

Prepared for:

National Park Service  
1111 Jackson Street  
Oakland, CA 94107

**Preliminary Assessment of Firing Range  
North Cascades NPS Complex  
Newhalem, Washington**

Kleinfelder Project No. 20200.003

Prepared by



John Lillie, RG  
Project Manager

**KLEINFELDER, INC.**  
2405 140<sup>th</sup> Avenue NE  
Suite A101  
Bellevue, WA 98005

Phone: (425) 562-4200  
Fax: (425) 562-4201

January 14, 2003

This document was prepared for use only by the client, only for the purposes stated, and within a reasonable time from issuance. Non-commercial, educational and scientific use of this report by regulatory agencies is regarded as a "fair use" and not a violation of copyright. Regulatory agencies may make additional copies of this document for internal use. Copies may also be made available to the public as required by law. The reprint must acknowledge the copyright and indicate that permission to reprint has been received.

## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2.0</b>	<b>SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS.....</b>	<b>1</b>
2.1	Location .....	1
2.2	Interviews.....	1
2.3	Site Description.....	2
2.4	Operational History and Waste Characteristics .....	2
<b>3.0</b>	<b>GROUNDWATER PATHWAY.....</b>	<b>2</b>
3.1	Hydrogeologic Setting .....	2
3.2	Groundwater Targets .....	3
3.3	Groundwater Conclusions.....	3
<b>4.0</b>	<b>SURFACE WATER PATHWAY.....</b>	<b>3</b>
4.1	Hydrologic Setting.....	3
4.2	Surface Water Targets.....	3
4.3	Surface Water Conclusions.....	4
<b>5.0</b>	<b>SOIL EXPOSURE AND AIR PATHWAYS.....</b>	<b>4</b>
5.1	Physical Conditions .....	4
5.2	Soil and Air Targets.....	4
5.3	Soil Exposure and Air Pathway Conclusions .....	4
5.4	records review.....	5
5.5	Historical Maps and City Directories Review .....	5
5.6	Aerial Photographs Review .....	5
5.7	Summary and Conclusions .....	6
<b>6.0</b>	<b>RECOMMENDATIONS.....</b>	<b>6</b>
<b>7.0</b>	<b>REFERENCES.....</b>	<b>7</b>

### TABLES

1 – Washington Department of Ecology Listed Sites

### FIGURES

1 – Location Map

2 – Preliminary Site Assessment Sites

### APPENDICES

A - Preliminary Assessment Score Sheet Data Summary Form

B - Site Photographs

## 1.0 INTRODUCTION

At the request of the National Park Service (NPS), and under authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), Kleinfelder conducted a Preliminary Assessment of one site located near the Skagit River in the Ross Lake National Recreation Area of the North Cascades NPS Complex (NOCA). The purpose of this investigation was to collect information concerning conditions at an active Firing Range sufficient to assess the threat posed to human health and the environment and to determine the need for additional CERCLA/SARA or other appropriate action. The scope of the investigation included review of available local, state, and federal agency file information, a comprehensive target survey, and an onsite reconnaissance and NOCA personnel interviews conducted on September 26, 2001. The Preliminary Assessment Data Summary Form and Score Sheet can be found in Attachment A.

## 2.0 SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS

### 2.1 LOCATION

Newhalem, Washington is located at river mile 93 on the Skagit River in the Ross Lake National Recreation Area. The town of Newhalem is owned and operated by Seattle City Light to house the Skagit Hydroelectric Project workers. Newhalem is located at milepost 120 on the North Cascades Highway. There are approximately 50 to 100 year-round residents living in Newhalem. The Firing Range is located to the west of Newhalem at about milepost 119 on Highway 20, on the northwest side of the highway.

The Newhalem area is characterized by a marine climate, producing warm summers and moderate winters. Summers are warm with temperatures reaching an average of 73° F. The winter months are generally mild, with daily average temperatures of 46° F. Average annual precipitation is 80 inches, with an average annual snowfall of 1 inch.

### 2.2 INTERVIEWS

The following individuals were interviewed by Kleinfelder to obtain information about the site's current and historical use.

NOCA personnel: Mr. Dennis Stanchfield, Maintenance Supervisor, Marblemount Ranger Station.

Seattle City Light personnel: Jenny Goldberg, Engineer.

### **2.3 SITE DESCRIPTION**

The Firing Range is located approximately 2000 feet northwest of the Skagit River (at river mile 92) to the north of Washington State Route 20. The Firing Range is located in an opening in a densely forested area of the valley, off of an access road that cuts perpendicular to a power line. The geographic location is 48° 40' 05.9" north latitude by 121° 16' 47.6" (by handheld GPS with an accuracy of ~10 feet).

Photographs of the site taken during the field assessment can be found in Attachment B.

### **2.4 OPERATIONAL HISTORY AND WASTE CHARACTERISTICS**

According to Mr. Stanchfield the firing range was originally used by residents of Newhalem before the formation of the North Cascades National Park Complex. The firing range is now used primarily by NPS personnel and residents of Newhalem. The range is used by NPS personnel for small arms proficiency practice. The range is used by Newhalem residents for the purpose of sighting-in hunting rifles. The primary weapons fired at the range are rifles and handguns. There is also some shotgun target practice. The firing range is backed by a high soil berm that has been built up against a crib wall of cedar logs (see photos). There are remains of what appear to be target "pop-up" mechanisms in the forest behind the crib wall (see photos). Both the east and west sides of the firing range are contained by low soil berms. The range housekeeping was noted to be very good with no visible spent casings, targets or other debris.

## **3.0 GROUNDWATER PATHWAY**

### **3.1 HYDROGEOLOGIC SETTING**

The geology and geological history of the North Cascades is complex and well beyond the scope of this report. The discussion in this report will be limited to the hydrogeological characteristics of the immediate vicinity of the site.

The Newhalem public water supply is derived from a single well. The well penetrates an alluvium aquifer to a depth of 157.3 feet. The aquifer is unconfined and is composed of locally derived sand and gravel. The Skagit Valley is bounded on both sides by steep mountains, with bedrock exposed at or very near the surface. The valley alluvial fill is the main hydrogeologic unit in the area.

Groundwater flow direction in the valley aquifer is assumed to follow ground surface topography, and the general flow of the Skagit River. Based on the topographic map, groundwater flow is to the southwest, with the ultimate discharge point being the Skagit River. The valley aquifer is assumed to be hydraulically connected to the river and precipitation and surface water runoff recharge the aquifer. As a result, water levels in the aquifer may fluctuate in response to seasonal changes in precipitation. Based on the well drillers log, the aquifer is capable of yielding between 300 and 500 gallons per minute and has a static water level of about 57 feet below the top of the well casing. It is expected that static water levels will be shallower closer to the river.

### **3.2 GROUNDWATER TARGETS**

The Firing Range is located approximately one mile from Newhalem in an area that is believed to be hydrologically down-gradient.

There does not appear to be any target population at risk from a potential release at the Firing Range.

### **3.3 GROUNDWATER CONCLUSIONS**

There is no recorded or anecdotal information regarding a release of potential hazardous substances resulting from activities at the Firing Range. There does not appear to be a completed pathway for groundwater exposure.

## **4.0 SURFACE WATER PATHWAY**

### **4.1 HYDROLOGIC SETTING**

Overland drainage from the Firing Range most likely flows southwest towards the Skagit River. Drainage from the steep mountain slopes immediately behind the site flows to the Skagit River. The river empties into the Puget Sound, which is about 92 river miles from the Firing Range.

### **4.2 SURFACE WATER TARGETS**

The Skagit River is used for sport fisheries and other water recreational activities. The river is used by both rafters and fishers during the all seasons. The lower portions of the river are also used by bald eagles as a winter roosting area.

The national wetlands inventory indicates one minor wetland area on the river about two miles down stream of the site. No wetlands were observed to be near the Firing Range.

### **4.3 SURFACE WATER CONCLUSIONS**

There are no indications of a release of contamination to surface water from the Firing Range, nor were any historical records found indicating past releases in connection with the sites. No stressed vegetation or discoloration of soils in the vicinity of the sites was observed during the field visit. There does not appear to be any means by which the surface water pathway can be completed.

## **5.0 SOIL EXPOSURE AND AIR PATHWAYS**

### **5.1 PHYSICAL CONDITIONS**

The Firing Range is located in a forest clearing at the end of a dirt road that is closed to the public by a locked gate. The gate is separated from Highway 20 by a power line, and is not readily visible from the highway. Keys to the gate are held by NPS and City Light personnel. The range rules are very specific about entry and use of the range (see photos).

### **5.2 SOIL AND AIR TARGETS**

There are no residents at or within one mile of the site; however, both NPS personnel and Newhalem residents use the Firing Range. The potentially hazardous materials at the range are spent lead bullets, shotgun pellets and clay pigeons. The spent bullets are for the most part embedded into the soil berm behind the targets and are not readily accessible. Lead does not break down in the environment and should not pose a hazard as long as it remains buried in the berm. Shotgun pellets (if lead in composition) have the potential to affect wildlife if ingested (United States Environmental Protection Agency, Office of Emergency and Remedial Response (5204G) EPA-540-F-00-009, OSWER 9285.7-37, Guidance Document May 2000). Some clay pigeons contain a creosote-like binder, which can be a source of polynuclear aromatic hydrocarbons (United States Environmental Protection Agency, National Exposure Research Laboratory, Press Release). One partial clay pigeon and some minor fragments were noted on the ground at the target end of the range.

### **5.3 SOIL EXPOSURE AND AIR PATHWAY CONCLUSIONS**

The soil exposure pathway for spent lead bullets and clay pigeon fragments at the firing range does not appear to pose a threat to human health or the surrounding environment and local wildlife. There may be some slight risk of exposure to wildlife of shotgun pellets.

The air exposure pathway for both sites does not appear to pose a threat to human health or the surrounding environment and local wildlife.

## 5.4 RECORDS REVIEW

Kleinfelder conducted a search of state and federal agency records. Various federal and state regulations require that government agencies maintain records of environmental permits, properties known to be impacted by hazardous wastes, and properties under investigation by the government for alleged violations of hazardous material regulations. Given the remote location of the sites an EDR search was not contracted. The records searched by Kleinfelder are listed below.

- EPA Region 10 records for National Priorities List (NPL) sites, Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) sites, Federal Resource Conservation and Recovery Act (RCRA) Corrective Action Report (CORRACTS) for Treatment, Storage, and Disposal (TSD) sites, and the Facility Index System (FINDS) list database. The NPL and the RCRA, CORRACTS, TSD sites lists were reviewed for the minimum search distance of five miles from the two sites.
- Ecology confirmed or suspected contaminated sites (CSCS) list and the hazardous sites list (HSL). The CSCS list was reviewed for the minimum search distance of five miles from the subject property. The HSL was reviewed for the two sites.
- Ecology's underground storage tank (UST) registration and the leaking underground storage tank (LUST) databases. The LUST list was reviewed for the two sites within a search radius of five miles of the two sites. The UST list was reviewed for the subject property and addresses within a search radius of 5 miles of the subject property.
- Available aerial photographs for historical and current property use for the subject property (1991, 1996).

The sites were not listed on any of the federal databases searched. The Ecology databases list three USTs, one spill and a state cleanup site (Newhalem Dump) within five miles of the site. The listings are summarized in Table 1.

## 5.5 HISTORICAL MAPS AND CITY DIRECTORIES REVIEW

Neither historical Sanborn fire insurance maps, nor *Polk Directories*, exist for Newhalem.

## 5.6 AERIAL PHOTOGRAPHS REVIEW

Historical aerial photographs of the sites, taken in 1991, were reviewed for evidence of past development or land disturbances. The Firing Range was visible as a faint clearing in the forest.

## **5.7 SUMMARY AND CONCLUSIONS**

A Preliminary Assessment of a Firing Range was conducted to establish potential threats to human health and the environment. The existing data and information do not indicate a threat to human health, the surrounding environment, or local wildlife.

## **6.0 RECOMMENDATIONS**

Housekeeping at the firing range should continue as practiced. Use of shotguns and clay pigeons should either be curtailed or environmentally friendly shot and clay pigeons should be used. The use of “green” ammunition would also reduce the overall deposition of lead into the environment at the firing range.

We do not recommend any further investigations at either site.

## 7.0 REFERENCES

U.S. Geological Survey, 7.5-minute topographic quadrangle map, Mount Triumph, Washington, 1969, photo revised 1987.

Water Well Reports, State of Washington Department of Ecology Northwest Regional Office files.

History of Newhalem, Seattle City Light official web page.

Mr. Dennis Stanchfield, Maintenance Supervisor, Marblemount Ranger Station, on-site interview.

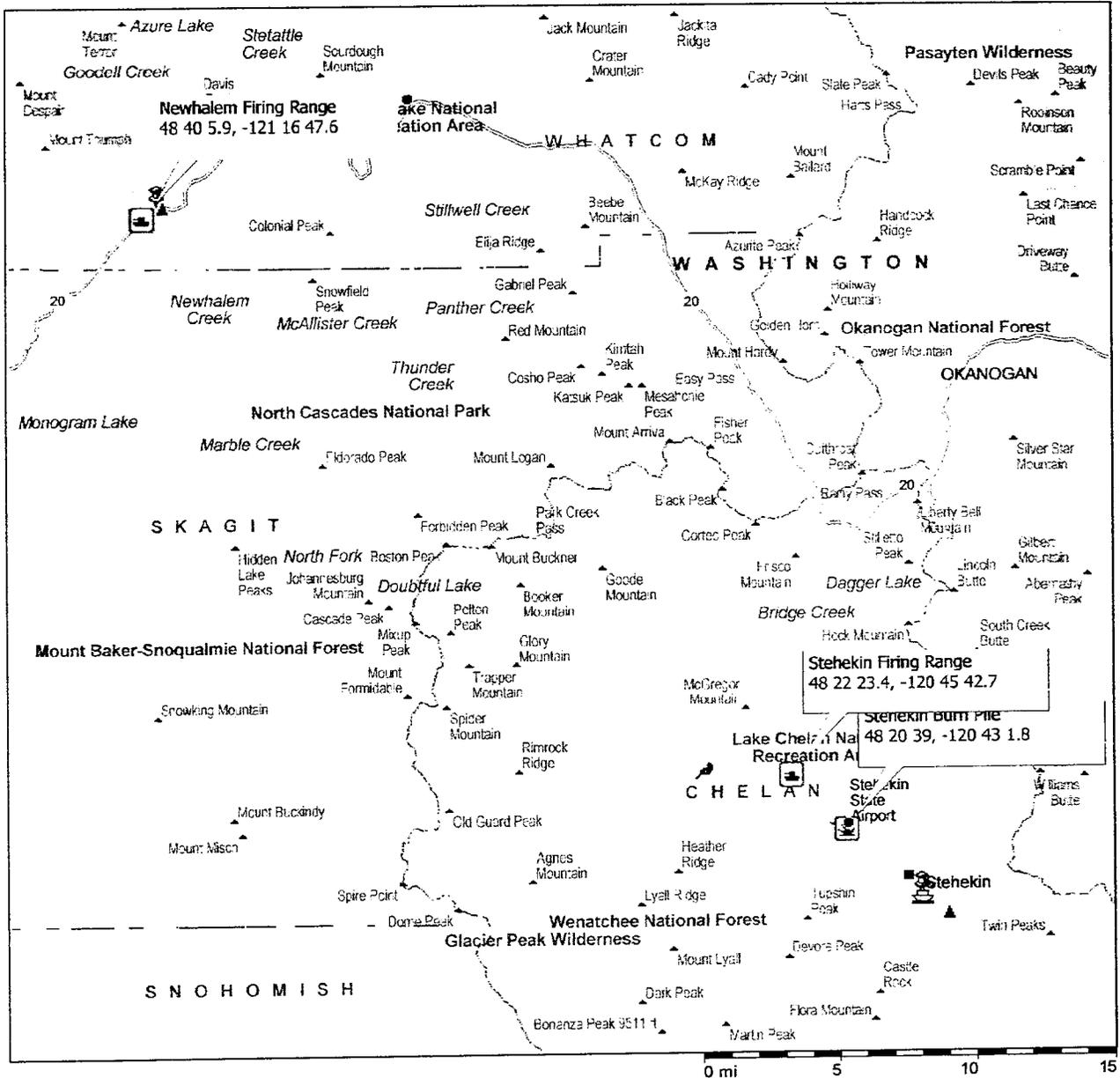
Jenny Goldberg, Engineer, Seattle City Light, telephone interview.

Ney, R.E., 1990, A Practical Guide to Chemical Fate and Transport in the Environment.

**Table 1**  
**North Cascades National Park Service Complex**  
**Newhalem Preliminary Assessment**  
**Washington Department of Ecology Listed Sites**

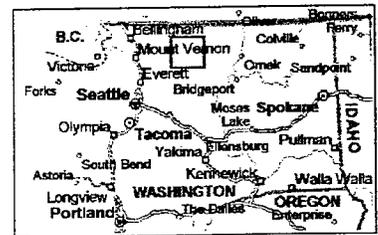
<b>Ecology Site ID</b>	<b>Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Listing</b>	<b>Status</b>	<b>Impact</b>
81545246	Diablo Lake Resort	48 32 23.42	-121 33 43.48	UST State Cleanup	Inactive	None listed Metals&PCBs suspected in soil
2874	Newhalem Dump	48 40 29.8	-121 16 2.6	Site	Active	None listed
43971548	Newhalem Maintenance Facility	48 40 26	-121 15 42	UST	Active	None listed
71249987	Seattle City Light N Ross Lake	48 43 52	-121 3 56	UST WTP to surface	Active	None listed
37776819	Seattle City Light Newhalem	48 2 11.4	-121 8 39.37	water	Active	None listed
28163168	WaDOT Newhalem	48 32 23	-121 25 12	Spill Hazardous Waste	Inactive	Cleaned up
41554739	WaDOT SR 20	48 29 28.03	-121 33 18.86	Generator	Inactive	None listed

# North Cascades NPS Complex



North Cascades NPS Complex Newhalem North Cascades NPS Complex Stehekin Area

- Diablo Lake Resort
- Newhalem Dump
- Newhalem Firing Range
- Newhalem Maintenance Facility
- Seattle City Light N Ross Lake
- Seattle City Light Newhalem
- WADOT Newhalem
- WADOT SR 20
- Courtney landing
- High Bridge Ranger Station
- Stehekin Burn Pile
- Stehekin Firing Range
- Stehekin Maintenance Yard
- Stehekin Maintenance Yard UST
- Stehekin Sewage Treatment Plant
- Waste Treatment Plant disposal to groundwater



Not to Scale

Copyright © 1998-2001 Microsoft Corp. and/or its suppliers. All rights reserved. <http://www.microsoft.com/mappoint>.  
 © Copyright 2000 by Geographic Data Technology, Inc. All rights reserved. © 2000 Navigation Technologies. All rights reserved. This data includes information taken with permission from Canadian authorities. © Her Majesty the Queen in Right of Canada. © Copyright 2000 by CompuLink Microsystems, Data and Systems Ltd.



PROJECT NO. 20200

October 2002

**Location Map**  
 Preliminary Assessment  
 NPS- North Cascades Complex  
 Washington

**FIGURE**  
**1**

**APPENDIX A**  
**PRELIMINARY ASSESSMENT SCORE SHEET DATA SUMMARY FORM**  
**AND PA SCORE SHEET**









CERCLIS Number:

**8. Surface Water Pathway (continued)**

Wetlands Located Along the Surface Water Migration Path:

- Yes  
 No

Have Primary Target Wetlands Been Identified:

- Yes  
 No

List Secondary Target Wetlands:

Water Body	Flow (cfs)	Frontage Miles
None		

Other Sensitive Environments Located Along the Surface Water Migration Path:

- Yes National Park  
 No

Have Primary Target Sensitive Environments Been Identified:

- Yes  
 No

List Secondary Target Sensitive Environments:

Water Body	Flow (cfs)	Sensitive Environment Type
None		

**9. Soil Exposure Pathway**

Are People Occupying Residences or Attending School or Daycare on or Within 200 Feet of Areas of Known or Suspected Contamination:

- Yes  
 No

If Yes, Enter Total Resident Population:

\_\_\_\_\_ People

Number of Workers Onsite:

- None  
 1 - 100  
 101 - 1,000  
 >1,000

Have Terrestrial Sensitive Environments Been Identified on or Within 200 Feet of Areas of Known or Suspected Contamination:

- Yes  
 No

If Yes, List Each Terrestrial Sensitive Environment:

\_\_\_\_\_

**10. Air Pathway**

Is There a Suspected Release to Air:

- Yes  
 No

Enter Total Population on or Within:

Onsite	_____
0 - ¼ Mile	_____
> ¼ - ½ Mile	_____
> ½ - 1 Mile	_____
> 1 - 2 Miles	_____
> 2 - 3 Miles	_____
> 3 - 4 Miles	_____
Total Within 4 Miles	0

Wetlands Located Within 4 Miles of the Site:

- Yes  
 No

Other Sensitive Environments Located Within 4 Miles of the Site:

- Yes  
 No

List All Sensitive Environments Within ¼ Mile of the Site:

Distance	Sensitive Environment Type/Wetlands Area (acres)
Onsite	National Park
0 - ¼ Mile	_____
> ¼ - ½ Mile	_____

APPENDIX A

OMB Approval Number: 2050-0095  
Approved for Use Through: 1/92

# *PA Scoresheets*

Site Name: Newhalem Firing Range

Investigator: John Lillie

CERCLIS ID No.: \_\_\_\_\_

Agency/Organization: Kleinfelder

Street Address: MP 119 - SR 20

Street Address: 2405 140th AVE. NE

City/State/Zip: Newhalem, WA 98283

City/State/Zip: Bellevue, WA 98005

Date: \_\_\_\_\_

## INSTRUCTIONS FOR SCORESHEETS

### Introduction

This scoresheets package functions as a self-contained workbook providing all of the basic tools to apply collected data and calculate a PA score. Note that a computerized scoring tool, "PA-Score," is also available from EPA (Office of Solid Waste and Emergency Response, Directive 9345. 1-11). The scoresheets provide space to:

- Record information collected during the PA
- Indicate references to support information
- Select and assign values ("scores") for factors
- Calculate pathway scores
- Calculate the site score

Do not enter values or scores in shaded areas of the scoresheets. You are encouraged to write notes on the scoresheets and especially on the Criteria Lists. On scoresheets with a reference column, indicate a number corresponding to attached sources of information or pages containing rationale for hypotheses; attach to the scoresheets a numbered list of these references. Evaluate all four pathways. Complete all Criteria Lists, scoresheets, and tables. Show calculations, as appropriate. If scoresheets are photocopy reproduced, copy and submit the numbered pages (right-side pages) only.

### GENERAL INFORMATION

**Site Description and Operational History:** Briefly describe the site and its operating history. Provide the site name, owner/operator, type of facility and operations, size of property, active or inactive status, and years of waste generation. Summarize waste treatment, storage, or disposal activities that have or may have occurred at the site; note also if these activities are documented or alleged. Identify probable source types and prior spills. Summarize highlights of previous investigations.

**Probable Substances of Concern:** List hazardous substances that have or may have been stored, handled, or disposed at the site, based on your knowledge of site operations. Identify the sources to which the substances may be related. Summarize any existing analytical data concerning hazardous substances detected onsite, in releases from the site, or at targets.

**GENERAL INFORMATION**

**Site Description and Operational History:**

**Probable Substances of Concern:**  
(Previous investigations, analytical data)

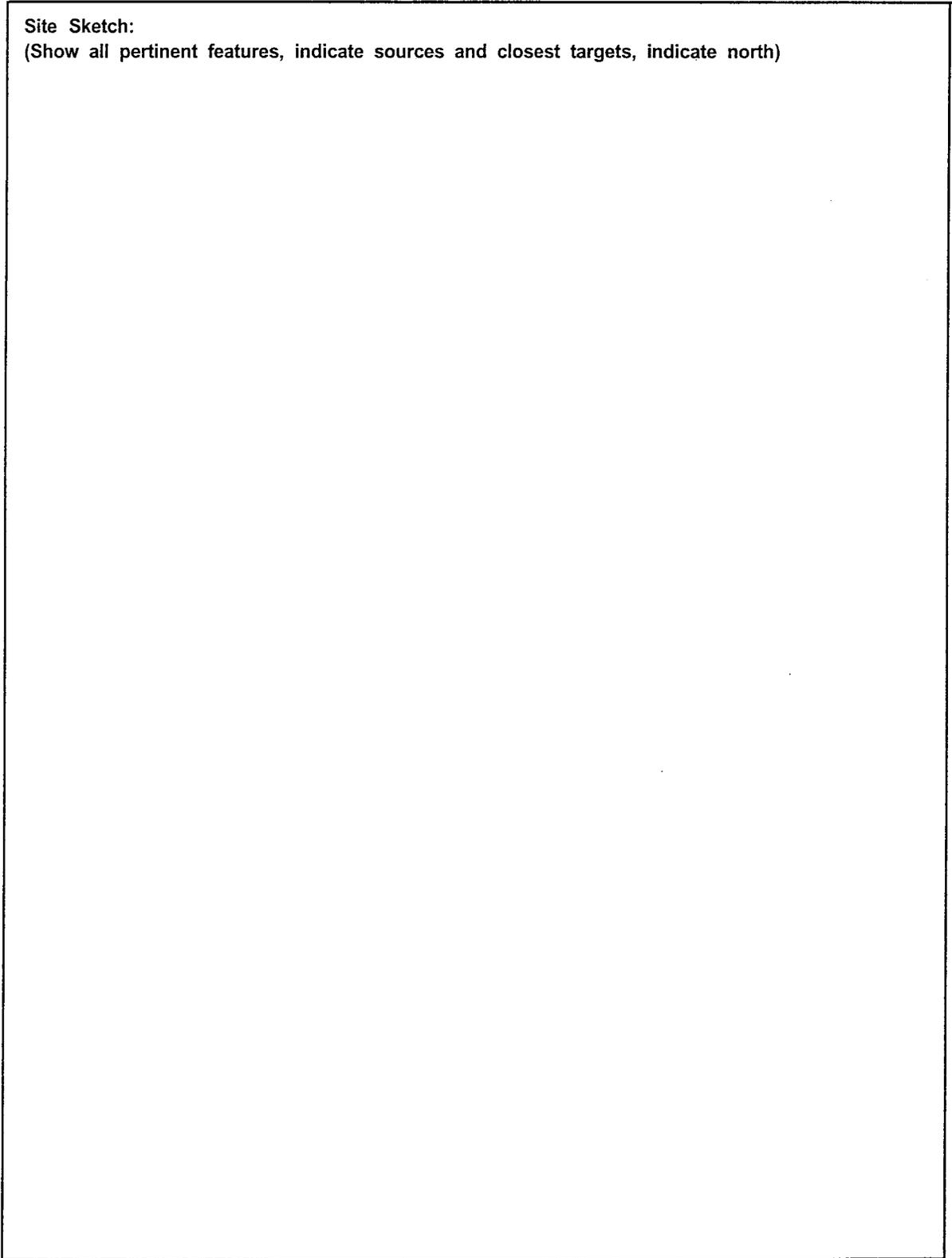
## GENERAL INFORMATION (continued)

**Site Sketch:** Prepare a sketch of the site (freehand is acceptable). Indicate all pertinent features of the site and nearby environs, including: waste sources, buildings, residences, access roads, parking areas, drainage patterns, water bodies, vegetation, wells, sensitive environments, etc.

GENERAL INFORMATION (continued)

Site Sketch:

(Show all pertinent features, indicate sources and closest targets, indicate north)



## SOURCE EVALUATION

- Number and name each source (e.g., 1. East Drum Storage Area, 2. Sludge Lagoon, 3. Battery Pile).
- Identify source type according to the list below.
- Describe the physical character of each source (e.g., dimensions, contents, waste types, containment, operating history).
- Show waste quantity (WQ) calculations for each source for appropriate tiers. Refer to instructions opposite page 5 and PA Tables 1a and 1b. Identify waste quantity tier and waste characteristics (WC) factor category score (for a site with a single source, according to PA Table 1a). Determine WC from PA Table 1 b for the sum of source WQs for a multiple-source site.
- Attach additional sheets if necessary.
- Determine the site WC factor category score and record at the bottom of the page.

### Source Type Descriptions

**Landfill:** an engineered (by excavation or construction) or natural hole in the ground into which wastes have been disposed by backfilling, or by contemporaneous soil deposition with waste disposal, covering wastes from view.

**Surface Impoundment:** a topographic depression, excavation, or diked area, primarily formed from earthen materials (lined or unlined) and designed to hold accumulated liquid wastes, wastes containing free liquids, or sludges that were not backfilled or otherwise covered during periods of deposition; depression may be dry if deposited liquid has evaporated, volatilized or leached, or wet with exposed liquid; structures that may be more specifically described as lagoon pond, aeration pit, settling pond, tailings pond, sludge pit, etc.; also a surface impoundment that has been covered with soil after the final deposition of waste materials (i.e., buried or backfilled).

**Drums:** portable containers designed to hold a standard 55-gallon volume of wastes.

**Tanks and Non-Drum Containers:** any stationary device, designed to contain accumulated wastes, constructed primarily of fabricated materials (such as wood, concrete, steel, or plastic) that provide structural support; any portable or mobile device in which waste is stored or otherwise handled.

**Contaminated Soil:** soil onto which available evidence indicates that a hazardous substance was spilled, spread, disposed, or deposited.

**Pile:** any non-containerized accumulation above the ground surface of solid, non-flowing wastes; includes open dumps. Some types of piles are: Chemical Waste Pile -- consists primarily of discarded chemical products, by-products, radioactive wastes, or used or unused feedstocks; Scrap Metal or Junk Pile -- consists primarily of scrap metal or discarded durable goods such as appliances, automobiles, auto parts, or batteries, composed of materials suspected to contain or have contained a hazardous substance; Tailings Pile -- consists primarily of any combination of overburden from a mining operation and tailings from a mineral mining, beneficiation, or processing operation; Trash Pile -- consists primarily of paper, garbage, or discarded non-durable goods which are suspected to contain or have contained a hazardous substance.

**Land Treatment:** landfarming or other land treatment method of waste management in which liquid wastes or sludges are spread over land and tilled, or liquids are injected at shallow depths into soils.

**Other:** a source that does not fit any of the descriptions above; examples include contaminated building, ground water plume with no identifiable source, storm drain, dry well, and injection well.

SOURCE EVALUATION

Source No.: 1	Source Name: Newhalem Firing Range	Source Waste Quantity (WQ) Calculations:
Source Description: Rifle/Pistol Target Range		

Source No.:	Source Name:	Source Waste Quantity (WQ) Calculations:
Source Description:		

Source No.:	Source Name:	Source Waste Quantity (WQ) Calculations:
Source Description:		

Site WC: 18
----------------

## WASTE CHARACTERISTICS (WC) SCORES

WC, based on waste quantity, may be determined by one or all of four measures called "tiers": constituent quantity, wastestream quantity, source volume, and source area. PA Table 1 a (page 5) is divided into these four tiers. The amount and detail of information available determine which tier(s) to use for each source. For each source, evaluate waste quantity by as many of the tiers as you have information to support, and select the result that gives you the highest WC score. If minimal, incomplete, or no information is available regarding waste quantity, assign a WC score of 18 (minimum).

PA Table 1a has 6 columns: column 1 indicates the quantity tier; column 2 lists source types for the four tiers; columns 3, 4, and 5 provide ranges of waste amount for sites with only one source, which correspond to WC scores at the top of the columns (18, 32, or 100); column 6 provides formulas to obtain source waste quantity (WQ) values at sites with multiple sources.

### **To determine WC for sites with only one source:**

1. Identify source type (see descriptions opposite page 4).
2. Examine 811 waste quantity data available.
3. Estimate the mass and/or dimensions of the source.
4. Determine which quantity tiers to use based on available source information.
5. Convert source measurements to appropriate units for each tier you can evaluate for the source.
6. Identify the range into which the total quantity falls for each tier evaluated (PA Table 1a).
7. Determine the highest WC score obtained for any tier (18, 32, or 100, at top of PA Table 1a columns 3, 4, and 5, respectively).
8. Use this WC score for all pathways.

### **To determine WC for sites with multiple sources:**

1. Identify each source type (see descriptions opposite page 4).
2. Examine all waste quantity data available for each source.
3. Estimate the mass and/or dimensions of each source.
4. Determine which quantity tiers to use for each source based on the available information.
5. Convert source measurements to appropriate units for each tier you can evaluate for each source.
6. For each source, use the formulas in column 6 of PA Table 1a to determine the WQ value for each tier that can be evaluated. The highest WQ value obtained for any tier is the WQ value for the source.
7. Sum the WQ values for all sources to get the site WQ total.
8. Use the site WQ total from step 7 to assign the WC score from PA Table 1a.
9. Use this WC score for all pathways.

---

The WC score is considered in all four pathways. However, if a primary target is identified for the ground water, surface water, or air migration pathway, assign the determined WC or a score of 32, whichever is greater, as the WC score for that pathway.

PA TABLE 1: WASTE CHARACTERISTICS (WC) SCORES

PA Table 1a: WC Scores for Single Source Sites and Formulas for Multiple Source Sites

TIER	SOURCE TYPE	SINGLE SOURCE SITES (assigned WC scores)			MULTIPLE SOURCE SITES
		WC = 18	WC = 32	WC = 100	
CONCENTRATION	N/A	≤ 100 lb	> 100 to 10,000 lb	> 10,000 lb	$lb + 1$
WASTEWATER	N/A	≤ 500,000 lb	> 500,000 to 50 million lb	> 50 million lb	$lb + 5,000$
VOLUME	Landfill	≤ 6.75 million ft <sup>3</sup> ≤ 250,000 yd <sup>3</sup>	> 6.75 million to 675 million ft <sup>3</sup> > 250,000 to 25 million yd <sup>3</sup>	> 675 million ft <sup>3</sup> > 25 million yd <sup>3</sup>	$ft^3 + 67,500$ $yd^3 + 2,500$
	Surface impoundment	≤ 6,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 6,750 to 675,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 675,000 ft <sup>3</sup> > 25,000 yd <sup>3</sup>	$ft^3 + 67.5$ $yd^3 + 2.5$
	Drums	≤ 1,000 drums	> 1,000 to 100,000 drums	> 100,000 drums	$drums + 10$
	Tanks and non-drum containers	≤ 50,000 gallons	> 50,000 to 5 million gallons	> 5 million gallons	$gallons + 500$
	Contaminated soil	≤ 6.75 million ft <sup>3</sup> ≤ 250,000 yd <sup>3</sup>	> 6.75 million to 675 million ft <sup>3</sup> > 250,000 to 25 million yd <sup>3</sup>	> 675 million ft <sup>3</sup> > 25 million yd <sup>3</sup>	$ft^3 + 67,500$ $yd^3 + 2,500$
	Pile	≤ 6,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 6,750 to 675,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 675,000 ft <sup>3</sup> > 25,000 yd <sup>3</sup>	$ft^3 + 67.5$ $yd^3 + 2.5$
AREA	Other	≤ 6,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 6,750 to 675,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 675,000 ft <sup>3</sup> > 25,000 yd <sup>3</sup>	$ft^3 + 67.5$ $yd^3 + 2.5$
	Landfill	≤ 340,000 ft <sup>2</sup> ≤ 7.8 acres	> 340,000 to 34 million ft <sup>2</sup> > 7.8 to 780 acres	> 34 million ft <sup>2</sup> > 780 acres	$ft^2 + 3,400$ $acres + 0.078$
	Surface impoundment	≤ 1,300 ft <sup>2</sup> ≤ 0.029 acres	> 1,300 to 130,000 ft <sup>2</sup> > 0.029 to 2.9 acres	> 130,000 ft <sup>2</sup> > 2.9 acres	$ft^2 + 13$ $acres + 0.00029$
	Contaminated soil	≤ 3.4 million ft <sup>2</sup> ≤ 78 acres	> 3.4 million to 340 million ft <sup>2</sup> > 78 to 7,800 acres	> 340 million ft <sup>2</sup> > 7,800 acres	$ft^2 + 34,000$ $acres + 0.78$
	Pile*	≤ 1,300 ft <sup>2</sup> ≤ 0.029 acres	> 1,300 to 130,000 ft <sup>2</sup> > 0.029 to 2.9 acres	> 130,000 ft <sup>2</sup> > 2.9 acres	$ft^2 + 13$ $acres + 0.00029$
Land treatment	≤ 27,000 ft <sup>2</sup> ≤ 0.62 acres	> 27,000 to 2.7 million ft <sup>2</sup> > 0.62 to 62 acres	> 2.7 million ft <sup>2</sup> > 62 acres	$ft^2 + 270$ $acres + 0.0062$	

1 ton = 2,000 lb = 1 yd<sup>3</sup> = 4 drums = 200 gallons

\* Use area of land surface under pile, not surface area of pile.

PA Table 1b: WC Scores for Multiple Source Sites

WQ Total	WC Score
> 0 to 100	18
> 100 to 10,000	32
> 10,000	100

## GROUND WATER PATHWAY

**Ground Water Use Description:** Provide information on ground water use in the vicinity. Present the general stratigraphy, aquifers used, and distribution of private and municipal wells.

**Calculations for Drinking Water Populations Sewed by Ground Water:** Provide populations from private wells and municipal supply systems in each distance category. Show apportionment calculations for blended supply systems.

**GROUND WATER PATHWAY  
GROUND WATER USE DESCRIPTION**

**Describe Ground Water Use Within 4-miles of the Site:**  
(Describe stratigraphy, information on aquifers, municipal and/or private wells)

**Calculations for Drinking Water Populations Served by Ground Water:**

## GROUND WATER PATHWAY CRITERIA LIST

This "Criteria List" helps guide the process of developing hypotheses concerning the occurrence of a suspected release and the exposure of specific targets to a hazardous substance. The check-boxes record your professional judgment in evaluating these factors. Answers to all of the listed questions may not be available during the PA. Also, the list is not all-inclusive; if other criteria help shape your hypotheses, list them at the bottom of the page or attach an additional page.

The "Suspected Release" section identifies several site, source, and pathway conditions that could provide insight as to whether a release from the site is likely to have occurred. If a release is suspected, use the "Primary Targets" section to evaluate conditions that may help identify targets likely to be exposed to a hazardous substance. Record responses for the well that you feel has the highest probability of being exposed to a hazardous substance. You may use this section of the chart more than once, depending on the number of targets you feel may be considered "primary."

Check the boxes to indicate a "yes," "no," or "unknown" answer to each question. If you check the "Suspected Release" box as "yes," make sure you assign a Likelihood of Release value of 550 for the pathway.

**GROUND WATER PATHWAY CRITERIA LIST**

<i>SUSPECTED RELEASE</i>	<i>PRIMARY TARGETS</i>
<p>Y N U e o n s k</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are sources poorly contained?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is the source a type likely to contribute to ground water contamination (e.g., wet lagoon)?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is waste quantity particularly large?</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Is precipitation heavy?</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Is the infiltration rate high?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Is the site located in an area of karst terrain?</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Is the subsurface highly permeable or conductive?</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Is drinking water drawn from a shallow aquifer?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are suspected contaminants highly mobile in ground water?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does analytical or circumstantial evidence suggest ground water contamination?</p> <p><input type="checkbox"/> <input type="checkbox"/> Other criteria? _____</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <b>SUSPECTED RELEASE?</b></p>	<p>Y N U e o n s k</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Is any drinking water well nearby?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Has any nearby drinking water well been closed?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Has any nearby drinking water user reported foul-tasting or foul-smelling water?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does any nearby well have a large drawdown or high production rate?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is any drinking water well located between the site and other wells that are suspected to be exposed to a hazardous substance?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does analytical or circumstantial evidence suggest contamination at a drinking water well?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does any drinking water well warrant sampling?</p> <p><input type="checkbox"/> <input type="checkbox"/> Other criteria? _____</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <b>PRIMARY TARGET(S) IDENTIFIED?</b></p>
<p>Summarize the rationale for Suspected Release (attach an additional page if necessary):</p> <p>Release is not suspected, known contaminants are lead from bullets contained in soil berm.</p>	<p>Summarize the rationale for Primary Targets (attach an additional page if necessary):</p> <p>No Primary Targets</p>

## GROUND WATER PATHWAY SCORESHEET

### Pathway Characteristics

Answer the questions at the top of the page. Refer to the Ground Water Pathway Criteria List (page 7) to hypothesize whether you suspect that a hazardous substance associated with the site has been released to ground water. Record depth to aquifer (in feet): the difference between the deepest occurrence of a hazardous substance and the depth of the top of the shallowest aquifer at (or as near as possible) to the site. Note whether the site is in karst terrain (characterized by abrupt ridges, sink holes, caverns, springs, disappearing streams). Record the distance (in feet) from any source to the nearest well used for drinking water.

### Likelihood of Release (LR)

**1. Suspected Release:** Hypothesize based on professional judgment guided by the Ground Water Pathway Criteria List (page 7). If you suspect a release to ground water, use only Column A for this pathway and do not evaluate factor 2.

**2. No Suspected Release:** If you do not suspect a release, determine score based on depth to aquifer or whether the site is in an area of karst terrain. If you do not suspect a release to ground water, use only Column B to score this pathway.

### Targets (T)

This factor category evaluates the threat to populations obtaining drinking water from ground water. To apportion populations served by blended drinking water supply systems, determine the percentage of population served by each well based on its production.

**3. Primary Target Population:** Evaluate populations served by all drinking water wells that you suspect have been exposed to a hazardous substance released from the site. Use professional judgment guided by the Ground Water Pathway Criteria List (page 7) to make this determination. In the space provided, enter the population served by any wells you suspect have been exposed to a hazardous substance from the site. If only the number of residences is known, use the average county residents per household (rounded up to the next integer) to determine population served. Multiply the population by 10 to determine the Primary Target Population score. Note that if you do not suspect a release, there can be no primary target population.

**4. Secondary Target Population:** Evaluate populations served by all drinking water wells within 4 miles that you do not suspect have been exposed to a hazardous substance. Use PA Table 2a or 2b (for wells drawing from non-karst and karst aquifers, respectfully) (page 9). If only the number of residences is known, use the average county residents per household (rounded to the nearest integer) to determine population served. Circle the assigned value for the population in each distance category and enter it in the column on the far-right side of the table. Sum the far-right column and enter the total as the Secondary Target Population factor score.

**5. Nearest Well** represents the threat posed to the drinking water well that is most likely to be exposed to a hazardous substance. If you have identified a primary target population, enter 50. Otherwise, assign the score from PA Table 2a or 2b for the closest distance category with a drinking water well population.

**6. Wellhead Protection Area (WHPA):** WHPAs are special areas designated by States for protection under Section 1428 of the Safe Drinking Water Act. Local/State and EPA Regional water officials can provide information regarding the location of WHPAs.

**7. Resources:** A score of 5 can generally be assigned as a default measure. Assign zero only if ground water within 4 miles has no resource use.

Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

### Waste Characteristics (WC)

**8. Waste Characteristics:** Score is assigned from page 4. However, if you have identified any primary target for ground water, assign either the score calculated on page 4 or a score of 32, whichever is greater.

**Ground Water Pathway Score:** Multiply the scores for LR, T, and WC. Divide the product by 82,500. Round the result to the nearest integer. If the result is greater than 100, assign 100.

## GROUND WATER PATHWAY SCORESHEET

Pathway Characteristics	
Do you suspect a release (see Ground Water Pathway Criteria List, page 7)?	Yes ___ No <input checked="" type="checkbox"/>
Is the site located in karst terrain?	Yes ___ No <input checked="" type="checkbox"/>
Depth to aquifer:	57 ft
Distance to the nearest drinking water well:	5000 ft

LIKELIHOOD OF RELEASE	A	B	Reference
	Suspected Release (500)	No Suspected Release (500 = 340)	
1. SUSPECTED RELEASE: If you suspect a release to ground water (see page 7), assign a score of 550. Use only column A for this pathway.			
2. NO SUSPECTED RELEASE: If you do not suspect a release to ground water, and the site is in karst terrain or the depth to aquifer is 70 feet or less, assign a score of 500; otherwise, assign a score of 340. Use only column B for this pathway.		500	
<b>LR =</b>		<b>500</b>	

TARGETS	A	B	Reference
	Suspected Release (500)	No Suspected Release (500 = 340)	
3. PRIMARY TARGET POPULATION: Determine the number of people served by drinking water wells that you suspect have been exposed to a hazardous substance from the site (see Ground Water Pathway Criteria List, page 7). <span style="margin-left: 40px;">0 people x 10 =</span>	0		
4. SECONDARY TARGET POPULATION: Determine the number of people served by drinking water wells that you do NOT suspect have been exposed to a hazardous substance from the site, and assign the total population score from PA Table 2.  Are any wells part of a blended system? Yes ___ No ___ If yes, attach a page to show apportionment calculations.		100	
5. NEAREST WELL: If you have identified a primary target population for ground water, assign a score of 50; otherwise, assign the Nearest Well score from PA Table 2. If no drinking water wells exist within 4 miles, assign a score of zero.		5	
6. WELLHEAD PROTECTION AREA (WHPA): If any source lies within or above a WHPA, or if you have identified any primary target well within a WHPA, assign a score of 20; assign 5 if neither condition holds but a WHPA is present within 4 miles; otherwise assign zero.		0	
7. RESOURCES		5	
<b>T =</b>		<b>110</b>	

WASTE CHARACTERISTICS	A	B	Reference
	Suspected Release (500)	No Suspected Release (500 = 340)	
8. A. If you have identified any primary target for ground water, assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.			
B. If you have NOT identified any primary target for ground water, assign the waste characteristics score calculated on page 4.		18	
<b>WC =</b>		<b>18</b>	

GROUND WATER PATHWAY SCORE:	$\frac{LR \times T \times WC}{82.500}$	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <small>(subject to a maximum of 100)</small>  <span style="font-size: 24pt; font-weight: bold;">12</span> </div>
-----------------------------	--	---



## SURFACE WATER PATHWAY

**Migration Route Sketch:** Sketch the surface water migration pathway (freehand is acceptable) illustrating the drainage route and identifying water bodies, probable point of entry, flows, and targets.

**SURFACE WATER PATHWAY  
MIGRATION ROUTE SKETCH**

**Surface Water Migration Route Sketch:**

(include runoff route, probable point of entry, 15-mile target distance limit, intakes, fisheries, and sensitive environments)

## SURFACE WATER PATHWAY CRITERIA LIST

This "Criteria List" helps guide the process of developing hypotheses concerning the occurrence of a suspected release and the exposure of specific targets to a hazardous substance. The check-boxes record your professional judgment in evaluating these factors. Answers to all of the listed questions may not be available during the PA. Also, the list is not all-inclusive; if other criteria help shape your hypotheses, list them at the bottom of the page or attach an additional page.

The "Suspected Release" section identifies several site, source, and pathway conditions that could provide insight as to whether a release from the site is likely to have occurred. If a release is suspected, use the "Primary Targets" section to guide you through evaluation of some conditions that may help identify targets likely to be exposed to a hazardous substance. Record responses for the target that you feel has the highest probability of being exposed to a hazardous substance. You may use this section of the chart more than once, depending on the number of targets you feel may be considered "primary."

Check the boxes to indicate a "yes," "no," or "unknown" answer to each question. If you check the "Suspected Release" box as "yes," make sure you assign a Likelihood of Release value of 550 for the pathway.

If the distance to surface water is greater than 2 miles, do not evaluate the surface water migration pathway. Document the source of information in the text boxes below the surface water criteria list.

**SURFACE WATER PATHWAY CRITERIA LIST**

<i>SUSPECTED RELEASE</i>	<i>PRIMARY TARGETS</i>
<p>Y N U e o n s k</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Is surface water nearby?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is waste quantity particularly large?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is the drainage area large?</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Is rainfall heavy?</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Is the infiltration rate low?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are sources poorly contained or prone to runoff or flooding?</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Is a runoff route well defined (e.g., ditch or channel leading to surface water)?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is vegetation stressed along the probable runoff route?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are sediments or water unnaturally discolored?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is wildlife unnaturally absent?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Has deposition of waste into surface water been observed?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is ground water discharge to surface water likely?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does analytical or circumstantial evidence suggest surface water contamination?</p> <p><input type="checkbox"/> <input type="checkbox"/> Other criteria? _____</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> SUSPECTED RELEASE?</p>	<p>Y N U e o n s k</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is any target nearby? If yes:</p> <p><input type="checkbox"/> Drinking water intake <input type="checkbox"/> Fishery <input type="checkbox"/> Sensitive environment</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Has any intake, fishery, or recreational area been closed?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does analytical or circumstantial evidence suggest surface water contamination at or downstream of a target?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does any target warrant sampling? If yes:</p> <p>Drinking water intake Fishery Sensitive environment</p> <p><input type="checkbox"/> <input type="checkbox"/> Other criteria? _____</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> PRIMARY INTAKE(S) IDENTIFIED?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> PRIMARY FISHERY (IES) IDENTIFIED?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> PRIMARY SENSITIVE ENVIRONMENT(S) IDENTIFIED?</p>
<p>Summarize the rationale for Suspected Release (attach an additional page if necessary):</p>	<p>Summarize the rationale for Primary Targets (attach an additional page if necessary):</p>

## SURFACE WATER PATHWAY LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT SCORESHEET

### Pathway Characteristics

The surface water pathway includes three threats: Drinking Water Threat, Human Food Chain Threat, and Environmental Threat. Answer the questions at the top of the page. Refer to the Surface Water Pathway Criteria List (page 11) to hypothesize whether you suspect that a hazardous substance associated with the site has been released to surface water. Record the distance to surface water (the shortest overland drainage distance from a source to a surface water body). Record the flood frequency at the site (e.g., 100-yr, 200-yr). If the site is located in more than one floodplain, use the most frequent flooding event. Identify surface water use(s) along the surface water migration path and their distance(s) from the site.

### Likelihood of Release (LR)

**1. Suspected Release:** Hypothesize based on professional judgment guided by the Surface Water Pathway Criteria List (page 11). If you suspect a release to surface water, use only Column A for this pathway and do not evaluate factor 2.

**2. No Suspected Release:** If you do not suspect a release, determine score based on the shortest overland drainage distance from a source to a surface water body. If distance to surface water is 2,500 feet or less, assign a score of 500. If distance to surface water is greater than 2,500 feet, determine score based on flood frequency. If you do not suspect a release to surface water, use only Column B to score this pathway.

### Drinking Water Threat Targets (T)

**3.** List all drinking water intakes on downstream surface water bodies along the surface water migration path. Record the intake name, the type of water body on which the intake is located, the flow of the water body, and the number of people served by the intake (apportion the population if part of a blended system).

**4. Primary Target Population:** Evaluate populations served by all drinking water intakes that you suspect have been exposed to a hazardous substance released from the site. Use professional judgment guided by the Surface Water Pathway Criteria List (page 11) to make this determination. In the space provided, enter the population served by all intakes you suspect have been exposed to a hazardous substance from the site. If only the number of residences is known, use the average county residents per household (rounded up to the next integer) to determine population served. Multiply by 10 to determine the Primary Target Population score. Remember, if you do not suspect a release, there can be no primary target population.

**5. Secondary Target Population:** Evaluate populations served by all drinking water intakes within the target distance limit that you do not suspect have been exposed to a hazardous substance. Use PA Table 3 (page 13) and enter the population served by intakes for each flow category. If only the number of residences is known, use the average county residents per household (rounded to the nearest integer) to determine population served. Circle the assigned value for the population in each flow category and enter it in the column on the far-right side of the table. Sum the far-right column and enter the total as the Secondary Target Population factor score.

Gauging station data for many surface water bodies are available from USGS or other sources. In the absence of gauging station data, estimate flow using the list of surface water body types and associated flow categories in PA Table 4 (page 13). The flow for lakes is determined by the sum of flows of streams entering or leaving the lake. Note that the flow category "mixing zone of quiet flowing rivers" is limited to 3 miles from the probable point of entry.

**6. Nearest Intake** represents the threat posed to the drinking water intake that is most likely to be exposed to a hazardous substance. If you have identified a primary target population, enter 50. Otherwise, assign the score from PA Table 3 (page 13) for the lowest-flowing water body on which there is an intake.

**7. Resources:** A score of 5 can generally be assigned as a default measure. Assign zero only if surface water within the target distance limit has no resource use.

Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

**SURFACE WATER PATHWAY  
LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT SCORESHEET**

Pathway Characteristics	
Do you suspect a release (see Surface Water Pathway Criteria List, page 11)?	Yes _____ No <u>X</u>
Distance to surface water:	<u>2000</u> ft
Flood frequency:	_____ yrs
What is the downstream distance to the nearest drinking water intake?	<u>None</u> miles
Nearest fishery? _____ miles	Nearest sensitive environment? _____ miles

**LIKELIHOOD OF RELEASE**

- SUSPECTED RELEASE:** If you suspect a release to surface water (see page 11), assign a score of 550. Use only column A for this pathway.
- NO SUSPECTED RELEASE:** If you do not suspect a release to surface water, use the table below to assign a score based on distance to surface water and flood frequency. Use only column B for this pathway.

Distance to surface water $\leq$ 2,500 feet	500
Distance to surface water > 2,500 feet, and	
Site in annual or 10-year floodplain	500
Site in 100-year floodplain	400
Site in 500-year floodplain	300
Site outside 500-year floodplain	100

A	B
Suspected Release	No Suspected Release
550	
	500 400 300 = 100
	400
550	500 400 300 = 100
	400

References \_\_\_\_\_

LR =

**DRINKING WATER THREAT TARGETS**

- Record the water body type, flow (if applicable), and number of people served by each drinking water intake within the target distance limit. If there is no drinking water intake within the target distance limit, factors 4, 5, and 6 each receive zero scores.

Intake Name	Water Body Type	Flow	People Served
_____	_____	_____ cfs	_____
_____	_____	_____ cfs	_____
_____	_____	_____ cfs	_____

- PRIMARY TARGET POPULATION:** If you suspect any drinking water intake listed above has been exposed to a hazardous substance from the site (see Surface Water Pathway Criteria List, page 11), list the intake name(s) and calculate the factor score based on the total population served.

\_\_\_\_\_ people x 10 = 0

- SECONDARY TARGET POPULATION:** Determine the number of people served by drinking water intakes that you do NOT suspect have been exposed to a hazardous substance from the site, and assign the total population score from PA Table 3.

Are any intakes part of a blended system? Yes \_\_\_ No \_\_\_  
If yes, attach a page to show apportionment calculations.

- NEAREST INTAKE:** If you have identified a primary target population for the drinking water threat (factor 4), assign a score of 50; otherwise, assign the Nearest Intake score from PA Table 3. If no drinking water intake exists within the target distance limit, assign a score of zero.

- RESOURCES**

T =

PA TABLE 3: VALUES FOR SECONDARY SURFACE WATER TARGET POPULATIONS

Surface Water Body Flow (see PA Table 4)	Nearest Intake (cfs)	Population	Population Served by Intakes Within Flow Category												Population Value									
			3T		30T		100T		300T		1000T		3000T			10000T		30000T		100000T		300000T		
			to 100	to 300	to 1000	to 3000	to 10000	to 30000	to 100000	to 300000	to 1000000	to 3000000	to 10000000	to 30000000		to 100000000	to 300000000	to 1000000000	to 3000000000	to 10000000000	to 30000000000	to 100000000000	to 300000000000	
<10 cfs	20		5	14	52	181	521	1,833	5,114	16,325	52,134	163,246												
10 to 100 cfs	2		1	2	5	16	52	181	521	1,831	5,214	15,325												
>100 to 1,000 cfs	1		0	1	1	2	5	16	52	183	521	1,833												
>1,000 to 10,000 cfs	0		0	0	0	1	1	2	5	16	52	183												
>10,000 cfs or Great Lakes	0		0	0	0	0	0	1	1	2	5	16												
3-mile Mixing Zone	10		1	3	29	82	261	418	2,807	8,152	26,088	81,883												
Nearest Intake =		0																					Score =	0

PA TABLE 4: SURFACE WATER TYPE / FLOW CHARACTERISTICS WITH DILUTION WEIGHTS FOR SECONDARY SURFACE WATER SENSITIVE ENVIRONMENTS

Water Body Type	Type of Surface Water Body		Dilution Weight
	DR	Flow	
minimal stream small to moderate stream moderate to large stream large stream to river large river	< 10 cfs 10 to 100 cfs > 100 to 1,000 cfs > 1,000 to 10,000 cfs > 10,000 cfs	1 0.1 N/A N/A N/A	
3-mile mixing zone of quiet flowing streams or rivers	10 cfs or greater	N/A	
coastal tidal water (harbors, sounds, bays, etc.), ocean, or Great Lakes	N/A	N/A	

## SURFACE WATER PATHWAY HUMAN FOOD CHAIN THREAT SCORESHEET

### Likelihood of Release (LR)

LR is the same for all surface water pathway threats. Enter LR score from page 12.

### Human Food Chain Threat Targets (T)

8. The only human food chain targets are fisheries. A fishery is an area of a surface water body from which food chain organisms are taken or could be taken for human consumption on a subsistence, sporting, or commercial basis. Food chain organisms include fish, shellfish, crustaceans, amphibians, and amphibious reptiles. Fisheries are delineated by changes in surface water body type (i.e., streams and rivers, lakes, coastal tidal waters, and oceans/Great Lakes) and whenever the flow characteristics of a stream or river change.

In the space provided, identify all fisheries within the target distance limit. Indicate the surface water body type and flow for each fishery. Gauging station flow data are available for many surface water bodies from USGS or other sources. In the absence of gauging station data, estimate flow using the list of surface water body types and associated flow categories in PA Table 4 (page 13). The flow for lakes is determined by the sum of flows of streams entering or leaving the lake. Note that, if there are no fisheries within the target distance limit, the Human Food Chain Threat Targets score is zero.

9. **Primary fisheries** are any fisheries within the target distance limit that you suspect have been exposed to a hazardous substance released from the site. Use professional judgment guided by the Surface Water Pathway Criteria List (page 11) to make this determination. If you identify any primary fisheries, list them in the space provided, enter 300 as the Primary Fisheries factor score, and do not evaluate Secondary Fisheries. Note that if you do not suspect a release, there can be no primary fisheries.

10. **Secondary fisheries** are fisheries that you do not suspect have been exposed to a hazardous substance. Evaluate this factor only if fisheries are present within the target distance limit, but none is considered a primary fishery.

- A. If you suspect a release to surface water and have identified a secondary fishery but no primary fishery, assign a score of 210.
- B. If you do not suspect a release, evaluate this factor based on flow. In the absence of gauging station flow data, estimate flow using the list of surface water body types and associated flow categories in PA Table 4 (page 13). Assign a Secondary Fisheries score from the table on the scoresheet using the lowest flow at any fishery within the target distance limit, (Dilution weight multiplier does not apply to PA evaluation of this factor.)

Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

SURFACE WATER PATHWAY (continued)  
HUMAN FOOD CHAIN THREAT SCORESHEET

		A	B	
LIKELIHOOD OF RELEASE		<i>Suspected Release</i>	<i>No Suspected Release</i>	<i>References</i>
Enter Surface Water Likelihood of Release score from page 12.	LR =	(540)	(540, 100, 200 = 100) <b>400</b>	

**HUMAN FOOD CHAIN THREAT TARGETS**

8. Record the water body type and flow (if applicable) for each fishery within the target distance limit. If there is no fishery within the target distance limit, assign a Targets score of 0 at the bottom of the page.

<i>Fishery Name</i>	<i>Water Body Type</i>	<i>Flow</i>
_____	_____	cfs

9. PRIMARY FISHERIES: If you suspect any fishery listed above has been exposed to a hazardous substance from the site (see Surface Water Criteria List, page 11), assign a score of 300 and do not evaluate Factor 10. List the primary fisheries:

\_\_\_\_\_, \_\_\_\_\_  
\_\_\_\_\_, \_\_\_\_\_

10. SECONDARY FISHERIES

A. If you suspect a release to surface water and have identified a secondary fishery but no primary fishery, assign a score of 210.

B. If you do not suspect a release, assign a Secondary Fisheries score from the table below using the lowest flow at any fishery within the target distance limit.

<i>Lowest Flow</i>	<i>Secondary Fisheries Score</i>
< 10 cfs	210
10 to 100 cfs	30
> 100 cfs, coastal tidal waters, oceans, or Great Lakes	12

	(300)			
	(210)			
		(210, 30, = 12)		
		12		
	(200, 210, = 0)	0	(210, 30, 12 = 0)	12
<b>T =</b>				

## SURFACE WATER PATHWAY ENVIRONMENTAL THREAT SCORESHEET

### Likelihood of Release (LR)

LR is the same for all surface water pathway threats. Enter LR score from page 12.

### Environmental Threat Targets (T)

11. PA Table 5 (page 16) lists sensitive environments for the Surface Water Pathway Environmental Threat. In the space provided, identify all sensitive environments located within the target distance limit. Indicate the surface water body type and flow at each sensitive environment. Gauging station flow data for many surface water bodies are available from USGS or other sources. In the absence of gauging station data, estimate flow using the list of surface water body types and associated flow categories in PA Table 4 (page 13). The flow for lakes is determined by the sum of flows of streams entering or leaving the lake. Note that if there are no sensitive environments within the target distance limit, the Environmental Threat Targets score is zero.

12. **Primary sensitive environments** are surface water sensitive environments within the target distance limit that you suspect have been exposed to a hazardous substance released from the site. Use professional judgment guided by the Surface Water Pathway Criteria List (page 11) to make this determination. If you identify any primary sensitive environments, list them in the space provided, enter 300 as the Primary Sensitive Environments factor score, and do not evaluate Secondary Sensitive Environments. Note that if you do not suspect a release, there can be no primary sensitive environments.

13. **Secondary sensitive environments** are surface water sensitive environments that you do not suspect have been exposed to a hazardous substance. Evaluate this factor only if surface water sensitive environments are present within the target distance limit, but none is considered a primary sensitive environment. Evaluate secondary sensitive environments based on flow.

- In the table provided, list all secondary sensitive environments on surface water bodies with flow of 100 cfs or less.
  - 1) Use PA Table 4 (page 13) to determine the appropriate dilution weight for each.
  - 2) Use PA Tables 5 and 6 (page 16) to determine the appropriate value for each sensitive environment type and for wetlands frontage.
  - 3) For a sensitive environment that falls into more than one of the categories in PA Table 5, sum the values for each type to determine the environment value (e.g., a wetland with 1.5 miles frontage (value of 50) that is also a critical habitat for a Federally designated endangered species (value of 100) would receive a total value of 150).
  - 4) For each sensitive environment, multiply the dilution weight by the environment type (or length of wetlands) value and record the product in the far-right column.
  - 5) Sum the values in the far-right column and enter the total as the Secondary Sensitive Environments score. Do not evaluate part B of this factor.
- If all secondary sensitive environments are on surface water bodies with flows greater than 100 cfs, assign 10 as the Secondary Sensitive Environments score.

Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

SURFACE WATER PATHWAY (continued)  
ENVIRONMENTAL THREAT SCORESHEET

		A	B	
LIKELIHOOD OF RELEASE		<i>Suspected Release</i> <small>(1500)</small>	<i>No Suspected Release</i> <small>(1500, 400, 300 = 100)</small>	<i>Reference</i>
Enter Surface Water Likelihood of Release score from page 12.	LR =		400	

**ENVIRONMENTAL THREAT TARGETS**

11. Record the water body type and flow (if applicable) for each surface water sensitive environment within the target distance limit (see PA Tables 4 and 5). If there is no sensitive environment within the target distance limit, assign a Targets score of 0 at the bottom of the page.

Environment Name	Water Body Type	Flow
		cfs

12. PRIMARY SENSITIVE ENVIRONMENTS: If you suspect any sensitive environment listed above has been exposed to a hazardous substance from the site (see Surface Water Criteria List, page 11), assign a score of 300 and do not evaluate factor 13. List the primary sensitive environments:

\_\_\_\_\_

\_\_\_\_\_

13. SECONDARY SENSITIVE ENVIRONMENTS: If sensitive environments are present, but none is a primary sensitive environment, evaluate Secondary Sensitive Environments based on flow.

A. For secondary sensitive environments on surface water bodies with flows of 100 cfs or less, assign scores as follows, and do not evaluate part B of this factor:

Flow	Dilution Weight (PA Table 4)	Environment Type and Value (PA Tables 5 and 6)	Total
1000 cfs	x	100	= 100
	x		=
	x		=
	x		=
	x		=

Sum =

B. If all secondary sensitive environments are located on surface water bodies with flows > 100 cfs, assign a score of 10.

T =

300				
			100	
100				
			100	

PA TABLE 5: SURFACE WATER AND AIR PATHWAY SENSITIVE ENVIRONMENTS VALUES

<i>Sensitive Environment</i>	<i>Assigned Value</i>
Critical habitat for Federally designated endangered or threatened species Marine Sanctuary National Park Designated Federal Wilderness Area Ecologically important areas identified under the Coastal Zone Wilderness Act Sensitive Areas identified under the National Estuary Program or Near Coastal Water Program of the Clean Water Act Critical Areas Identified under the Clean Lakes Program of the Clean Water Act (subareas in lakes or entire small lakes) National Monument (air pathway only) National Seashore Recreation Area National Lakeshore Recreation Area	100
Habitat known to be used by Federally designated or proposed endangered or threatened species National Preserve National or State Wildlife Refuge Unit of Coastal Barrier Resources System Federal land designated for the protection of natural ecosystems Administratively Proposed Federal Wilderness Area Spawning areas critical for the maintenance of fish/shellfish species within a river system, bay, or estuary Migratory pathways and feeding areas critical for the maintenance of anadromous fish species in a river system Terrestrial areas utilized for breeding by large or dense aggregations of vertebrate animals (air pathway) or semi-aquatic foragers (surface water pathway) National river reach designated as Recreational	75
Habitat known to be used by State designated endangered or threatened species Habitat known to be used by a species under review as to its Federal endangered or threatened status Coastal Barrier (partially developed) Federally designated Scenic or Wild River	50
State land designated for wildlife or game management State designated Scenic or Wild River State designated Natural Area Particular areas, relatively small in size, important to maintenance of unique biotic communities	25
State designated areas for protection/maintenance of aquatic life under the Clean Water Act	5
Wetlands	See PA Table 6 (Surface Water Pathway) or PA Table 9 (Air Pathway)

PA TABLE 6: SURFACE WATER PATHWAY WETLANDS FRONTAGE VALUES

<i>Total Length of Wetlands</i>	<i>Assigned Value</i>
Less than 0.1 mile	0
0.1 to 1 mile	25
Greater than 1 to 2 miles	50
Greater than 2 to 3 miles	75
Greater than 3 to 4 miles	100
Greater than 4 to 8 miles	150
Greater than 8 to 12 miles	250
Greater than 12 to 18 miles	350
Greater than 18 to 20 miles	450
Greater than 20 miles	500

## **SURFACE WATER PATHWAY WASTE CHARACTERISTICS, THREAT, AND PATHWAY SCORES**

### **Waste Characteristics (WC)**

**14. Waste Characteristics:** Score is assigned from page 4. However, if a primary target has been identified for any surface water threat, assign either the score calculated on page 4 or a score of 32, whichever is greater.

### **Surface Water Pathway Threat Scores**

Fill in the matrix with the appropriate scores from the previous pages. To calculate the score for each threat: multiply the scores for LR, T, and WC; divide the product by 82,500; and round the result to the nearest integer. The Drinking Water Threat and Human Food Chain Threat are each subject to a maximum of 100. The Environmental Threat is subject to a maximum of 60. Enter the rounded threat scores in the far-right column.

### **Surface Water Pathway Score**

Sum the individual threat scores to determine the Surface Water Pathway Score. If the sum is greater than 100, assign 100.

**SURFACE WATER PATHWAY (concluded)  
WASTE CHARACTERISTICS, THREAT, AND PATHWAY SCORE SUMMARY**

	<b>A</b>	<b>B</b>
<b>WASTE CHARACTERISTICS</b>	<i>Suspected Release</i>	<i>No Suspected Release</i>
<p>14. A. If you have identified any primary target for surface water (pages 12, 14, or 15), assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.</p>	(100 = 32)	
<p>B. If you have NOT identified any primary target for surface water, assign the waste characteristics score calculated on page 4.</p>	(100, 32, or 18)	(100, 32, or 18)  18
<b>WC =</b>		18

**SURFACE WATER PATHWAY THREAT SCORES**

Threat	<i>Likelihood of Release (LR) Score</i> <small>(from page 12)</small>	<i>Targets (T) Score</i> <small>(pages 12, 14, 15)</small>	<i>Pathway Waste Characteristics (WC) Score</i> <small>(determined above)</small>	<i>Threat Score</i> $LR \times T \times WC$ <small>/ 82,500</small>
Drinking Water	400	0	18	0 <small>(subject to a maximum of 100)</small>
Human Food Chain	400	12	18	1 <small>(subject to a maximum of 100)</small>
Environmental	400	100	18	8.7 <small>(subject to a maximum of 80)</small>

**SURFACE WATER PATHWAY SCORE**  
(Drinking Water Threat + Human Food Chain Threat + Environmental Threat)

<small>(subject to a maximum of 100)</small>  9.7
---

## SOIL EXPOSURE PATHWAY CRITERIA LIST

Areas of surficial contamination can generally be assumed. This "Criteria List" helps guide the process of developing a hypothesis concerning the exposure of specific targets to a hazardous substance at the site. Use the "Resident Population" section to evaluate site and source conditions that may help identify targets likely to be exposed to a hazardous substance. The check-boxes record your professional judgment. Answers to all of the listed questions may not be available during the PA. Also, the list is not all-inclusive; if other criteria help shape your hypothesis, list them at the bottom of the page or attach an additional page.

Check the boxes to indicate a "yes," "no," or "unknown" answer to each question.

**SOIL EXPOSURE PATHWAY CRITERIA LIST**

<i>SUSPECTED CONTAMINATION</i>	<i>RESIDENT POPULATION</i>
<p>Surficial contamination can generally be assumed.</p>	<p>Y N U e o n s k</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is any residence, school, or daycare facility on or within 200 feet of an area of suspected contamination?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is any residence, school, or daycare facility located on adjacent land previously owned or leased by the site owner/operator?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is there a migration route that might spread hazardous substances near residences, schools, or daycare facilities?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Have onsite or adjacent residents or students reported adverse health effects, exclusive of apparent drinking water or air contamination problems?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does any neighboring property warrant sampling?</p> <p><input type="checkbox"/> <input type="checkbox"/> Other criteria? _____</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> RESIDENT POPULATION IDENTIFIED?</p>

Summarize the rationale for Resident Population (attach an additional page if necessary):

## SOIL EXPOSURE PATHWAY SCORESHEET

### Pathway Characteristics

Answer the questions at the top of the page. Identify people who may be exposed to a hazardous substance because they work at the facility, or reside or attend school or daycare on or within 200 feet of an area of suspected contamination. If the site is active, estimate the number of full and part-time workers. Note that evaluation of targets is based on current site conditions.

### Likelihood of Exposure (LE)

**1. Suspected Contamination:** Areas of surficial contamination are present at most sites, and a score of 550 can generally be assigned as a default measure. Assign zero, which effectively eliminates the pathway from further consideration, only if there is no surficial contamination; reliable analytical data are generally necessary to make this determination.

### Resident Population Threat Targets (T)

**2. Resident Population** corresponds to "primary targets" for the migration pathways. Use professional judgment guided by the Soil Exposure Pathway Criteria List (page 18) to determine if there are people living or attending school or daycare on or within 200 feet of areas of suspected contamination. Record the number of people identified as resident population and multiply by 10 to determine the Resident Population factor score.

**3. Resident Individual:** Assign 50 if you have identified a resident population; otherwise, assign zero.

**4. Workers:** Estimate the number of full and part-time workers at this facility and adjacent facilities where contamination is also suspected. Assign a score for the Workers factor from the table.

**5. Terrestrial Sensitive Environments:** In the table provided, list each terrestrial sensitive environment located on an area of suspected contamination. Use PA Table 7 (page 20) to assign a value for each. Sum the values and assign the total as the factor score.

**6. Resources:** A score of 5 can generally be assigned as a default measure. Assign zero only if there is no land resource use on an area of suspected contamination.

Sum the target scores.

### Waste Characteristics (WC)

7. Enter the WC score determined on page 4.

**Resident Population Threat Score:** Multiply the scores for LE, T, and WC. Divide the product by 82,500. Round the result to the nearest integer. If the result is greater than 100, assign 100.

**Nearby Population Threat Score:** Do not evaluate this threat if you gave a zero score to Likelihood of Exposure. Otherwise, assign a score based on the population within a 1-mile radius (use the same 1-mile radius population you evaluate for air pathway population targets):

<u>Population Within One Mile</u>	<u>Nearby Population Threat Score</u>
< 10,000	1
10,000 to 50,000	2
> 50,000	4

**Soil Exposure Pathway Score:** Sum the Resident Population Threat score and the Nearby Population Threat score, subject to a maximum of 100.

**SOIL EXPOSURE PATHWAY SCORESHEET**

<i>Pathway Characteristics</i>	
Do any people live on or within 200 ft of areas of suspected contamination?	Yes ___ No <b>X</b>
Do any people attend school or daycare on or within 200 ft of areas of suspected contamination?	Yes ___ No <b>X</b>
Is the facility active? Yes <b>X</b> No ___ If yes, estimate the number of workers: <u>0</u>	

LIKELIHOOD OF EXPOSURE	<i>Suspected Contamination</i> <small>(100 = 0)</small>	<i>References</i>
1. SUSPECTED CONTAMINATION: Surficial contamination can generally be assumed, and a score of 550 assigned. Assign zero only if the absence of surficial contamination can be confidently demonstrated. <b>LE =</b>	<b>550</b>	_____

RESIDENT POPULATION THREAT TARGETS		<i>References</i>										
2. RESIDENT POPULATION: Determine the number of people occupying residences or attending school or daycare on or within 200 feet of areas of suspected contamination (see Soil Exposure Pathway Criteria List, page 18). <u>0</u> people x 10 =	<b>0</b> <small>(100 = 0)</small>	_____										
3. RESIDENT INDIVIDUAL: If you have identified a resident population (factor 2), assign a score of 50; otherwise, assign a score of 0.	<b>0</b> <small>(10, 10, 1, = 0)</small>	_____										
4. WORKERS: Use the following table to assign a score based on the total number of workers at the facility and nearby facilities with suspected contamination:	<b>0</b>	_____										
<table border="1" style="margin-left: 20px;"> <thead> <tr> <th style="text-align: center;"><i>Number of Workers</i></th> <th style="text-align: center;"><i>Score</i></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">1 to 100</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">101 to 1,000</td> <td style="text-align: center;">10</td> </tr> <tr> <td style="text-align: center;">&gt; 1,000</td> <td style="text-align: center;">15</td> </tr> </tbody> </table>	<i>Number of Workers</i>	<i>Score</i>	0	0	1 to 100	5	101 to 1,000	10	> 1,000	15		
<i>Number of Workers</i>	<i>Score</i>											
0	0											
1 to 100	5											
101 to 1,000	10											
> 1,000	15											
5. TERRESTRIAL SENSITIVE ENVIRONMENTS: Use PA Table 7 to assign a value for each terrestrial sensitive environment on an area of suspected contamination:	<b>100</b>	_____										
<table border="1" style="margin-left: 20px;"> <thead> <tr> <th style="text-align: left;"><i>Terrestrial Sensitive Environment Type</i></th> <th style="text-align: center;"><i>Value</i></th> </tr> </thead> <tbody> <tr> <td>National Park</td> <td style="text-align: center;">100</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	<i>Terrestrial Sensitive Environment Type</i>	<i>Value</i>	National Park	100								
<i>Terrestrial Sensitive Environment Type</i>	<i>Value</i>											
National Park	100											
6. RESOURCES	<b>100</b> <small>(10 = 0)</small>	_____										
<b>T =</b>	<b>100</b>	_____										

WASTE CHARACTERISTICS		<i>References</i>
7. Assign the waste characteristics score calculated on page 4. <b>WC =</b>	<b>18</b> <small>(100, 20, or 10)</small>	_____

RESIDENT POPULATION THREAT SCORE:	<b>LE X T X WC</b> <b>82,500</b>	<b>12</b> <small>(dependent to a maximum of 100)</small>
NEARBY POPULATION THREAT SCORE:		<b>1</b> <small>(4, 2, or 1)</small>
SOIL EXPOSURE PATHWAY SCORE: Resident Population Threat + Nearby Population Threat		<b>13</b> <small>(dependent to a maximum of 100)</small>

**PA TABLE 7: SOIL EXPOSURE PATHWAY  
TERRESTRIAL SENSITIVE ENVIRONMENT VALUES**

<i>Terrestrial Sensitive Environment</i>	<i>Assigned Value</i>
Terrestrial critical habitat for Federally designated endangered or threatened species National Park Designated Federal Wilderness Area National Monument	100
Terrestrial habitat known to be used by Federally designated or proposed threatened or endangered species National Preserve (terrestrial) National or State terrestrial Wildlife Refuge Federal land designated for protection of natural ecosystems Administratively proposed Federal Wilderness Area Terrestrial areas utilized by large or dense aggregations of animals (vertebrate species) for breeding	75
Terrestrial habitat used by State designated endangered or threatened species Terrestrial habitat used by species under review for Federal designated endangered or threatened status	50
State lands designated for wildlife or game management State designated Natural Areas Particular areas, relatively small in size, important to maintenance of unique biotic communities	25

## AIR PATHWAY CRITERIA LIST

This "Criteria List" helps guide the process of developing a hypothesis as to whether a release to the air is likely to be detected. The check-boxes record your professional judgment. Answers to all of the listed questions may not be available during the PA. Also, the list is not all-inclusive; if other criteria help shape your hypothesis, list them at the bottom of the page or attach an additional page.

The "Suspected Release" section identifies several conditions that could provide insight as to whether a release from the site is likely to be detected. If a release is suspected, primary targets are any residents, workers, students, and sensitive environments on or within  $\frac{1}{4}$  mile of the site.

Check the boxes to indicate a "yes," "no," or "unknown" answer to each question. If you check the "Suspected Release" box as "yes," make sure you assign a Likelihood of Release value of 550 for the pathway.

AIR PATHWAY CRITERIA LIST	
SUSPECTED RELEASE	PRIMARY TARGETS
<p>Y N U e o n s k</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are odors currently reported?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Has release of a hazardous substance to the air been directly observed?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are there reports of adverse health effects (e.g., headaches, nausea, dizziness) potentially resulting from migration of hazardous substances through the air?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does analytical or circumstantial evidence suggest a release to the air?</p> <p><input type="checkbox"/> <input type="checkbox"/> Other criteria? _____</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> SUSPECTED RELEASE?</p>	<p>If you suspect a release to air, evaluate all populations and sensitive environments within ¼ mile (including those onsite) as primary targets.</p>
<p>Summarize the rationale for Suspected Release (attach an additional page if necessary):</p>	

## AIR PATHWAY SCORESHEET

### Pathway Characteristics

Answer the questions at the top of the page. Refer to the Air Pathway Criteria List (page '21) to hypothesize whether you suspect that a hazardous substance release to the air could be detected. Due to dispersion, releases to air are not as persistent as releases to water migration pathways and are much more difficult to detect. Develop your hypothesis concerning the release of hazardous substances to air based on "real time" considerations. Record the distance (in feet) from any source to the nearest regularly occupied building.

### Likelihood of Release (LR)

1. **Suspected Release:** Hypothesize based on professional judgment guided by the Air Pathway Criteria List (page 21) If you suspect a release to air, use only Column A for this pathway and do not evaluate factor 2.

2. **No Suspected Release:** If you do not suspect a release, enter 600 and use only Column B for this pathway.

### Targets (T)

3. **Primary Target Population:** Evaluate populations subject to exposure from release of a hazardous substance from the site. If you suspect a release, the resident, student, and worker populations on and within ¼ mile of the site are considered primary target population. If only the number of residences is known, use the average county residents per household (rounded up to the next integer) to determine the population. In the space provided, enter this population. Multiply the population by 10 to determine the Primary Target Population score. Note that if you do not suspect a release, there can be no primary target population.

4. **Secondary Target Population:** Evaluate populations in distance categories not suspected to be subject to exposure from release of a hazardous substance from the site. If you suspect a release, residents, students, and workers in the ¼ to 4-mile distance categories are secondary target population. If you do not suspect a release, all residents, students, and workers onsite and within 4 miles are considered secondary target population.

Use PA Table 8 (page 23). Enter the population in each secondary target population distance category, circle the assigned value, and record it on the far-right side of the table. Sum the far-right column and enter the total as the Secondary Target Population factor score.

5. **Nearest Individual** represents the threat posed to the person most likely to be exposed to a hazardous substance release from the site. If you have identified a primary target population, enter 60. Otherwise, assign the score from PA Table 8 (page 23) for the closest distance category in which you have identified a secondary target population.

6. **Primary Sensitive Environments:** If a release is suspected, all sensitive environments on or within ¼ mile of the site are considered primary targets. List them and assign values for sensitive environment type (from PA Table 5, page 16) and/or wetland acreage (from PA Table 9, page 23). Sum the values and enter the total as the factor score.

7. **Secondary Sensitive Environments:** If a release is suspected, sensitive environments in the ¼- to ½-mile distance category are secondary targets; greater distances need not be evaluated because distance weighting greatly diminishes the impact on site score. If you do not suspect a release, all sensitive environments on and within ½ mile of the site are considered secondary targets. List each secondary sensitive environment on PA Table 10 (page 23) and assign a value to each using PA Tables 5 and 9. Multiply each value by the indicated distance weight and record the product in the far-right column. Sum the products and enter the total as the factor score.

8. **Resources:** A score of 6 can generally be assigned as a default measure. Assign zero only if there is no land resource use within ½ mile.

Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

### Waste Characteristics (WC)

9. **Waste Characteristics:** Score is assigned from page 4. However, if you have identified any primary target for the air pathway, assign either the score calculated on page 4 or a score of 32, whichever is greater.

**Air Pathway Score:** Multiply the scores for LR, T, and WC. Divide the product by 82,500. Round the result to the nearest integer. If the result is greater than 100, assign 100.

### AIR PATHWAY SCORESHEET

Pathway Characteristics	
Do you suspect a release (see Air Pathway Criteria List, page 21)?	Yes _____ No <input checked="" type="checkbox"/>
Distance to the nearest individual:	5000 ft

LIKELIHOOD OF RELEASE	A	B	References
	Suspected Release (500)	No Suspected Release (500)	
1. SUSPECTED RELEASE: If you suspect a release to air (see page 21), assign a score of 550. Use only column A for this pathway.			
2. NO SUSPECTED RELEASE: If you do not suspect a release to air, assign a score of 500. Use only column B for this pathway.		500	
LR =		500	

TARGETS	A	B	References								
	3. PRIMARY TARGET POPULATION: Determine the number of people subject to exposure from a suspected release of hazardous substances to the air. <span style="margin-left: 100px;">0 people x 10 =</span>	0									
4. SECONDARY TARGET POPULATION: Determine the number of people not suspected to be exposed to a release to air, and assign the total population score using PA Table 8.		0									
5. NEAREST INDIVIDUAL: If you have identified any Primary Target Population for the air pathway, assign a score of 50; otherwise, assign the Nearest Individual score from PA Table 8.											
6. PRIMARY SENSITIVE ENVIRONMENTS: Sum the sensitive environment values (PA Table 5) and wetland acreage values (PA Table 9) for environments subject to exposure from a suspected release to the air.											
<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th style="width: 80%;">Sensitive Environment Type</th> <th style="width: 20%;">Value</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	Sensitive Environment Type	Value									
Sensitive Environment Type	Value										
Sum =											
7. SECONDARY SENSITIVE ENVIRONMENTS: Use PA Table 10 to determine the score for secondary sensitive environments.	18 or 0	18 or 0									
8. RESOURCES											
T =		0									

WASTE CHARACTERISTICS	A	B	
9. A. If you have identified any Primary Target for the air pathway, assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.	(100, 32)		
B. If you have NOT identified any Primary Target for the air pathway, assign the waste characteristics score calculated on page 4.	18	(100, 32, or 18)	
WC =	18		

**AIR PATHWAY SCORE:**

$$\frac{LR \times T \times WC}{82,500}$$

(Adjusted to a maximum of 100)
0

PA TABLE 8: VALUES FOR SECONDARY AIR TARGET POPULATIONS

Distance from Site	Nearest Individual Population	Nearest Individual Population	Population Within Distance Category												Population Value		
			1 to 1/4 mi	1/4 to 1/2 mi	1/2 to 1 mi	1 to 2 mi	2 to 3 mi	3 to 4 mi	4 to 5 mi	5 to 6 mi	6 to 7 mi	7 to 8 mi	8 to 9 mi	9 to 10 mi		Greater than 10 mi	
< 0 miles	20	0	2	5	15	52	143	521	1,823	5,314	15,325	39,001	94,001	230,001	582,126	1,452,246	
> 0 to 1/4 mile	20	0	1	1	4	13	41	130	405	1,303	4,081	13,034	40,811	126,815	378,815	1,081,815	
> 1/4 to 1/2 mile	2	0	0	0	1	3	8	24	88	282	882	2,815	8,815	27,815	87,815	278,815	
> 1/2 to 1 mile	1	0	0	0	1	1	3	9	28	83	251	753	2,251	6,753	20,251	60,753	
> 1 to 2 miles	0	0	0	0	0	1	1	3	8	27	83	256	786	2,412	7,412	22,412	
> 2 to 3 miles	0	0	0	0	0	1	1	1	1	1	3	10	35	110	350	1,100	
> 3 to 4 miles	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	
Nearest Individual =															0		
															Score =		
															0		

PA TABLE 10: DISTANCE WEIGHTS AND CALCULATIONS FOR AIR PATHWAY SECONDARY SENSITIVE ENVIRONMENTS

Distance	Distance Weight	Sensitive Environment Type and Value (from PA Table 5 or 9)	Product
Onsite	0.10	X	
		X	
		X	
0-1/4 mi	0.025	X	
		X	
1/4-1/2 mi	0.0054	X	
		X	
		X	
Total Environment Score =			

PA TABLE 9: AIR PATHWAY VALUES FOR WETLAND AREA

Wetland Area	Assumed Value
Less than 1 acre	0
1 to 50 acres	25
Greater than 50 to 100 acres	75
Greater than 100 to 150 acres	125
Greater than 150 to 200 acres	175
Greater than 200 to 300 acres	250
Greater than 300 to 400 acres	350
Greater than 400 to 500 acres	450
Greater than 500 acres	500

## SITE SCORE CALCULATION

In the column labeled S, record the Ground Water Pathway score, the Surface Water Pathway score, the Soil Exposure Pathway score, and the Air Pathway score. Square each pathway score and record the result in the S<sup>2</sup> column. Sum the squared pathway scores. Divide the sum by 4, and take the square root of the result to obtain the Site Score.

## SUMMARY

Answer the summary questions, which ask for a qualitative evaluation of the relative risk of targets being exposed to a hazardous substance from the site. You may find your responses to these questions a good cross-check against the way you scored the individual pathways. For example, if you scored the ground water pathway on the basis of no suspected release and secondary targets only, yet your response to question #1 is "yes," this presents apparently conflicting conclusions that you need to reconsider and resolve. Your answers to the questions on page 24 should be consistent with your evaluations elsewhere in the PA scoresheets package.

**SITE SCORE CALCULATION**

	S	S <sup>2</sup>
GROUND WATER PATHWAY SCORE (S <sub>gw</sub> ):	12	144
SURFACE WATER PATHWAY SCORE (S <sub>sw</sub> ):	9.7	94.1
SOIL EXPOSURE PATHWAY SCORE (S <sub>s</sub> ):	13	169
AIR PATHWAY SCORE (S <sub>a</sub> ):	0	0
SITE SCORE:	$\sqrt{\frac{S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2}{4}}$	10

**SUMMARY**

	YES	NO
<p>1. Is there a high possibility of a threat to any nearby drinking water well(s) by migration of a hazardous substance in ground water?</p> <p style="margin-left: 20px;">A. If yes, identify the well(s). _____</p> <p style="margin-left: 20px;">B. If yes, how many people are served by the threatened well(s)? _____</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>2. Is there a high possibility of a threat to any of the following by hazardous substance migration in surface water?</p> <p style="margin-left: 20px;">A. Drinking water intake</p> <p style="margin-left: 20px;">B. Fishery</p> <p style="margin-left: 20px;">C. Sensitive environment (wetland, critical habitat, others)</p> <p style="margin-left: 20px;">D. If yes, identify the target(s). _____</p> <p style="margin-left: 20px;">_____</p> <p style="margin-left: 20px;">_____</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<p>3. Is there a high possibility of an area of surficial contamination within 200 feet of any residence, school, or daycare facility?</p> <p style="margin-left: 20px;">If yes, identify the property(ies) and estimate the associated population(s). _____</p> <p style="margin-left: 20px;">_____</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>4. Are there public health concerns at this site that are not addressed by PA scoring considerations? If yes, explain:</p> <p style="margin-left: 20px;">_____</p> <p style="margin-left: 20px;">_____</p> <p style="margin-left: 20px;">_____</p>	<input type="checkbox"/>	<input type="checkbox"/>

**APPENDIX B  
SITE PHOTOGRAPHS**

**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Newhalem Firing Range

**Site Location:** Newhalem, WA

**Date:** September 2002

**Photographer:**  
John Lillie



**Direction:**  
North

**Comments:**  
Locked, gated entrance to Newhalem Firing Range. The entrance is approximately 500 feet north of Highway 20 at mile post 119.

**Photographer:**  
John Lillie



**Direction:**  
North

**Comments:**  
Newhalem Firing Range looking north, eastern flank of Trappers Peak in the distance.

**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Newhalem Firing Range

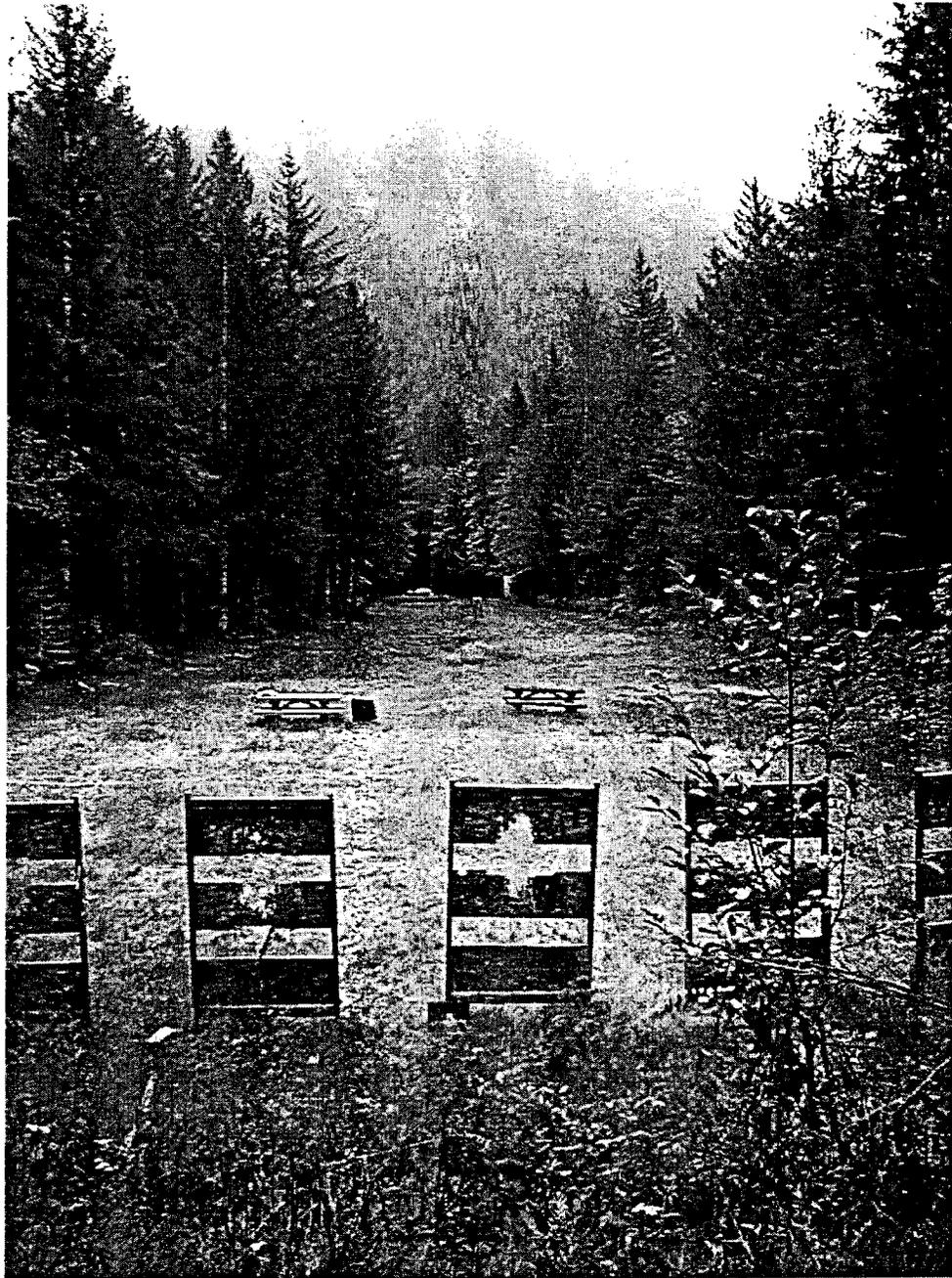
**Site Location:** Newhalem, WA

**Date:** September 2002

**Photographer:**  
John Lillie

**Direction:**  
South

**Comments:**  
Newhalem Firing Range looking south, Big Devil Peak in the distance. The Skagit River is approximately 2000 feet south-southeast of the clearing.



**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Newhalem Firing Range

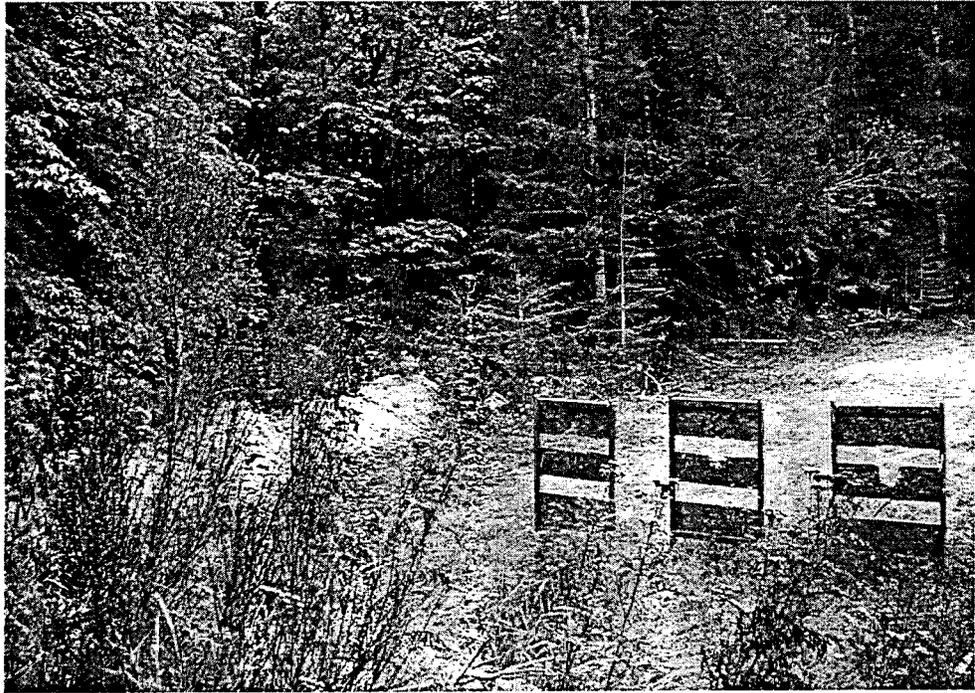
**Site Location:** Newhalem, WA

**Date:** September 2002

**Photographer:**  
John Lillie

**Direction:**  
East

**Comments:**  
East side of  
Newhalem Firing  
Range.



**Photographer:**  
John Lillie

**Direction:**  
West

**Comments:**  
West side of  
Newhalem Firing  
Range.



**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Newhalem Firing Range

**Site Location:** Newhalem, WA

**Date:** September 2002

**Photographer:**  
John Lillie



**Direction:**  
N/A

**Comments:**  
Cedar logs used for  
cribbing on back side  
of projectile stop  
berm. The bottom log  
is about three feet in  
diameter.

**Photographer:**  
John Lillie



**Direction:**  
N/A

**Comments:**  
Abandoned pop-up  
mechanism located  
behind berm cribbing

**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Newhalem Firing Range

**Site Location:** Newhalem, WA

**Date:** September 2002

**Photographer:**  
John Lillie



**Direction:**  
North

**Comments:**  
Projectile stop berm  
behind target mounts.  
Note soil is disturbed  
from bullet impact.  
Lead was observed to  
be present in the soil.

**Photographer:**  
John Lillie



**Direction:**  
N/A

**Comments:**  
Spent rounds in  
disturbed soil area of  
projectile stop berm.  
The scale is 2.5  
inches in length.

**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Newhalem Firing Range

**Site Location:** Newhalem, WA

**Date:** September 2002

**Photographer:**  
John Lillie

**Direction:**  
North

**Comments:**  
Newhalem Firing Range pistol rests and target backstops.



**Photographer:**  
John Lillie

**Direction:**  
N/A

**Comments:**  
Newhalem Firing Range clay pigeon fragment.



Kleinfelder  
Photographic Record

Client: National Park Service

Project Number: 20200

Site Name: Newhalem Firing Range

Site Location: Newhalem, WA

Date: September 2002

Photographer:  
John Lillie

Direction:  
N/A

Comments:  
Newhalem Firing  
Range Rules.



**APPENDIX C**  
**BURN PILE DOCUMENTATION**

ERTS # 527190

**Initial Report**

External Reference #

Caller Information

Where did it happen

First Middle Last  
 Name STEVE JAMES  
 Business Name NORTH CASCADES NATIONAL PARK  
 Street Address  
 Other Address  
 City State WA Zip  
 E-mail Confidential\_FL   
 Phone Ext Type  
 (380) 856-5700 262 Business

Business of Location Name NORTH CASCADES NATIONAL PARK  
 Street Address STEHEKIN  
 Other Address  
 City/Place STEHEKIN State WA Zip  
 County - Region CHELAN CRO FS ID  
 WIFA #  
 Waterway Type  
 Latitude Longitude  
 Topo Quad 1:24:000 STEHEKIN  
 Direction/Landmark (mile post, cross roads, township/range)

What happened

Incident Date Received Date 6/19/2002 15:54  
 Medium SOIL  
 Material UNKNOWN  
 Quantity Unit  
 Source OTHER  
 Cause OTHER  
 Activity DISPOSING  
 Impact SOIL CONTAMINATION  
 Vessel Name Type

Primary Potentially Responsible Party Information

First Middle Last  
 Name STEVE JAMES  
 Business Name NATIONAL PARK SERVICE  
 Street Address  
 Other Address  
 City STEHEKIN State WA Zip  
 Phone (350) 856-5700 Ext 262 Type Business  
 E-mail

Additional Contact Information

Name Phone Ext Type

More Information

I talked with Steve James with the Park Service this morning about the Stehekin burn site. It has been in existence at least 10 years. It is located near the Stehekin Airport (or unmanned airstrip really). The burn site is separated from any residence by at least a quarter mile. The airstrip is about 6 miles up the main road from the boat landing. He said that they burn at this pile just once a year, and then after they obtain the appropriate permits, etc., and also after they pull inappropriate items out of the pile.

The future use of this burn site is in question. There is a preliminary assessment now being written by a consultant. The Park Service is looking for other options to handling forest wood, shrubbery, etc. The burn site may stay and continue to be used as such. If it is, the access (about 3/4 mile in from the main road) will be gated/controlled and people will not be able to drive to it as is possible now.

Mr. James faxed me analyses of metals 4 (arsenic, cadmium, chromium, lead) that were sampled from the burn site. He sampled from the four cardinal directions and in the center too (5 samples). He took a background sample (6th sample) a distance from the burn site. The burn site results show slightly elevated levels of arsenic and lead, though none of the 5 samples exceed MTCA cleanup. The highest arsenic analysis was 13.0 mg/kg and the average of the five was 9.91 mg/kg. Arsenic background was ND. The highest lead analysis was 152 mg/kg and the average of the five was 58.1. Lead background was 4.92 mg/kg. The cadmium and chromium analyses from the burn site were similar to the background sample.

The area of the burn material we are talking he said was about 30' x 70' x 10'. It had been piled. He said the volume was perhaps 20 cubic yards.

Mr. James is going to send a copy of the preliminary assessment to me when it is completed sometime in August or September. I conclude from the sample analyses he faxed me that there is a high possibility that this is not a MTCA site, and that your visiting the site would, in my opinion be a waste of time. In addition, Mr. James would have to be notified and would accompany you from his west-side office for the express purpose of showing you the burn pile. I don't think this burn site warrants a site visit.

I have some materials that Mr. James faxed me if you want to look at them.

Entry Person SMITH-TAYLOR, DEBBIE

Entry Date 6/20/2002



11525 Knudson Rd.  
 Burlington, WA 98233  
 (800) 755-9295  
 (360) 757-1400 - FAX (360) 757-1402

# Data Report

Client Name: North Cascade NPS Complex  
 810 State Rte 20  
 Sedro Woolley, WA 98284

Report Date: 6/12/2002  
 Reference Number: 02-2688  
 Project: Burn Pile

Collected By:

Date Sampled: 5/30/2002  
 Date Received: 6/3/2002  
 Supervisor: *[Signature]*

Analyte	Result	PQL	Units	Method	Analyzed	Analyst	Batch	Comments
<u>Lab Number: 4687</u>								
<u>Sample Description: Ste #1 - background sample</u>								
ARSENIC	ND	5.16	mg/Kg	6010B/3051	6/10/2002	JN	6010B_020610	
CADMIUM	ND	0.155	mg/Kg	6010B/3051	6/10/2002	JN	6010B_020610	
CHROMIUM	31.1	0.226	mg/Kg	6010B/3051	6/10/2002	JN	6010B_020610	
LEAD	4.92	1.81	mg/Kg	6010B/3051	6/10/2002	JN	6010B_020610	
<u>Lab Number: 4688</u>								
<u>Sample Description: Ste #2 - S end dirt pile</u>								
ARSENIC	9.97	4.27	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
CADMIUM	ND	0.128	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
CHROMIUM	30.3	0.187	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
LEAD	20.0	1.50	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
<u>Lab Number: 4689</u>								
<u>Sample Description: Ste #3 - middle dirt pile</u>								
ARSENIC	9.45	4.96	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
CADMIUM	ND	0.149	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
CHROMIUM	28.8	0.217	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
LEAD	46.2	1.74	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
<u>Lab Number: 4690</u>								
<u>Sample Description: Ste #4 - N end dirt pile</u>								
ARSENIC	9.41	4.80	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
CADMIUM	ND	0.144	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
CHROMIUM	36.2	0.210	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
LEAD	53.1	1.68	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
<u>Lab Number: 4691</u>								
<u>Sample Description: Ste #5 - E end dirt pile</u>								
ARSENIC	7.70	5.04	mg/Kg	6010B/3051	6/10/2002	JN	6010_020610	
CADMIUM	ND	0.151	mg/Kg	6010B/3051	6/10/2002	JN	6010_020610	
CHROMIUM	31.4	0.220	mg/Kg	6010B/3051	6/10/2002	JN	6010_020610	
LEAD	19.2	1.76	mg/Kg	6010B/3051	6/10/2002	JN	6010_020610	
<u>Lab Number: 4692</u>								
<u>Sample Description: Ste #6 - W end dirt pile</u>								
ARSENIC	13.0	4.93	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
ADMIUM	ND	0.148	mg/Kg	6010B/3051	6/10/2002		6010B_020610	

L = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.  
 = Not detected above the listed practical quantitation limit (PQL).



## Data Report

Collected By:

Date Sampled: 5/30/2002

Date Received: 6/3/2002

Analyte	Result	PQL	Units	Method	Analyzed	Analyst	Batch	Comments
CHROMIUM	41.9	0.216	mg/Kg	6010B/3051	6/10/2002		6010B_020610	
LEAD	152	1.72	mg/Kg	6010B/3051	6/10/2002		6010B_020610	

PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.

N = Not detected above the listed practical quantitation limit (PQL)

WSDOE Lab C057  
WSDOH Lab 046

