ultra Coolant		Ingersoll Rand	Per 609 RMB102	Compounded Product	1 gal	Y	N/A	N/A	Y
Stainless Steel polish		3M Center	Per 609 RM116	Compounded Product	21 oz	Y	N/A	N/A	Y
Super Freeze Mist (aerosol)		GC Electronics	Per 609 RM102	100% Dichloro-difluoromethane	15 oz	Y	N/A	N/A	N
Tapmatic		Triple E	Per 609 RM109	Compounded Product	5 oz	Y	N/A	N/A	
Thermal Arc Tourch Coolant		Thermal Dynamics	Per 622	Compounded Product	1 gal	Y	N/A	N/A	Y

Table A-1. (continued).

Chemical	Trade Name	Manufacturer	Location[a]	Description	Typical Quantity	MSDS Y/N	Shelf Life	EXP. Date	SARA Y/N
Thermalcote		Themalloy Inc.	Per 609 RMB102	Compounded Product	2 oz	Y	N/A	N/A	Y
Traffic Paint (aerosol)		Fox Valley	Per 609 FSC RM109	Compounded Product	234 oz	Y			
Tuff Bond	Adhesive	Goodloe E Moore Inc.	Per 609 FSC RM109	Compounded Product	1 gal	Y	N/A	N/A	
Ultragel 2		Johnson & Johnson	Per 609 RMB102	Compounded Product	72 oz	Y	N/A	N/A	
Unocal Unoba EP Grease 2		Unocal Oil Co.	Per 609 RM109 & RMB103	Compounded Product	28 oz RM109 280 oz RMB103	Y	N/A	N/A	N
Urinal Blocks		Triple S	Per 609 RM116	Compounded Product	44 oz	Y	N/A	N/A	
Vinyl Spackling		Crawford Products Co.	Per 609 RMB107	Compounded Product	4 qt	Y	N/A	N/A	N
WD-40		WD-40 Co.	Per 609 RM109	Compounded Product	4 qt	Y	N/A	N/A	N
Windex		Drackett Products Co.	Per 609 RM116	Compounded Product	4 qt	Y	N/A	N/A	N

a. The abbreviations for the locations include
FSC - Flammable Storage Cabinet
CS - Custodial Storage
NFPS - Nonflammable Paint Storage
CCS - Cargo Container Storage

Appendix B

Facility Limits for Hazardous Materials without a TPQ or RQ

Appendix B

Facility Limits for Hazardous Materials without a TPQ or RQ

The nonradiological hazardous materials have been identified for WERF. Most of the hazardous materials identified had a TPQ or RQ value which was used to determine the facility limit quantity. This appendix provides the calculations that were used to obtain the facility limit quantity for those hazardous materials that did not have a TPQ or RQ value. The facility limit for these hazardous materials are based on air concentration limits or other properties associated with the particular hazardous material.

B-1. FACILITY LIMITS SET USING AIR CONCENTRATION LIMITS

For chemicals with neither a TPQ nor RQ, emergency air concentration limits (e.g., IDLH) or workplace air concentration limits (e.g., TLV-TWA or TLV-STEL) were used to establish a facility limit quantity. The limiting quantities are established by not exceeding the specified air concentration limit at 100 m (minimum distance because of calculation limitations of dispersion codes) for the worse case accident. The worse case accident is a facility fire where the chemicals are consumed and released over 8 hours. The RSAC-4 computer code[1] has been used to model the atmospheric dispersion coefficients for the worst case meteorological conditions and to determine the air concentrations at the receptor location (100 m) during accident conditions for a ground release. A ground release is considered to be bounding because the plume from a release above the ground (i.e., stack release) may touch down well past the nearest site boundary. Plume concentrations at the time of touch down for a stack release are less than the plume concentrations for a ground release. The meteorological parameters[2] used in the RSAC-4 calculations for the worse case release include

- Weather Class — F
- Wind Speed (less than 2 km) — 0.5 m/s
- Wind Speed (greater than 2 km) — 2.0 m/s
- Air Density — 1.099E+03 g/m^3
- Sigma Y — Markee
- Sigma Z — Markee.

The X/Q (dispersion coefficient related to the expansion of the vapor cloud in units of seconds per cubic meter) value[3] at 100 m is listed in Table B-1. The quantity released to cause the airborne concentration limit (in kg) are calculated by dividing the X/Q value (s/m^3) into the concentration limit (may be either 0.1*IDLH, 1/8*TLV-STEL, or TLV-TWA in mg/m^3) and dividing the result by 1.0E+06 to convert from mg to kg. Table B-1 displays the results of the calculations. Since the calculated number is the total quantity released to reach the airborne limit, it is similar to the RQ value. Therefore, this quantity is divided by the release fraction to get the facility quantity limits. The maximum quantity is limited to 4,540 kg (10,000 lb).

B-2. FACILITY LIMITS SET USING OTHER MATERIAL PROPERTIES

Some hazardous materials do not have an established TPQ, RQ, or air concentration limits. For these hazardous materials other methods were used to determine a facility limit quantity. Gold is not considered poisonous and is relatively inert. Therefore, in accordance with 40 CFR 355, the facility limit for gold can be set at 4,540 kg (10,000 lb). Gold Cyanide emits CN^- ion when heated and

therefore the limit is established the same as the RQ for Cyanides (4.536 kg), which produces a facility limit of 4536 kg (10,000 lb). For magnesium, the quantity is based on the TLV-TWA for magnesium oxide since this is the likely form of release due to its reactivity. The quantity for potassium is determined in the same manner as magnesium using the TLV-STEL for potassium hydroxide. The ester limit is determined by using the TLV-TWA for emery (CAS No. 12415-34-8). Strontium is similar to calcium; therefore, the limiting quantities for calcium may be used for strontium. Thorium is assumed to be thorium-232 which is an alpha emitter. The limit for "any other alpha emitter" is 2 curies.[4] The 2 curies translates into 18,500 kg of thorium; therefore the facility limit is set at 4,540 kg (10,000 lb).

For boron, a dose of 6 g to an infant can be fatal. Therefore, 6 g is used as the facility limiting quantity. Doses obtained through inhalation do not correspond to doses obtained through ingestion. Ingested doses go through the stomach and are absorbed through the intestines. Inhaled doses are absorbed through the lungs. An inhaled dose may not represent the actual dose absorbed by the body since a fraction of the material may be exhaled rather than absorbed. Therefore, using an inhaled dose adds another layer of conservatism to the calculation.

Since the worse case event scenario is fire lasting for at least 8 hours, the airborne concentration that a person would have to breathe for 8 hours in order to inhale 6 g is calculated. A formula for this calculation is found in the EPA "Exposure Factors Handbook"[5] and is as follows:

$$IHX = IR \times ED \times C$$

where

IHX = Inhalation exposure (mg) - 6,000 mg (6 g)
IR = Inhalation rate (m^3/h) - 4.2 m^3/h for an adult at a high activity level
ED = duration of exposure event (hours) - 8 hours
C = average air concentration for boron

Thus, substituting into the above equation,

$$6{,}000 \text{ mg} = 4.2 \text{ m}^3/\text{h} \times 8 \text{ h} \times C$$

and solving for C,

$$C = 178.6 \text{ mg/m}^3$$

The calculated average concentration is fatal for an accident lasting 8 hours. This value is reduced by a factor of ten for conservatism and used as an air concentration limit to calculate the facility quantity limit for this chemical.

B-3. REFERENCES

1. D. R. Wenzel, "Radiological Safety Analysis Code (RSAC-4)," Version 4.03, April 10,1990.

2. G. E. Stuart, NOAA, to L. Finch, WINCO, "Interim Guidance for Dispersion Calculations at ICPP," March 1989.

3. WERF-0232, "Accident Analysis of Anticipated Accidents."

4. 10 CFR 30.72, "Schedule C-Quantities of radioactive materials requiring consideration of the need for an emergency plan for responding to a release," Code of Federal Regulations Chapter 10, Part 30.72, January 1991.

5. U. S. Environmental Protection Agency, Exposure Factors Handbook, PB90-106774, July 1989.

Table B-1. Calculation of release quantities from air concentration limits.

Material	Calculated Release Quantity (kg)	Duration (s)	X/Q (s/m^3)	Windspeed (m/s)	Distance (m)	Air Concentration Limit (mg/m^3)	Type of limit[a]
Barium	1.694	28800	8.50E-03	0.5	100	0.5	TLV-TWA
Bismuth	0.2118	28800	8.50E-03	0.5	100	0.0625	STEL of 0.5 mg/m^3 divided by 8 to estimate TLV-TWA
Boron	60.51	28800	8.50E-03	0.5	100	17.86	Estimated from lethal conc of 6 g to child (reduced by factor of 10)
Butoxy Ethanol-2	112.8	28800	8.50E-03	0.5	100	33.3	1/10 IDLH (700 ppm or 3328 mg/m^3)
Calcium	0.6776	28800	8.50E-03	0.5	100	0.2	TLV-TWA
Cobalt	0.1694	28800	8.50E-03	0.5	100	0.05	TLV-TWA
Ester	16.94	28800	8.50E-03	0.5	100	5	TLV-TWA for EMERY as representative
Ethyl Alcohol	6438.0	28800	8.50E-03	0.5	100	1900	TLV-TWA
Freon-113	25751.0	28800	8.50E-03	0.5	100	7600	TLV-TWA
Hexane	6099.0	28800	8.50E-03	0.5	100	1800	1/10 IDLH (5000 ppm or 18000 mg/m^3)
Iron	33.88	28800	8.50E-03	0.5	100	10	TLV-TWA
Magnesium	33.88	28800	8.50E-03	0.5	100	10	TLV-TWA for Magnesium Oxide
Manganese	3.388	28800	8.50E-03	0.5	100	1	TLV-TWA
Methylnaphthalene-2	8.471	28800	8.50E-03	0.5	100	2.5	STEL of 20 mg/m^3 divided by 8 to estimate TLV-TWA
Mineral Oil	16.94	28800	8.50E-03	0.5	100	5	TLV-TWA
Molybdenum	16.94	28800	8.50E-03	0.5	100	5	TLV-TWA
Oxalic Acid	169.4	28800	8.50E-03	0.5	100	50	1/10 IDLH (500 mg/m^3)
Perchlorates	0.3388	28800	8.50E-03	0.5	100	0.1	TLV-TWA
Petroleum Naphtha	13553.0	28800	8.50E-03	0.5	100	4000	1/10 IDLH (10000 ppm or 40000 mg/m^3)
Polytetrafluoroethylene	4.235	28800	8.50E-03	0.5	100	1.25	STEL of 10 mg/m^3 (from USSR) divided by 8 to estimate TLV-TWA

Table B-1. (continued).

Material	Calculated Release Quantity (kg)	Duration (s)	X/Q (s/m^3)	Windspeed (m/s)	Distance (m)	Air Concentration Limit (mg/m^3)	Type of limit[a]
Potassium	0.2118	28800	8.50E-03	0.5	100	0.0625	TLV-C of 2 mg/m^3 for potassium hydroxide divided by 4 to determine ceiling and divided by 8 to estimate TLV-TWA
Sodium Chloride	2.118	28800	8.50E-03	0.5	100	0.625	STEL of 5 mg/m^3 (from USSR) divided by 8 to estimate TLV-TWA
Sodium Sulfate	4.235	28800	8.50E-03	0.5	100	1.25	STEL of 10 mg/m^3 (from USSR) divided by 8 to estimate TLV-TWA
Strontium	0.6776	28800	8.50E-03	0.5	100	0.2	TLV-TWA for calcium used, strontium is similar
Sulfide	0.0847	28800	8.50E-03	0.5	100	0.025	STEL of 0.2 mg/m^3 (from USSR) divided by 8 to estimate TLV-TWA
Thorium	18500.0	28800	8.50E-03	0.5	100	5460.1	Estimated from the maximum grams of thorium for 2 curies as indicated for alpha emitters in 10 CFR 30
Tin	135.53	28800	8.50E-03	0.5	100	40	1/10 IDLH (400 mg/m^3)
Tributyl Phosphate	461.1	28800	8.50E-03	0.5	100	136.1	1/10 IDLH (125 ppm or 1361 mg/m^3)
Trichlorobenzene-1,2,3	15.67	28800	8.50E-03	0.5	100	4.625	STEL of 37 mg/m^3 divided by 8 to estimate TLV-TWA
Trimethylbenzene-1,2,4	406.6	28800	8.50E-03	0.5	100	120	TLV-TWA (from Japan)
Vanadium	1.694	28800	8.50E-03	0.5	100	0.5	TLV-TWA (from United Kingdom)

a. IDLH values are from the U.S. Department of Health and Human Services, "NIOSH Pocket Guide to Chemical Hazards," June 1990. TLV-TWA, TLV-STEL, and TLV-C values are from the American Conference of Governmental Industrial Hygienists, "Threshold Limit Values and Biological Exposure Indices," 1992 (unless a foreign origin is indicated). TLV-TWA, TLV-STEL, and TLV-C values with a foreign origin come from "Occupational Exposure Limits for Airborne Toxic Substances" by the International Labour Organisation, Geneva, 1991.

Appendix C

Event Consequence Results

Appendix C

EVENT CONSEQUENCE RESULTS

This appendix provides the event consequence results for each hazardous material analyzed in this analysis. A consequence result table is presented for each hazardous material modeled with the ALOHA or EPI dispersion code. The tables indicate the type of release modeled and the peak concentrations estimated at the various receptor locations for the two sets of meteorological conditions. The tables also provide the ERPG or equivalent values used as protective action criteria for each hazardous material evaluated. The tables also indicate the highest emergency class for each release that was modeled.

Table C-1. Summary of event consequences for a release of acenapthene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	5.34 (5)	NSC[e]	NSC	10	NLA[f]	-	NSC	NLA	NLA
	Typical	1.59 (4)	NSC	NSC	10	NLA	-	NSC	NLA	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for acenapthene.

c. There is no Site Area Emergency or General Emergency protective action criteria value listed for acenapthene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for acenapthene.

e. NSC stands for No Significant Consequences. The estimated airborne concentrations were not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-2. Summary of event consequences for a release of acetic acid.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	334 (5)	13.1 (22)	NSC[e]	30	50	Site Area	430	315	NSC
	Typical	221 (5)	4.72 (7)	NSC	30	50	Site Area	285	218	NSC
Spill	95% worst-case	15.5 (4)	NSC	NSC	30	50	-	NSC	NSC	NSC
	Typical	1.6 (3)	NSC	NSC	30	50	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	529 (5)	19.5 (23)	NSC	30	50	Site Area	562	410	NSC
	Typical	243 (20)	4.79 (25)	NSC	30	50	Site Area	292	226	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for acetic acid.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for acetic acid.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 1,000 ppm for acetic acid was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-3. Summary of event consequences for a release of acetone.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	347 (5)	NSC[e]	NSC	1,000	3,750	-	NSC	NSC	NSC
	Typical	209 (5)	NSC	NSC	1,000	3,750	-	NSC	NSC	NSC
Spill	95% worst-case	101 (5)	NSC	NSC	1,000	3,750	-	NSC	NSC	NSC
	Typical	37.5 (3)	NSC	NSC	1,000	3,750	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	143 (5)	NSC	NSC	1,000	3,750	-	NSC	NSC	NSC
	Typical	13.5 (3)	NSC	NSC	1,000	3,750	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for acetone.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for acetone.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 20,000 ppm for acetone was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-4. Summary of event consequences for a release of acetophenone.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	156 (5)	6.01 (24)	NSC[e]	3	5	Site Area	1,200	834	NLA[f]
	Typical	91.4 (4)	2.35 (8)	NSC	3	5	Site Area	656	500	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for acetophenone.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for acetophenone.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for acetophenone.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-5. Summary of event consequences for a release of acrylonitrile.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	725 (4)	25.5 (21)	NSC[e]	6	10	Site Area	1,900	1,400	119
	Typical	379 (3)	10.1 (5)	0.277 (20)	6	10	Site Area	988	750	NSC
Spill	95% worst-case	53.8 (4)	2.3 (20)	NSC	6	10	Site Area	425	298	NSC
	Typical	15 (2)	0.373 (6)	0.0187 (42)	6	10	Site Area	160	125	NSC
Spill w/ fire	95% worst-case	732 (3)	26 (23)	NSC	6	10	Site Area	1,800	1,400	120
	Typical	609 (3)	19.5 (7)	NSC	6	10	Site Area	1,400	1,100	112

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for acrylonitrile.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TWA-TLV) value for acrylonitrile.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 500 ppm for acrylonitrile was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-6. Summary of event consequences for a release of arsenic.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.25 (2)	1.8E-3 (13)	NSC[e]	0.03	0.05	Site Area	240	190	NLA[f]
	Typical	0.04 (1)	8.6E-4 (5)	NSC	0.03	0.05	Alert	125	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for arsenic.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for arsenic.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for arsenic.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-7. Summary of event consequences for a release of asbestos.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.25 (2)	1.8E-3 (13)	NSC[e]	0.026	0.025	Site Area	250	250	NLA[f]
	Typical	0.04 (1)	8.6E-4 (5)	NSC	0.026	0.025	Site Area	130	130	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for asbestos.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for asbestos.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for asbestos.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-8. Summary of event consequences for a release of barium.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.94 (2)	6.9E-3 (13)	NSC[e]	1.5	2.5	-	NSC	NSC	NSC
	Typical	0.15 (1)	3.2E-4 (5)	NSC	1.5	2.5	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for barium.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for barium.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 1,100 mg/m^3 for barium was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-9. Summary of event consequences for a release of benzene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	1.63 (5)	NSC[e]	NSC	5	5	-	NSC	NSC	NSC
	Typical	0.334 (4)	NSC	NSC	5	5	-	NSC	NSC	NSC
Spill	95% worst-case	9.79 (5)	NSC	NSC	5	5	Site Area	160	160	NSC
	Typical	1.7 (5)	NSC	NSC	5	5	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	74.9 (4)	2.25 (18)	NSC	5	5	Site Area	490	490	NSC
	Typical	72 (3)	1.27 (6)	NSC	5	5	Site Area	400	400	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for benzene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for benzene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 3,000 ppm for benzene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-10. Summary of event consequences for a release of benzoic acid.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	154 (6)	5.91 (23)	NSC[e]	30	50	Site Area	260	193	NLA[f]
	Typical	86.9 (4)	2.15 (10)	NSC	30	50	Site Area	163	127	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for benzoic acid.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for benzoic acid.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for benzoic acid.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-11. Summary of event consequences for a release of benzo[a]anthracene.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	8.11 (4)	0.17 (20)	NSC[e]	0.6	1	Site Area	385	295	NLA[f]
	Typical	0.45 (2)	NSC	NSC	0.6	1	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The defintions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for benzo[a]anthracene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for benzo[a]anthracene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for benzo[a]anthracene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-12. Summary of event consequences for a release of benzo[a]pyrene.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.25 (2)	1.8E-3 (13)	NSC[e]	NLA[f]	NLA	-	NLA	NLA	NLA
	Typical	0.04 (1)	8.6E-4 (5)	NSC	NLA	NLA	-	NLA	NLA	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. There is no Alert protective action criteria value listed for benzo[a]pyrene.

c. There is no Site Area Emergency or General Emergency protective action criteria value listed for benzo[a]pyrene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for benzo[a]pyrene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-13. Summary of event consequences for a release of benzo[b]fluoranthene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.08 (4)	NSC[e]	NSC	15	25	-	NSC	NSC	NLA[f]
	Typical	0.004 (3)	NSC	NSC	15	25	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for benzo[b]fluoranthene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for benzo[b]fluoranthene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for benzo[b]fluoranthene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-14. Summary of event consequences for a release of benzo[g,h,i]perylene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	353 (3)	7.59 (14)	NSC[e]	15	25	Site Area	519	396	NLA[f]
	Typical	19.6 (2)	0.48 (8)	NSC	15	25	Alert	116	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for benzo[g,h,i]perylene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for benzo[g,h,i]perylene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for benzo[g,h,i]perylene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-15. Summary of event consequences for a release of beryllium.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	2.5 (2)	0.018 (13)	NSC[e]	NLA[f]	25	-	NLA	NSC	NSC
	Typical	0.4 (1)	8.6E-3 (5)	NSC	NLA	25	-	NLA	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. There is no Alert protective action criteria value listed for beryllium.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the draft ERPG-2 value for beryllium.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The draft ERPG-3 concentration of 100 ppm for beryllium was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-16. Summary of event consequences for a release of bis(2-ethylhexyl) phthalate.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	72 (2)	1.4 (13)	NSC[e]	10	25	Site Area	260	160	NLA[f]
	Typical	4.4 (1)	NSC	NSC	10	25	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for bis(2-ethylhexyl) phthalate.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for bis(2-ethylhexyl) phthalate.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for bis(2-ethylhexyl) phthalate.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-17. Summary of event consequences for a release of butyl/benzylphthalate (1,2 benzene dicarboxylic acid).

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	624 (4)	13.4 (18)	NSC[e]	5	15	Site Area	1,300	711	NLA[f]
	Typical	34.7 (2)	0.85 (10)	NSC	5	15	Site Area	279	155	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for 1,2 benzene dicarboxylic acid.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for 1,2 benzene dicarboxylic acid.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for 1,2 benzene dicarboxylic acid.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-18. Summary of event consequences for a release of cadmium.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	2.5 (2)	0.018 (13)	NSC[e]	0.6	1.0	Site Area	602	496	NSC
	Typical	0.4 (1)	8.6E-3 (5)	NSC	0.6	1.0	Site Area	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for cadmium.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for cadmium.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 50 mg/m^3 for cadmium was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-19. Summary of event consequences for a release of carbon tetrachloride.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.853 (5)	NSC[e]	NSC	20	100	-	NSC	NSC	NSC
	Typical	0.164 (5)	NSC	NSC	20	100	-	NSC	NSC	NSC
Spill	95% worst-case	5.1 (5)	NSC	NSC	20	100	-	NSC	NSC	NSC
	Typical	1.08 (2)	NSC	NSC	20	100	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	35.6 (4)	NSC	NSC	20	100	Alert	110	NSC	NSC
	Typical	29.8 (3)	NSC	NSC	20	100	Alert	100	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 value for carbon tetrachloride.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for carbon tetrachloride.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 750 ppm for carbon tetrachloride was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-20. Summary of event consequences for a release of chlordane.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	250 (2)	1.8 (13)	0.018 (87)	1.5	2.5	Site Area	810	650	NSC[e]
	Typical	40 (1)	0.86 (5)	NSC	1.5	2.5	Site Area	550	420	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for chlordane.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for chlordane.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 500 mg/m^3 for chlordane was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-21. Summary of event consequences for a release of chlorine.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	23.7 (5)	0.997 (20)	NSC[e]	1	3	Site Area	756	400	120
	Typical	8.05 (3)	0.175 (5)	NSC	1	3	Site Area	300	175	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 value for chlorine.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for chlorine.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 20 ppm for chlorine was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-22. Summary of event consequences for a release of chlorobenzene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	7.65 (5)	NSC[e]	NSC	30	50	-	NSC	NSC	NSC
	Typical	2.32 (5)	NSC	NSC	30	50	-	NSC	NSC	NSC
Spill	95% worst-case	13.6 (4)	NSC	NSC	30	50	-	NSC	NSC	NSC
	Typical	1.44 (2)	NSC	NSC	30	50	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	110 (5)	3.72 (22)	NSC	30	50	Site Area	220	158	NSC
	Typical	82.5 (5)	2.72 (7)	NSC	30	50	Site Area	203	143	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for chlorobenzene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for chlorobenzene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 2,400 ppm for chlorobenzene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-23. Summary of event consequences for a release of chloroform.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	304 (5)	10.2 (25)	NSC[e]	100	1,000	Alert	181	NSC	NSC
	Typical	149 (3)	4.49 (6)	NSC	100	1,000	Alert	130	NSC	NSC
Spill	95% worst-case	60.9 (5)	2.72 (21)	NSC	100	1,000	-	NSC	NSC	NSC
	Typical	63.9 (15)	1.45 (25)	NSC	100	1,000	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	484 (5)	14.1 (20)	NSC	100	1,000	Alert	232	NSC	NSC
	Typical	327 (3)	13.1 (25)	NSC	100	1,000	Alert	214	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the draft ERPG-1 value for chloroform.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the draft ERPG-2 value for chloroform.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The draft ERPG-3 concentration of 5,000 ppm for chloroform was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-24. Summary of event consequences for a release of chromium.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	1300 (2)	9.1 (13)	NSC[e]	1.5	2.5	Site Area	1,600	1,300	NLA[f]
	Typical	200 (1)	4.3 (5)	NSC	1.5	2.5	Site Area	1,400	1,000	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for chromium.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for chromium.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for chromium.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-25. Summary of event consequences for a release of chrysene.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	25 (2)	0.18 (13)	NSC[e]	0.6	1	Site Area	460	360	NLA[f]
	Typical	4.0 (1)	0.086 (5)	NSC	0.6	1	Site Area	260	200	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for chrysene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for chrysene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for chrysene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-26. Summary of event consequences for a release of copper.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	1300 (2)	9.1 (13)	NSC[e]	0.6	1	Site Area	2,400	1,900	NLA[f]
	Typical	200 (1)	4.3 (5)	NSC	0.6	1	Site Area	2,400	1,750	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for copper.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for copper.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for copper.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-27. Summary of event consequences for a release of cresol-p.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	45.5 (5)	2.15 (23)	NSC[e]	15	25	Site Area	200	150	NSC
	Typical	22.3 (4)	0.517 (8)	NSC	15	25	Alert	125	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for cresol-p.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for cresol-p.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 250 ppm for cresol-p was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-28. Summary of event consequences for a release of cresol.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	180 (4)	3.88 (20)	NSC[e]	15	25	Site Area	363	280	NSC
	Typical	10 (3)	0.246 (7)	NSC	15	25	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for cresol.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for cresol.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 250 ppm for cresol was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-29. Summary of event consequences for a release of cresol-m.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	45.4 (5)	2.15 (22)	NSC[e]	15	25	Site Area	205	146	NSC
	Typical	22.4 (4)	0.517 (6)	NSC	15	25	Alert	125	NSC	NSC
Spill	95% worst-case	0.284 (10)	NSC	NSC	15	25	-	NSC	NSC	NSC
	Typical	0.0265 (2)	NSC	NSC	15	25	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	133 (5)	5.58 (20)	NSC	15	25	Site Area	385	280	NSC
	Typical	131 (5)	3.83 (10)	NSC	15	25	Site Area	360	275	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for cresol-m.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for cresol-m.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 250 ppm for cresol-m was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-30. Summary of event consequences for a release of cresol-o (454 kg).

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	45.5 (5)	2.15 (20)	NSC[e]	15	25	Site Area	200	145	NSC
	Typical	22.3 (4)	0.517 (6)	NSC	15	25	Alert	124	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for cresol-o.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TWA-TLV) value for cresol-o.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 250 ppm for cresol-o was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-31. Summary of event consequences for a release of cresol-o (4,540 kg).

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	337 (5)	11.3 (25)	NSC[e]	15	25	Site Area	630	450	113
	Typical	165 (3)	4.92 (6)	NSC	15	25	Site Area	400	300	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for cresol-o.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TWA-TLV) value for cresol-o.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 250 ppm for cresol-o was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-32. Summary of event consequences for a release of n-dioctyphthalate.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	227 (4)	4.88 (20)	NSC[e]	5	15	Site Area	746	409	NLA[f]
	Typical	12.6 (3)	0.31 (7)	NSC	5	15	Alert	162	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for n-dioctyphthalate.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for n-dioctyphthalate.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for n-dioctyphthalate.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-33. Summary of event consequences for a release of di-n-butylphthalate.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	7.2 (2)	0.14 (13)	NSC[e]	15	25	-	NSC	NSC	NSC
	Typical	0.44 (1)	NSC	NSC	15	25	-	NSC	NSC	NSC
Spill	95% worst-case	0.42 (2)	NSC	NSC	15	25	-	NSC	NSC	NSC
	Typical	0.03 (1)	NSC	NSC	15	25	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	10 (2)	0.3 (13)	NSC	15	25	-	NSC	NSC	NSC
	Typical	0.76 (1)	NSC	NSC	15	25	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for di-n-butylphthalate.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for di-n-butylphthalate.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 9,300 mg/m^3 for di-n-butylphthalate was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-34. Summary of event consequences for a release of 1,3-dichlorobenzene.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	NSC[e]	NSC	NSC	150	250	-	NSC	NSC	NLA[f]
	Typical	NSC	NSC	NSC	150	250	-	NSC	NSC	NLA
Spill	95% worst-case	2.06 (3)	NSC	NSC	150	250	-	NSC	NSC	NLA
	Typical	0.24 (3)	NSC	NSC	150	250	-	NSC	NSC	NLA
Spill w/ fire	95% worst-case	64.7 (5)	NSC	NSC	150	250	-	NSC	NSC	NLA
	Typical	60.3 (5)	NSC	NSC	150	250	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for 1,3-dichlorobenzene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for 1,3-dichlorobenzene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for 1,3-dichlorobenzene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-35. Summary of event consequences for a release of dichlorobenzene-1,2 (o-dichlorobenzene).

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	12 (2)	0.23 (13)	NSC[e]	50	125	-	NSC	NSC	NSC
	Typical	0.74 (1)	NSC	NSC	50	125	-	NSC	NSC	NSC
Spill	95% worst-case	0.55 (2)	NSC	NSC	50	125	-	NSC	NSC	NSC
	Typical	0.04 (1)	NSC	NSC	50	125	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	12 (2)	0.3 (13)	NSC	50	125	-	NSC	NSC	NSC
	Typical	0.86 (1)	NSC	NSC	50	125	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for o-dichlorobenzene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for o-dichlorobenzene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 1,000 ppm for o-dichlorobenzene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-36. Summary of event consequences for a release of dichlorobenzene-1,4 (p-dichlorobenzene).

Release Type	Meteorological conditions	Peak concentration (mg/m^3) (time to) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	25 (2)	0.18 (13)	NSC[e]	660	2,250	-	NSC	NSC	NSC
	Typical	4.0 (1)	NSC	NSC	660	2,250	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for p-dichlorobenzene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for p-dichlorobenzene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 1,000 ppm for p-dichlorobenzene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-37. Summary of event consequences for a release of dichlorodifluoromethane.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	156 (5)	5.98 (24)	NSC[e]	3,000	5,000	-	NSC	NSC	NSC
	Typical	91 (3)	NSC	NSC	3,000	5,000	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for dichlorodifluoromethane.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TWA-TLV) value for dichlorodifluoromethane.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 50,000 ppm for dichlorodifluoromethanewas used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-38. Summary of event consequences for a release of 1,1-dichloroethane.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	50.2 (5)	2.37 (22)	NSC[e]	300	500	-	NSC	NSC	NSC
	Typical	23.7 (5)	0.563 (8)	NSC	300	500	-	NSC	NSC	NSC
Spill	95% worst-case	69.2 (7)	3.12 (23)	NSC	300	500	-	NSC	NSC	NSC
	Typical	61.2 (5)	1.49 (10)	NSC	300	500	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	449 (7)	11 (30)	NSC	300	500	Alert	125	NSC	NSC
	Typical	311 (4)	10.9 (8)	NSC	300	500	Alert	105	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for 1,1-dichloroethane.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for 1,1-dichloroethane.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 4,000 ppm for 1,1-dichloroethane was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-39. Summary of event consequences for a release of 1,2-dichloroethane.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	18 (2)	0.34 (13)	NSC[e]	75	125	-	NSC	NSC	NSC
	Typical	1.1 (1)	NSC	NSC	75	125	-	NSC	NSC	NSC
Spill	95% worst-case	36 (2)	.95 (13)	NSC	75	125	-	NSC	NSC	NSC
	Typical	2.6 (1)	NSC	NSC	75	125	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	300 (2)	7.8 (13)	NSC	75	125	Site Area	220	160	NSC
	Typical	21 (1)	0.62 (5)	NSC	75	125	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for 1,2-dichloroethane.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for 1,2-dichloroethane.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 1,000 ppm for 1,2-dichloroethane was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-40. Summary of event consequences for a release of 1,2-dichloroethene.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	NSC[e]	NSC	NSC	2379	3965	-	NSC	NSC	NLA[f]
	Typical	NSC	NSC	NSC	2379	3965	-	NSC	NSC	NLA
Spill	95% worst-case	378 (10)	NSC	NSC	2379	3965	-	NSC	NSC	NLA
	Typical	346 (6)	NSC	NSC	2379	3965	-	NSC	NSC	NLA
Spill w/ fire	95% worst-case	434 (10)	NSC	NSC	2379	3965	-	NSC	NSC	NLA
	Typical	81.9 (6)	NSC	NSC	2379	3965	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*PEL) value for 1,2-dichloroethene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*PEL) value for 1,2-dichloroethene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for 1,2-dichloroethene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-41. Summary of event consequences for a release of 1,1-dichloroethylene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	18 (2)	0.35 (13)	NSC[e]	20	25	-	NSC	NSC	NLA[f]
	Typical	1.1 (1)	NSC	NSC	20	25	-	NSC	NSC	NLA
Spill	95% worst-case	260 (2)	6.9 (13)	NSC	20	25	Site Area	410	360	NLA
	Typical	19 (1)	NSC	NSC	20	25	-	NSC	NSC	NLA
Spill w/ fire	95% worst-case	380 (2)	10 (13)	NSC	20	25	Site Area	160	150	NLA
	Typical	28 (1)	NSC	NSC	20	25	Site Area	170	150	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for 1,1-dichloroethylene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for 1,1-dichloroethylene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for 1,1-dichloroethylene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-42. Summary of event consequences for a release of diethyl phthalate.

Release Type	Meteorological conditions	Peak concentration (mg/m^3) (time to) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	720 (2)	14 (13)	0.62 (87)	15	25	Site Area	720	550	NLA[f]
	Typical	44 (1)	1.1 (5)	NSC[e]	15	25	Site Area	170	140	NLA
Spill	95% worst-case	2.2E-3 (2)	NSC	NSC	15	25	-	NSC	NSC	NLA
	Typical	1.6E-4 (1)	NSC	NSC	15	25	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	0.47 (2)	NSC	NSC	15	25	-	NSC	NSC	NLA
	Typical	0.034 (1)	NSC	NSC	15	25	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for diethyl phthalate.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for diethyl phthalate.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for diethyl phthalate.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-43. Summary of event consequences for a release of 2,4-dinitrotoluene.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	2.5 (2)	0.018 (13)	NSC[e]	0.45	0.75	Site Area	200	160	NSC
	Typical	0.4 (1)	8.6E-3 (5)	NSC	0.45	0.75	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for 2,4-dinitrotoluene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for 2,4-dinitrotoluene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 200 mg/m^3 for 2,4-dinitrotoluene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-44. Summary of event consequences for a release of endrin (227 kg).

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	130 (2)	0.91 (13)	NSC[e]	0.3	0.5	Site Area	1,200	975	NSC
	Typical	20 (1)	0.43 (5)	NSC	0.3	0.5	Site Area	920	700	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for endrin.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for endrin.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 200 mg/m^3 for endrin was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-45. Summary of event consequences for a release of endrin (4,540 kg).

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	2,500 (2)	18 (13)	0.18 (87)	0.3	0.5	Site Area	4,200	3,400	280
	Typical	400 (1)	8.6 (5)	0.35 (35)	0.3	0.5	Site Area	5,800	4,100	150

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for endrin.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for endrin.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 200 mg/m^3 for endrin was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-46. Summary of event consequences for a release of ethyl benzene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	46.4 (5)	2.19 (23)	NSC[e]	125	500	-	NSC	NSC	NSC
	Typical	22.6 (3)	0.526 (8)	NSC	125	500	-	NSC	NSC	NSC
Spill	95% worst-case	12.7 (5)	0.281 (21)	NSC	125	500	-	NSC	NSC	NSC
	Typical	1.24 (2)	NSC	NSC	125	500	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	6.58 (5)	0.375 (23)	NSC	125	500	-	NSC	NSC	NSC
	Typical	13.9 (3)	0.345 (10)	NSC	125	500	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for ethyl benzene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for ethyl benzene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 2,000 ppm for ethyl benzene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-47. Summary of event consequences for a release of ethylenediamine.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	632 (5)	21.9 (22)	0.0672 (60)	30	50	Site Area	620	436	NSC[e]
	Typical	326 (3)	9.22 (15)	0.246 (25)	30	50	Site Area	398	305	NSC
Spill	95% worst-case	14 (3)	NSC	NSC	30	50	-	NSC	NSC	NSC
	Typical	1.5 (2)	NSC	NSC	30	50	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	606 (5)	20.8 (21)	NSC	30	50	Site Area	600	425	NSC
	Typical	484 (3)	15.3 (7)	0.493 (30)	30	50	Site Area	520	400	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for ethylenediamine.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TWA-TLV) value for ethylenediamine.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 2000 ppm for ethylenediamine was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-48. Summary of event consequences for a release of ethylene diamine tetraacetic acid.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	334 (4)	7.18 (20)	NSC[e]	30	50	Site Area	348	266	NLA[f]
	Typical	18.5 (2)	NSC	NSC	30	50	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for ethylene diamine tetraacetic acid.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for ethylene diamine tetraacetic acid.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for ethylene diamine tetraacetic acid.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-49. Summary of event consequences for a release of fluoranthene.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	3.9 (5)	NSC[e]	NSC	30	50	-	NSC	NSC	NLA[f]
	Typical	1.22 (4)	NSC	NSC	30	50	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for fluoranthene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for fluoranthene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for fluoranthene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-50. Summary of event consequences for a release of formic acid.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	456 (4)	NSC[e]	0.286 (60)	10	25	Site Area	1,100	603	530
	Typical	260 (3)	6.08 (6)	NSC	10	25	Site Area	573	351	317
Spill	95% worst-case	33 (3)	0.741 (18)	NSC	10	25	Site Area	187	116	NSC
	Typical	3.5 (1)	NSC	NSC	10	25	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	550 (5)	22 (22)	NSC	10	25	Site Area	1,200	680	598
	Typical	557 (3)	10.7 (7)	NSC	10	25	Site Area	756	483	437

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for formic acid.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TWA-TLV) value for formic acid.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 30 ppm for formic acid was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-51. Summary of event consequences for a release of heptachlor.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.25 (2)	1.8E-3 (13)	NSC[e]	1.5	2.5	-	NSC	NSC	NSC
	Typical	0.04 (1)	8.6E-4 (5)	NSC	1.5	2.5	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for heptachlor.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for heptachlor.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 700 mg/m^3 for heptachlor was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-52. Summary of event consequences for a release of hexachlorobenzene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.56 (6)	NSC[e]	NSC	3	5	-	NSC	NSC	NLA[f]
	Typical	NSC	NSC	NSC	3	5	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for hexachlorobenzene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for hexachlorobenzene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for hexachlorobenzene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-53. Summary of event consequences for a release of hexachlorobutadiene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.068 (2)	NSC[e]	NSC	3	10	-	NSC	NSC	NSC
	Typical	4.2E-3 (1)	NSC	NSC	3	10	-	NSC	NSC	NSC
Spill	95% worst-case	2.4E-3 (2)	NSC	NSC	3	10	-	NSC	NSC	NSC
	Typical	1.5E-4 (1)	NSC	NSC	3	10	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	0.1 (2)	NSC	NSC	3	10	-	NSC	NSC	NSC
	Typical	6.3E-3 (1)	NSC	NSC	3	10	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 value for hexachlorobutadiene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for hexachlorobutadiene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 30 ppm for hexachlorobutadiene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-54. Summary of event consequences for a release of hexachloroethane.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	8.24 (5)	0.177 (20)	NSC[e]	3	5	Site Area	168	130	NSC
	Typical	0.458 (2)	NSC	NSC	3	5	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for hexachloroethane.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for hexachloroethane.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 300 ppm for hexachloroethane was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-55. Summary of event consequences for a release of hexone (methyl isobutyl ketone).

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	190 (4)	7.33 (22)	NSC[e]	75	250	Alert	175	NSC	NSC
	Typical	110 (3)	2.77 (6)	NSC	75	250	Alert	125	NSC	NSC
Spill	95% worst-case	12 (5)	NSC	NSC	75	250	-	NSC	NSC	NSC
	Typical	2.59 (2)	NSC	NSC	75	250	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	84.9 (5)	3.67 (22)	NSC	75	250	Alert	107	NSC	NSC
	Typical	43.9 (3)	NSC	NSC	75	250	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for hexone (methyl isobutyl ketone).

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for hexone (methyl isobutyl ketone).

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 3,000 ppm for hexone (methyl isobutyl ketone) was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-56. Summary of event consequences for a release of lead.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.25 (2)	1.8E-3 (13)	NSC[e]	0.45	0.75	-	NSC	NSC	NSC
	Typical	0.04 (1)	8.6E-4 (5)	NSC	0.45	0.75	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for lead.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for lead.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 700 mg/m^3 for lead was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-57. Summary of event consequences for a release of lindane (454 kg).

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	250 (2)	1.8 (13)	0.018 (87)	1.5	2.5	Site Area	820	650	NSC[e]
	Typical	40 (1)	0.86 (5)	NSC	1.5	2.5	Site Area	550	420	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for lindane.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for lindane.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 1,000 mg/m^3 for lindane was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-58. Summary of event consequences for a release of lindane (4,540 kg).

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	2,500 (2)	18 (13)	0.18 (87)	1.5	2.5	Site Area	2,100	1,720	150
	Typical	400 (1)	8.6 (5)	0.35 (35)	1.5	2.5	Site Area	2,100	1,500	NSC[e]

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for lindane.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for lindane.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 1,000 mg/m^3 for lindane was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-59. Summary of event consequences for a release of mercury.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.72 (2)	0.014 (13)	NSC[e]	0.03	0.2	Site Area	500	180	NSC
	Typical	0.044 (1)	1.1E-3 (5)	NSC	0.03	0.2	Alert	130	NSC	NSC
Spill	95% worst-case	1.9E-5 (2)	NSC	NSC	0.03	0.2	-	NSC	NSC	NSC
	Typical	1.2E-6 (1)	NSC	NSC	0.03	0.2	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	2.5E-3 (2)	NSC	NSC	0.03	0.2	-	NSC	NSC	NSC
	Typical	3.2E-4 (1)	NSC	NSC	0.03	0.2	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for mercury.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (EEGL-60) value for mercury.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 10 mg/m^3 for mercury was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-60. Summary of event consequences for a release of methanol (methyl alcohol).

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	744 (3)	32.2 (17)	NSC[e]	200	1,000	Alert	225	NSC	NSC
	Typical	350 (3)	8.65 (5)	NSC	200	1,000	Alert	135	NSC	NSC
Spill	95% worst-case	179 (4)	4.02 (18)	NSC	200	1,000	-	NSC	NSC	NSC
	Typical	18.2 (2)	NSC	NSC	200	1,000	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	909 (5)	37.8 (20)	NSC	200	1,000	Alert	250	NSC	NSC
	Typical	305 (3)	7.58 (10)	NSC	200	1,000	Alert	125	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 value for methanol (methyl alcohol).

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for methanol (methyl alcohol).

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 5,000 ppm for methanol (methyl alcohol) was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-61. Summary of event consequences for a release of methoxychlor.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.25 (2)	1.8E-3 (13)	NSC[e]	30	50	-	NSC	NSC	NLA[f]
	Typical	0.04 (1)	8.6E-4 (5)	NSC	30	50	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for methoxychlor.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for methoxychlor.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for methoxychlor.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-62. Summary of event consequences for a release of methyl ethyl ketone.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	272 (5)	NSC[e]	NSC	300	1,000	-	NSC	NSC	NSC
	Typical	159 (4)	NSC	NSC	300	1,000	-	NSC	NSC	NSC
Spill	95% worst-case	42.2 (4)	NSC	NSC	300	1,000	-	NSC	NSC	NSC
	Typical	13.3 (2)	NSC	NSC	300	1,000	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	659 (10)	21.3 (30)	NSC	300	1,000	Alert	155	NSC	NSC
	Typical	482 (7)	17.5 (10)	NSC	300	1,000	Alert	136	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for methyl ethyl ketone.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (TLV-C) value for methyl ethyl ketone.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 3,000 ppm for methyl ethyl ketone was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-63. Summary of event consequences for a release of methylene chloride.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	210 (2)	4.0 (13)	NSC[e]	150	400	Alert	125	NSC	NSC
	Typical	13 (1)	NSC	NSC	150	400	-	NSC	NSC	NSC
Spill	95% worst-case	200 (2)	5.2 (13)	NSC	150	400	Alert	125	NSC	NSC
	Typical	14 (1)	NSC	NSC	150	400	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	390 (2)	10 (13)	NSC	150	400	Alert	175	NSC	NSC
	Typical	58 (1)	1.7 (5)	NSC	150	400	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for methylene chloride.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for methylene chloride.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 1,000 ppm for methylene chloride was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-64. Summary of event consequences for a release of naphthalene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	6.56 (5)	0.254 (23)	NSC[e]	15	50	-	NSC	NSC	NSC
	Typical	1.89 (3)	NSC	NSC	15	50	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for naphthalene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for naphthalene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 500 ppm for naphthalene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-65. Summary of event consequences for a release of nitric acid.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	84.6 (5)	3.99 (20)	NSC[e]	2	15	Site Area	1,100	300	200
	Typical	37.6 (3)	0.885 (5)	NSC	2	15	Site Area	500	175	112
Spill	95% worst-case	24.3 (5)	0.875 (20)	NSC	2	15	Site Area	458	135	NSC
	Typical	5.54 (1)	0.138 (5)	NSC	2	15	Site Area	170	NSC	NSC
Spill w/ fire	95% worst-case	366 (5)	13.8 (20)	0.0518 (60)	2	15	Site Area	2,200	700	462
	Typical	343 (3)	8.8 (5)	1.91 (15)	2	15	Site Area	1,700	575	384

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 value for nitric acid.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for nitric acid.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 30 ppm for nitric acid was used. concentration for 1,2,4-trichlorobenzene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-66. Summary of event consequences for a release of nitrobenzene.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	294 (4)	9.83 (23)	NSC[e]	3	5	Site Area	1,600	1,100	119
	Typical	143 (3)	4.4 (8)	0.12 (27)	3	5	Site Area	916	696	NSC
Spill	95% worst-case	0.178 (3)	NSC	NSC	3	5	-	NSC	NSC	NSC
	Typical	0.019 (1)	NSC	NSC	3	5	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	332 (7)	10.6 (30)	NSC	3	5	Site Area	1,700	1,200	127
	Typical	246 (3)	3.84 (21)	0.093 (50)	3	5	Site Area	850	650	115

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for nitrobenzene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TWA-TLV) value for nitrobenzene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 200 ppm for nitrobenzene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-67. Summary of event consequences for a release of pentachlorophenol.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	2.5 (2)	0.018 (13)	NSC[e]	1.5	2.5	Site Area	130	100	NSC
	Typical	0.4 (1)	8.6E-3 (5)	NSC	1.5	2.5	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for pentachlorophenol.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for pentachlorophenol.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 150 mg/m^3 for pentachlorophenol was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-68. Summary of event consequences for a release of phenanthrene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	103 (5)	3.97 (23)	NSC[e]	81	135	Alert	150	NSC	NLA[f]
	Typical	58 (3)		NSC	81	135	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for phenanthrene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for phenanthrene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for phenanthrene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-69. Summary of event consequences for a release of phenol (227 kg).

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	31.3 (5)	1.53 (20)	NSC[e]	10	50	Alert	208	NSC	NSC
	Typical	12.1 (3)	0.295 (6)	NSC	10	50	Alert	110	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 value for phenol.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for phenol.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 250 ppm for phenol was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-70. Summary of event consequences for a release of phenol (4,540 kg).

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	391 (5)	13.2 (25)	NSC[e]	10	50	Site Area	900	325	123
	Typical	193 (3)	603 (6)	NSC	10	50	Site Area	575	250	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 value for phenol.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for phenol.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 250 ppm for phenol was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-71. Summary of event consequences for a release of potassium permanganate.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	81.1 (3)	1.74 (20)	NSC[e]	15	25	Site Area	238	183	NLA[f]
	Typical	4.5 (2)	NSC	NSC	15	25	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*PEL) value for potassium permanganate.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*PEL) value for potassium permanganate.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for potassium permanganate.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-72. Summary of event consequences for a release of potassium hydroxide.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	250 (2)	1.8 (13)	0.018 (87)	NLA[f]	2	Site Area	NLA	756	NLA
	Typical	40 (1)	0.86 (5)	NSC	NLA	2	Site Area	NLA	375	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. There is no Alert protective action criteria value listed for potassium hydroxide.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (PEL-C) value for potassium hydroxide.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for potassium hydroxide.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-73. Summary of event consequences for a release of potassium chromate.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	8.11 (4)	0.17 (20)	NSC[e]	0.3	0.5	Site Area	560	424	NLA[f]
	Typical	0.45 (2)	NSC	NSC	0.3	0.5	Alert	124	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*PEL) value for potassium chromate.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*PEL) value for potassium chromate.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for potassium chromate.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-74. Summary of event consequences for a release of potassium.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.38 (4)	NSC[e]	NSC	30	50	-	NSC	NSC	NLA[f]
	Typical	0.02 (3)	NSC	NSC	30	50	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for potassium.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for potassium.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for potassium.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-75. Summary of event consequences for a release of pyrene.

Release Type	Meteorological conditions	Peak concentration (time to) (mp/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	193 (6)	9.23 (24)	NSC[e]	0.6	1	Site Area	3,200	2,900	NLA[f]
	Typical	96.3 (4)	2.31 (7)	NSC	0.6	1	Site Area	1,500	1,200	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*PEL) value for pyrene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*PEL) value for pyrene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for pyrene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-76. Summary of event consequences for a release of pyridine.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	64.6 (5)	3.05 (21)	NSC[e]	15	25	Site Area	260	185	NSC
	Typical	32.7 (3)	0.713 (7)	NSC	15	25	Site Area	150	115	NSC
Spill	95% worst-case	29 (3)	0.644 (20)	NSC	15	25	Site Area	141	108	NSC
	Typical	2.89 (1)	NSC	NSC	15	25	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	279 (7)	10.4 (22)	NSC	15	25	Site Area	600	440	NSC
	Typical	295 (5)	8.03 (8)	NSC	15	25	Site Area	530	400	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for pyridine.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for pyridine.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 3,600 ppm for pyridine was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-77. Summary of event consequences for a release of selenium.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	25 (2)	0.18 (13)	NSC[e]	0.6	1	Site Area	460	370	NLA[f]
	Typical	4.0 (1)	0.086 (5)	NSC	0.6	1	Site Area	260	200	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for selenium.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for selenium.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for selenium.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-78. Summary of event consequences for a release of soluble silver.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	250 (2)	1.8 (13)	0.018 (87)	0.03	0.05	Site Area	4,100	3,300	NLA[f]
	Typical	40 (1)	0.86 (5)	NSC	0.03	0.05	Site Area	5,800	4,100	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for soluble silver.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for soluble silver.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for soluble silver.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-79. Summary of event consequences for a release of silvex (2,4,5-TP).

Release Type	Meteorological conditions	Peak concentration (ppm) 100 m	Peak concentration (ppm) 756 m	Peak concentration (ppm) 5,200 m	Time to (min)	Protective action criteria[a] (ppm) Alert[b]	Protective action criteria[a] (ppm) Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	Distance to ERPG or equivalent[d] (m) ERPG-2 or equivalent	Distance to ERPG or equivalent[d] (m) ERPG-3 or equivalent
Direct	95% worst-case	7.24 (4)	0.16 (23)	NSC[e]		0.3	0.5	Site Area	526	400	NLA[f]
	Typical	0.402 (2)	NSC	NSC		0.3	0.5	Alert	116	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for silvex (2,4,5-TP).

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for silvex (2,4,5-TP).

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for silvex (2,4,5-TP).

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-80. Summary of event consequences for a release of sodium fluoride.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	241 (5)	11.3	NSC[e]	7.5	12.5	Site Area	940	700	NLA[f]
	Typical	97.2 (3)	NSC	NSC	7.5	12.5	Site Area	400	303	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*PEL) value for sodium fluoride.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*PEL) value for sodium fluoride.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for sodium fluoride.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-81. Summary of event consequences for a release of sodium.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	8.11 (4)	NSC[e]	NSC	30	50	-	NSC	NSC	NLA[f]
	Typical	0.45 (3)	NSC	NSC	30	50	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for sodium.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for sodium.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for sodium.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-82. Summary of event consequences for a release of sulfuric acid.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mp/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	720 (2)	14 (13)	NSC[e]	2	10	Site Area	2,300	900	500
	Typical	45 (1)	1.1 (5)	NSC	2	10	Site Area	530	225	125
Spill	95% worst-case	8.9E-7 (2)	NSC	NSC	2	10	-	NSC	NSC	NSC
	Typical	6.4E-8 (1)	NSC	NSC	2	10	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	4.9E-3 (2)	NSC	NSC	2	10	-	NSC	NSC	NSC
	Typical	3.5E-4 (1)	NSC	NSC	2	10	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 value for sulfuric acid.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for sulfuric acid.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 30 mg/m^3 for sulfuric acid was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-83. Summary of event consequences for a release of tetrachloroethene.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	11 (2)	0.21 (13)	NSC[e]	100	200	-	NSC	NSC	NSC
	Typical	0.66 (1)	NSC	NSC	100	200	-	NSC	NSC	NSC
Spill	95% worst-case	6.4 (2)	NSC	NSC	100	200	-	NSC	NSC	NSC
	Typical	0.46 (1)	NSC	NSC	100	200	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	77 (2)	2.0 (13)	NSC	100	200	-	NSC	NSC	NSC
	Typical	5.5 (1)	NSC	NSC	100	200	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 value for tetrachloroethene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for tetrachloroethene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 500 ppm for tetrachloroethene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-84. Summary of event consequences for a release of tetrachloroethylene.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	4.92 (5)	NSC[e]	NSC	100	200	-	NSC	NSC	NSC
	Typical	1.48 (4)	NSC	NSC	100	200	-	NSC	NSC	NSC
Spill	95% worst-case	7.73 (8)	NSC	NSC	100	200	-	NSC	NSC	NSC
	Typical	1.57 (3)	NSC	NSC	100	200	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	133 (18)	NSC	NSC	100	200	Alert	120	NSC	NSC
	Typical	74.9 (4)	NSC	NSC	100	200	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the draft ERPG-1 value for tetrachloroethylene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the draft ERPG-2 value for tetrachloroethylene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The draft ERPG-3 concentration of 500 ppm for tetrachloroethylene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-85. Summary of event consequences for a release of toluene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	54.3 (4)	NSC[e]	NSC	150	250	-	NSC	NSC	NSC
	Typical	25 (3)	NSC	NSC	150	250	-	NSC	NSC	NSC
Spill	95% worst-case	15.6 (3)	NSC	NSC	150	250	-	NSC	NSC	NSC
	Typical	3.81 (1)	NSC	NSC	150	250	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	359 (5)	10.9 (20)	NSC	150	250	Site Area	162	123	NSC
	Typical	327 (4)	NSC	NSC	150	250	Site Area	164	120	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for toluene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for toluene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 2,000 ppm for toluene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-86. Summary of event consequences for a release of toxaphene (227 kg).

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	130 (2)	0.91 (13)	NSC[e]	1	2.5	Site Area	720	500	NLA[f]
	Typical	20 (1)	0.43 (5)	NSC	1	2.5	Site Area	920	700	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for toxaphene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for toxaphene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for toxaphene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-87. Summary of event consequences for a release of toxaphene (4,540 kg).

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	2,500 (2)	18 (13)	0.18 (87)	1	2.5	Site Area	2,500	1,700	NLA[f]
	Typical	400 (1)	8.6 (5)	0.35 (35)	1	2.5	Site Area	2,600	1,500	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for toxaphene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for toxaphene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for toxaphene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-88. Summary of event consequences for a release of trans-1,2-dichloroethane.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	1.8 (2)	0.034 (13)	NSC[e]	2	5	-	NSC	NSC	NSC
	Typical	0.11 (1)	NSC	NSC	2	5	-	NSC	NSC	NSC
Spill	95% worst-case	17 (2)	0.4 (13)	NSC	2	5	Site Area	320	190	NSC
	Typical	1.2 (1)	NSC	NSC	2	5	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	67 (2)	1.6 (13)	NSC	2	5	Site Area	650	410	NSC
	Typical	4.6 (1)	0.13 (5)	NSC	2	5	Alert	150	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for trans-1,2-dichloroethane.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for trans-1,2-dichloroethane.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 1,000 ppm for trans-1,2-dichloroethane was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-89. Summary of event consequences for a release of 1,2,4-trichlorobenzene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	10 (2)	0.19 (13)	NSC[e]	NLA[f]	5	Site Area	NLA	434	NLA
	Typical	0.6 (1)	NSC	NSC	NLA	5	-	NLA	NSC	NLA
Spill	95% worst-case	0.15 (2)	NSC	NSC	NLA	5	-	NLA	NSC	NLA
	Typical	0.011 (1)	NSC	NSC	NLA	5	-	NLA	NSC	NLA
Spill w/ fire	95% worst-case	4.2 (2)	0.11 (13)	NSC	NLA	5	-	NLA	NSC	NLA
	Typical	0.3 (1)	NSC	NSC	NLA	5	-	NLA	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. There is no alert protective action criteria value listed for 1,2,4-trichlorobenzene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (PEL-C) value for 1,2,4-trichlorobenzene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for 1,2,4-trichlorobenzene.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-90. Summary of event consequences for a release of 1,1,1-trichloroethane.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	130 (2)	2.6 (13)	NSC[e]	500	1,000	-	NSC	NSC	NSC
	Typical	8.1 (1)	NSC	NSC	500	1,000	-	NSC	NSC	NSC
Spill	95% worst-case	47 (2)	1.2 (13)	NSC	500	1,000	-	NSC	NSC	NSC
	Typical	3.4 (1)	NSC	NSC	500	1,000	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	300 (2)	8.0 (13)	NSC	500	1,000	-	NSC	NSC	NSC
	Typical	22 (1)	NSC	NSC	500	1,000	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 value for 1,1,1-trichloroethane.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for 1,1,1-trichloroethane.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 3,000 ppm for 1,1,1-trichloroethane was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-91. Summary of event consequences for a release of trichloroethene.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	13 (2)	0.26 (13)	NSC[e]	100	500	-	NSC	NSC	NSC
	Typical	0.83 (1)	NSC	NSC	100	500	-	NSC	NSC	NSC
Spill	95% worst-case	28 (2)	NSC	NSC	100	500	-	NSC	NSC	NSC
	Typical	2.0 (1)	NSC	NSC	100	500	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	240 (2)	6.4 (13)	NSC	100	500	Alert	160	NSC	NSC
	Typical	17 (1)	NSC	NSC	100	500	-	NSC	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 value for trichloroethene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 value for trichloroethene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 concentration of 1,000 ppm for trichloroethene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-92. Summary of event consequences for a release of trichloroethylene.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	6.39 (5)	NSC[e]	NSC	100	500	-	NSC	NSC	NSC
	Typical	1.91 (3)	NSC	NSC	100	500	-	NSC	NSC	NSC
Spill	95% worst-case	20.8 (5)	NSC	NSC	100	500	-	NSC	NSC	NSC
	Typical	6.47 (1)	NSC	NSC	100	500		NSC	NSC	NSC
Spill w/ fire	95% worst-case	205 (6)	4.32 (30)	NSC	100	500	Alert	150	NSC	NSC
	Typical	202 (3)	5.4 (8)	NSC	100	500	Alert	150	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the draft ERPG-1 value for trichloroethylene.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the draft ERPG-2 value for trichloroethylene.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The draft ERPG-3 concentration of 1,000 ppm for trichloroethylene was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-93. Summary of event consequences for a release of 2,4,5-trichlorophenol.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.98 (4)	NSC[e]	NSC	6	10	-	NSC	NSC	NLA[f]
	Typical	0.05 (2)	NSC	NSC	6	10	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for 2,4,5-trichlorophenol.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for 2,4,5-trichlorophenol.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for 2,4,5-trichlorophenol.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-94. Summary of event consequences for a release of 2,4,6-trichlorophenol.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.98 (4)	NSC[e]	NSC	6	10	-	NSC	NSC	NLA[f]
	Typical	0.05 (3)	NSC	NSC	6	10	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for 2,4,6-trichlorophenol.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for 2,4,6-trichlorophenol.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for 2,4,6-trichlorophenol.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-95. Summary of event consequences for a release of vinyl chloride.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	0.235 (3)	0.0055 (16)	NSC[e]	15	25	-	NSC	NSC	NLA[f]
	Typical	0.017 (2)	NSC	NSC	15	25	-	NSC	NSC	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (3*TLV-TWA) value for vinyl chloride.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TWA-TLV) value for vinyl chloride.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. There is no ERPG-3 or equivalent concentration for vinyl chloride.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.

Table C-96. Summary of event consequences for a release of xylene-m.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	46.4 (5)	NSC[e]	NSC	150	500	-	NSC	NSC	NSC
	Typical	22.6 (3)	NSC	NSC	150	500	-	NSC	NSC	NSC
Spill	95% worst-case	9.32 (4)	NSC	NSC	150	500	-	NSC	NSC	NSC
	Typical	1.07 (2)	NSC	NSC	150	500	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	245 (5)	NSC	NSC	150	500	Alert	129	NSC	NSC
	Typical	244 (4)	NSC	NSC	150	500	Alert	125	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for xylene-m.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for xylene-m.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 1,000 ppm for xylene-m was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-97. Summary of event consequences for a release of xylene-o.

Release Type	Meteorological conditions	Peak concentration (ppm) (time to) (min)			Protective action criteria[a] (ppm)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	46.4 (5)	NSC[e]	NSC	150	500	-	NSC	NSC	NSC
	Typical	22.6 (3)	NSC	NSC	150	500	-	NSC	NSC	NSC
Spill	95% worst-case	7.5 (4)	NSC	NSC	150	500	-	NSC	NSC	NSC
	Typical	0.86 (1)	NSC	NSC	150	500	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	232 (5)	NSC	NSC	150	500	Alert	150	NSC	NSC
	Typical	231 (4)	NSC	NSC	150	500	Alert	150	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for xylene-o.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for xylene-o.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 1,000 ppm for xylene-o was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-98. Summary of event consequences for a release of xylene-p.

Release Type	Meteorological conditions	Peak concentration (time to) (ppm) (min) 100 m	756 m	5,200 m	Protective action criteria[a] (ppm) Alert[b]	Site Area or General Emergency[c]	Highest emergency class	Distance to ERPG or equivalent[d] (m) ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	46.4 (5)	NSC[e]	NSC	150	500	-	NSC	NSC	NSC
	Typical	22.7 (4)	NSC	NSC	150	500	-	NSC	NSC	NSC
Spill	95% worst-case	11.5 (3)	NSC	NSC	150	500	-	NSC	NSC	NSC
	Typical	1.12 (2)	NSC	NSC	150	500	-	NSC	NSC	NSC
Spill w/ fire	95% worst-case	263 (6)	8.54 (20)	NSC	150	500	Alert	139	NSC	NSC
	Typical	241 (4)	8.09 (7)	NSC	150	500	Alert	136	NSC	NSC

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (TLV-STEL) value for xylene-p.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (5*TLV-TWA) value for xylene-p.

d. The company guidelines for ERPGs and ERPG equivalents are discussed in the text. The ERPG-3 equivalent (IDLH) concentration of 1,000 ppm for xylene-p was used.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

Table C-99. Summary of event consequences for a release of zinc.

Release Type	Meteorological conditions	Peak concentration (time to) (mg/m^3) (min)			Protective action criteria[a] (mg/m^3)		Highest emergency class	Distance to ERPG or equivalent[d] (m)		
		100 m	756 m	5,200 m	Alert[b]	Site Area or General Emergency[c]		ERPG-1 or equivalent	ERPG-2 or equivalent	ERPG-3 or equivalent
Direct	95% worst-case	219 (5)	10.4 (20)	NSC[e]	15	25	Site Area	576	407	NLA[f]
	Typical	101 (4)	2.32 (8)	NSC	15	25	Site Area	277	211	NLA

a. Protective action criteria are based on company guidelines for determining event classification. The definitions for event classifications of hazardous material releases at the INEL are discussed in the text.

b. The Alert protective action criteria value listed is the ERPG-1 equivalent (estimated by WERF IH) value for zinc.

c. The Site Area Emergency and General Emergency protective action criteria value listed is the ERPG-2 equivalent (estimated by WERF IH) value for zinc.

d. The company guidelines for ERPG-1 30 minutes or the IDLH (in that order). There is no ERPG-3 or equivalent concentration for zinc.

e. NSC stands for No Significant Consequences. The estimated airborne concentration was not significant at this receptor location or the ERPG (or equivalent) concentration was not exceeded at 100 m.

f. NLA stands for No Limit Available. NLA indicates that an ERPG or equivalent concentration limit was not available for the hazardous material.