

Prepared for:

National Park Service  
1111 Jackson Street  
Oakland, CA 94107

**Preliminary Assessment of Two Sites  
North Cascades NPS Complex  
Stehekin, Washington**

Kleinfelder Project No. 20200.003

Prepared by



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## 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 (PA) of two locations in the Stehekin Valley of the Lake Chelan 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 and an active forest slash Burn Pile 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 10 and 26, 2002. A Preliminary Assessment Data Summary Forms and Score Sheets for the two locations can be found in Attachment A.

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

### 2.1 LOCATION

Stehekin, Washington is located at the head of Lake Chelan approximately 55 miles by boat from Chelan, Washington (Figure 1). Stehekin is accessible by boat, airplane or by hiking in from Rainy Pass on the North Cascades Highway via either the Pacific Crest Trail or McAlester Trail. There are approximately 80 to 100 year-round residents living in the Stehekin Valley.

The Stehekin Valley is characterized by a mixture of marine and semi-arid climates, producing warm summers and moderate to cold winters, with up to seven feet of snow standing at any one time. Summers are warm to hot with temperatures reaching an average of 80° F and a record of 107° F. The winter months are generally cold, with daily average temperatures of 20° to 35° F. Average annual precipitation is 35.5 inches, with about half falling as snow during the winter.

### 2.2 INTERVIEWS

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

NOCA personnel: Mr. Steve James, Maintenance Supervisor, Stehekin Ranger Station.

Washington Department of Ecology personnel: Roger Johnson, Central Regional Office.

### 2.3 SITE DESCRIPTION

The Burn Pile is located approximately 1000 feet east of the Stehekin Valley Landing Strip off of Company Creek Road. The Burn Pile is located in an opening in a densely forested area of the valley. The geographic location is 48° 20' 39" north latitude by 120° 43' 1.8" (by handheld GPS with an accuracy of ~14 feet).

The Firing Range is located off the Valley Road, about 7.5 miles from Stehekin Landing. The range is in a forested area on the extreme lower flank of Rainbow Mountain above McGregor Meadows. The geographic location is 48° 22' 23.4" north latitude by 120° 45' 42.7" west longitude (by handheld GPS with an accuracy of ~50 feet). The Firing Range is designated in the Code of Federal Regulations, Title 36, Volume 1, Chapter 1, Part 7 Section 7.62 (C) for target practice use.

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

### 2.4 OPERATIONAL HISTORY AND WASTE CHARACTERISTICS

The Burn Pile is used exclusively by NPS personnel to burn forest slash. The slash is a product of forest thinning practices. The pile is located in a forest clearing at the end of a service road that is not accessible to the general public. The Burn Pile had been used for about the past 10 years. Burning is limited to naturally occurring materials once a year. Procedures used by the NPS dictate that any man-made materials be removed from the pile prior to burning. These materials are barged down-lake with other solid waste produced in Stehekin. Solid waste is disposed of at the Chelan County Landfill.

According to Mr. James the Firing Range has been in use for about 20 years. The Firing Range is used primarily by Valley residents for the purpose of sighting-in hunting rifles. The range is also used by NPS personnel for small arms proficiency practice. The primary weapons fired at the range are rifles. There is also some handgun and shotgun target practice. The Firing Range is backed by a low soil berm. Both the east and west sides of the Firing Range are contained by soil berms. The range housekeeping was noted to be very good with no visible spent casings, targets or other debris. One broken "clay pigeon" shotgun target and a few spent shotgun shells were observed near the target end of the range.

### 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 Stehekin Valley in the vicinity of the two PA sites.

A total of 43 records for water supply wells located within the Valley are on file with the Washington Department of Ecology (Ecology). These wells penetrate an alluvial aquifer to a depth of 138 feet. The aquifer is unconfined and is composed of locally derived sand and gravel. The 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. The water wells average about 50 feet deep and serve individual residences, businesses, and NPS facilities.

Groundwater flow direction in the alluvial aquifer is assumed to follow the ground surface topography, and the general flow of the Stehekin River. Based on the topographic map, groundwater flow is to the southeast, with the ultimate discharge point being Lake Chelan. The Valley aquifer is hydraulically connected to the river and precipitation and surface water runoff recharge the Valley aquifer. As a result, water levels in the shallow aquifer fluctuate in response to seasonal changes in precipitation. Based on well drillers log, the aquifer is capable of yielding between 10 and 30 gallons per minute and has a static water level of between 5 and 100 feet below the top of the well casing. This variation in static water level appears to be related to the depth of the completed well, and possibly its topographic location within the valley. Wells located close to both the river and the lake have very shallow static water levels.

#### 3.2 GROUNDWATER TARGETS

The Burn Pile is located approximately 6,000 feet from the nearest well that is on file with Ecology, and approximately 2,000 feet from the nearest mapped structure. The Firing Range is located approximately three miles from the nearest well that is on file with Ecology, and approximately 1,000 feet from the nearest mapped structure.

There are approximately 80 to 100 people that live in the Valley year round that are considered to be the population most likely to be affected by the groundwater pathway. The secondary population that would be affected by a release to the groundwater would be seasonal visitors and campers. In 2001, a total of 21,957 people visited Stehekin via the Lake Chelan Boat Company "Lady of the Lake" passenger service. The majority of these were day-trippers, spending from 4 to 8 hours in Stehekin. The NPS estimates an additional 2,000 to 3,000 people come to Stehekin

by either plane, personal boat, or by hiking in. The nearest active campground, Rainbow Falls, is approximately 7,500 feet from the Burn Pile, and two miles from 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 either the Burn Pile or 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 Burn Pile most likely flows east toward the Stehekin River. Overland drainage from the Firing Range most likely flows southwest toward the Stehekin River. Drainage from the steep mountain slopes immediately behind each of the sites flows to the Stehekin River. The river empties into Lake Chelan, which is about 5.5 river miles from the Firing Range and about 3.5 river miles from the Burn Pile.

### **4.2 SURFACE WATER TARGETS**

Both Lake Chelan and the Stehekin River are used for sport fisheries and other water recreational activities. The river is used by both rafters and fishers during the summer. The lake is used mostly in the summer by recreational boaters and fishers. Both bodies of water are listed under Section 303D of the Clean Water Act. The Stehekin River was listed for arsenic exceeding criteria five times between December 1986 and November 1987. Lake Chelan was listed for exceeding 4,4'-DDE and PCB criteria in 1994 and pH criteria three times in 1991 and 1992.

The national wetlands inventory indicates eight minor wetland areas along the stretch of river running past the sites and at its discharge point into Lake Chelan. No wetlands were observed to be near either the Burn Pile or the Firing Range.

### **4.3 SURFACE WATER CONCLUSIONS**

There are no indications of a release of contamination to surface water from either the Burn Pile or 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 Burn Pile is located in a forest clearing behind a maintenance yard, which is not accessible by visitors to the park. The Firing Range is also located in a forest clearing, which is not readily accessible by park visitors. It is used by Valley residents.

### 5.2 SOIL AND AIR TARGETS

There are no residents at either site; however, NOCA maintenance personnel work at the Burn Pile periodically, and both NPS personnel and Valley residents use the Firing Range. There are no hazardous materials at the burn site. Soil samples were collected from the four cardinal points and the center of the Burn Pile, along with a background soil sample in May 2002. The soil samples were analyzed for arsenic, cadmium, chromium and lead. The background sample had non-detectable levels of arsenic and cadmium, 4.92 mg/kg lead, and 31.1 mg/kg chromium. The soil samples collected from the Burn Pile had arsenic ranging from 7.7 to 13 mg/kg, non-detectable levels of cadmium, chromium ranging from 28.8 mg/kg to 41.9 mg/kg, and lead ranging from 19.2 mg/kg to 152 mg/kg. All of the metals concentrations for all soil samples are below Washington Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Method A cleanup levels. Copies of the analytical reports, a sample location sketch map and the Ecology file on the Burn Pile are included in Appendix C.

The potentially hazardous materials at the Firing 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. Lead shotgun pellets 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 the Burn Pile does not appear to pose a threat to human health or the surrounding environment and local wildlife.

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, if lead pellets were used at the range.

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 two PA sites were not listed on any of the federal databases. The Ecology databases have seven listings for the Stehekin Valley, five of the listings are for USTs and two are for the sewage treatment plant. 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 the Stehekin Valley.

## **5.6 AERIAL PHOTOGRAPHS REVIEW**

Historical aerial photographs of the sites, taken in 1991, were reviewed for evidence of past development or land disturbances. Both the Burn Pile and the Firing Range are visible as faint clearings in the forest.

## **5.7 SUMMARY AND CONCLUSIONS**

Preliminary Assessments of a forest slash Burn Pile and a Firing Range were 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**

The practices used at the Burn Pile of removing any none-natural materials prior to burning should continue to be followed. Placement of a gate on the access road to the Burn Pile should also be considered.

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, Stehekin, Washington, 1969, photo revised 1987.

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

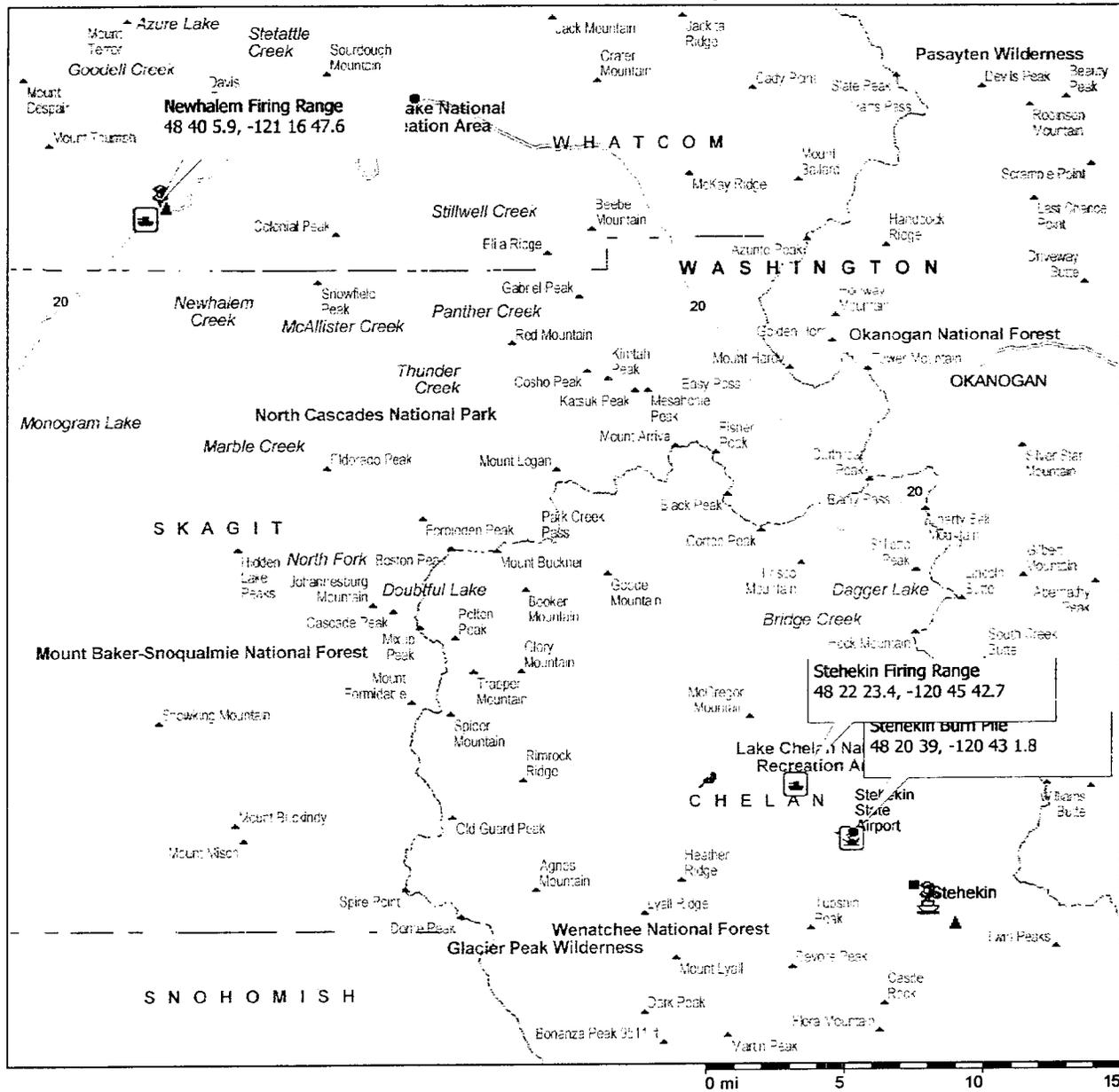
Mr. Steven James, Maintenance Supervision, Stehekin Range Station on-site interview.

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

**Table 1**  
**North Cascades National Park Service Complex**  
**Stehekin 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>
55378682	Courtney landing	48 18 36.49	-120 39 28.35	UST	Active	None listed
27558989	High Bridge Ranger Station	48 22 17.47	-120 50 14.37	UST	Active	None listed
40922667	Stehekin Landing	48 18 35.49	-120 39 24.35	UST	Removed	None listed
14837778	Stehekin Maintenance Yard UST	48 19 9.99	-120 40 6.65	UST	Active	None listed
76312622	Stehekin Maintenance Yard	48 20 51.48	-120 42 58.36	UST	Active	None listed
87387985	Stehekin Sewage Treatment Plant	48 18 36.49	-120 39 28.35	WTP	Active	None listed
51373741	WTP disposal to groundwater	48 17 59.5	-120 38 4.34	WTP	Active	None listed

# North Cascades NPS Complex



0 mi 5 10 15

## North Cascades NPS Complex Newhalem Area North Cascades NPS Complex Stehekin Area

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li> Diablo Lake Resort</li> <li> Newhalem Dump</li> <li> Newhalem Firing Range</li> <li> Newhalem Maintenance Facility</li> <li> Seattle City Light N Ross Lake</li> <li> Seattle City Light Newhalem</li> <li> WADOT Newhalem</li> <li> WADOT SR 20</li> </ul> | <ul style="list-style-type: none"> <li> Courtney landing</li> <li> High Bridge Ranger Station</li> <li> Stehekin Burn Pile</li> <li> Stehekin Firing Range</li> <li> Stehekin Maintenance Yard</li> <li> Stehekin Maintenance Yard UST</li> <li> Stehekin Sewage Treatment Plant</li> <li> Waste Treatment Plant disposal to groundwater</li> </ul> |
|---|---|



Not to Scale

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PROJECT NO. 20200

October 2002

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

# FIGURE 1

**APPENDIX A**

**PRELIMINARY ASSESSMENT SCORE SHEET DATA SUMMARY  
FORMS AND PA SCORE SHEETS**

<b>Potential Hazardous Waste Site Preliminary Assessment Form</b>		<i>Identification</i>	
		State: WA	CERCLIS Number:
		CERCLIS Discovery Date:	
<b>1. General Site Information</b>			
Name: Stehekin Burn Pile		Street Address: Stehekin Valley Road	
City: Stehekin	State: WA	Zip Code: 98852	County: Chelan Co. Code: Cong. Dist:
Latitude: 48° 20' 39.0"	Longitude: 120° 43' 01.8"	Approximate Area of Site: _____ Acres 75x75 Square Ft	Status of Site: <input checked="" type="checkbox"/> Active <input type="checkbox"/> Not Specified <input type="checkbox"/> Inactive <input type="checkbox"/> NA (GW plume, etc.)
<b>2. Owner/Operator Information</b>			
Owner: National Park Service		Operator: National Park Service	
Street Address: 1111 Jackson Street		Street Address: 810 State Route 20	
City: Oakland		City: Sedro-woolley	
State: CA	Zip Code: 94107	Telephone: (510) 816-1376	State: WA Zip Code: 98284 Telephone: (360) 856-5700
Type of Ownership: <input type="checkbox"/> Private <input checked="" type="checkbox"/> Federal Agency Name: <u>NPS</u> <input type="checkbox"/> State <input type="checkbox"/> Indian <input type="checkbox"/> County <input type="checkbox"/> Municipal <input type="checkbox"/> Not Specified <input type="checkbox"/> Other _____		How Initially Identified: <input type="checkbox"/> Citizen Complaint <input type="checkbox"/> PA Petition <input type="checkbox"/> State/Local Program <input type="checkbox"/> RCRA/CERCLA Notification <input checked="" type="checkbox"/> Federal Program <input type="checkbox"/> Incidental <input type="checkbox"/> Not Specified <input type="checkbox"/> Other _____	
<b>3. Site Evaluator Information</b>			
Name of Evaluator: John Lillie		Agency/Organization: Kleinfelder, Inc.	Date Prepared: 9-10-02
Street Address: 2405 - 140th Ave. NE		City: Bellevue	State: WA
Name of EPA or State Agency Contact: Washington Dept. of Ecology		Street Address: 3190 - 160th Ave. SE	
City: Bellevue		State: WA	Telephone: (425) 649-7000
<b>4. Site Disposition (for EPA use only)</b>			
Emergency Response/Removal Assessment Recommendation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Date: _____		CERCLIS Recommendation: <input type="checkbox"/> Higher Priority SI <input type="checkbox"/> Lower Priority SI <input type="checkbox"/> NFRAP <input type="checkbox"/> RCRA <input type="checkbox"/> Other _____ Date: _____	
		Signature:	
		Name (typed):	
		Position:	



CERCLIS Number: \_\_\_\_\_

### 5. General Site Characteristics

Predominant Land Uses Within 1 Mile of Site (check all that apply):

- Industrial     Agriculture     DOI  
 Commercial     Mining     Other Federal Facility  
 Residential     DOD  
 Forest/Fields     DOE     Other Recreation

Site Setting:

- Urban  
 Suburban  
 Rural

Years of Operation:

- Beginning Year \_\_\_\_\_  
 Ending Year \_\_\_\_\_  
 Unknown

Type of Site Operations (check all that apply):

- |  |  |
|--|--|
| <input type="checkbox"/> Manufacturing (must check subcategory)<br><input type="checkbox"/> Lumber and Wood Products<br><input type="checkbox"/> Inorganic Chemicals<br><input type="checkbox"/> Plastic and/or Rubber Products<br><input type="checkbox"/> Paints, Varnishes<br><input type="checkbox"/> Industrial Organic Chemicals<br><input type="checkbox"/> Agricultural Chemicals (e.g., pesticides, fertilizers)<br><input type="checkbox"/> Miscellaneous Chemical Products (e.g., adhesives, explosives, ink)<br><input type="checkbox"/> Primary Metals<br><input type="checkbox"/> Metal Coating, Plating, Engraving<br><input type="checkbox"/> Metal Forging, Stamping<br><input type="checkbox"/> Fabricated Structural Metal Products<br><input type="checkbox"/> Electronic Equipment<br><input type="checkbox"/> Other Manufacturing<br><input type="checkbox"/> Mining<br><input type="checkbox"/> Metals<br><input type="checkbox"/> Coal<br><input type="checkbox"/> Oil and Gas<br><input type="checkbox"/> Non-metallic Minerals | <input type="checkbox"/> Retail<br><input type="checkbox"/> Recycling<br><input type="checkbox"/> Junk/Salvage Yard<br><input type="checkbox"/> Municipal Landfill<br><input type="checkbox"/> Other Landfill<br><input type="checkbox"/> DOD<br><input type="checkbox"/> DOE<br><input checked="" type="checkbox"/> DOI<br><input type="checkbox"/> Other Federal Facility _____<br><input type="checkbox"/> RCRA<br><input type="checkbox"/> Treatment, Storage, or Disposal<br><input type="checkbox"/> Large Quantity Generator ✓<br><input type="checkbox"/> Small Quantity Generator<br><input type="checkbox"/> Subtitle D<br><input type="checkbox"/> Municipal<br><input type="checkbox"/> Industrial<br><input type="checkbox"/> "Converter"<br><input type="checkbox"/> "Protective Filer"<br><input type="checkbox"/> "Non- or Late Filer"<br><input type="checkbox"/> Not Specified<br><input checked="" type="checkbox"/> Other <u>Burn Pile</u> |
|--|--|

Waste Generated:

- Onsite  
 Offsite  
 Onsite and Offsite

Waste Deposition Authorized By:

- Present Owner  
 Former Owner  
 Present & Former Owner  
 Unauthorized  
 Unknown

Waste Accessible to the Public:

- Yes  
 No

Distance to Nearest Dwelling, School, or Workplace:

1500 Feet

### 6. Waste Characteristics Information

Source Type:  
(check all that apply)

- Landfill  
 Surface Impoundment  
 Drums  
 Tanks and Non-Drum Containers  
 Chemical Waste Pile  
 Scrap Metal or Junk Pile  
 Tailings Pile  
 Trash Pile (open dump)  
 Land Treatment  
 Contaminated Ground Water Plume (unidentified source)  
 Contaminated Surface Water/Sediment (unidentified source)  
 Contaminated Soil  
 Other Burn Pile  
 No Sources

Source Waste Quantity:  
(include units)

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General Types of Waste (check all that apply)

- |  |  |
|--|--|
| <input type="checkbox"/> Metals                        | <input type="checkbox"/> Pesticides/Herbicides |
| <input type="checkbox"/> Organics                      | <input type="checkbox"/> Acids/Bases           |
| <input type="checkbox"/> Inorganics                    | <input type="checkbox"/> Oily Waste            |
| <input type="checkbox"/> Solvents                      | <input type="checkbox"/> Municipal Waste       |
| <input type="checkbox"/> Paints/Pigments               | <input type="checkbox"/> Mining Waste          |
| <input type="checkbox"/> Laboratory/Hospital Waste     | <input type="checkbox"/> Explosives            |
| <input type="checkbox"/> Radioactive Waste             | <input type="checkbox"/> Other _____           |
| <input type="checkbox"/> Construction/Demolition Waste |  |

Physical State of Waste as Deposited (check all that apply):

- Solid     Sludge     Powder  
 Liquid     Gas

\* C = Constituent, W = Wastestream, V = Volume, A = Area



### 7. Ground Water Pathway

<p>Is Ground Water Used for Drinking Water Within 4 Miles:</p> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>Is There a Suspected Release to Ground Water:</p> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>List Secondary Target Population Served by Ground Water Withdrawn From:</p> <p>0 - ¼ Mile _____</p> <p>&gt; ¼ - ½ Mile _____</p> <p>&gt; ½ - 1 Mile _____</p> <p>&gt; 1 - 2 Miles _____</p> <p>&gt; 2 - 3 Miles _____</p> <p>&gt; 3 - 4 Miles _____</p> <p>Total Within 4 Miles <u>0</u></p>
<p>Type of Drinking Water Wells Within 4 Miles (check all that apply):</p> <input type="checkbox"/> Municipal <input checked="" type="checkbox"/> Private <input type="checkbox"/> None	<p>Have Primary Target Drinking Water Wells Been Identified:</p> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<p>Depth to Shallowest Aquifer:</p> <p><u>7-10</u> Feet</p> <p>Karst Terrain/Aquifer Present:</p> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>Nearest Designated Wellhead Protection Area:</p> <input type="checkbox"/> Underlies Site <input type="checkbox"/> > 0 - 4 Miles <input checked="" type="checkbox"/> None Within 4 Miles	

### 8. Surface Water Pathway

<p>Type of Surface Water Draining Site and 15 Miles Downstream (check all that apply):</p> <input type="checkbox"/> Stream <input checked="" type="checkbox"/> River <input type="checkbox"/> Pond <input checked="" type="checkbox"/> Lake <input type="checkbox"/> Bay <input type="checkbox"/> Ocean <input type="checkbox"/> Other _____	<p>Shortest Overland Distance From Any Source to Surface Water:</p> <p>_____ Feet</p> <p><u>3/4</u> Miles</p>																								
<p>Is There a Suspected Release to Surface Water:</p> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>Site is Located in:</p> <input type="checkbox"/> Annual - 10 yr Floodplain <input type="checkbox"/> > 10 yr - 100 yr Floodplain <input type="checkbox"/> > 100 yr - 500 yr Floodplain <input type="checkbox"/> > 500 yr Floodplain																								
<p>Drinking Water Intakes Located Along the Surface Water Migration Path:</p> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>List All Secondary Target Drinking Water Intakes:</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Water Body</th> <th>Flow (cfs)</th> <th>Population Served</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr> <td colspan="3">Total within 15 Miles</td> <td><u>0</u></td> </tr> </tbody> </table>	Name	Water Body	Flow (cfs)	Population Served																	Total within 15 Miles			<u>0</u>
Name		Water Body	Flow (cfs)	Population Served																					
Total within 15 Miles			<u>0</u>																						
<p>Have Primary Target Drinking Water Intakes Been Identified:</p> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																									
<p>If Yes, Enter Population Served by Primary Target Intakes:</p> <p>_____ People</p>																									
<p>Fisheries Located Along the Surface Water Migration Path:</p> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>List All Secondary Target Fisheries:</p> <table border="1"> <thead> <tr> <th>Water Body/Fishery Name</th> <th>Flow (cfs)</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	Water Body/Fishery Name	Flow (cfs)																						
Water Body/Fishery Name		Flow (cfs)																							
<p>Have Primary Target Fisheries Been Identified:</p> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																									



### 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
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Other Sensitive Environments Located Along the Surface Water Migration Path:

- Yes  
 No

Have Primary Target Sensitive Environments Been Identified:

- Yes  
 No

List Secondary Target Sensitive Environments:

Water Body	Flow (cfs)	Sensitive Environment Type
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

### 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	_____

Wetlands Located Within 4 Miles of the Site:

- Yes  
 No

Other Sensitive Environments Located Within 4 Miles of the Site:

- Yes National Park  
 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: \_\_\_\_\_

Investigator: \_\_\_\_\_

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

Agency/Organization: \_\_\_\_\_

Street Address: \_\_\_\_\_

Street Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

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)

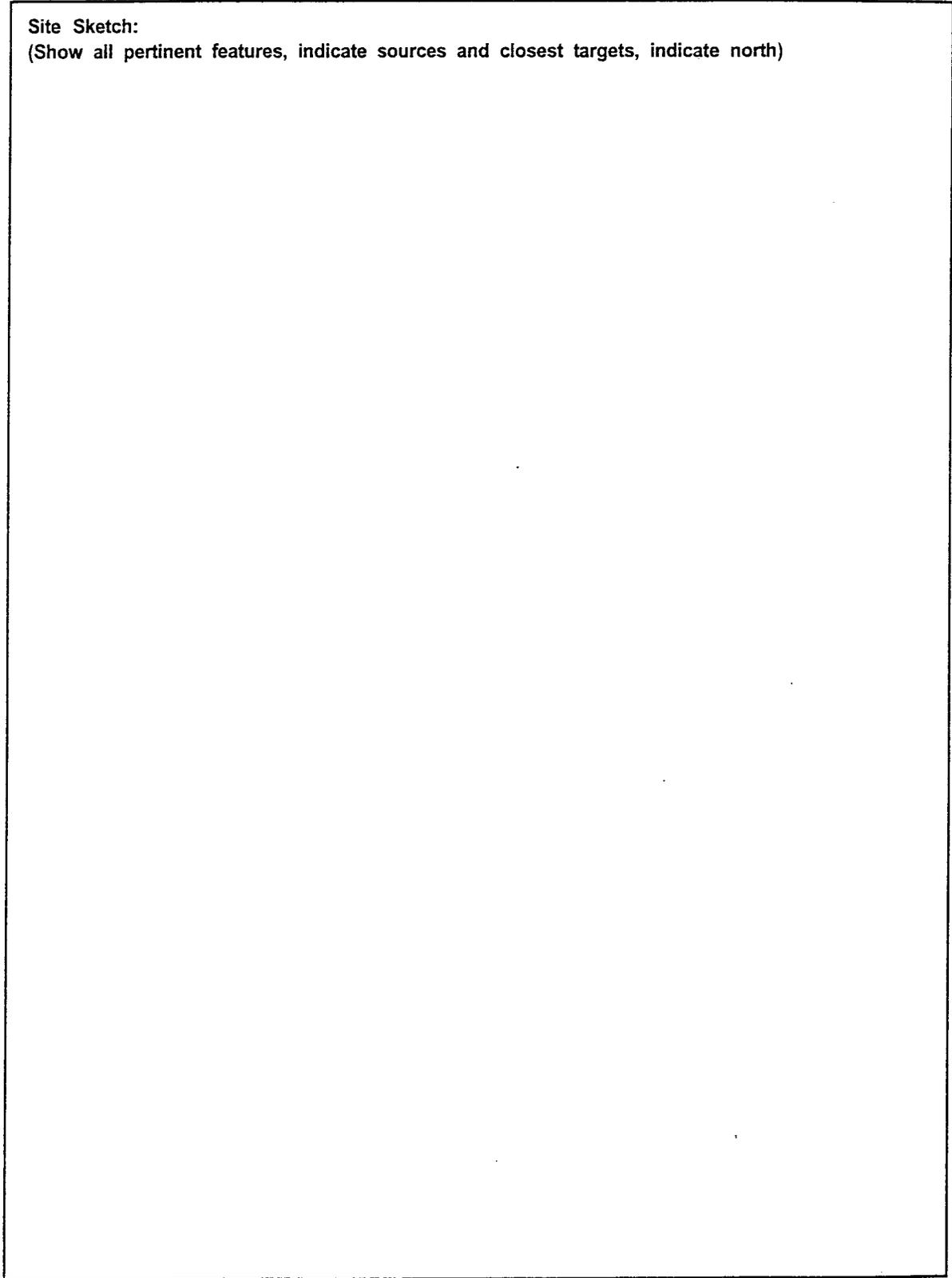
## GENERAL INFORMATION (continued)

**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.

## 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 1b.
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	
COMMUNITY	N/A	≤ 100 lb	> 100 to 10,000 lb	> 10,000 lb	$lb + 1$
WATERWAY	N/A	≤ 500,000 lb	> 500,000 to 50 million lb	> 50 million lb	$lb + 5,000$
VOLUME	Landfill	≤ 8.75 million ft <sup>3</sup> ≤ 250,000 yd <sup>3</sup>	> 8.75 million to 875 million ft <sup>3</sup> > 250,000 to 25 million yd <sup>3</sup>	> 875 million ft <sup>3</sup> > 25 million yd <sup>3</sup>	$ft^3 + 67,500$ $yd^3 + 2,500$
	Surface impoundment	≤ 8,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 8,750 to 875,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 875,000 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	≤ 8.75 million ft <sup>3</sup> ≤ 250,000 yd <sup>3</sup>	> 8.75 million to 875 million ft <sup>3</sup> > 250,000 to 25 million yd <sup>3</sup>	> 875 million ft <sup>3</sup> > 25 million yd <sup>3</sup>	$ft^3 + 67,500$ $yd^3 + 2,500$
	Pile	≤ 8,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 8,750 to 875,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 875,000 ft <sup>3</sup> > 25,000 yd <sup>3</sup>	$ft^3 + 67.5$ $yd^3 + 2.5$
AREA	Other	≤ 8,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 8,750 to 875,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 875,000 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 checked="" type="checkbox"/> <input type="checkbox"/> <input 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 type="checkbox"/> <input checked="" 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</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 <u>X</u>
Is the site located in karst terrain?	Yes ___ No <u>X</u>
Depth to aquifer:	<u>7-100</u> ft
Distance to the nearest drinking water well:	<u>6000</u> ft

#### LIKELIHOOD OF RELEASE

	A	B	References
	Suspected Releases (550)	No Suspected Releases (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>		500	

#### TARGETS

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). <u>0</u> people x 10 = <u>0</u>	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 <u>X</u> If yes, attach a page to show apportionment calculations.		80	
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.		2	
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>		87	

#### WASTE CHARACTERISTICS

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.	(100, 32) = 32		
8. B. If you have NOT identified any primary target for ground water, assign the waste characteristics score calculated on page 4.	(100, 32) = 18	(100, 32) = 18	
<b>WC =</b>		18	

GROUND WATER PATHWAY SCORE:

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

(subject to a maximum of 100)
9.5

PA TABLE 2: VALUES FOR SECONDARY GROUND WATER TARGET POPULATIONS

PA Table 28: Non-Karst Aquifers

Distance from Site	Population	Nearest Well (House Alphabet)	Population Served by Wells Within Distance Category												Population Value				
			0 to 1/4 mile		1/4 to 1/2 mile		1/2 to 3/4 mile		3/4 to 1 mile		1 to 1 1/4 miles		1 1/4 to 2 miles			2 to 3 miles		3 to 4 miles	
			#	%	#	%	#	%	#	%	#	%	#	%		#	%	#	%
0 to 1/4 mile		20	1	2	5	16	52	163	521	1,633	5,214	14,325							
> 1/4 to 1/2 mile		18	1	3	10	32	108	323	1,012	3,233	10,121								
> 1/2 to 1 mile		8	1	2	5	17	52	167	522	1,668	5,224								
> 1 to 2 miles		5	1	1	3	9	29	84	254	739	2,938								
> 2 to 3 miles		3	1	1	2	7	21	68	212	678	2,121								
> 3 to 4 miles	80	2	1	1	1	4	13	42	131	417	1,308								
Nearest Well =			Score =															80	

PA Table 2b: Karst Aquifers

Distance from Site	Population	Nearest Well (House Alphabet)	Population Served by Wells Within Distance Category												Population Value				
			0 to 1/4 mile		1/4 to 1/2 mile		1/2 to 3/4 mile		3/4 to 1 mile		1 to 1 1/4 miles		1 1/4 to 2 miles			2 to 3 miles		3 to 4 miles	
			#	%	#	%	#	%	#	%	#	%	#	%		#	%	#	%
0 to 1/4 mile		20	1	2	5	16	52	163	521	1,633	5,214	14,325							
> 1/4 to 1/2 mile		20	1	1	3	10	32	101	323	1,012	3,233	10,121							
> 1/2 to 1 mile		20	1	1	1	4	20	82	267	816	2,807	8,162							
> 1 to 2 miles		20	1	1	3	8	26	82	261	816	2,807	8,162							
> 2 to 3 miles		20	1	1	3	8	26	82	261	816	2,807	8,162							
> 3 to 4 miles		20	1	1	3	8	26	82	261	816	2,807	8,162							
Nearest Well =			Score =															80	

## 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 type="checkbox"/> <input checked="" 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 checked="" type="checkbox"/> <input 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 type="checkbox"/> <input checked="" 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 checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Is any target nearby? If yes:</p> <p><input type="checkbox"/> Drinking water intake <input checked="" type="checkbox"/> Fishery <input checked="" 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>3000</u> ft
Flood frequency:	_____ yrs
What is the downstream distance to the nearest drinking water intake?	<u>4</u> miles
Nearest fishery? _____ miles	Nearest sensitive environment? <u>4</u> 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 Suspected Release (550)	B No Suspected Release (500 400 300 = 100)	References
		400	
LR =		400	

**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 = \_\_\_\_\_

- 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**

	0		
	0		
	0		
	0		
T =	0	400	



## 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>Reference</i>
Enter Surface Water Likelihood of Release score from page 12.	LR =	1000	1000 + 0.300 = 1000	
			400	

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

	1000			
	0			
	1210			
	0			
		1210, 30 = 12		
		30		
	1200, 210 = 0		1210, 30, 12 = 0	
T =	0		30	

## 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>(100)</small>	<i>No Suspected Release</i> <small>(100, 400, 200 = 100)</small>	<i>References</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 <small>(PA Table 4)</small>		Environment Type and Value <small>(PA Tables 5 and 6)</small>		Total
100 cfs	0.1	x	100	=	1
		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 =

	A	B	
LR =		400	
Sum =	100	100	
T =	0	1	

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	100
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	
Habitat known to be used by Federally designated or proposed endangered or threatened species	75
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	
Habitat known to be used by State designated endangered or threatened species	50
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	
State land designated for wildlife or game management	25
State designated Scenic or Wild River	
State designated Natural Area	
Particular areas, relatively small in size, important to maintenance of unique biotic communities	
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 16 miles	350
Greater than 16 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**

	A	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>	1100 = 32	
<p>B. If you have NOT identified any primary target for surface water, assign the waste characteristics score calculated on page 4.</p>	1100, 32 = 18	1100, 32 = 18  18
<b>WC =</b>		

**SURFACE WATER PATHWAY THREAT SCORES**

Threat	Likelihood of Release (LR) Score <i>(from page 12)</i>	Targets (T) Score <i>(pages 12, 14, 15)</i>	Pathway Waste Characteristics (WC) Score <i>(determined above)</i>	Threat Score $LR \times T \times WC$ <i>/ 82,500</i>
Drinking Water	400	0	18	0 <small>(subject to a maximum of 100)</small>
Human Food Chain	400	30	18	2.7 <small>(subject to a maximum of 100)</small>
Environmental	400	1	18	0.08 <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>  2.78
--

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

LIKELIHOOD OF EXPOSURE	<i>Suspected Contamination</i>	<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. LE =	0	

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 =	0											
3. RESIDENT INDIVIDUAL: If you have identified a resident population (factor 2), assign a score of 50; otherwise, assign a score of 0.	0											
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:												
<table border="1"> <thead> <tr> <th><i>Number of Workers</i></th> <th><i>Score</i></th> </tr> </thead> <tbody> <tr> <td align="center">0</td> <td align="center">0</td> </tr> <tr> <td align="center">1 to 100</td> <td align="center">5</td> </tr> <tr> <td align="center">101 to 1,000</td> <td align="center">10</td> </tr> <tr> <td align="center">&gt; 1,000</td> <td 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	0	
<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:												
<table border="1"> <thead> <tr> <th><i>Terrestrial Sensitive Environment Type</i></th> <th><i>Value</i></th> </tr> </thead> <tbody> <tr> <td align="center">National Park</td> <td 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					100			
<i>Terrestrial Sensitive Environment Type</i>	<i>Value</i>											
National Park	100											
6. RESOURCES												
<b>T =</b>	<b>100</b>											

WASTE CHARACTERISTICS		
7. Assign the waste characteristics score calculated on page 4. WC =	18	

RESIDENT POPULATION THREAT SCORE:	$\frac{LE \times T \times WC}{82,500}$	0
-----------------------------------	--	---

NEARBY POPULATION THREAT SCORE:	1
---------------------------------	---

SOIL EXPOSURE PATHWAY SCORE: Resident Population Threat + Nearby Population Threat	1
---	---

**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	100
National Park	
Designated Federal Wilderness Area	
National Monument	
Terrestrial habitat known to be used by Federally designated or proposed threatened or endangered species	75
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	
Terrestrial habitat used by State designated endangered or threatened species	50
Terrestrial habitat used by species under review for Federal designated endangered or threatened status	
State lands designated for wildlife or game management	25
State designated Natural Areas	
Particular areas, relatively small in size, important to maintenance of unique biotic communities	

## 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**

<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 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 checked="" 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**

<i>Pathway Characteristics</i>	
Do you suspect a release (see Air Pathway Criteria List, page 21)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Distance to the nearest individual:	2000 ft

	A	B	Reference
	<i>Suspected Release</i>	<i>No Suspected Release</i>	
<b>LIKELIHOOD OF RELEASE</b>			
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.	550		
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	
<b>LR =</b>		500	

	A	B	Reference										
	<i>Suspected Release</i>	<i>No Suspected Release</i>											
<b>TARGETS</b>													
3. PRIMARY TARGET POPULATION: Determine the number of people subject to exposure from a suspected release of hazardous substances to the air. 0 people x 10 =	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.		0											
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.	0												
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:80%;"><i>Sensitive Environment Type</i></th> <th style="width:20%;"><i>Value</i></th> </tr> <tr> <td> </td> <td align="center">0</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td align="right"><b>Sum =</b></td> <td> </td> </tr> </table>	<i>Sensitive Environment Type</i>	<i>Value</i>		0					<b>Sum =</b>				
<i>Sensitive Environment Type</i>	<i>Value</i>												
	0												
<b>Sum =</b>													
7. SECONDARY SENSITIVE ENVIRONMENTS: Use PA Table 10 to determine the score for secondary sensitive environments.		0											
8. RESOURCES													
<b>T =</b>	0	0											

	A	B	Reference
	<i>Suspected Release</i>	<i>No Suspected Release</i>	
<b>WASTE CHARACTERISTICS</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.	32		
B. If you have NOT identified any Primary Target for the air pathway, assign the waste characteristics score calculated on page 4.	18		
<b>WC =</b>	18		

<b>AIR PATHWAY SCORE:</b>	$\frac{LR \times T \times WC}{82,500}$	0
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## 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> ):	9.5	90.25
SURFACE WATER PATHWAY SCORE (S <sub>sw</sub> ):	2.78	7.728
SOIL EXPOSURE PATHWAY SCORE (S <sub>s</sub> ):	1	1
AIR PATHWAY SCORE (S <sub>a</sub> ):	0	0
SITE SCORE:	$\sqrt{\frac{S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2}{4}}$	5

**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>A. If yes, identify the well(s). _____</p> <p>B. If yes, how many people are served by the threatened well(s)? _____</p>	<input type="checkbox"/>	<input checked="" 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>A. Drinking water intake <input type="checkbox"/></p> <p>B. Fishery <input type="checkbox"/></p> <p>C. Sensitive environment (wetland, critical habitat, others) <input type="checkbox"/></p> <p>D. If yes, identify the target(s). _____</p> <p>_____</p> <p>_____</p>	<input type="checkbox"/>	<input checked="" 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>If yes, identify the property(ies) and estimate the associated population(s). _____</p> <p>_____</p>	<input type="checkbox"/>	<input checked="" 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>_____</p> <p>_____</p> <p>_____</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

 <b>Potential Hazardous Waste Site Preliminary Assessment Form</b>		<b>Identification</b>		
		State: WA	CERCLIS Number:	
		CERCLIS Discovery Date:		
<b>1. General Site Information</b>				
Name: Stehekin Firing Range		Street Address: Stehekin Valley Road		
City: Stehekin	State: WA	Zip Code: 98852	County: Chelan	Co. Code: _____ Cong. Dist: _____
Latitude: 48° 22' 23.4"	Longitude: 120° 45' 42.7"	Approximate Area of Site: 0.5 Acres	Status of Site: <input checked="" type="checkbox"/> Active <input type="checkbox"/> Not Specified <input type="checkbox"/> Inactive <input type="checkbox"/> NA (GW plume, etc.)	
<b>2. Owner/Operator Information</b>				
Owner: National Park Service		Operator: National Park Service		
Street Address: 1111 Jackson Street		Street Address: 810 State Route 20		
City: Oakland		City: Sedro-Woolley		
State: CA	Zip Code: 94107	Telephone: (510) 817-1376	State: WA	Zip Code: 98284   Telephone: (360) 856-5700
Type of Ownership: <input type="checkbox"/> Private <input checked="" type="checkbox"/> Federal Agency   Name: <u>NPS</u> <input type="checkbox"/> State <input type="checkbox"/> Indian		How Initially Identified: <input type="checkbox"/> Citizen Complaint <input type="checkbox"/> Federal Program <input type="checkbox"/> Municipal <input type="checkbox"/> PA Petition <input type="checkbox"/> Not Specified <input type="checkbox"/> State/Local Program <input type="checkbox"/> Other _____ <input type="checkbox"/> RCRA/CERCLA Notification <input type="checkbox"/> Other _____		
<b>3. Site Evaluator Information</b>				
Name of Evaluator: John Lillie		Agency/Organization: Kleinfelder, Inc.	Date Prepared: 9-10-02	
Street Address: 2405 - 140th Ave. NE		City: Bellevue	State: WA	
Name of EPA or State Agency Contact: Washington Dept. of Ecology -CRO		Street Address: 15 West Yakima Ave.		
City: Yakima		State: WA	Telephone: (509) 572-2490	
<b>4. Site Disposition (for EPA use only)</b>				
Emergency Response/Removal Assessment Recommendation: <input type="checkbox"/> Yes <input type="checkbox"/> No Date: _____		CERCLIS Recommendation: <input type="checkbox"/> Higher Priority SI <input type="checkbox"/> Lower Priority SI <input type="checkbox"/> NFRAP <input type="checkbox"/> RCRA <input type="checkbox"/> Other _____ Date: _____		Signature: _____ Name (typed): _____ Position: _____



Potential Hazardous Waste Site  
Preliminary Assessment Form - Page 2 of 4

CERCLIS Number: \_\_\_\_\_

**5. General Site Characteristics**

Predominant Land Uses Within 1 Mile of Site (check all that apply):

- Industrial     Agriculture     DOI  
 Commercial     Mining     Other Federal Facility  
 Residential     DOD  
 Forest/Fields     DOE     Other Recreation

Site Setting:

- Urban  
 Suburban  
 Rural

Years of Operation:

Beginning Year \_\_\_\_\_

Ending Year \_\_\_\_\_

Unknown

Type of Site Operations (check all that apply):

- Manufacturing (must check subcategory)  
 Lumber and Wood Products  
 Inorganic Chemicals  
 Plastic and/or Rubber Products  
 Paints, Varnishes  
 Industrial Organic Chemicals  
 Agricultural Chemicals (e.g., pesticides, fertilizers)  
 Miscellaneous Chemical Products (e.g., adhesives, explosives, ink)  
 Primary Metals  
 Metal Coating, Plating, Engraving  
 Metal Forging, Stamping  
 Fabricated Structural Metal Products  
 Electronic Equipment  
 Other Manufacturing  
 Mining  
 Metals  
 Coal  
 Oil and Gas  
 Non-metallic Minerals  
 Retail  
 Recycling  
 Junk/Salvage Yard  
 Municipal Landfill  
 Other Landfill  
 DOD  
 DOE  
 DOI  
 Other Federal Facility \_\_\_\_\_  
 RCRA  
 Treatment, Storage, or Disposal  
 Large Quantity Generator ✓  
 Small Quantity Generator  
 Subtitle D  
 Municipal  
 Industrial  
 "Converter"  
 "Protective Filer"  
 "Non- or Late Filer"  
 Not Specified  
 Other Firing Range

Waste Generated:

- Onsite  
 Offsite  
 Onsite and Offsite

Waste Deposition Authorized By:

- Present Owner  
 Former Owner  
 Present & Former Owner  
 Unauthorized  
 Unknown

Waste Accessible to the Public:

- Yes  
 No

Distance to Nearest Dwelling, School, or Workplace:

1500 Feet

**6. Waste Characteristics Information**

Source Type:  
(check all that apply)

Source Waste Quantity:  
(include units)

Tier \* :

- |   |       |       |
|---|-------|-------|
| <input type="checkbox"/> Landfill   | _____ | _____ |
| <input type="checkbox"/> Surface Impoundment  | _____ | _____ |
| <input type="checkbox"/> Drums  | _____ | _____ |
| <input type="checkbox"/> Tanks and Non-Drum Containers                                | _____ | _____ |
| <input type="checkbox"/> Chemical Waste Pile  | _____ | _____ |
| <input type="checkbox"/> Scrap Metal or Junk Pile                                     | _____ | _____ |
| <input type="checkbox"/> Tailings Pile  | _____ | _____ |
| <input type="checkbox"/> Trash Pile (open dump)                                       | _____ | _____ |
| <input type="checkbox"/> Land Treatment   | _____ | _____ |
| <input type="checkbox"/> Contaminated Ground Water Plume<br>(unidentified source)     | _____ | _____ |
| <input type="checkbox"/> Contaminated Surface Water/Sediment<br>(unidentified source) | _____ | _____ |
| <input type="checkbox"/> Contaminated Soil  | _____ | _____ |
| <input checked="" type="checkbox"/> Other <u>Firing Range</u>                         | _____ | _____ |
| <input type="checkbox"/> No Sources   |       |       |

General Types of Waste (check all that apply)

- Metals     Pesticides/Herbicides  
 Organics     Acids/Bases  
 Inorganics     Oily Waste  
 Solvents     Municipal Waste  
 Paints/Pigments     Mining Waste  
 Laboratory/Hospital Waste     Explosives  
 Radioactive Waste     Other \_\_\_\_\_  
 Construction/Demolition Waste

Physical State of Waste as Deposited (check all that apply):

- Solid     Sludge     Powder  
 Liquid     Gas

\* C = Constituent, W = Wastestream, V = Volume, A = Area





**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
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Other Sensitive Environments Located Along the Surface Water Migration Path:

- Yes  
 No

Have Primary Target Sensitive Environments Been Identified:

- Yes  
 No

List Secondary Target Sensitive Environments:

Water Body	Flow (cfs)	Sensitive Environment Type
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**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 National Park  
 No

List All Sensitive Environments Within ¼ Mile of the Site:

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

APPENDIX A

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

# *PA Scoresheets*

Site Name: Stehekin - Range

Investigator: \_\_\_\_\_

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

Agency/Organization: \_\_\_\_\_

Street Address: Stehekin Valley Rd.

Street Address: \_\_\_\_\_

City/State/Zip: Stehekin, WA

City/State/Zip: \_\_\_\_\_

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)**

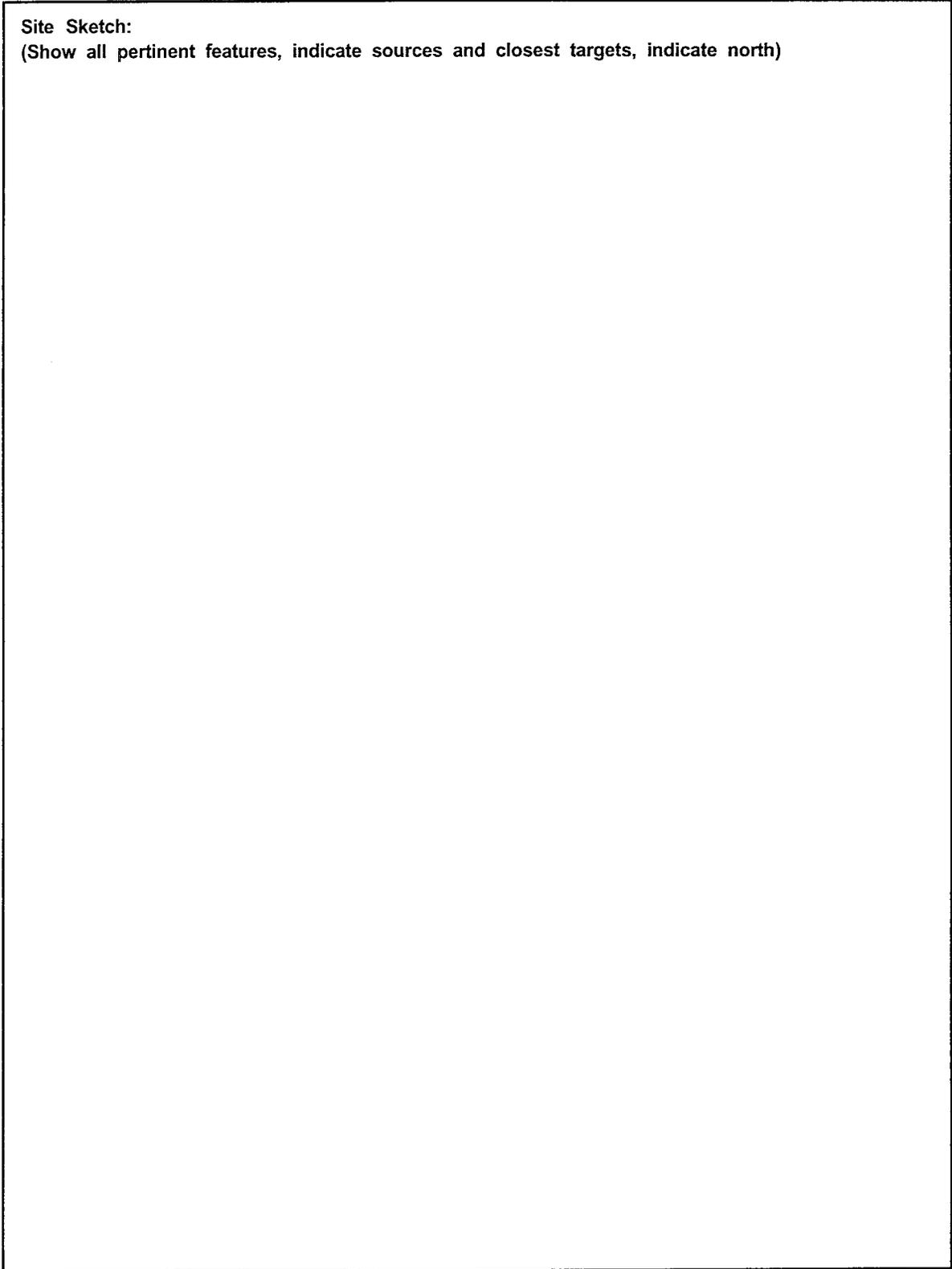
## GENERAL INFORMATION (continued)

**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: Firing Range	Source Waste Quantity (WQ) Calculations:  <100 lbs./year based on interview with NOCA personnel
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
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## 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 1b.
9. Use this WC score for all pathways.

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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	≤ 8,750 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	≤ 8,750 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	≤ 8,750 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 type="checkbox"/> <input checked="" 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"/> <input type="checkbox"/> Is the site located in an area of karst terrain?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input 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 type="checkbox"/> <input checked="" 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 <u>X</u>
Is the site located in karst terrain?	Yes ___ No <u>X</u>
Depth to aquifer:	<u>7</u> = 100 ft
Distance to the nearest drinking water well:	<u>15000</u> ft

LIKELIHOOD OF RELEASE	A	B	References
	Suspected Release (550)	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>		500	

TARGETS			
	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). <u>0</u> people x 10 =	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 <u>X</u> If yes, attach a page to show apportionment calculations.		80	
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.		2	
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>		87	

WASTE CHARACTERISTICS			
	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.	(100 = 32)	
B. If you have NOT identified any primary target for ground water, assign the waste characteristics score calculated on page 4.	(100, 32 = 18)	(100, 32 = 18)	
<b>WC =</b>		18	

GROUND WATER PATHWAY SCORE:	$\frac{LR \times T \times WC}{82,500}$	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <small>(subject to a maximum of 100)</small>  <b>9.5</b> </div>
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PA TABLE 2: VALUES FOR SECONDARY GROUND WATER TARGET POPULATIONS

PA Table 28: Non-Karst Aquifers

Distance from Site	Population	Nearest Well (hours to nearest)	Population Served by Wells Within Distance Category												Population Value				
			1/4		1/2		3/4		1		1 1/2		2			3		4	
			100	200	100	200	100	200	100	200	100	200	100	200		100	200	100	200
0 to 1/4 mile	—	20	1	1	2	5	16	52	163	521	1,633	5,214	14,325	—	—	—	—		
> 1/4 to 1/2 mile	—	18	1	3	10	32	108	323	1,012	3,223	10,121	—	—	—	—	—	—		
> 1/2 to 3/4 mile	—	8	1	2	5	17	52	167	522	1,668	5,224	—	—	—	—	—	—		
> 3/4 to 1 mile	—	5	1	1	3	9	29	84	254	839	2,538	—	—	—	—	—	—		
> 1 to 2 miles	—	3	1	1	2	7	21	68	212	678	2,121	—	—	—	—	—	—		
> 2 to 3 miles	—	2	1	1	1	4	13	42	131	417	1,308	—	—	—	—	—	—		
> 3 to 4 miles	80	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Nearest Well =		2															80		
																	Score =		

PA Table 2b: Karst Aquifers

Distance from Site	Population	Nearest Well (hours to nearest)	Population Served by Wells Within Distance Category												Population Value				
			1/4		1/2		3/4		1		1 1/2		2			3		4	
			100	200	100	200	100	200	100	200	100	200	100	200		100	200	100	200
0 to 1/4 mile	—	20	1	2	5	16	52	163	521	1,633	5,214	14,325	—	—	—	—	—		
> 1/4 to 1/2 mile	—	20	1	3	10	32	101	323	1,012	3,233	10,121	—	—	—	—	—	—		
> 1/2 to 3/4 mile	—	20	1	1	3	9	28	82	261	816	2,607	8,162	—	—	—	—	—		
> 3/4 to 1 mile	—	20	1	1	3	8	25	82	261	816	2,607	8,162	—	—	—	—	—		
> 1 to 2 miles	—	20	1	1	3	8	25	82	261	816	2,607	8,162	—	—	—	—	—		
> 2 to 3 miles	—	20	1	1	3	8	25	82	261	816	2,607	8,162	—	—	—	—	—		
> 3 to 4 miles	—	20	1	1	3	8	25	82	261	816	2,607	8,162	—	—	—	—	—		
Nearest Well =																	Score =		

## 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	
SUSPECTED RELEASE	PRIMARY TARGETS
<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 type="checkbox"/> <input checked="" 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 checked="" type="checkbox"/> <input 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>3000</u> ft
Flood frequency:	_____ yrs
What is the downstream distance to the nearest drinking water intake?	<u>5.5</u> miles
Nearest fishery? _____ miles	Nearest sensitive environment? <u>5.5</u> 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
(540)	(500 400 300 = 100)
	400
(540)	(500 400 300 = 100)
LR =	400

References

**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 = \_\_\_\_\_

- 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**

0	
0	
(50, 20, 10, 2, 1 = 0)	(20, 10, 2, 1 = 0)
0	
(5 = 0)	(5 = 0)
T =	0

PA TABLE 3: VALUES FOR SECONDARY SURFACE WATER TARGET POPULATIONS

Surface Water Body Flow (See PA Table 4)	Nearest Intake (Source Adjacent)	Population	Population Served by Intakes Within Flow Category												Population Value										
			7 to 30		31 to 100		101 to 300		301 to 1,000		1,001 to 3,000		3,001 to 10,000			10,001 to 30,000		30,001 to 100,000		100,001 to 300,000		300,001 to 1,000,000		Greater than 1,000,000	
			#	W	#	W	#	W	#	W	#	W	#	W		#	W	#	W	#	W	#	W	#	W
< 10 cfs	20		5	14	52	181	521	1,833	5,114	14,325	36,134	86,246	163,246												
10 to 100 cfs	2		1	2	5	15	52	181	521	1,833	5,114	14,325	36,134	86,246	163,246										
> 100 to 1,000 cfs	1		0	1	1	2	5	15	52	181	521	1,833	5,114	14,325	36,134	86,246	163,246								
> 1,000 to 10,000 cfs	0		0	0	0	1	1	2	5	15	52	181	521	1,833	5,114	14,325	36,134	86,246	163,246						
> 10,000 cfs or Great Lakes	0		0	0	0	0	0	1	1	2	5	15	52	181	521	1,833	5,114	14,325	36,134	86,246	163,246				
3-mile Mixing Zone	10		3	8	24	82	251	418	2,807	8,163	24,088	61,653													
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		< 10 cfs	1
small to moderate stream		10 to 100 cfs	0.1
moderate to large stream		> 100 to 1,000 cfs	N/A
large stream to river		> 1,000 to 10,000 cfs	N/A
large river		> 10,000 cfs	N/A
3-mile mixing zone of great 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>
		<small>(540)</small>	<small>(100, 400, 300 = 100)</small>	
Enter Surface Water Likelihood of Release score from page 12.	LR =		400	

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
_____	_____	_____	cfs
_____	_____	_____	cfs
_____	_____	_____	cfs
_____	_____	_____	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 = 18)	30	
T =	(200, 210 = 0)		(210, 30, 12 = 0)	
	0		30	

## 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).



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 8 (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 16 miles	350
Greater than 16 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**

	A	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)
<b>WC =</b>		<b>18</b>

**SURFACE WATER PATHWAY THREAT SCORES**

Threat	Likelihood of Release (LR) Score <i>(from page 12)</i>	Targets (T) Score <i>(pages 12, 14, 15)</i>	Pathway Waste Characteristics (WC) Score <i>(determined above)</i>	Threat Score $LR \times T \times WC$ <i>/ 82,500</i>
Drinking Water	400	0	18	0 <small>(subject to a maximum of 100)</small>
Human Food Chain	400	30	18	2.7 <small>(subject to a maximum of 100)</small>
Environmental	400	1	18	0.08 <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> <b>2.78</b>
---

## 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 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**

Pathway Characteristics	
Do any people live on or within 200 ft of areas of suspected contamination?	Yes ___ No <u>X</u>
Do any people attend school or daycare on or within 200 ft of areas of suspected contamination?	Yes ___ No <u>X</u>
Is the facility active? Yes <u>X</u> 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>	550	

**RESIDENT POPULATION THREAT TARGETS**

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 =	0 <small>(50 = 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.	0 <small>(10, 15, 5, = 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:	0											
<table border="1"> <thead> <tr> <th>Number of Workers</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>1 to 100</td> <td>5</td> </tr> <tr> <td>101 to 1,000</td> <td>10</td> </tr> <tr> <td>&gt;1,000</td> <td>15</td> </tr> </tbody> </table>	Number of Workers	Score	0	0	1 to 100	5	101 to 1,000	10	>1,000	15		
Number of Workers	Score											
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:	100											
<table border="1"> <thead> <tr> <th>Terrestrial Sensitive Environment Type</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>National Park</td> <td>100</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Terrestrial Sensitive Environment Type	Value	National Park	100								
Terrestrial Sensitive Environment Type	Value											
National Park	100											
6. RESOURCES	Sum = 15 = 0											
<b>T =</b>	<b>100</b>											

**WASTE CHARACTERISTICS**

7. Assign the waste characteristics score calculated on page 4. <b>WC =</b>	<small>(100, 22, = 18)</small> 18	
---	--------------------------------------	--

RESIDENT POPULATION THREAT SCORE:

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

<small>Subject to a maximum of 100</small>
12

NEARBY POPULATION THREAT SCORE:

<small>(4, 2, = 1)</small>
1

SOIL EXPOSURE PATHWAY SCORE:

Resident Population Threat + Nearby Population Threat

<small>Subject to a maximum of 100</small>
13

**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	100
National Park	
Designated Federal Wilderness Area	
National Monument	
Terrestrial habitat known to be used by Federally designated or proposed threatened or endangered species	75
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	
Terrestrial habitat used by State designated endangered or threatened species	50
Terrestrial habitat used by species under review for Federal designated endangered or threatened status	
State lands designated for wildlife or game management	25
State designated Natural Areas	
Particular areas, relatively small in size, important to maintenance of unique biotic communities	

## 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 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**

<i>Pathway Characteristics</i>	
Do you suspect a release (see Air Pathway Criteria List, page 21)?	Yes ___ No <b>X</b>
Distance to the nearest individual:	_____ ft

<b>LIKELIHOOD OF RELEASE</b>	<b>A</b>	<b>B</b>	<i>References</i>
	<i>Suspected Release</i> <small>(140)</small>	<i>No Suspected Release</i> <small>(500)</small>	
1. <b>SUSPECTED RELEASE:</b> If you suspect a release to air (see page 21), assign a score of 550. Use only column A for this pathway.			_____
2. <b>NO SUSPECTED RELEASE:</b> If you do not suspect a release to air, assign a score of 500. Use only column B for this pathway.		500	_____
<b>LR =</b>		500	

<b>TARGETS</b>	<b>A</b>	<b>B</b>	<i>References</i>										
	<small>(10, 20, 7, 2, 1, or 0)</small>	<small>(30, 7, 2, 1, or 0)</small>											
3. <b>PRIMARY TARGET POPULATION:</b> Determine the number of people subject to exposure from a suspected release of hazardous substances to the air. _____ people x 10 =	0		_____										
4. <b>SECONDARY TARGET POPULATION:</b> 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.			_____										
5. <b>NEAREST INDIVIDUAL:</b> 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. <b>PRIMARY SENSITIVE ENVIRONMENTS:</b> 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;"> <thead> <tr> <th style="width:80%;"><i>Sensitive Environment Type</i></th> <th style="width:20%;"><i>Value</i></th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr> <td align="right"><b>Sum =</b></td> <td> </td> </tr> </tbody> </table>	<i>Sensitive Environment Type</i>	<i>Value</i>							<b>Sum =</b>				_____
<i>Sensitive Environment Type</i>	<i>Value</i>												
<b>Sum =</b>													
7. <b>SECONDARY SENSITIVE ENVIRONMENTS:</b> Use PA Table 10 to determine the score for secondary sensitive environments.			_____										
8. <b>RESOURCES</b>			_____										
<b>T =</b>													

<b>WASTE CHARACTERISTICS</b>	<b>A</b>	<b>B</b>	<i>References</i>
	<small>(100, 32, or 18)</small>	<small>(100, 32, or 18)</small>	
9. <b>A.</b> 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.			_____
<b>B.</b> If you have NOT identified any Primary Target for the air pathway, assign the waste characteristics score calculated on page 4.	18		_____
<b>WC =</b>	18	0	

**AIR PATHWAY SCORE:**

$\frac{LR \times T \times WC}{82,500}$	<small>Subject to a maximum of 1000</small> <div style="font-size: 2em; font-weight: bold;">0</div>
--	--

PA TABLE 8: VALUES FOR SECONDARY AIR TARGET POPULATIONS

Distance from Site	Population	Nearest Land-Use (Population)	Population Within Distance Category										Population Value			
			0 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				
0 miles	—	20	1	2	5	15	52	143	321	521	1,033	5,314	18,325	52,136	183,346	—
> 0 to 1/4 mile	—	20	1	1	4	13	41	130	408	1,303	4,081	13,034	4,081	13,034	40,811	—
> 1/4 to 1/2 mile	—	2	0	0	1	3	5	28	88	282	882	2,812	882	2,812	8,815	—
> 1/2 to 1 mile	—	1	0	0	1	8	1	8	30	83	251	834	251	834	2,812	—
> 1 to 2 miles	—	0	0	0	0	1	1	3	8	27	83	278	83	278	833	—
> 2 to 3 miles	—	0	0	0	0	1	1	1	4	11	38	120	38	120	378	—
> 3 to 4 miles	80	0	0	0	0	0	0	1	2	7	23	73	23	73	233	0
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	0.035	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	350
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> ):	9.5	90.25
SURFACE WATER PATHWAY SCORE (S <sub>sw</sub> ):	2.78	7.728
SOIL EXPOSURE PATHWAY SCORE (S <sub>s</sub> ):	13	169
AIR PATHWAY SCORE (S <sub>a</sub> ):	0	0
SITE SCORE:	$\sqrt{\frac{S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2}{4}}$	
	8.2	

### 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 checked="" 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>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" 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>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>4. Are there public health concerns at this site that are not addressed by PA scoring considerations? If yes, explain: _____ _____ _____</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**ATTACHMENT B**  
**SITE PHOTOGRAPHS**

**Kleinfelder  
Photographic Record**

**Client:** National Park Service

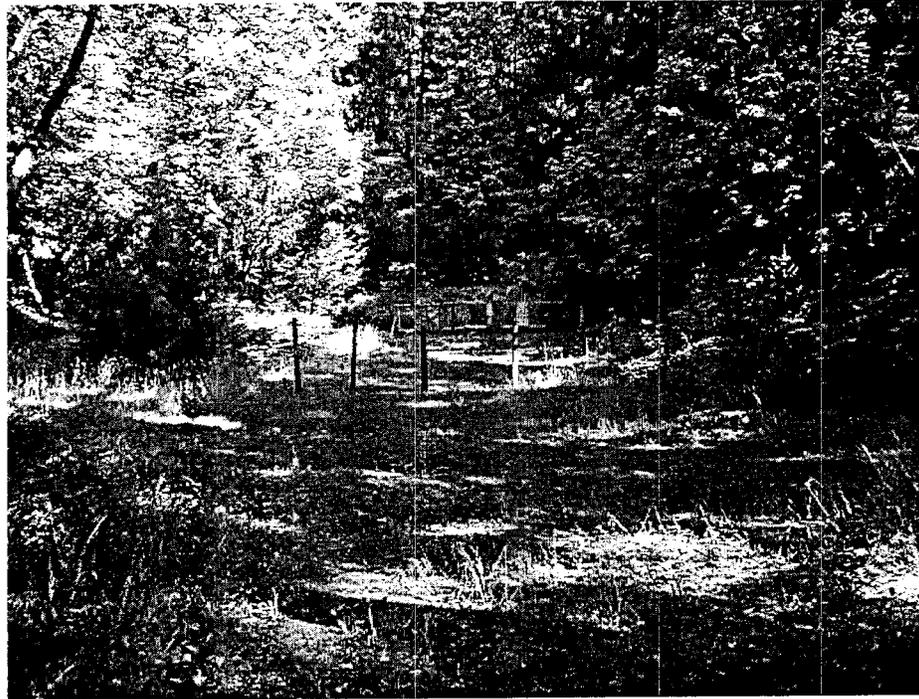
**Project Number:** 20200

**Site Name:** Stehekin Firing Range

**Site Location:** Stehekin, WA

**Date:** September 2002

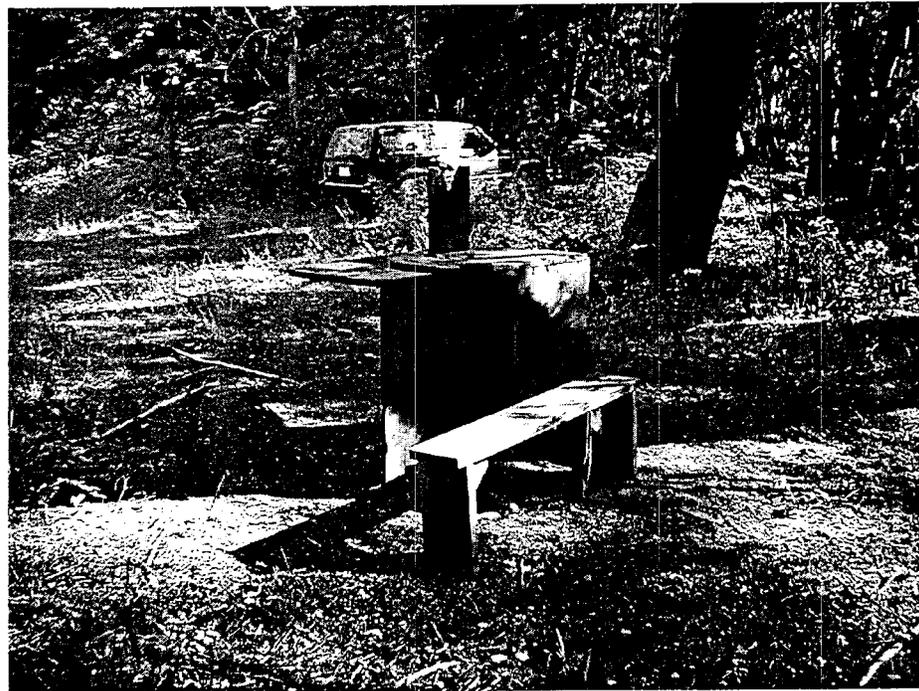
**Photographer:**  
John Lillie



**Direction:** Up-range

**Comments:**  
Looking from bench rest up-range to target area and projectile stop berm.

**Photographer:**  
John Lillie



**Direction:** NA

**Comments:**  
Bench rest.

**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Stehekin Firing Range

**Site Location:** Stehekin, WA

**Date:** September 2002

**Photographer:**  
John Lillie

**Direction:**  
Looking South

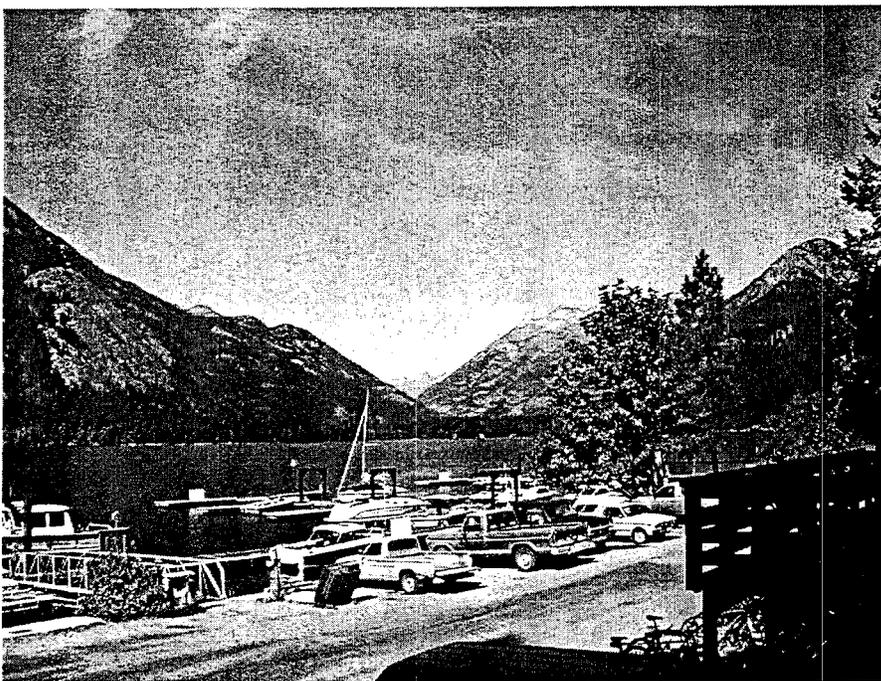
**Comments:**  
Burn Pile



**Photographer:**  
John Lillie

**Direction:**  
North

**Comments:**  
Stehekin River enters  
Lake Chelan



**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Stehekin Firing Range

**Site Location:** Stehekin, WA

**Date:** September 2002

**Photographer:**  
John Lillie

**Direction:** NA

**Comments:**  
Projectile stop berm  
behind target mounts.  
Note soil is disturbed  
from bullet impact.  
Lead was not  
observed in the soil.



**Photographer:**  
John Lillie

**Direction:** NA

**Comments:**  
Clay "pigeon"  
fragment on berm  
behind target area.



**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Stehekin Firing Range

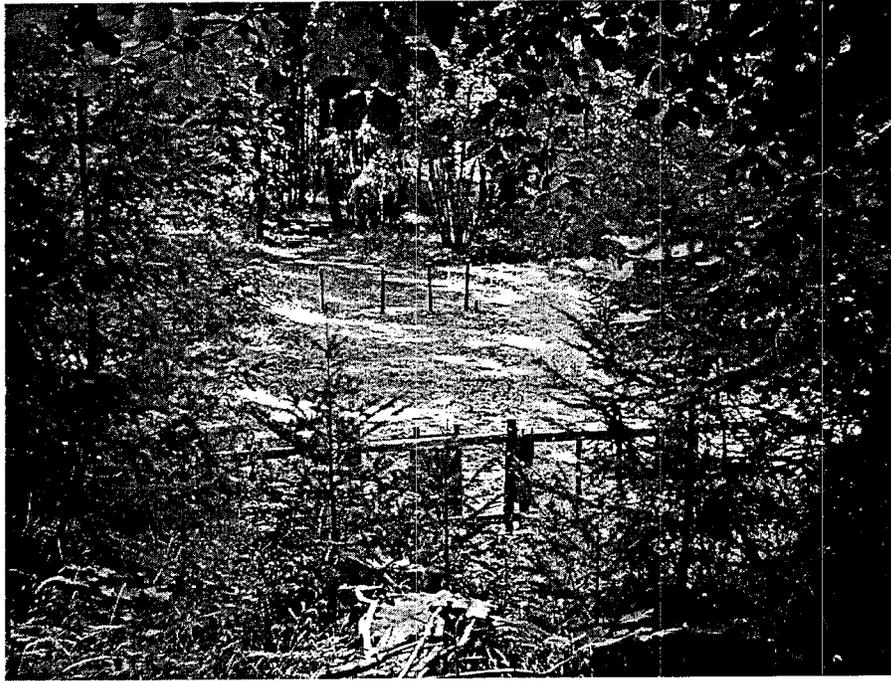
**Site Location:** Stehekin, WA

**Date:** September 2002

**Photographer:**  
John Lillie

**Direction:**  
Down-Range

**Comments:**  
Looking down-range  
from top of projectile  
stop berm to bench  
rest.



**Photographer:**  
John Lillie

**Direction:** East

**Comments:**  
East side of range.



**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Stehekin Firing Range

**Site Location:** Stehekin, WA

**Date:** September 2002

**Photographer:**  
John Lillie

**Direction:** West

**Comments:**  
West side of range.



**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Stehekin Burn Pile

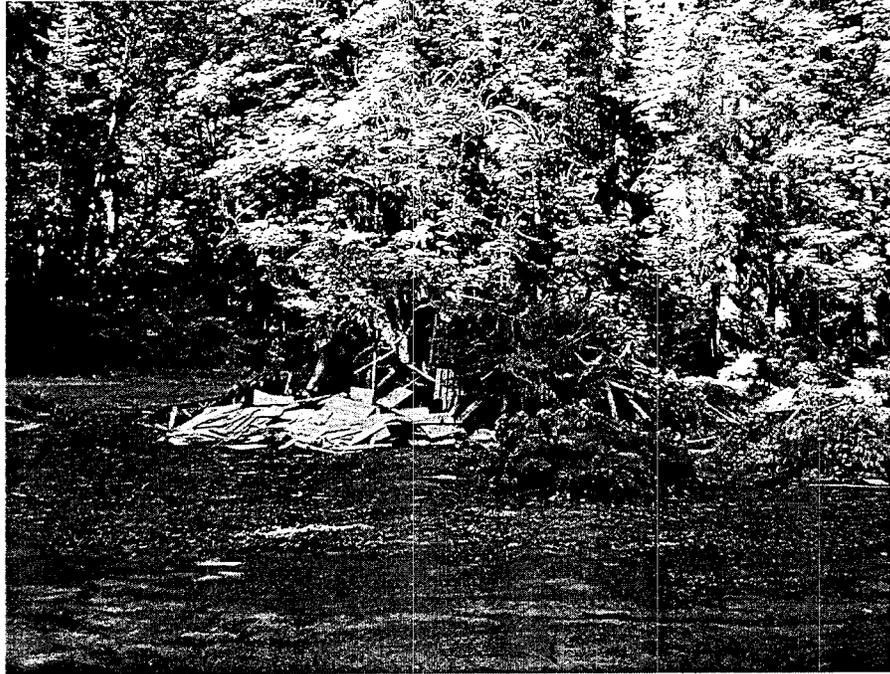
**Site Location:** Stehekin, WA

**Date:** September 2002

**Photographer:**  
John Lillie

**Direction:**  
Looking North

**Comments:**  
South side of Burn  
Pile. All construction  
material and debris is  
removed prior to  
burning.



**Photographer:**  
John Lillie

**Direction:**  
Looking North

**Comments:**  
North end of Burn  
Pile.



**Kleinfelder  
Photographic Record**

**Client:** National Park Service

**Project Number:** 20200

**Site Name:** Stehekin Burn Pile

**Site Location:** Stehekin, WA

**Date:** September 2002

**Photographer:**  
John Lillie

**Direction:**  
Looking South

**Comments:**  
North end of pile  
looking south. Soil  
background sample  
location is behind  
Jeep.



**Photographer:**  
John Lillie

**Direction:**  
NA

**Comments:**  
Background soil  
sampling location for  
NPS collected  
sample.

